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Regulation and Market-Based Instruments
for Biodiversity and Ecosystem Services.

The Case of Payments for Ecosystem Services
and Habitat Banking Schemes

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March 2015

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INTRODUCTION

This report relating to the legal approach of MBIS¹ proposes a strong reflection on the role of law in their design and implementation. This globally implies to value its role on effectiveness, efficacy and efficiency in those instruments. In that report, we use the term « effectiveness » to qualify a norm which is enforced or implemented. Furthermore, we use « efficacy » to describe a norm which reaches the expected. The term « efficiency » is used to show that the norm reaches the expected result at the lowest cost.

We propose to analyze this role in two ways. On one hand, we value different kinds of regulation at stage of design and implementation of MBIS, in the light of the notion of “regulation”. In that report, the term “regulation” is used in several meanings, depending on the context. It could have a broad sense: all forms of norms, from the most negotiated (contracts...) to the most binding (legal rules...). The expressions “private regulation” and “public regulations” refers to specific meanings which are explained in the next development. On the other hand, we value the role of law in the flow of knowledge within MBIS, in order to appreciate the degree of its intervention to ensure their effectiveness, efficacy and efficiency. Consequently, this report will try to answer two main questions: what are the place and the role of public regulation in the field of MBIS? What is the role of public regulation in the flow of knowledge mobilized within MBIS?

VI. THE NOTION OF REGULATION

The notion of regulation isn't clear. That is why remarks and clarification must be done early. Conceptions of regulation depend on the perspective adopted by authors. Consequently, whereas this term presents a strong polysemy and equivocity², to debate on it emphasize its complexity.

The concept of regulation in its broadest sense refers to rules made for governing behavior and ordering spaces. This builds coexistence between legitimate interests of parts of society. This kind of regulation refers to the question of governing new spaces in which State's authority alone is not enough to grasp³. This is the example of market governance, which refers to a normative power-sharing between State's power and the power of the financial markets. This approach refers to a disruption in the organization of politics.

In a more restricted sense, regulation refers to traditional instruments used by public authority. In that case, regulation is required to provide standards of behavior, or rules on which institutions are built. Regulation then returns to the traditional definition of law, *i.e.* restrictive rules governing relationship between people, in order to maintain mutual interests⁴.

¹ Before continuing the research, introductory remarks should be done. We consider “market based instruments” or “MBIS” under the Invaluable research applies. See: Pirard (R.), Broughton (E.), “What's in a Name? Market-Based Instruments for Biodiversity”, *Analyses*, IDDRI, Sc. Po, IFRI, n° 3, May 2011, pp. 4-31.

² Jeammaud (A.), « Introduction à la sémantique juridique », In Clam (J.) et Martin (G.J.) (dir.), *Les transformations de la régulation juridique*, LGDJ, Coll. Droit et société, 1998, p. 66.

³ Descoings (R.), « La nécessité d'une réflexion générale et croisée sur la régulation », In Frison-Roche (M.A.) (dir.), *Les régulations économiques : légitimité et efficacité*, Dalloz, Coll. Thèmes et commentaires, 2004, p. 4.

⁴ *Ibid.*

If we consider the coexistence of these two kinds of regulation, their linkages is problematic. The position of the French Council of State in its 2013 annual report⁵ takes a very broad conception of regulation by equating all kinds of norms: legal one and those driven by the law. It considers as soft law all various forms of self-regulation, technical standards, accounting standards, recommendations and guidelines or standards, qualifying them as part of law relaxed. The Council of State justifies its point of view on the fact that law irrigates their creation. This very inclusive approach has to deal with a range of other nuanced approaches far from considered as marginal.

Various meanings of the term have their origin in the growing interference of new actors into normative activity. Part of the doctrine proposes that the development of new forms of dialogue, such as negotiation, lead to compromise and consensus. This both leads to a reconfiguration of the relationship between actors and to diminution of public authority's power. According to some authors, this trend has resulted in a shift from a State-imposing to a State-negotiating constantly with the social partners⁶. This also leads to a form of transition of a centralized control (entrusted exclusively to the public authority) to a multipolar regulation (marked by polycentricity action levels and strong interrelations between actors)⁷. Consequently, this causes a distortion of traditional legal norms which leads to the emergence and development of an "other law"⁸. This other law should be characterized by its adaptation to the concrete, the approximation of individuals, and its suitability to the context of societies it governs⁹. All decisions taken through consultation and concertation process or based on the public debate process in France are some examples of these new forms of legal norms. As a consequence, regulatory instruments as legal rules should be marked by pragmatism and flexibility. Pragmatism, insofar as legal norms result from the association of recipients to the decision-making process. Regulation is based on the confrontation and arbitrage of social interests which should be harmonized. In that way, law becomes a "negotiated law"¹⁰. Flexibility, insofar techniques aim at guiding the behavior of actors and promoting their self-discipline, and not making binding norms. Thus, legal norms would be based on the conviction and not coercion, they would be formulated in terms of goals and recommendations and not of limitation; they would be motivated by the objective of deterrence and not repression¹¹.

These new ways for creating norms blur the boundaries between public authority's intervention and social and economic actors' intervention. Indeed, regulation involves intervention of multiple actors in different fields (society, science, economics...), located in different areas (European, local, national, international) and reflects a double movement. On one hand, the State no longer appears as the unique law-making actor. The State body of law

⁵ Conseil d'Etat, *Le droit souple*, Etude annuelle 2013, La documentation française, 2013.

⁶ Chevallier (J.), « La régulation juridique en question », *Revue Droit et société*, 2001, p. 827, en ligne : <http://www.reds.msh-paris.fr/publications/revue/html/ds049/ds049-07.htm/> ; Jobert (B.), Commaille (J.), « Régulation, gouvernance et territoire », In Jobert (B.) et Commaille (J.) (dir.), *Les métamorphoses de la régulation politique*, Librairie générale de droit et de jurisprudence, 1998, pp. 203-240.

⁷ Commaille (J.), « sociologie de l'action publique », In L. Boussaguet, S. Jacquet et P. Ravinet (dir.), *Dictionnaire des politiques publiques*, 3^{ème} édition, Presses de Sciences Po, 2009, p. 519.

⁸ Frison-Roche (M.A.), *Le droit de la régulation*, *Recueil Dalloz*, 2001, Chronique, p. 610.

⁹ Timsit (G.), *Archipel de la norme*, PUF, Coll. Les voies du droit, 1997.

¹⁰ Gérard (P.), Ost (F.), Van de Kerkhove (M.), *Droit négocié, droit imposé ?*, Bruxelles, Publications des Facultés universitaires Saint-Louis, 1996, 703 p.

¹¹ Chevallier (J.), *L'Etat post-moderne*, Paris, LGDJ-Extensio, 2008, 266 p.

would be "relayed"¹² by other instruments such charters, codes of conduct, contracts, agreements... It would be another kind of law. This question has often been discussed in the literature, particularly in social corporate responsibility which requires integration of environmental constraint in the economic activity through ethical codes and charters. On the other hand, State would no longer be the unique drafter of legal norms and should deal with a set of heterogeneous actors, all giving rise to the development of another concept: governance. This second aspect today is a matter of importance for biodiversity.

Economic regulation has its origins in the analysis of market imperfections. Compared to administrative regulations (as administrative police measure), using market instruments is justified by their properties cost-effectiveness, when optimizing the distribution of emissions within the economy is crucial. However, even if economic regulation is dissociated from the legal sphere, they are articulated and complementary. In that sense, we talk about economic instruments of public environmental policy studied by law of economic regulation¹³. Because regulation remains a polysemic word, several definitions co-exist. Thus, the term does not refer to a final and complete institutional reality¹⁴. The definition of economic regulation oscillates from the most general sense, mixing up with the law itself, to the more specific, specifying the regulatory as an imposed limit in the exercise of powers. A third meaning, is proposed by M. A. Frison-Roche and considered as a mid-positioning. She identifies the law of economic regulation from economic sectors in which it is carried out. Those sectors must be constructed and maintained in a balance between the principle of competition and other principles¹⁵. In this case, regulation acts as a kind of specific sector instrument which intertwines general rules, specific decisions, sanctions, conflict resolution, and usually including the creation of an independent regulator¹⁶. Legal rules are only tools used to build this regulation (arbitrage, contracts...).

Regulation is also considered as a public action which circumscribes the social playing, from a position of exteriority and superiority and through the implementation of coercive powers¹⁷. This new perception presupposes the existence of open markets in which various operators deploy competitive strategies: regulation only aims at maintaining an overall balance without distorting the growth of market economy. Therefore, the function of the regulator is not to legislate, regulate or outline of a policy. It is a technical function, an economic or social permanent adaptation of an economic sector¹⁸. J.M. Hubert distinguishes three levels of regulation. The first one is the legal regulation, which includes instruments made by an institution, regardless of their texture. This is for example international treaty, european directive, or national law. The second one is the economic regulation, which refers to instruments issued by market practice and authorities empowered. This is professional norms or regulation of professional ethic made by the Autorité des Marchés Financiers. The

¹² Arnaud (A.-J.), Introduction, *In* Clam J. et Martin G.J. (dir.), *Les transformations de la régulation juridique*, Paris, LGDJ, 1998, p. 75.

¹³ Frison-Roche (M.A.), « Définition du droit de la régulation économique », *In* Frison-Roche (M.A.) (dir.), *Les régulations économiques : légitimité et efficacité*, Dalloz, Coll. Thèmes et commentaires, 2004.

¹⁴ *Ibid.*, p. 7.

¹⁵ *Ibid.*, p. 8.

¹⁶ *Ibid.*, p. 13.

¹⁷ Chevallier (J.), « Le modèle politique du contrat dans les nouvelles conceptions des régulations économiques », *In* Frison-Roche (M.A.) (dir.), *Les engagements dans les systèmes de régulation*, Dalloz, Coll. Thèmes et commentaires, 2006, p.14.

¹⁸ Hubert (J.-M.), « Le cas de l'autorité de régulation des télécommunications », *In* *La Régulation. Nouveaux modes ? Nouveaux territoires ?*, *Revue française d'administration publique*, n° 109, 2004, p. 100.

last one is the law of economic regulation, which overlaps instruments made by an institution which supervise or recommend the creation of economic instruments for variables but identified purposes. This is the example of the French law on New Economic Regulation (NER) of May 2001.

In view of these elements, and considering that we work on Market based instrument and not economic instruments, we could adopt a positioning adapted to our research. Consequently, in this report, we work with two definitions of regulation:

- **Public regulation.** This recovers instruments established by an institution, regardless of texture (soft or command and control), which present two characteristics: they are unilateral norms and the recipient must submit himself to the norm, even if he does not agree with content. This is for example a rule of law, a european directive, a taxes imposed by administration...
- **Private regulation.** This kind of regulation recovers two characteristics: they are not unilateral and the adhesion is voluntary. They are forms of contracts and agreements known in private law.

VII. MBIS AND REGULATION

In light of this clarification, what are the place and the role of public regulation in the field of MBIS? Answer this main question consist in analyzing the different degrees of public regulation (from greatest to low-gradient, *i.e.* from the rule of law to the directive) and the intensity of the legal framework applicable to MBIS (from the more strict to the more flexible, *i.e.* from the prescription to the recommendation). It will permit to appreciate the place and the role of public regulation in the design and the implementation of MBIS.

This implies to answer a range of issues: is there a gradation in the regulation or is it a binary approach? Which degree of public regulation should be adopted to ensure effectiveness and efficiency of MBIS? What kind of regulation should be adopted to ensure the environmental efficacy of the MBIS? What kinds of regulation ensure the social acceptability of the MBIS? Could law define with precision the conditions of use MBIS to ensure their effectiveness? What kind of legal framework allows to make MBIS more legitimate and effective, and if so, how?

At least, the legal approach, both theoretical and practical, tends to suggest recommendations to ensure a greater effectiveness and efficacy of MBIS. This implies to pronounce and position itself on the degree of regulation to adopt, for MBIS chosen in this report, in order to determine the degree of public regulation the more effective. Concretely, can we say that a MBI which gives a strong capacity for action to actors is struck of a greater effectiveness than a MBI strictly framed by public regulation?

VIII. FLOW OF KNOWLEDGE

The second main issue discussed in this report is the role of public regulation in the flow of knowledge mobilized within MBIS. The attention paid to socio-economic assessment of biodiversity is strongly observed in the recent instruments of E.U. Consequently, the place of law in the field of scientific and unscientific knowledge is increasingly questioned.

Because this analysis focuses on the relationship between law and the knowledge mobilized within MBIS, it concerns the role of legal rules in the collection, the introduction and the circulation of knowledge within MBIS. It supposes to question several points: to what extent the intervention of law in the mobilization of knowledge is necessary? What should be the degree of its intervention to keep the interest of actors toward MBIS? By which legal or institutional ways the law can guarantee the collection, the circulation and the introduction of knowledge? What is the role of law in the identification of the knowledge required for the implementation of MBIS? More concretely: which rules define the useful knowledge? What sorts of knowledge are considered indispensable by law in order to determine the demand from investors? What knowledge is considered indispensable by law to determine the territories to invest? What knowledge is considered indispensable to know the social acceptability of a MBI? Should the intervention of the legislator remain *ad hoc* or should it be constant?

It also implies to appreciate if the introduction of knowledge (economic valuation, ecological expertise, social issues *etc.*), considered as indispensable prerequisite to the efficacy of instruments, must be framed by the law, and to what extent.

IX. MBIS SELECTED– BRIEF PRESENTATION

To make this study, we take into account two types of MBIS studied in the Invaluable project. First, payments for ecosystem services (PES) and second, habitat banking. The choice of those two kinds of MBIS is justified, on one hand, by the frequency of their economic, politic and social analysis in the project, backdrop on controversy. This invites some legal clarification. On the other hand, this choice is based on the interplay of actors within those MBIS, that accounts for an aloofness of the public authority in favor of private actors.

X. PLAN

This report will be divided in two parts. In the first one, we will discuss the issue of regulation and knowledge toward PES (Part 1). In the second one, we will appreciate the issue of regulation and knowledge among habitat banking (Part 2).

Part 1 : Payments for ecosystem services (PES)

Chapter 1 : Introduction

VII. DEFINITION

Usually, PES are not presented in a one-way definition. There are as many definitions as cases studies, which do not improve the consistency of the instrument but maintain its vagueness¹⁹. For instance, A. Karsenty, proposes that PES consist in the payment of an agent for a services rendered by other agents through intentional activity aiming at preserving, restoring or increasing an environmental services agreed between the parties. In addition, K. Mayrand and M. Paquin consider PES as a mechanism that aims at favoring positive environmental externalities thanks to the transfer of financial resources between beneficiaries of ecosystem services and suppliers of those services or the managers of environmental resources²⁰. In that perspective, two criteria emerge. On one side, an actor manages a natural resource for the benefit of another actor. On the other side, there is financial contribution. Nevertheless, we should underline that these approaches are based on an economic perspective.

The commonly used definition, not only by economists but also by lawyers, is the Wunder's one. According to Wunder, a PES is a voluntary transaction in which one a defined environmental service is buying by one (or several) buyer(s) from one (or several) supplier(s), only if the supplier secures the provision of this service²¹. Consequently, we can list a set of criteria: a volunteer aspect, a precisely definition of the secured service covered by the transaction, one or several buyers, one or several suppliers, a conditionality²². At least, we note that the definition given less attention to the economic dimension and seems to be more inclusive.

But a most recent definition, resulting from practice and used in Invaluable project debates the Wunder's one²³ on the grounds that many PES does not meet the criteria set by this theory. This definition postulates that :

- transactions rarely take place without an intermediary
- the state often playing the role of referee
- contracts are not always made on a voluntary basis
- non-economic criteria not always prevail

¹⁹ Karsenty (A.), Sembrès (T.), Perrot-Maître (D.), « Paiements pour services environnementaux et pays du Sud. La Conservation de la nature rattrapée par le développement ? », 3emes journées de recherche en sciences sociales, INRA, SFER, CIRAD, 9-10-11 décembre 2009, Montpellier.

²⁰ Mayrand (K.) et Paquin (M.), *Le paiement pour les services environnementaux : Etude et évaluation des systèmes actuels*, UNISFERA Centre International Centre - Commission de coopération environnementale de l'Amérique du Nord, Montréal, 2004.

²¹ Wunder (S.), *Payments for environmental services: Some nuts and bolts*, Center for International Forestry Research, Jakarta, Indonesia, 2005.

²² Wunder, (S.), *Payments for Environmental Services: Institutional Reconditions in Developing Countries. Presented at the International Conference on Payments for Ecosystem Services and their Institutional Dimensions*, Berlin, November 2011.

²³ Muradian, (R.) *et al.*, "Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services", *Ecological Economics*, 2010, pp. 1202–1208 ; See also: Vatn (A.), "An institutional analysis of payments for environmental services", *Ecological Economics*, 2010, pp. 1245-1252 ; Maury (C.) *et al.*, « Governance Across Multiple Levels of Agri-environmental Measures in France », Chapter 13, *In Muradian (R.) and Rival (L.) (Eds.), Governing the Provision of Ecosystem Services, Studies in Ecological Economics*, Springer Science + Business Media Dordrecht, 2013, pp. 257-277.

- negotiated arrangements are specific to a social, institutional and political context
- information is not always perfect for actors
- the efficacy of PES is rarely documentable, *etc.*

This position challenges the Coasean theory promoted by Wunder.

Consequently, R. Muradian analyses the limitations of this Coasean approach and argued that PES should be seen as “incentives for collective action”. So he tries to elaborate a new way of conceptualizing PES, an alternative vision based on three elements. First, the management of ecosystem services can be conceived as a social dilemma. It means that the management of ecosystem services does not result from an externality problem, because most of services are either common-pool or public goods. Second, hybrid structures tend to be more efficient in the management of ecosystem services. Such hybrid structures usually take the form of collective action, where autonomous agents give up part of their rights in a concerted way in order to solve social dilemmas. Third, we need to properly acknowledge the distinction between rewards, incentives and markets, and the context in which they are appropriate²⁴.

As a conclusion, R. Muradian suggests that PES should be considered as a « *transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources* »²⁵. So we note the deletion of criteria in favor of a **softly and flexible definition which prioritized incentives which bring in line the land use and the interest of society. This last definition, much more inclusive, should be our reference tool.**

VIII. PES AND REGULATIONS

According to case studies, PES can sometimes be considered as a contractual system which excludes public regulation. Therefore, PES differ from taxes, the polluter-pays principle, and EU’s subsidies based on cross-compliance. But, regulations often intertwine. This led some authors to distinguish four types of contracts²⁶:

- Contracts concluded between public authorities and private owners, on agricultural land or forest, to maintain or enhance the ecosystem services.
- Contracts concluded between private actors, but regulated by public authority which defines thresholds for the level of ecosystem services to provide (*e.g.* market for the right to pollute).
- Contracts concluded between private actors and not controlled by the public authority, in which one beneficiaries and providers organize themselves (*e.g.* self-organized private markets).
- Contracts concluded between providers of services and public or private structures (*e.g.* environmental labelling).

²⁴ Muradian (R.), “Payments for Ecosystem Services as Incentives for Collective Action”, Working Paper INVALUABLE.

²⁵ Muradian, (R.) *et al.*, “Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services”, *Ecological Economics*, 2010, pp. 1202–1208.

²⁶ Waage (S.), Scherr (S.), Inbar (M.) *et al.*, *Guide pour la conduite d'inventaires nationaux des paiements, des contrats et du renforcement de capacité en matière de services de l'écosystème. Version préliminaire, 21 juillet 2005, Cadre pour l'inventaire des paiements de services de l'écosystème à un niveau national*. Washington, Forest Trends. 31 p.

This intertwining of public and private norms complicates the perception of PES because their place and their importance in the design and the implementation of the instrument are variable. The observed synergy between private regulation and public regulation could contribute to explain why PES are generally considered more flexible and adaptable than traditional legal regulatory framework. They take place in non-coercive way of changing, promotes participatory methods and fair behavior, and mobilizes new financial resources from the private sector²⁷.

Although encouraged by the European Union²⁸, PES are still a new tool that is not consistent with our legal categories²⁹. The legal doctrine discusses their form of articulation between economic and command and control instruments³⁰, their homogeneity³¹, or the fact that they are widely presented as conventional tools which improperly excludes any unilateral regulation aspect³².

So, among the case studies conducted as part of the Invaluable project, it remains important to observe the role of different forms of regulation present in PES, the legal implications arising from those interactions, and societal, ecological and economic impacts resulting from those intertwines. This will be studied from the mechanism globally observed among PES: a landowner concludes an agreement with a third party and receives payment for a practice which generates ecosystem services.

PES are based on different presuppositions. Among advantages we notice that PES promote direct payments between service beneficiaries and providers, they maximize efficacy / cost because they focus efforts where profits are the largest and costs are the lowest, they are sustainable because they are based on the specific interests of users and service providers, they take into account the importance of the economic value of ecosystem services (and thus, the loss would represent their disappearance). On providers side, PES increase their well-being thanks to additional revenue, and on buyers side, PES maintain and enhance provision of environmental services, and allow to gear the management of the resource on the basis of terms determined jointly.

But there are also disadvantages. Globally, we note a difficulty of assessing the value of service, a difficulty of quantifying the initial levels of services provided by an ecosystem, some poor population who used free resources may no longer have access to them or have to pay, the implementation of PES require technical skills and institutional capacities that are not always available locally. On the side of providers, property rights are not always clearly defined. This poses problems for assessing the amount of payments and recipients. On the side of buyers in developing countries, they do not always have the opportunity to participate,

²⁷ Perrot-Maître (D.), *The Vittel payments for Ecosystem Services: "Perfect" PES Case,* ", International Institute for Environment and Development, London, UK, 2006.

²⁸ Billet (Ph.), « L'indemnité compensatoire des contraintes environnementales dans les zones d'érosion et certaines zones de protection des aires d'alimentation des captages », *Droit rural*, 2008, n° 364, Comm. 124.

²⁹ Langlais (A.), « Les paiements pour services environnementaux comme expression d'une relation complexe entre un outil économique et des droits de propriété », *In M. Falque et H. Lamotte, Ressources agricoles et forestières, Droits de propriété, économie et environnement*, Bruylant, 2014, pp. 437-449 ; Langlais (A.), « Les paiements pour services environnementaux, une nouvelle forme d'équité environnementale pour les agriculteurs ? Réflexions juridiques », *Environnement*, 2013, n° 1, Etude 4.

³⁰ Y. Jegouzo, « L'évolution des instruments de protection de l'environnement », *revue Pouvoirs*, n° 127, 2008, p. 30 et s.

³¹ G. Martin, « Le recours aux instruments économiques dans la mise en œuvre des politiques de protection de l'environnement », *in les politiques communautaires de protection des consommateurs et de l'environnement : convergences et divergences*, coll. Droit et consommation, 1988, Paris, pp. 168 et ss.

³² Langlais (A.), « Les paiements pour services environnementaux comme expression d'une relation complexe entre un outil économique et des droits de propriété », *op. cit.*

or have not financial capacity to implement PES program. As a consequence, external sources of funding may be required in order to compensate.

In that report, we will study those presupposition by analysing the balance between private and public regulation within several case studies. Our goal is to answer this question: **do the most complex forms of regulations within PES lead to satisfied tools, regarding efficacy, efficiency and effectiveness?**

At least, we will study the place of flow of knowledge within PES by analysing the place given to each kind of knowledge (scientific, economics, social, cultural...) for each PES selected. This will be useful for several reasons. First, it will determine whether the presence or absence of certain kinds of knowledge influences the efficacy, efficiency or effectiveness of PES. Then it will measure the role of public regulation in the presence or absence of this knowledge and generate hypotheses about its implication on the efficacy, efficiency and effectiveness of the tool. Finally, this will permit **to make proposals and recommendations to adjust the legal intervention within PES in order to get the best knowledge / success ratio of PES.**

IX. CASE STUDIES SELECTED

Among numerous examples of what is called PES, we chose various case studies from the Invaluable project: PES approach in Belgium, more precisely in Walloon Region, the Program of Payment for Environmental Services called PPES in Costa Rica, two Indonesian cases, and the Vittel case in France. Each of them proposes an original illustration of PES.

On one hand, Costa Rica is considered as the oldest and most illustrative PES experience. In the continuity of Costa Rica's approach, the Vittel case in France illustrates a real contractual relation. On the other hand, Indonesia shows the evolution of PES through the intervention of public regulation, which is also observed in Walloon Region, where PES are linked with subventions. **Those several case studies present an original range of set of regulation bringing a hybrid perspective leading to new PES generation.**

X. ISSUE AND PERSPECTIVES

Because approaches of PES are numerous, it seems to be useful not to start from a definition of PES, but from the exact expression, even if practical manifestations are various. Indeed, the use of the term reflects different realities. Regarding the main issues (what are the place and the role of public regulation in the field of MBIS, under an analysis based on regulation), the reflection will:

- Analyze if PES can be considered as an inclusive legal framework instruments (based on case studies mentioned above) and present various practical manifestations (reflecting different legal regimes), ranging from the lowest intervention of public authority to the strongest intervention (and thus analyze the issue of regulation in terms of degree and intensity). It will give opportunity to appreciate the role of public authority and its aloofness in regulation area, to assess the choice of a contractual instrument and its efficacy, the opportunity of a public or a private regulation...
- Analyze the role of knowledge within PES and best law/knowledge relationship to get a successful tool.

- Establish a “grille de lecture” of regulation on PES. More precisely, for each PES studied, to identify the degree of State intervention, the needs behind the establishment of PES, the effectiveness, efficiency and efficacy of the measure.
- Give opportunity to compare case studies and to propose a best way of regulation (which kind of regulation for which context and need?).

Those issues imply answering several questions: is there a gradation in regulation? What degree of regulation should be adopted to ensure effectiveness and efficacy of PES? What kind of regulation should be adopted to ensure the ecological efficacy of PES? What kind of regulation should be preferred to ensure the social acceptability of PES? Does the law should precisely define the way of using instruments to make them effective? What kind of legal framework can make PES, more relevant, legitimate, effective, and if so how?

XI. KNOWLEDGE

The second issue discussed in this report is the role of law in the flow of knowledge mobilized within PES. We wonder how can law improve values of ecosystems in PES, or if it is important to prescribe ecologic and socio-economic evaluation in legal rules.

Because this analysis focuses on the relationship between law and the knowledge mobilized within PES, it concerns the role of public regulation in the collection, the introduction and the circulation of knowledge within PES.

XII. PLAN

Chapter 2: Costa Rica
Chapter 3: France
Chapter 4: Indonesia
Chapter 5: Belgium

Chapter 2 : Costa Rica

VI. Introduction

Costa Rica was a pioneer in mobilizing the concept of ecosystem services in the Forest Act of 1996 and establishing PES. **In Costa Rica, PES are considered as an alternative to command and control approach³³** because they are based on a contractual relation. Furthermore, **initially considered as market-based instruments, they are now increasingly viewed in an institutional perspective.**

As a consequence, PES (also called PPES (Program of Payment for Environmental Services) in Costa Rica) are **considered as instruments of public policy³⁴**. This results from a 5 steps process:

- “policy agenda”: identifies the problem to be solved.
- “policy formulation”: refers to the development of the solution to the problem.
- “policy adoption”: corresponds to the solution of the decision given by the government through the adoption of legislation or program.
- “policy implementation”: refers to the implementation of the program.
- “policy evaluation” that assesses the results of the policy³⁵.

We can notice that all steps do not imply the same kind of regulation, or do not imply any regulation. The first two steps include a political dimension and the intervention of public authority, but not any form of regulation. The third one is more interesting because it draws the public policy adopted. In practical terms, this step specifies if the State defines a command and control approach (with binding rules) for the issue or if it chooses a soft law approach (with recommendations and opportunity for addressees to develop their own private regulation). In case of PES, this second way was chosen. At last, while the four step directly concern nature and form of PES (private or public regulation, stakeholders, implementation...), the fifth step envisages the assessment of the policy (control of application, effectiveness, efficacy, efficiency of PES tools to achieve the objectives of public policy...).

PES in Costa Rica both include public and private regulation. But which one take precedence over the other? What is the place of public authority and private actors? What is the place of public regulation in the process? Does this kind of biodiversity management produce satisfactory results?

VII. GENESIS of PES

PPES in Costa Rica results from the failure of a series of measures put in place to reduce deforestation and to promote reforestation. It puts forward a change in practices. From the 90's, new experimental instruments were set at local levels. They consisted in contractual

³³ Le Coq (J.-F.) *et al.*, « La mise en politique des services environnementaux : la genèse du Programme de paiements pour services environnementaux au Costa Rica », *Vertigo*, Vol. 12, n°3, décembre 2012, <http://vertigo.revues.org/12920>

³⁴ *Ibid.*

³⁵ *Ibid.*

payments to forest owners in order to conserve forest. They aimed at promoting forest protection and conservation of natural resources by adopting sustainable management practices within cooperation projects. For instance, we can evoke the BOSCOA project from Neotropica foundation³⁶ in the Osa Peninsula, or the REFORESTA project funded by USAID³⁷ and implemented by FUNDECOR³⁸ in the Central Valley. These projects, which developed empirical forms of contractual payments to forest owners to conserve their forest, constituted the first experiments of PES. Promoters of these experiments sought support among major U.S. environmental NGOs and the World Bank but they refused. This reflects that this type of instrument was not yet recognized at the international level and was very new. To some extent, the adoption by the Costa Rica of the Forest Act 7575 in 1996³⁹ contributed to curb this international position not interest in the payment of forest owners for "services rendered". So, this Act constituted the basis of the development of PES afterwards.

In the 1996 Act, three key elements underpinning the PPES: the recognition of the provision of services by forests, the creation of a financing system based on the selective tax on consumption of fuel and oil, and the creation and the recognition of FONAFIFO. FONAFIFO, as a key actor of PES, describes itself as a public entity⁴⁰, while authors qualifies it a semi-autonomous agency with independent legal status⁴¹. It was placed in charge of fundraising and management PPES. FONAFIFO's board of directors is composed of five members: three public sector representatives including one representative of the Ministry of Environment (MINAET), one representative of the Ministry of Agriculture (MAG) and one representative of the national banking system, and two private sector representatives nominated by the National Forestry office ("Oficina Nacional Forestal", *i.e.* ONF) including one small/medium forestry producers representative and one industrial sector representative⁴². FONAFIFO's status gives it a relative degree of autonomy in making personal decisions and in managing funds, but it remains subject to a variety of governmental restrictions. For example, its budget must be approved by the Ministry of Finance. Delays in these administrative procedures have often hampered FONAFIFO's work.

PPES⁴³ in Costa Rica was established in 1996, and based on several legal texts. First, the 7575 Forest Act 1996, which is the legal basis of payment for environmental services⁴⁴. Then, the Law of the Regulatory Authority for Public Services, which provides the institutional framework, and the Biodiversity Law which establishes the contribution of Costa Rica to the conservation of biodiversity, world heritage, in accordance with decisions of the United Nations Conference on Environment and Development (UNCED) in 1992. It is also based on various international agreements such as the UN Framework Convention on Climate

³⁶ This foundation is dedicated to sustainable development : <http://www.neotropica.org/>

³⁷ USAID is the U.S. Agency for International Development: <http://www.usaid.gov/>

³⁸ FUNDECOR is a Costa Rican Non-Governmental Organization founded in 1989 through international cooperation.

³⁹ For an English translation of the text: <http://www.climateparl.net/cpcontent/pdfs/080731%20Forestry%20Act%20content%20Costa%20Rica.pdf>. For the original version: http://onfcr.org/media/uploads/cyclope_old/adjuntos/LeyForestal7575rp16236.pdf

⁴⁰ http://www.fonafifo.go.cr/home/about_us/index.html.

⁴¹ Pagiola (S.), "Payments for Environmental Services in Costa Rica", *MPRA Paper n° 2010*, December 2006. <http://mpra.ub.uni-muenchen.de/2010/>

⁴² Le Coq (J.-F.) *et al.*, "The Governance of Costa Rica's Programme of Payments for Environmental Services: A Stakeholder's Perspective", Chapter 12, *In* Muradian (R.) and Rival (L.), Springer Publisher, 2013.

⁴³ Official website: http://www.fonafifo.com/paginas_espanol/servicios_ambientales/servicios_ambientales.htm

⁴⁴ They are defined as "services provided by forests and forest plantations to protect and improve the environment".

Change (UNFCCC) which allows Costa Rica to take a central role in the prevention of global climate change through project management and conservation of natural forests and forest plantations. In the late 1990s, FONAFIFO established the PPES with its own management structure and board. Its objective was to promote a rational use of natural resources, with limited deforestation and maintaining of forest ecosystem services (like carbon sequestration, watershed protection, biodiversity, and landscape beauty)⁴⁵.

VIII. MECHANISM

The PPES program proposes payments to landowners according to their land uses (forest conservation, reforestation, sustainable management, *etc*) with the justification that these lands uses generate ecosystem services either locally or globally⁴⁶. These payments vary with land uses, probably assuming that services have different values. For instance, reforestation is paid several times more than natural regeneration because reforestation implies investment and maintenance costs, while natural regeneration involves opportunity costs only⁴⁷.

The financial resources for the program are collected from several sources, among them the hydrocarbon industry, multilateral cooperation (World Bank loans, Global Environment Facility grants), and voluntary contributions by private hydroelectric producers⁴⁸. FONAFIFO is in charge of making the payments, but it is also responsible for the management of the whole scheme. Contracts are signed between the FONAFIFO and landowners for various periods of time depending on the land use, but the time periods never exceed 15 years⁴⁹. Durations are not specific to each landowner, thus not negotiable and initial contracts were issued on a “first come, first serve” basis.

Over the years, the PPES program has evolved considerably. In 2000, the array of instruments was simplified to only two: timber plantations and forest conservation. An agroforestry contract was introduced in 2004, and a natural regeneration contract is being introduced. Initially completely untargeted, the PPES program is moving towards a greater degree of targeting⁵⁰.

PPES implementation is regulated by two primary legal instruments that are updated annually. First, an **annual decree signed by the Ministry of Environment**, which defines the eligible PES modalities and the total budget allocation for each of them. Second, a **procedure manual** that defines the PES access conditions, requisites, priority criteria and administrative rules. These documents are revised annually by FONAFIFO’s executive management and are submitted for comment to three main actors: SINAC (the forestry public

⁴⁵ Pirard (R.), Broughton (E.), “What’s in a Name? Market-Based Instruments for Biodiversity”, *Analyses*, IDDRI, Sc. Po, IFRI, n° 3, May 2011, pp. 4-31.

⁴⁶ Sanchez-Azofeifa (G.A.) *et al.*, “Costa Rica’s Payment for Environmental Services program: Intention, implementation and impact”, *Conservation Biology*, vol. 21, n° 5, 2007, pp. 1165-73.

⁴⁷ Pirard (R.), Broughton (E.), “What’s in a Name? Market-Based Instruments for Biodiversity”, *op. cit.*

⁴⁸ The hydrocarbon industry was originally targeted through the consumer tax on fossil fuels, but due to unsatisfactory money transfers by the Ministry of Finance to the institution in charge of making the payments to land owners, a share of this tax on fossil fuels was assigned formally to the PES program.

⁴⁹ This being the duration applied to reforestation since the plantation has to be maintained long enough to ensure it is properly done.

⁵⁰ Pagiola (S.), “Payments for Environmental Services in Costa Rica”, *MPRA Paper n° 2010*, December 2006. <http://mpa.ub.uni-muenchen.de/2010/>

administration representative), ONF (the forestry private sector representative) and the Board of Agronomy Engineering that supervises the forestry regents activities. After consultation, the decree and procedure manual are approved by FONAFIFO's board and signed by the Minister of Environment⁵¹.

- *Does beneficiaries pay for the PPES program?*

To date, the bulk of PPES program financing has been obtained by allocating to FONAFIFO 3.5% of the revenues from a fossil fuel sales tax (about US\$10 million a year)⁵². From 2001 to 2006, the PPES program was supported by a loan from the World Bank and a grant from the Global Environment Facility (GEF)⁵³, through the Ecomarkets Project. A new project, the Mainstreaming Market Based Instruments for Environmental Management (MMBIEM), will continue supporting the program from 2007⁵⁴. The PPES has also received a grant from German aid agency KfW through the Huetar Norte Forest Program. Efforts have also been made to charge various service users for the services they are receiving. **So for the moment, beneficiaries not pay for services they received. But ultimately, it is envisaged that all beneficiaries of environmental services would pay for them.** This objective has been met only partially to date, though progress is being made⁵⁵.

- *How are service providers paid?*⁵⁶

The PPES program targets private land users, with the aim of integrating environmental considerations in landscapes outside protected areas⁵⁷. Landowners were initially contracted by the national conservation area system (Sistema Nacional de Areas de Conservación, SINAC) and by NGOs such as FUNDECOR. FONAFIFO took over this task in 2003, establishing eight regional offices to handle applications, sign contracts, and monitor implementation. **To participate, landowners must present a sustainable forest management plan prepared by a licensed forester called "regent". These plans describe the proposed land use, and include information on land tenure and physical access; topography, soils, climate, drainage, actual land use, and carrying capacity with respect to land use;** plans for preventing forest fires, illegal hunting, and illegal harvesting; and monitoring schedules. Once their plans have been approved, landowners begin adopting the specified practices, and receive payments⁵⁸. The initial payment can be requested at contract signing, but subsequent annual payments are made after verification of compliance (by the regentes, with a sample being audited). For information, payments for forest conservation

⁵¹ Le Coq (J.-F.) *et al.*, "The Governance of Costa Rica's Programme of Payments for Environmental Services: A Stakeholder's Perspective", Chapter 12, *In* Muradian (R.) and Rival (L.), Springer Publisher, 2013.

⁵² Initially, the PSA program was to receive one third of fuel tax revenues, but conflicts with the Ministry of Finance meant that only a small and variable part of these funds were actually received (FONAFIFO, 2000). Subsequently, Fiscal Reform Law No.8114 of 2001 reduced FONAFIFO's share of fuel tax revenues to 3.5%, but guaranteed this amount.

⁵³ The Global Environment Facility is a partnership for international cooperation where 183 countries work together with international institutions, civil society organizations and the private sector, to address global environmental issues. <http://www.thegef.org/gef/home>

⁵⁴ In both the Ecomarkets and the MMBIEM Projects, the GEF grants represent additional resources for the PSA program, but the Bank loans do not.

⁵⁵ Pagiola (S.), "Payments for Environmental Services in Costa Rica", *MPRA Paper n° 2010*, December 2006. <http://mpra.ub.uni-muenchen.de/2010/>

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*

⁵⁸ For information, additionality is not explicitly part of Costa Rica's PES design and is nowhere part of the Forestry Law 7575. Instead, this criterion is externally-imposed, evolving along with the international climate change policy dialogue.

increased to US\$ 64 per ha per year, and for plantations to US\$ 816 per ha over 10 years. Coming well before new funding sources are scheduled to be available, these increases are forcing a substantial reduction in area contracted. The net value of the payment is lower than its face value, as landowners must pay the regentes for the initial management plan and for monitoring (these fees take about 15% of payments). At least, except two minor exceptions, payments offered under each contract are the same everywhere in the country. The establishment of trustworthy contract monitoring and verification systems is an important part of any system of payments. Monitoring is undertaken primarily by the agencies responsible for contracting with farmers, including SINAC, FUNDECOR, and the regentes, with regular audits to verify the accuracy of monitoring. With the financial support of the Ecomarkets Project, FONAFIFO has established a state-of-the-art database to track compliance. Noncomplying participants forfeit further payments, and regentes who incorrectly certify compliance can lose their license.

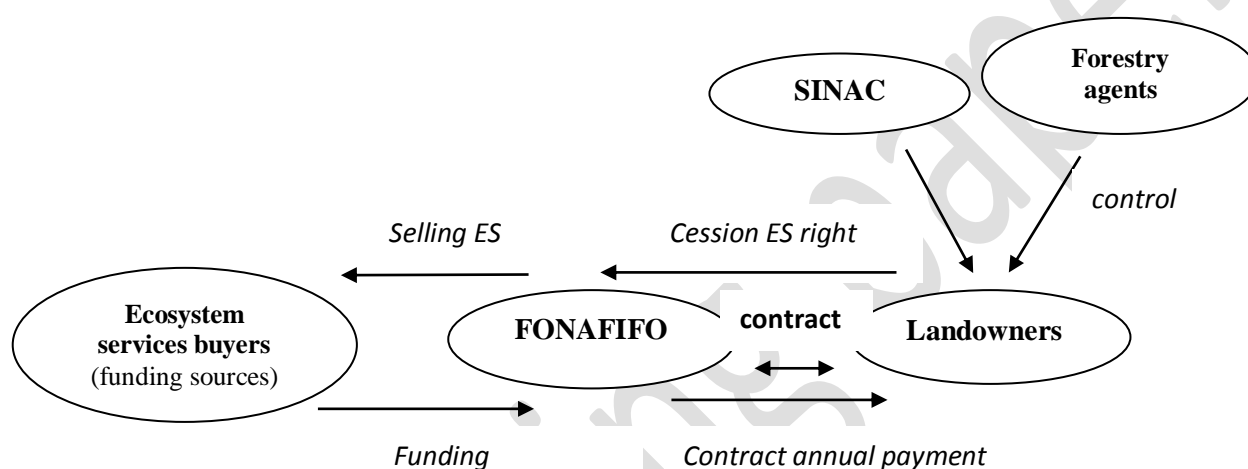


Fig 1⁵⁹

Regulation analysis

There was several generations of PES in Costa Rica. Firms considered as an alternative to command and control approach, they become more and more framed by public regulation. In the 90's, experimental contractual agreements were concluded under development projects. They consisted in paying a landowner to execute practices which protect a forest area. This kind of practice was quickly taken by law. As a consequence, the Forest Act of 1996 was drawn to recognize the notion of « services rendered by ecosystem » and « payment for service rendered », and to create the FONAFIFO, an institution which will permit to manage the balance between them⁶⁰. The institutionalization of a such mechanism reduced the liberty

⁵⁹ Le Coq (J.-F.) *et al.*, "The Governance of Costa Rica's Programme of Payments for Environmental Services: A Stakeholder's Perspective", Chapter 12, *In* Muradian (R.) and Rival (L.), Springer Publisher, 2013.

⁶⁰ Article 46 of Forestry Act: « *Se crea el Fondo Nacional de Financiamiento Forestal, cuyo objetivo será financiar, para beneficio de pequeños y medianos productores, mediante créditos u otros mecanismos de fomento del manejo del bosque, intervenido o no, los procesos de forestación, reforestación, viveros forestales, sistemas agroforestales, recuperación de áreas denudadas y los cambios tecnológicos en aprovechamiento e*

of stakeholder to self-regulate and imposed the contractual scheme⁶¹. Consequently, a strong public regulation was built by FONAFIFO itself through the two legal text updated yearly and after a control made by public authority. On one hand, a decree which define eligibility criteria and budget affected to PES. On the other hand, a manual which is submitted to a strong process: reviewed by FONAFIFO, discussed by partner institutions, approval by FONAFIFO, signature by the ministry of environment.

The balance between public and private regulation is interesting, as regard to lapse of time: a negotiated framework and exclusively “contractualised” was gradually legalized under the creation and organization of the FONAFIFO. Furthermore, the private regulation framed by a hybrid regulation (self-regulation made by an independent authority, the FONAFIFO), then become public regulation. Whether the contractual instrument still exists (it was first negotiated and concluded between a landowner and a beneficiary), it is now non-negotiable and⁶², and takes place in a complex scheme which implies a partly state-owned institution.

IX. IMPACT OF THE PPES PROGRAM

3. Perverse effects

The PPES program has been very popular with landowners, with requests to participate far outstripping available financing⁶³. At the end of 2005, about 270 000 ha were enrolled in the program. Forest conservation has consistently been the most popular contract, accounting for 91% of the area covered since 1998, and for 95% of enrolled area at the end of 2005.

Nonetheless, PPES suffers from various kinds of gaps⁶⁴, linked with actors involved in:

- Offering payments that are insufficient to induce adoption of socially-desirable land uses, thus causing socially-undesirable land uses to remain in use.
- Inducing the adoption of socially-undesirable land uses, that supply environmental services, but at a cost higher than the value of the services.

The first two problems result both at a social and financial levels: the failure to adopt practices whose social benefits exceed their costs, and the adoption of practices whose benefits are smaller than their costs. In both cases, social welfare is reduced over what it might have been. The third problem is a financial inefficiency because the program generates less environmental services per dollar spent than if the problem was avoided.

The type and size of payments provided by a PES program affect the likelihood of these problems arising. Costa Rica’s PPES offers a relatively low, undifferentiated, and mostly un-targeted payment. Thus, it will only tend to attract participants whose opportunity

industrialización de los recursos forestales. También captará financiamiento para el pago de los servicios ambientales que brindan los bosques, las plantaciones forestales y otras actividades necesarias para fortalecer el desarrollo del sector de recursos naturales, que se establecerán en el reglamento de esta ley. »

⁶¹ Art. 50: «El Fondo Nacional de Financiamiento Forestal podrá contratar al personal y los servicios profesionales necesarios para la ejecución y el control de sus operaciones, así como adquirir el equipo y mobiliario necesarios para el desempeño de sus funciones».

⁶² That is why this system is sometimes qualify as a subsidies one : Pirard (R.), Broughton (E.), “What’s in a Name? Market-Based Instruments for Biodiversity”, *Analyses*, IDDRI, Sc. Po, IFRI, n° 3, May 2011, pp. 4-31.

⁶³ Pagiola (S.), “Payments for Environmental Services in Costa Rica”, *MPRA Paper n° 2010*, December 2006. <http://mpa.ub.uni-muenchen.de/2010/>

⁶⁴ *Ibid.*

cost of participation is low, or negative⁶⁵. Furthermore, being undifferentiated and untargeted, the program will also attract many land users who would have adopted the desired practices anyway. The relatively low payments mean, however, that the program is unlikely to induce the adoption of social involvement for land uses on a significant scale.

- *Precariousness of contracts: example of biodiversity payment*⁶⁶:

The Ecomarkets Project included a US\$ 8 million grant from GEF, which can be considered as a payment from the global community for the biodiversity services provided by Costa Rica's forests. US\$ 5 million of this grant were used to make payments in biodiversity priority areas and the balance for institutional strengthening. Another GEF grant, for the Costa Rica component of the Regional Integrated Silvopastoral Ecosystem Management Project, is also channeled through the PPES program⁶⁷. This project aims to generate both biodiversity conservation and carbon sequestration benefits by using a PES mechanism to encourage the conversion of extensive pastures to silvopastoral land uses. The recently approved MMBIEM Project⁶⁸ includes a further US\$ 10 million grant from GEF. Conservation International (CI) is also paying for biodiversity conservation through the PPES, by providing US\$ 0.5 million to pay 50% of the cost of agroforestry contracts in the Osa and Amistad Pacifico conservation areas, and by paying 50% of the costs of planting up to 80,000 trees under agroforestry contracts in the buffer zone of Chirripó National Park.

Unlike agreements with water users, these agreements are not intended to be renewable. Efforts to generate financing from the local tourism industry to conserve the indirect benefits of natural ecosystems have not yet borne fruit. This creates a challenge for funding long-term payments to service providers in areas where neither water nor carbon payments are available. An endowment fund was established to provide a partial answer to the challenge of funding long-term payments for conservation in this area⁶⁹.

- *Have environmental services been generated?*

The PPES seeks to generate environmental services solely through forest land uses⁷⁰. Indeed, the very definition of environmental services in Forest Law 7575 is "*those that forests and plantations provide*" (art. 3). This is clearly a very blunt approach to environmental services. The Silvopastoral Project, for example, is demonstrating that the extent of benefits can vary widely from one land use to another⁷¹. The introduction of an agroforestry contract marks a small move away from pure forest land uses. The MMBIEM will assist FONAFIFO to further expand the range of contracts, with supported land use practices more closely tailored to specific requirements in particular areas. Nevertheless, it is unfortunately impossible to determine the extent to which the PPES has successfully generated

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

⁶⁷ Pagiola (S.) *et al.*, *Paying for biodiversity conservation services in agricultural landscapes*, Environment Department Paper No.96, World Bank, Washington, 2004; Ibrahim (M.) *et al.*, "Enfoques alternativos de pagos por servicios ambientales: Experiencia del proyecto Silvopastoral. Paper presented at the Workshop on Costa Rica's Experience with Payments for Environmental Services. San José, 25-26 September 2006.

⁶⁸ MBIEM : Market Based Instruments for Environmental Management.

⁶⁹ Pagiola (S.), Platais (G.), Ducassi (L.), « Paying for biodiversity: The Trust Fund for Sustainable Biodiversity Conservation », Paper presented at the Workshop on Costa Rica's Experience with Payments for Environmental Services, San José, 25-26 September 2006.

⁷⁰ Pagiola (S.), "Payments for Environmental Services in Costa Rica", *MPRA Paper n° 2010*, December 2006. <http://mpra.ub.uni-muenchen.de/2010/>

⁷¹ Ibrahim (M.) *et al.*, "Enfoques alternativos de pagos por servicios ambientales: Experiencia del proyecto Silvopastoral. Paper presented at the Workshop on Costa Rica's Experience with Payments for Environmental Services. San José, 25-26 September 2006.

environmental services⁷². Although the PPES has established a strong system to monitor land user compliance with payment contracts, the program remains weak in monitoring its effectiveness in generating the desired services.

The other major weakness in the PPES is the lack of data on the extent to which activities have generating environmental services. Only the GEF-supported silvopastoral project has monitored its impact on biodiversity conservation and carbon sequestration. The long-term sustainability of the program demand that understanding of how different land use practices contribute to generating environmental services be substantially improved. Work is currently underway, including one-time studies of the impact of different land uses on services and the establishment of long-term monitoring systems.

4. virtuous effects and advantages of PES

Despite the limitations of the program and drawbacks, Costa Rica's PPES program has been one of the conservation success stories of the last decade⁷³. Its approach has been widely studied and imitated. FONAFIFO has hosted dozens of official delegations from countries throughout the world who have come to study the PPES. Inspired by previous forest subsidy schemes, Costa Rica was able to develop an elaborate and nationwide system of payments for environmental services relatively rapidly.

With experience, many of weaknesses (like the lack of targeting and the use of undifferentiated payments) are being gradually corrected. **The PPES is evolving towards new approaches**, including the use of more differentiated payments. This play a role in service provision and the opportunity cost of providing services.

Perhaps the most important lesson that might be learned from the Costa Rica experience is the need to be flexible and to adapt to lessons learned.

Impact analysis

The actual PES scheme leads to inextricable economics, social and ecological effects.

In economics terms, the degree of interest for PES has created a reduction of payments because the Funds have insufficient funding to pay an increasing number of stakeholders. As a consequence, the net value of the payment was lower than its face value. Furthermore, landowners have to pay the regentes for the initial management plan and for monitoring. Whether the value for PES is lower than investments, the interest of stakeholder to participate to the PES program disappeared. Consequently, we can suggest that the « reassuring effect » of a framed and institutionalized process observed at the beginning of the PES scheme created a virtuous effect quickly turned in a perverse effect because the social benefit of practices was lower than costs. It turned into question the effectivity and efficiency of PES program.

In ecological terms, the assessment of the benefit from environment is not easy. It comes from several factors: the definition of the “service rendered by ecosystem” in the law is not clear and prevent from identifying possible effects of PES. Moreover, the gorals that stakeholder should achieve are not clearly established and payments are calculated without taking into account individual needs. It is difficult to assess the ecological efficacy of the scheme on services. To fight against this problem, we can suggest to lawmaker to give a specific legal definition of services rendered.

⁷² Pagiola (S.), “Payments for Environmental Services in Costa Rica”, *op. cit.*

⁷³ Ibid.

Two other negative effects hurt the process. On one hand, practices sustainability because contracts are concluded for different lapses of time but do not exceed 15 years or being extended. The principle of contractual freedom do not allow to put into question this kind of liberty. Consequently, only a mandatory provision introduced in public regulation can filled this gap. On the other hand, the payer identity is able to affect the legitimacy of the program because those who pay for a service are not those who benefit from the service. Thus, a public regulation could defined who are exactly beneficiary and obliged them to pay for the service.

Despite of these criticism, there are two virtuous effects. First, the flexibility and adaptability of the PPES program. It comes from the lack of command and control regulation and is due to the decree and the manual discussed and approved each year. This form of public regulation does not seems to be a barrier to the evolution of PPES. On the contrary, it is source of adaptability as regard to economics, ecological and social contexts. Second, the monitoring and sanction process organized ensure the implementation of PPES.

One of the major weakness in the PPES is lack of data. How is the exact place of law toward knowledge?

X. FLOW OF KNOWLEDGE AND PES

If regulation observed implicitly raise the issue of knowledge to the design and implementation of PES. In Costa Rica, the flow of knowledge has a double effect for PES. Upstream, it permits to build the process of PES by giving information on social, economic and ecological context, or it gives pre-conditions through the regente document. Downstream, it permits to build a database of lessons learnt from the implementation, concerning efficacy, effectiveness and efficiency of PES and PPES Program.

Upstream: in Costa Rica, we can note that major condition to conclude a PES is to present a sustainable forest management plan, prepared by a licensed forester called "regente". This describes the proposed land use, including information (land tenure and physical access, topography, soils, climate, drainage, actual land use and carrying capacity with respect to land use and plans for preventing forest fires, illegal hunting, and illegal harvesting, and monitoring schedules).

Downstream: alongside the ecological evaluation, an economical assessment has been completed to determine the economic benefits of biodiversity through PES⁷⁴.

In Costa Rica, advantages of a database collection based on assessment of implementation of PES leads to established strong archived imagery and/or classified land cover time series at the program's inception. Also, having forest land used as the target facilitates cross-site comparisons, relative to more specific site-based criteria like water quality standards, sedimentation rates or stand-based measures of carbon storage⁷⁵. This form of modeling may be used to construct spatially landscape hypothesis.

⁷⁴ Le Coq (J.-F.) *et al.*, « La mise en politique des services environnementaux : la genèse du Programme de paiements pour services environnementaux au Costa Rica », *Vertigo*, Vol. 12, n°3, décembre 2012, <http://vertigo.revues.org/12920>

⁷⁵ Daniels (A.E.) *et al.*, "Understanding the impacts of Costa Rica's PES: Are we asking the right questions?", *Ecological Economics*, 2010, pp. 2116-2126.

Three interrelated themes are important to consider in measuring the impact of Costa Rica's PES scheme: spatial data considerations, sampling considerations and the effects of institutional path dependency owed to the unique evolution of PES in the country⁷⁶.

Regarding spatial data, explicit criteria and technical procedures for regents to follow were slow to come about during initial contract establishment and subsequent monitoring. Since 2004, data collection has changed. Data collected prior to 2004 were recorded in a variety of incompatible formats, resulting in unnecessary spatial error when changing the datum and projection in post-hoc fashion. Only in 2006 and later, regentes required to map a polygon corresponding to the ground area(s) contracted for PES within the larger farm. The paucity of adequate spatial data makes satellite-based monitoring a challenge for early years of PES, particularly if it is not coupled with extensive field mapping and verification.

Sampling considerations arise from the dynamic and progressive nature of conservation in Costa Rica, and are further exacerbated by uncertainty in spatial data. Regardless of the approach taken to evaluate PES, any assessment hinges on knowing what area corresponds to PES contracts, what area does not, and what area is ineligible for PES, such as the land in national parks.

FONAFIFO is the government entity that has served as the “bank” for PES since its inception and as the implementing unit since 2003. But the situation of actors has changed. PES are considered as an evolution of the institutional and social context, as a redistribution of power between stakeholders⁷⁷.

Globally, it seems to be unrealistic to associate environmental services quantified and changes in agricultural practices. It also seems difficult to convert these environmental benefits in monetary terms⁷⁸. In most cases, the state of the science or lack of monitoring practice implies a non-measured or measurable impact of PES implemented. However, a fundamental aspect of PSE is the link between ecosystem services and administration of land. Whole mechanism is based on the fundamental hypothesis that, on one hand, we can know with sufficient certainty practices that lead to improved ecosystem services and on the other hand, that this improvement can be quantified and clearly linked to the change in practice (and their cost). In fact, uncertainty often prevails. For example, it is easier to measure the amount of carbon sequestered by a tree than to measure the link between hydrology and forest. Scientific knowledge and societal knowledge from practice then come into question.

- *The place of stakeholders and actors*

Numerous actors are involved in PPES governance and can influence the PPES decision process⁷⁹. The first actors are those in charge of PPES management such as FONAFIFO, SINAC (in charge of natural resources, management and control), the forestry regent represented by the Board of Agronomy Engineering (BAE) and local forestry organizations that promote and facilitate payment access to small forest owners.

⁷⁶ Daniels (A.E.) *et al.*, “Understanding the impacts of Costa Rica's PES: Are we asking the right questions?”, *op. cit.*

⁷⁷ Le Coq (J. F.) *et al.*, « 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 symposium Innovation and Sustainable Development in Agriculture, Montpellier, June 2010.

⁷⁸ Karsenty (A.), Sembrès (T.), Perrot-Maître (D.), « Paiements pour services environnementaux et pays du Sud. La Conservation de la nature rattrapée par le développement ? », 3emes journées de recherche en sciences sociales, INRA, SFER, CIRAD, 9-10-11 décembre 2009, Montpellier.

⁷⁹ Le Coq (J. F.) *et al.*, « Changement climatique et innovation dans les instruments de politiques publiques: le cas du programme de paiement pour services environnementaux au Costa Rica », *op. cit.*

The second group of actors are those represented in FONAFIFO's board of directors. Public sector representatives occupy three of the five positions. The Ministry of Environment's representative usually stands as the president of FONAFIFO's board, while the Ministry of Agriculture and the banking sector both maintain a representative on the board. The private forestry sector maintains two representatives on FONAFIFO's board. First, the large forestry companies representative that is currently represented by the Costa Rican Forestry Chamber (Camara Costarricense Forestal (CCF)). Then, the small and medium forest landowners, which are generally members of local forestry organizations and are represented by the National Assembly of Forestry Peasants (Junta Nacional Forestal Campesina (called JUNAFORCA)).

The third category of actors are those who are not part of the PPES structure but who may influence the evolution of PPES decisions. First, they are representatives of farmers groups, indigenous groups or ecological groups who may have access to lobbying activity on FONAFIFO's board directly or through ministries, deputies or public opinion. Then, they are funders who can make conditions to their funding agreements. At least, they are central state administration and its control bodies (Contraloria General de la Republica (CGR)) which can evaluate the PPES according to public fund management procedure. These actors vary in terms of visions, interests and positions regarding forestry problems and policy orientation and thus PPES orientations.

Three main stakeholders groups with differences in vision were identified. First, agricultural sector representatives, which in the 1980's-1990's considered forests as empty and "unproductive" space. Secondly, forestry sector representatives that consider forests as "productive" space and a provider of primary material (wood) for the industry; their interests lie in support of wood development production (such as reforestation), and they are prone to be against wood extraction restrictions. Thirdly, the environmental groups' representatives that consider forests as habitats to be protected to maintain plant and animal biodiversity; thus, they are in favor of incentives for forest protection, ecosystem restoration with native species and the restriction of wood extraction, especially in natural forests⁸⁰.

The evolution of PPES since 2006 illustrates a **multidirectional orientation driven by multiple stakeholders who performed a complex equilibrium of power and learning interactions upon ecosystem services and PES mechanisms, within national and international forums.**

The forestry stakeholders oriented themselves towards a more productive vision and have experienced a modest recovery in strength in the PPES decision process. Since the mid-2000's, the forest issue has dramatically changed from those of the mid-1990's and currently supports a conservation strategy. Furthermore, environmental influence on PPES seems to be fading as the support from international NGOs is decreasing following the financial crisis of 2007 and as other issues have been gaining more importance in the agenda of environmental organizations (*i.e.* the campaign towards the interdiction of mining of Cruzitas in 2009-2010). Nevertheless, **the national environmental mood is still gaining force** in the Costa Rican population following the **education campaign** of the last decade, resulting in forest conservation as an important PES factor and more than 80% of PPES budget being dedicated to PES-Protectionmodality.

⁸⁰ Le Coq (J. F.) *et al.*, « 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 symposium Innovation and Sustainable Development in Agriculture, Montpellier, June 2010.

Knowledge analysis

The legal framework made for PES did not concern the field of knowledge. In other words, the nature of knowledge and data mobilized to determine the opportunity, the place, modalities and efficacy of PES are not contained in the public regulation.

Knowledge mobilized within PES comes from other mechanisms. It is the example of the regents which are documents required to participate to the PES program. Upstream, there is a strong role played by regents (mandated by public authority), who are kind of official forestry experts. Plans they validate have a very important place. Plans give essential information on the land concerned by the demand: ecological and practical data. However, apart from these informations (often few in number and poorly) no economics, socio-economics or social data are required. Downstream, there are ecological and economical valuations. The problem is not the collection of data but their analysis which is not made. The FONAFIFO could do that, but there is a lack of dialogue within the institution and a non-sharing of knowledge between it and landowners (partly because contracts built on plans validated by regents are non-negotiable).

On all these aspects, law is absent and all remain essentially from practice. Whether monitoring of respect of plans made by regents and sanctions are prescribed by the law monitoring criteria and knowledge required are not. The weak role of public regulation in the flow of knowledge within PES, at the stage of their collection, introduction and circulation, must be adjusted.

We can suggest that lawmakers could create institutionalized and spontaneous participation and discussion places, and could draw more precisely modalities of collection, and identification of knowledge required.

Conclusion

The role of PES in forest expansion is poorly understood at the national level in Costa Rica since it has never been examined⁸¹. Landholder absenteeism and the non-farm-dependent tendency of PES participants on the whole⁸² suggest that Costa Rica's economic transition from an agrarian economy could be an important precondition for PES efficacy. **Legal framework, through a good balance between a flexible public regulation and private regulation could accompany change.**

PES in Costa Rica is not an objective *per se* but an instrument, raised and framed by public regulation and implemented by private regulation, for influencing land use toward the continued or enhanced provision of forest-derived ecosystem services. Its impact on efficacy, effectiveness and efficiency not only depend on the nature of regulation, but also on the presence of knowledge at the stage of its design and the presence of data (and crossing-data) at the stage of its implementation.

Now, let us see how the mechanism takes place in France through the particular Vittel case study.

⁸¹ Daniels (A.E.) *et al.*, "Understanding the impacts of Costa Rica's PES: Are we asking the right questions?", *Ecological Economics*, 2010, pp. 2116-2126.

⁸² Sierra (R.), Russman (E.), « On the efficiency of environmental service payments: a forest conservation assessment in the Osa Peninsula, Costa Rica », *Ecol. Econ.* 59, 2006, pp. 131-141; Morse (W.C.) *et al.*, "Consequences of environmental service payments for forest retention and recruitment in a Costa Rican biological corridor", *Ecol. Society* 14 (1), 23, 2009 <http://www.ecologyandsociety.org/vol14/iss1/art23/>.

Chapter 2 : France

V. INTRODUCTION

Selling ‘natural mineral water’ is the activity where the legislation is the most constraining and the reputational risk is especially high. Vittel waters are labelled ‘natural mineral waters’. This implies water must come from a well-protected specific underground source and the composition of the water must be stable. The water must be bottled at the source⁸³.

How water is treated depends on the type of water and the local legislation of each country. In France the legislation is very strict. Apart from elimination of natural unstable elements such as iron and manganese, no treatment is allowed for ‘natural mineral water’ and stability has to be achieved naturally. Water quality is so crucial to business operations that every day over 300 tests of water quality are carried out in the central laboratory of the Product Technology Center in Vittel⁸⁴. This is in addition to the tests conducted several times per day at each individual plant. In other countries, for instance in the United Kingdom and the United States, treatment is authorized. This significantly reduces business risk.

In the early 80’s, the de la Motte family, then owners of the Vittel brand, realized that the intensification of agriculture in the Vittel catchment posed a risk to the nitrate and pesticides level in Grande Source and consequently to the Vittel brand. The artesian spring for Vittel’s Grande Source is located in the thermal park and all farms in the catchment are located upstream from the spring.

The increased nitrate rate was caused primarily by the heavy leaching of fertilizers from the maize fields in the winter when fields are barren, overstocking, and poor management of animal waste. To continue to operate the water source, the Vittel Company had to find a solution to the pollution generated upstream. One alternative was chosen by Vittel. It had **to convince farmers to change their farming practices, and develop a system of incentives attractive enough for them to want to do so.**

So in 1989 Vittel, in partnership with the French National Agronomic Institute (INRA), launched a four-year multidisciplinary action research program called Agriculture-Environnement-Vittel (AGREV). The objective was threefold. First, to understand the relationship between actual farming practices and the nitrate rate in the aquifer. Then, to identify and test the practices necessary to reduce and maintain the rate of nitrates at the desired level rate. At last, to identify incentives necessary for farmers to change their practices.

Ultimately, a package of incentives was developed in collaboration with farmers who agreed. This package was composed of several conditions and modalities⁸⁵. It provides :

- A long term contract (about 18 or 30 year).
- The abolition of debt linked to land acquisition or usufruct for up to 30 years for lands acquired by Vittel.

⁸³ Perrot-Maître (D.), *The Vittel payments for Ecosystem Service : “Perfect” PES Case,*”, International Institute for Environment and Development, London, UK, 2006.

⁸⁴ Croville (J.L.), Water Resources and Environment Group, Nestlé Waters MT, Face to face interview, Vittel, July 2006.

⁸⁵ Perrot-Maître (D.), *The Vittel payments for Ecosystem Services: “Perfect” PES Case,*”, *op. cit.*

- Subsidy of, on average, about 200 euros per ha per year over five years. This measure can ensure a guaranteed income during the transition period and reimburse the debt contracted before entering the program for the acquisition of farm equipment. The exact amount is negotiated for each farm.
- Up to 150 000 euros per farm to cover the cost of all new farm equipment and building modernization.
- Free labour to apply compost in farmers' fields. Amounts are calculated for each plot for each farm every year, and individual farm plans are developed every year.
- Free technical assistance including annual individual farm plans and introduction to new social and professional networks. This is particularly important as giving up the intensive agricultural system alienated farmers from traditional farming networks and support organizations such as the Farmers' Federation and the Chamber of Agriculture.

Terms of contracts such as the time horizon, guaranteed income during the transition period, and farm equipment investment are discussed with each farmer and adjusted accordingly.

Simultaneously, to developing AGREV (and upon approval from the local Société d'Aménagement Foncier et d'Etablissement Rural (SAFER)⁸⁶), Agrivair (from Nestlé-Water France Belgique Society) had also purchased lands available in the area. This action was funded on a pre-emption right on any sales of farms and farmlands which are later sell back to interested farmers. The objective of this intervention on the land market is to help farmers access the land market and promote farm efficiency through farmland consolidation (called "remembrement"). The arrangement also helps young people who want to start farming to acquire land at acceptable prices. In less than five years, Agrivair had acquired 1 700 ha, *i.e.* 50% of the land located in sensitive areas. The land was then given in "prêt à usage" (usufruct) in exchange for signing an 18- or 30- year contract.

VI. MECHANISM

The mechanism presents strong characteristics which certainly lead to the success of the PES:

- the contracts are differentiated according to the cost structure and location of the individual farms. The program targets farms which can really make a difference in terms of water quality.
- the link between ecosystem service, *i.e.* water filtration, and maintenance of adequate levels of nitrate in the plant sub-root system, and management practices has been established scientifically at the sub-basin and plot level. A baseline has been established and the management practices recommended were based on four years of intensive farm modeling and continuous on-farm testing.
- Payments are not conditional on the change in nitrate rates in the aquifers as the contribution of individual farms to water quality in the spring is impossible to establish. Rather they are based on new farm investment and the cost of adoption of new farming practices. Optimal rates of manure application are established for each

⁸⁶ In France, SAFER are private institutions created by the public sector to intervene in the farmland market. The SAFER have priority over land and farms transactions in their area.

farm plot every year and manure applied by directly by Agrivair labourers to ensure that optimal rates are applied.

- to fine tune recommendations made to farmers, INRA monitors the nitrate rates all year round at 17 sites across four soil types and two types of farming systems. Agrivair monitors the farming practices, the good use of new building facilities, and the livestock stocking rate.

(See next Fig. 1)

Farmers' compliance with the new extensive farming system is not a problem. Once they have implemented the switch, they are not encouraged to go back to their former practices.

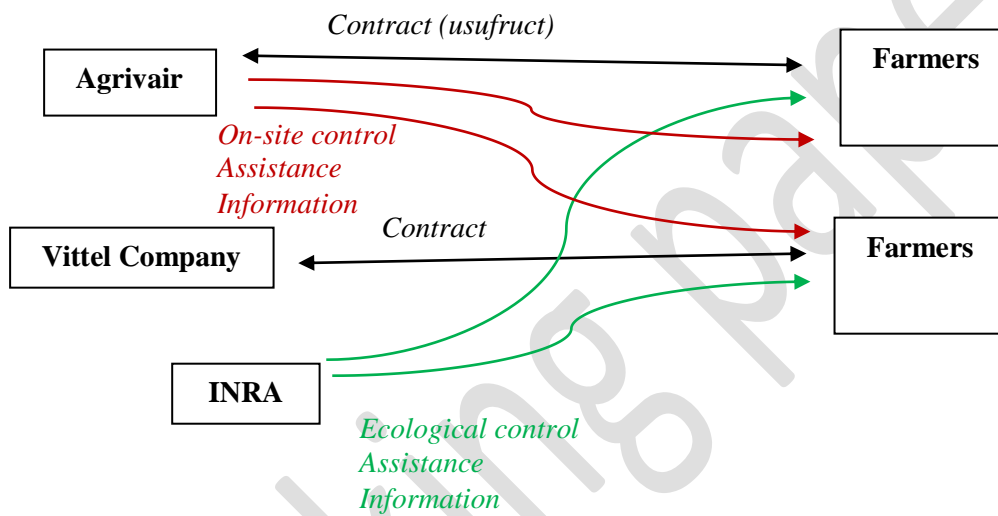


Fig.1

VII. IMPACT OF THE PES SCHEME

4. Success of the PES scheme

The program was ultimately successful. By 2004, all 26 farms in the area had adopted the new farming system. 1 700 ha of maize had been eliminated and 92% of the sub-basin was protected. The program speeded up the retirement of the marginal farmers who sold their land to Agrivair. The number of farms in the sub-basin declined from 37 to 26 while average size farm increased to 150 ha as the extensive production required additional land.

A clear indicator of success has been the request from young farmers who have taken over the family farm to enter into 30-year contracts. At present, all farmers have signed 30-year contracts.

Some other criteria are proposed to explain de success of Vittel case⁸⁷:

⁸⁷ Prokofieva (I.), Wunder (S.), Vidale (E.), *Les paiements pour services environnementaux : une opportunité pour les forêts méditerranéennes ?*, Le Cahier sur les politiques de l'EFI 7, European Forest Institute, 2012.

- Target brakes and levers: precisely define the surfaces of environmental issues, *i.e.* areas where absence of PSE constitute a threat.
 - Target areas of high environmental services: the majority of ecosystem services are unevenly distributed across landscape. For instance, the need to preserve the river basins next to major cities requires to cartography resources and needs to target areas of high priority.
 - To compensate individually: this depends on the properties of lands.
 - To strengthen control and payment conditions: the efficacy of the program implies to assess the effectiveness change on management practices.
 - To verify that the measures are carried out in coordination with various actors: the whole of stakeholders must coordinate their financial, contractual and control process. We can note that government's commitment often require to ensure the proper functioning of the PES.
5. Involvement of actors and adhesion

In the opinion of the Agrivair Director, even with all the scientific knowledge accumulated, the **program would not have been possible without the effort made to understand farmers, establish a permanent dialogue with them, and recognize their perspectives (not only in terms of farming practices but also in terms of life choices). The methodology used in this process was the key to success, not the funds injected into the program.**

The entire program was essentially a 'learning-by-doing' experiment and it was the ability to 'think outside the box' brought by the multidisciplinary INRA team, and later Agrivair, and the active participation of farmers in identifying and testing alternative practices, that brought success to the experience.

Understanding farmers' choices and constraints and offering them long-term rather than yearly contracts which permit to reduce risk were fundamental elements of success. **Understanding the local reality from a development perspective, and not just from a technical perspective ('farming practices'), was also key in identifying solutions that took into account farm families' present and future plans. Reducing risk and uncertainty by offering subsidies high enough to ensure that there was no loss in revenue was another important element.** INRA estimated that during the first five years, farmers subsidies were equivalent of up to 75% of farm disposable income⁸⁸.

This case study also illustrates convincingly the **fundamental role of intermediary institutions. INRA and then Agrivair played a key role in establishing trust between farmers and Vittel.** The Director of Agrivair was formerly employed with the INRA research team working in the area and his knowledge of the farming community, as well as his ability to **communicate scientific information to farmers**, made him a particularly effective interlocutor. The geographical proximity of the Agrivair grounds and staff was also important as it provided a convenient meeting place to establish an ongoing dialogue. Eventually Agrivair and the farmers succeeded in reaching a mutually satisfactory arrangement. The research team contributed in determining the basis on which Agrivair would **negotiate each contract with each individual farmer**, as neither Agrivair nor the farmers knew which changes were necessary to reach the desired nitrate level.

The successful long-term partnership with a public research institution was also a key element of success. Without it, Agrivair would not have been able to develop the program and

⁸⁸ INRA , *Les Dossiers de l'Environnement de l'INRA*, n° 14, 1997.

validate recommended practices scientifically. There was at the time a “strong political support to make the experience successful, to a certain extent regardless of the overall costs”⁸⁹. Much was at stake not only for Nestlé Waters but also for the municipality, which benefited from the employment created by the business and the tax revenues.

The research team played a **mediation and communication role that was fundamental in establishing trust and mutual comprehension of the technical issues**. Understanding the land market and debt cycle in which farmers were caught as well as their financial risk, demonstrating that the same revenue could be achieved with different farming systems, and providing long-term solutions, were all fundamental to the success of the negotiation process. Agrivair essentially proposed changing practices in exchange for ensuring long-term continuity of farming and sustainability of farm family life in the basin.

Feasible solutions and clauses in the proposed contracts were elaborated through a **collaborative process** with farmers, which increased their acceptability. The program was enthusiastically accepted by the Water Agency and the municipalities. In addition to leading negotiations and co-ordinating the design, implementation and monitoring of the program, Agrivair has a fundamental role in empowering farmers to act: it provided them with technical, administrative and organizational support by linking them to the research community and to new social and professional networks and services (technical support, input providers). Farmers who decided to enter the program lost their links with traditional farming networks (Chambers of Agriculture, Farmers’ Federation), and it was essential for the success of the program to provide new support networks and enable farmers to enter a new professional group and not be dependent on Agrivair alone. The program also provided **political mediation** between the different actors so that it could be publicly and openly debated by professional organizations. Agrivair provided a **platform** through which farmers could voice their concerns, doubts and questions, as well as **share their experiences**. It also provided tailored technical advice to individual farmers and addressed the labour bottleneck by providing the labour necessary to implement the new farming practices, like composting, and spread of composted manure. Agrivair maintains a staff of about 20 persons, although not all are involved fulltime with farmers, and provides 23% of the overall seasonal work for each farm⁹⁰. It is clearly filling a role without which the scheme would not have been possible.

The experience shows that generous financial incentives and scientific knowledge are far from sufficient to ensure the success and adoption of such a program. It also shows that imperfect knowledge does not limit the effectiveness of action if it is completed by experiences on the ground. Although there was much uncertainty at the beginning, it was possible to simultaneously develop an understanding of the system and propose solutions while initiating a dialogue with the farming community. In fact, the research in farmers’ fields provided a platform to discuss the solutions proposed and encouraged open dialogue.

6. Limits of the PES scheme

⁸⁹ Déprés (Ch.), Grolleau (G.), Mzoughi (N.), “Contracting for Environmental Property Rights: The case of Vittel”, Paper presented at the 99th Seminar of the European Association of Agricultural Economists, Copenhagen, Denmark, August 24-27, 2005.
http://www.eaae2005.dk/CONTRIBUTED_PAPERS/S59_713_Mzoughi_etal.pdf#search=%22observatoire%20environnement%202005%20vittel%22

⁹⁰ *Ibid.*

In terms of sustainability of the program's results, once farmers have undertaken the transition, the farming system is sustainable since it was designed to maintain farm income at all times. A few farmers decided to switch to organic milk production to increase the profitability of their operation but they found themselves unable to market the milk on the organic market. The reason for this is that in France, whenever milk producers have a contract with a cooperative, the milk belongs to both the producer and the cooperative and, regardless of its quality, cannot be marketed independently of the cooperative.

Regulation and impacts analysis

The Vittel case illustrates a PES developed on a private initiative. It is original because it deals with embottled water.

According to the mechanism, it is a contractual relationship between two private actors: a Company and farmers. There are two kind of contracts: contracts with farmers who are owners and usufruct contracts. Private regulation is over-dominant, whatever the identity of contracting party is.

The private regulation developed between Vittel and farmers is interesting because it supposed the intervention of lots of stakeholders without any previous legal framework. The conclusion of the contract, called "package", was the result of a long discursive process between farmers, research actors and private sector and was based on a scientifically study which permit to inform on ecological and agronomic factors which would allow to reach Vittel's goals. Moreover, the participation of institutionalized intermediaries was important because they made a strong awarenessraising policy, dialogue between stakeholders, and took into account farmers' interest. The Vittel case is a perfect example of the degree of negotiation and regulation put in place.

Among strength, we can note the term of the contract (even it is temporary (30 years), it is more sustainable than other contracts concluded for 5 years). Then we must underline the particularity of each contract concluded to take into account the specificity of lands and farmers. This contract offers financial advantages and technical assistance. Furthermore, a large place is given to intermediaries who negotiate contracts, monitor, help farmers, and communicate on PES scheme. At least, the process supposes a strong monitoring of practices and the evolution of the quality of water.

All of these factors created a favourable situation for effectiveness, efficacy and efficiency of contracts.

The strong relationship with the scientific sector have led to a deeply work on knowledge: scientific data and study to determine polluted lands, high priority areas, and assess (upstream and downstream) the rate of nitrates and other dangerous substances. Knowledge of experience was also took into account at the time of dialogue with farmers. They concerned their practices, theirs attempt, their capacity of adaptability...

Ecological and economic advantages from the PES scheme are predominant. On a social perspective, the dialogue bring trust and proximity between stakeholders. It led an effectiveness of a such mechanism.

Those criteria highlight that the Vittel experience provides many useful insights and lessons⁹¹. First of all, primary reasons for success are not necessarily financial. Then, It seems that private regulation was essential to achieve the Vittel's goal. Does it mean that public authority is unable to achieve this goal⁹²? To the question "why the Water Agencies and the French Ministries of Environment and Agriculture are not able to obtain similar results when vast amounts of money are spent every year to improve water quality?", Agrivair proposes this answer. First, institutions are dominated by a single scientific discipline, like agronomy, plant science, livestock science, *etc.* and offer technical solutions without addressing the economic, social, legal, political and communication aspects of change. Solutions and incentives tend to be short-term and do not take into account the livelihoods strategies of farm families and their long-term plans (including the future of family farming for the next generation). They do not start with the basic premises that in order to succeed, any change must ensure that agricultural revenues are maintained at all times, and that in the long run, social, political and technical support networks are fundamental elements of the farming systems and must also be considered throughout the process. Changing farming practices is as much a social and political change as a technical one.

VIII. FLOW OF KNOWLEDGE

The Vittel case study is very interesting in the field of flow of knowledge (from the most scientific data to the experiences on the ground) because the whole process, from the design of PES to its implementation, is based on it. Furthermore, it brings together ecological, economic and social aspects.

Knowledge was taken into account upstream the implementation of PES. To achieve this, a four step methodology was developed and based on ecological, economic and social aspects⁹³.

First, it tended to understand the farming systems and why farmers did what they did. This is farmers' knowledge through their experience and goals based on their experience.

Secondly, it aimed at analyzing conditions under whose farmers would accept to change their practices. This aspect deals with economic and ecological aspects. On one hand, it deals with the cost-benefit ratio which could play a key role in their changing practice. On the other hand, we can think that farmers should accept to change their practices if new ones bring an environmental improvement.

Thirdly, it aimed at identifying, testing, and validating in farmers' fields the management practices necessary to reduce the nitrate threat. This is a practice-ecological ratio. It implies to bring together farmers' knowledge and ecological hypothesis and data. We can notice that the agronomic research conducted led to the conclusions that in order to maintain nitrate rates below 4.5 mg/l in the aquifer, the nitrate rate had to be lower than 10mg/l in the root zone. A number of practices were identified to maintain this rate and a zero pesticides level : give up maize cultivation for animal feed (land under maize production shows nitrates rates of up to 200mg/l in the root zone), adopt extensive cattle ranching including pasture management (hay and alfalfa rotation so that farms produce all animal feeds themselves), reduce carrying capacity to a maximum of one cattle head⁴ per hectare, compost

⁹¹ Perrot-Maître (D.), *The Vittel payments for Ecosystem Services : "Perfect" PES Case,* , International Institute for Environment and Development, London, UK, 2006.

⁹² *Ibid.*

⁹³ *Ibid.*

animal waste and apply optimally in the fields, give up agrochemicals (chemical fertilizer replaced with composted manure, no pesticides), modernize farm buildings for optimal waste management and storing...⁹⁴. That's why authors qualify this process as ten year process of participatory research and negotiation⁹⁵.

Adopting a new farming system implied that the farmers had an interest in this change in the first place so that a dialogue could be established, and that they were willing to change under a number of mutually agreed conditions. The dialogue between the farming community and Vittel was initiated in 1989, through the establishment of AGREV. Farmers were invited to participate in the research action program and work with the researchers on identifying acceptable conditions for a new production system that would be compatible with Vittel's objectives. Despite all the scientific knowledge accumulating and the eventual willingness of both parties to reach an agreement, ten years were necessary to complete the bargaining process and convince all farmers actively engaged in the activity to change. So, the economic factor came into account. This was essentially due to the heterogeneity in farming situations, and the difficulty in reaching agreement on how to value the cost of changes and the size of compensation. Lack of trust on both sides complicated the valuation disputes, increasing transaction costs and lengthening the time necessary to reach an agreement. The main issue of contention in the valuation process was the choice of the basis to evaluate the level of compensation to farmers: should the baseline be based on farmer's costs or on Vittel's benefits? If based on the opportunity cost to the farmer, how could calculations reflect the heterogeneity of the farms?

To achieve this, two kind of factors were taken into account. On one hand, the level of compensation to be negotiated could not be lower than the opportunity cost of change for the farmers plus a little extra to provide an incentive for modifying practices. This cost included the loss in agricultural output incurred by changes in farming systems plus the investment and learning costs linked to adopting new practices. On the other hand, the upper limit was the opportunity cost to Vittel or the increased value of Vittel water because of maintenance of water quality. In practice, the upper limit would have to be a little lower than this otherwise Vittel would get no profit at all from the changes since all of it would be distributed to farmers. Of course, there was great uncertainty attached to the benefits for Vittel.

Predictably, in order to evaluate the level of their compensation, farmers wanted to use the benefit to Vittel while Agrivair wanted to use the opportunity cost to the farmer. Farmers were in a good position to negotiate their level of opportunity cost as they knew the potential of their farms and the costs and impacts of changes, and they challenged the estimated values. Some farmers even asked for reliable data on the sustainability of the Agrivair proposition. Each farmer located in the strategic area had a monopoly power because his or her land could not be substituted with others and a large proportion of the farm was located in the spring catchment. Because of the configuration of the basin (all farmlands were located upstream from the spring area and varied in their percentage of land within the protection perimeter and their distance to the spring), each farmer could individually influence the nitrate rate. A farmer next to the spring could alone increase nitrate rate in water and jeopardize the entire negotiation process. The strategic location of the farmland (with each farm having the potential to impact water quality) led to opportunistic behavior which increased transaction costs significantly. Furthermore, many farmers had their own family members employed by Vittel and local development was at stake in a region where unemployment has been rampant for decades. A major step was taken in 1992 when Nestlé Waters, then full owner of Vittel,

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*

created Agrivair, an intermediary responsible for negotiating and implementing the program. Agrivair was strategically located just outside the town of Vittel, close to farmers and farmers' associations. The Director of Agrivair was formerly employed with the INRA team that worked on AGREV and was well known to the farmers and stakeholders in the area. This contributed to ensuring continuity between the design and the implementation of the project and was critical to facilitating the communication of the results of scientific research to the farmers.

The fourth step was to provide financial and technical support to farmers willing to enter the program. This supposes to bring enough data, information and explanation to farmers to organize themselves changing practices.

Unlike conventional approaches in agriculture, which focus on the agronomic aspects of practices, **the methodology focused initially on understanding the history, the geography, and the sociology of the area and its people. Scientific and economic research were only introduced later after a dialogue had been successfully established between Vittel and the farmers**, compatibility between farmers' and Vittel's objectives had been demonstrated, and the idea of a mutually beneficial partnership accepted⁹⁶.

The farm typology developed showed there was no such a thing as a "typical farmer" in the area. Instead there were four groups of farmers, each with a different set of livelihood strategies, objectives and constraints, as well as a varied willingness and capacity to adapt to change. This shows an example of crossing-analyses between knowledge rinsing from experiences. Four groups were distinguished. The group A was composed of small farms, with activities concentrated on cattle-raising for meat production and hay cultivation. In that group, farmers were older than in other groups (over 50 years old). Group B included farms specializing in milk production, with hay and maize cultivation. Group C was composed of farms producing milk, meat, hay and maize with a good level of productivity. Farmers' ages were younger than for groups A and B (about 40 years). Group D were farms producing the same crop as those in Group C but with a focus on meat production and maize. Their level of productivity were much higher than for the other groups and practices were highly technical.

Knowledge was also taken into account downstream the implementation of PES. To be achieve, a strong monitoring was put in place to evaluate the adequation between practices and ecological change (more exactly, the link between ecosystem service as water filtration and maintenance of adequate levels of nitrate in the plant sub-root system, and management practices).

Knowledge analysis

In the Vittel case, the public regulation was absent. We can note that the flow of knowledge does not depend on law but on actors' dialogue. The whole process of PES, from its design to its implementation, is based on the flow of knowledge. Upstream, the implementation of PES, the exchange of data, willingness and experiences constituted the main part of the process. This aimed at adapting farmers' activity and practices without changing them in a way they do not accept. This approach on case-by-case take a strong part in the key of success. Ecological and economic consequences were both taken into account on the light of the sensitivity of each farmer to establish mutual agreements and mutual

⁹⁶ *Ibid.*

enrichment between them and Vittel. But unlike conventional approaches in agriculture, the methodology focused initially on understanding the history, the geography, and the sociology of the area and its people. Scientific and economic research were only introduced later after a dialogue had been successfully.

The role played by intermediaries, as AGREV or INRA was also very important to convince farmers of the opportunity, for them, of the operation. It has also contributed to confidence building between farmers and Vittel.

This lead to the main question: is a public regulation required to guarantee the dialogue and the collection of usefull data and knowledge? Maybe it is possible to give a nuance answer by taking into account the place and the role of actors and intermediaries in the process without who the Vittel case had not been a success.

Working paper

Chapter 4: Indonesia

V. INTRODUCTION

Anyone who read the literature on PES can see the gap between theory and practice. Practice seems to be a distortion of theory. Concretely, practice of PES often refers to well-known process in the field of conservation of action (as integrated conservation projects or regulations based on environmental taxation which deal with the polluter-pays principle)⁹⁷.

In the present Indonesian study, we take into account two experiences: the Cidanau case and the Lombok case.

VI. THE CIDANAU CASE STUDY: MECHANISM AND IMPACT

The Cidanau process was funded by a private water company and managed by local stakeholders through incentives agreements. It is probably the case that comes closest to the concept of PES.

Historically, PT Krakatau Tirta Industry (KTI) collects water near the Cidanau river mouth for its plant. The water is then processed and distributed to a number of users including PDAM (Perusahaan Daerah Air Minum), the local State-owned water company (which supplies 159 000 domestic consumers), and 120 industrial users. KTI staff clearly expressed concerns about the situation in the watershed as water demand by industrial and domestic units is expected to increase steadily and environmental problems might lead to a decrease in water availability and quality. Moreover, due to siltation KTI is reported to suffer from blockages in its 28 km water pipe and pump. As a result, the company used to spend US\$ 62000 a year to clean the Cidanau river and maintain infrastructures related to water processing⁹⁸. In response, building on the large amount of scientific research undertaken in the watershed, a broad group of actors established in 1998 the multi-stakeholder Cidanau Catchment Communication Forum (FKDC). It includes representatives from government agencies, a university, upstream and downstream farmers, KTI, and a local NGO called Rekonvasi Bhumi. It received legal recognition in 2002, and benefited in 2004 from scientific results and recommendations drawn from a seminar jointly organized and funded by several universities, the Government of Banten Province and the private water company KTI. The concept of downstream-upstream payments was first introduced to Cidanau stakeholders in 2002 by the German Technical Cooperation (GTZ) and the national NGO LP3ES. This move, under the coordination of the International Institute for Environment and Development and the World Agroforestry Centre, was part of a broader research-action project to develop, through PES schemes, economic incentives in several watersheds in Indonesia. While options were being considered in 2002, a member of the local NGO Rekonvasi Bhumi was funded by the GTZ and visited the Costa Rican PES scheme. There he identified the conditionality component as innovative and likely to ensure greater effectiveness, as compared with purportedly failed past land rehabilitation and reforestation programs in the area. In 2004, the FKDC was thus willing to trial such a new instrument to tackle environmental issues in the watershed, and in 2005 KTI, convinced to be a beneficiary from watershed services (water quality and quantity) to be provided by upland farmers, agreed to fund a PES scheme with

⁹⁷ Pirard (R.), Billé (R.), « Paiements pour services environnementaux. De la théorie à la pratique en Indonésie », *Vertigo*, 2011, Vol. 11, n° 1, <http://vertigo.revues.org/10746>

⁹⁸ Munawir (S.), Vermeulen (S.), *Fair Deals for Watershed Services in Indonesia*, London: International Institute for Environment and Development, 2007.

FKDC as intermediary and the local NGO Rekonvasi Bhumi as the implementer on the ground.

Institutionally, two different contracts are at play⁹⁹. On one hand, there is a 5-year Memorandum of Understanding (MOU) leading to an annual payment of US\$ 350 per ha per year by KTI to FKDC for planted and/or conserved forest (a minimum of 500 trees per hectare). On the other hand, there are several contracts between the FKDC and farmer groups for a similar period, specifying eligible tree species and payments of US\$ 125 per ha per year by FKDC to farmer groups. For each of these latter contracts FKDC deals with groups, not individuals, to plant and conserve trees on exactly 25 ha of contiguous land. Each group chooses the land, with various numbers of members depending on the size of the plots contracted under the PES. Each farmer group leader needs to assess the number of eligible trees for each individual plot before the contract begins. Whenever plots do not meet the 500 trees per hectare condition at the outset, the farmer needs to plant in order to fill the gap and can benefit from support by KTI with the distribution of free seedlings. The contract, describing rights and duties for both parties, is signed by the group leader but distributed to each group member. During the contract 5-year period the minimum 500 trees per ha must be maintained, which is verified by a monitoring team set up by FKDC. The team involves all stakeholders and goes to the field once a year to monitor 2.5 ha of lands randomly chosen within the farmer group. Once it gives its approval, payments are made to farmer group leaders (practically transferred on their bank account), who in turn are responsible for the cash distribution to participants. In case of a negative report by the team, *i.e.* if at least one farmer fails to meet the conditions, payments are terminated for the whole group¹⁰⁰. (See next figure 1.)

⁹⁹ Lapeyre (R.), Pirard (R.), Leimona (B.), “Payments for Environmental Services in Indonesia: What if economic signals were lost in translation?”? *Land Use Policy*, 2015.

¹⁰⁰ *Ibid.*

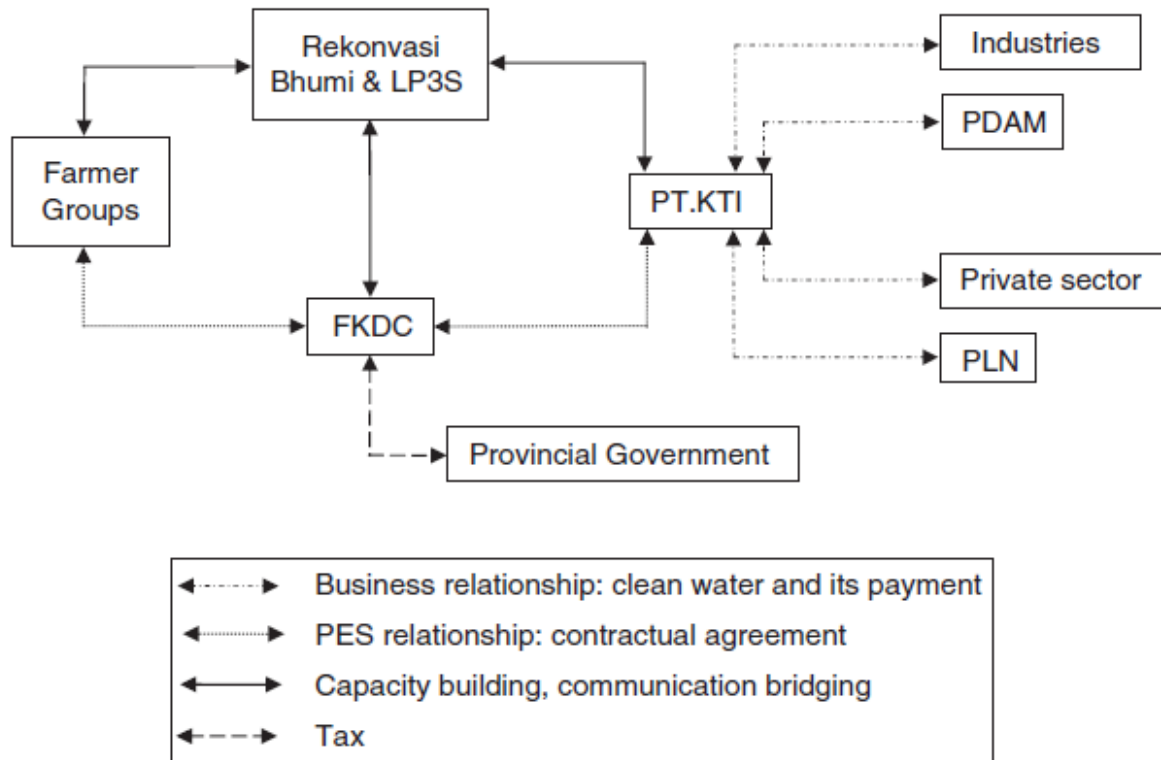


Fig. 1¹⁰¹

The Citarum case is quite close to the Cidanau one, which is easily explained by the presence of the same facilitator (LP3ES) and a similar problem on services related to water supply¹⁰². There are also contracts at several levels and substantial involvement of the State and NGOs. The problem of land degradation upstream has been previously identified. There is no doubt about it among stakeholders. In practice, contracts are signed and provide financial payments to collective farmers if land is rehabilitated, but in a short period of less than one year. Furthermore, conditionality is virtually absent, because owners farmers receive all payments in the first few months, regardless of their future decisions, especially good supply of environmental service.

- **Cidanau PES as a mixture of private regulation and economic tool without any public regulation?**

Building on discourses of PES and technical assistance from research partners, the contract here clearly sets an economic transaction where a buyer (KTI through the intermediary FKDC) buys a defined environmental service from a farmer group (and its members) specifically named a seller in the contract, depending on its willingness to accept. It is expected that such program will trigger a causal chain where conditional payments given to private farmers on steep land plots would alter the cost-benefit ratio for each possible land-use

¹⁰¹ Leimona (B.), Pasha (R.), Rahadian (N.P.), “The livelihood impacts of incentive payments for watershed management in Cidanau watershed, West Java, Indonesia”, in Tacconi (L.), Mahanty (S.), Suich (H.), *Payments for Environmental Services, Forest Conservation and Climate Change. Livelihoods in the REDD?*, Edward Elgar Cheltenham, UK, Northampton, MA, USA, 2010, pp. 106-129.

¹⁰² Pirard (R.), Billé (R.), « Paiements pour services environnementaux. De la théorie à la pratique en Indonésie », *Vertigo*, 2011, Vol. 11, n° 1, <http://vertigo.revues.org/10746>

activity on the plot concerned, thus modifies farmers' behavior and chosen strategy towards tree planting and conservation, and in turn would curb deforestation in the watershed and, ultimately, improves water quality and quantity¹⁰³.

PES as an economic tool is closed to the approach of the environmental law of 3rd October 2009. As a consequence, we can ask ourselves if practice has not inspired legislator. Indeed, this text gave formal recognition to the PES¹⁰⁴ and imposed regions to develop economic instruments for prevention¹⁰⁵. A list of instruments for their concrete work is proposed and explicitly mentions the development of PES¹⁰⁶, and a definition is given: payment for environmental services is the payment (or compensation) made by users of environmental services for the providers of these services.

- **What kind of limits does the process report?**

In the Cidanau experience, the annual payments are financial amounts accepted by all parties, but contracts do not detail the nature of the operations. The question of conditionality associated with the provision of a service is raised. Indeed, although the concept of service is widely quoted in the contracts as their ultimate justification, there is no procedure for checking the quantity or quality of water¹⁰⁷.

Furthermore, we can ask ourselves if the contract is understood by service providers. Due to the institutional design of the program, limited information sharing about the PES scheme does not allow participating farmers to understand the contract and thus to modify their strategies towards environmental sustainability¹⁰⁸. Indeed, because contracts are signed at the group level, farmer group leaders retain most of the information while individual participants have a limited understanding of the program¹⁰⁹. As a consequence, **knowledge among participants largely depends on the leaders' desire and capacity to disseminate information within the group**. This situation, we contend, might be an impediment to an optimal implementation of the scheme because responses to incentives might fall short of initial expectations if poorly understood, and participating farmers might lose interest in a project where they do not feel sufficiently involved and empowered. In other words, while participants appear to be well-aware of the contract rules, a significant number of them actually associate conditions for participation to the discretionary choice made by the group leader.

This fear is illustrated by R. Lapeyre, R. Pirard and B. Leimona¹¹⁰. They precise that 18% of participants noticeably make confusion between required conditions for participating in the scheme and the decision power in the village. Indeed, they report to actually be selected by the farmer group leader. This finding points to a lack of transparency and limited dissemination of information about the PES scheme. Due to this *modus operandi* of economic incentives within the scheme, there is very limited knowledge of the amount and timing of payments among participants. Up to 85% of households cannot say much about payments, although the contract is very clear in this regard. From the point of view of participants,

¹⁰³ Lapeyre (R.), Pirard (R.), Leimona (B.), "Payments for Environmental Services in Indonesia: What if economic signals were lost in translation?"? *Land Use Policy*, 2015.

¹⁰⁴ (UU 32/2009)

¹⁰⁵ (UU 32, 2009, art. 14 let. h et 42§1)

¹⁰⁶ (UU 32, 2009, art. 43§3 let. e)

¹⁰⁷ Pirard (R.), Billé (R.), « Paiements pour services environnementaux. De la théorie à la pratique en Indonésie », *Vertigo*, 2011, Vol. 11, n° 1, <http://vertigo.revues.org/10746>

¹⁰⁸ Lapeyre (R.), Pirard (R.), Leimona (B.), "Payments for Environmental Services in Indonesia: What if economic signals were lost in translation?"? *Land Use Policy*, 2015.

¹⁰⁹ *Ibid.*

¹¹⁰ *Ibid.*

distribution takes place at a random date and according to the discretionary choice by farmer group leaders.

At least, participants feel that **decision-making process is opaque**. When asked about who is responsible for setting rules and payments made to the farmer group, 73% mentioned the farmer group leader and 8% mentioned his name. Other stakeholders with great involvement in contract design are forgotten by participants. For instance, 5.5% of them name the intermediary FKDC, 6.5% name the water supply company KTI, and 5.5% name representatives from Rekonvasi Bhumi. Interestingly, only 2% of the participants see themselves as having a voice in the negotiation about rules and payments and no more than 3.5% of them see themselves as having a role in the global process.

- **What about the impact of this instrument on environmental service provision?**

It is interesting to study the real impact on the ground with changes in land uses: does the governance of the scheme allows incentives (on which PES schemes rely) to target and reach the appropriate providers? Is the contract sufficiently understood by service providers to trigger expected decisions?¹¹¹

It seems that the need to show progress in terms of implementation and enrollment of farmer groups seems contradictory with the search for additional environmental impacts. It appears that there is a tension between the reduction of transaction costs and enhanced effectiveness, and this is embodied by the key role played by farmer groups and their leaders in the implementation. These leaders centralize influence and power in operating the scheme, thus reducing costs (through selection of participants, dissemination of information, and the distribution of incentives). Key stakeholders are aware of this fact, and make efforts to improve the on-going situation. In particular, a new element might be introduced in the near-future with procedures to assess the quality of internal governance in the farmer groups. Indeed, the implementing NGO decided to introduce an institutional assessment of each group in order to assess information-sharing and decision-making processes within these groups. This is a move towards greater efficacy through better dissemination of information, farmers' involvement and social learning. In that perspective, because service providers have a low level of education and social pressure, public authorities could play a key role¹¹².

VII. THE LOMBOK CASE STUDY: MECHANISM AND IMPACT.

This case study shows three successive funding arrangements with water users. The scheme takes place in Lombok, which is part of the Eastern Indonesian islands. Degradation of water supplies and forest condition have been observed for more than a decade (43% of the large springs surrounding Rinjani have dried up in a decade, and approximately 30% of the Rinjani area was deforested over the period 1992–2002).

A workshop was organized in 2001 in the framework of the NRM (Natural Resources Management) project funded by USAID, which one year later led to an economic valuation of the watershed¹¹³. The impressively high figures calculated during the economic valuation resulted in the creation of three working groups involving various stakeholders including the district authorities, the Rinjani National Park, water consumers through the regional water utility company, the mineral water company and NGOs. These working groups addressed

¹¹¹ *Ibid.*

¹¹² *Ibid.*

¹¹³ WWF Indonesia Nusa Tenggara Program, *Resource Economic Valuation of Rinjani Mountain Area*, WWF Indonesia Nusa Tenggara Program, Mataram, Indonesia, 2002.

separately the required legal framework for better environmental management at both the district and provincial levels and the possibility of establishing a PES. In conclusion, it was decided in 2003 to design and implement a PES. A biophysical study was thus performed to provide all necessary elements of information to elaborate a PES that would optimally maintain the water services¹¹⁴.

Negotiations for the establishment of a mechanism took place from 2004 to 2007 with the creation of a mechanism that was initially voluntary, but eventually became compulsory as far as money collection is concerned. Indeed, while some areas of Mataram City agreed to participate in a pilot phase whereby individual water consumers paid monthly fees to rehabilitate lands in the watershed, it was eventually decided to enact a regulation to generalize the scheme amongst all water consumers. The financial components of the negotiation, *i.e.* who pays what, and associated laws and decrees, were all addressed during the 2007-2010 period. Decrees determined that 75% of the collected money is to be allocated to payments through PES contracts, while the remaining 25% is allocated to the district budget for overhead costs. The process was about ten years, but it allowed stakeholders to reach a comprehensive agreement that has the potential to generate substantial financial resources and to initiate long-lasting and satisfactory environmental management in the targeted Rinjani area¹¹⁵. This agreement led to the establishment of a multi-stakeholder body called IMP (Institusi Multi-Pihak) which is responsible for the collection of financial resources and for making deals with resource users to ensure appropriate land management. This body was requested by most stakeholders, especially residents of Mataram City as the main payers, in order to avoid a situation whereby the government alone would take responsibility for money management¹¹⁶.

Since water tariffs are regulated by a regional decree, the district government had the opportunity to take control of the PES. After a long legislative process, a new district regulation on environmental services management was issued in 2007, which paved the way for the establishment of a second PES from 2009 onwards. This second PES replaced the existing private intermediary body mentioned above with a sophisticated multi-stakeholder public agency (IMP). This new intermediary acted as fund manager, while implementing and controlling field operations, with the participation of civil society (WWF-NT, Konsepsi, *etc.*) and public agencies such as district authorities. The regulation established a monthly tax on water subscription that has been enforced since December 2009 and is collected through the PDAM billing system, and the funds have been used since 2010 by the IMP to cover expenses for forest restoration and local empowerment activities proposed by farmer groups. Restoration activities consist of the distribution of seedlings to individual farmers, under the supervision of a farmer group¹¹⁷.

Finally, a third PES scheme emerged in parallel after 2011, when the company PDAM (a major service beneficiary and a government company) decided to design and promote its

¹¹⁴ Hendrayana (H.), *Penyusunan Rancangan Rehabilitasi Ekosistem Sumber Mata Air Tertentu di Pulau Lombok*, Dinas Kehutanan Propinsi Nusa Tenggara Barat, Mataram, Indonesia, 2002.

¹¹⁵ Pirard (R.), Broughton (E.), "What's in a Name? Market-Based Instruments for Biodiversity", *Analyses*, IDDRI, Sc. Po, IFRI, n° 3, May 2011, pp. 4-31 ; Pirard (R.), Payments for Environmental Services (PES) in the public policy landscape: "Mandatory" spices in the Indonesian recipe, *Forest Policy and Economics*, 2012, n° 18, pp. 23-29.

¹¹⁶ Pirard (R.), Broughton (E.), "What's in a Name? Market-Based Instruments for Biodiversity", *op. cit.* ; Pirard (R.), Payments for Environmental Services (PES) in the public policy landscape: "Mandatory" spices in the Indonesian recipe, *op. cit.*

¹¹⁷ Pirard (R.), de Buren (G), Lapeyre (R), "Do PES Improve the Governance of Forest Restoration?", *Forests*, 2014, n° 5, pp. 404-425.

own approach, probably because of the perceived ineffectiveness of the two previous attempts. This scheme involves bilateral agreements with farmers (without the multi-stakeholder agency IMP as intermediary) and takes place in parallel with the activities supported by the second scheme. Case selection is ultimately made by PDAM on the basis of proposals from the district forest service that in turn considers initial requests that originate in the farmer groups. While the funded activities (seedling distribution) that serve as incentives are very similar to the second and third schemes, the funding and coordination aspects are contrasting. Fee collection is clearly innovative in this third scheme. As opposed to the second scheme that exhibits features of a regional tax allocated to public activities through the district budget, this third scheme has the company directly charge the costs of land rehabilitation to water users¹¹⁸.

This third version consists legally of **administrative contracts, a hybrid between a private transaction and a delegation of a public task**¹¹⁹. When PDAM negotiates a contract, it acts in a similar way to private actors, despite its public legal status. The legitimacy of such payments is based on the contribution provided to the public good and relies on a formal legal basis stating that all Indonesian public water supply companies can include restoration activities in their operational costs. In contrast, the second PES consists in the implementation of a public regulation. Both are regulated by public law, but they fundamentally differ in nature. In fact, bilateral arrangements are used by public structures (primarily the PDAM) to protect areas for the abstraction of drinking water¹²⁰. This question becomes important when command and control approach do not allow to influence land use. In such a situation, these contracts provide an alternative to protect water. Here, the public actor resumed developed by the pilot of the first generation of PES had created an imbalance between the beneficiary-pays logical bi-or multilateral.

These actions explain the distrust of actors with regard to public regulation and the way found for public persons to achieve the management of services through a disguised method. This approach promotes specific measures¹²¹. Public policies are not seen as instruments to solve such problem. Actors have more leeway when institutional frameworks in which they operate are poorly integrated¹²². But this does not reduce the complexity of the relationship between the rules laid.

It appears that three types of contracts, regulating three distinct types of relationships, are used to conduct similar activities in the same area in a different institutional manner: private contracts in first generation of PES, implementation of a public regulation in second generation of PES and administrative contracts in third generation of PES. Therefore, from a governance point of view, we observe differences in terms of voluntary (private contracts) or mandatory (public regulation) financial contributions by service beneficiaries, and the role of public authorities in organizing and controlling the transactions. (See next figure 1).

¹¹⁸ Pirard (R.), de Buren (G), Lapeyre (R), “Do PES Improve the Governance of Forest Restoration?”, *Forests*, 2014, n° 5, pp. 404-425.

¹¹⁹ *Ibid.*

¹²⁰ De Buren (G.), La régulation des interdépendances entre les forêts, et l’eau domestique en Indonésie. Etude de cas sur le site du Lombok, Working paper de l’IDHEAP, 1/2013.

¹²¹ *Ibid.*

¹²² *Ibid.*

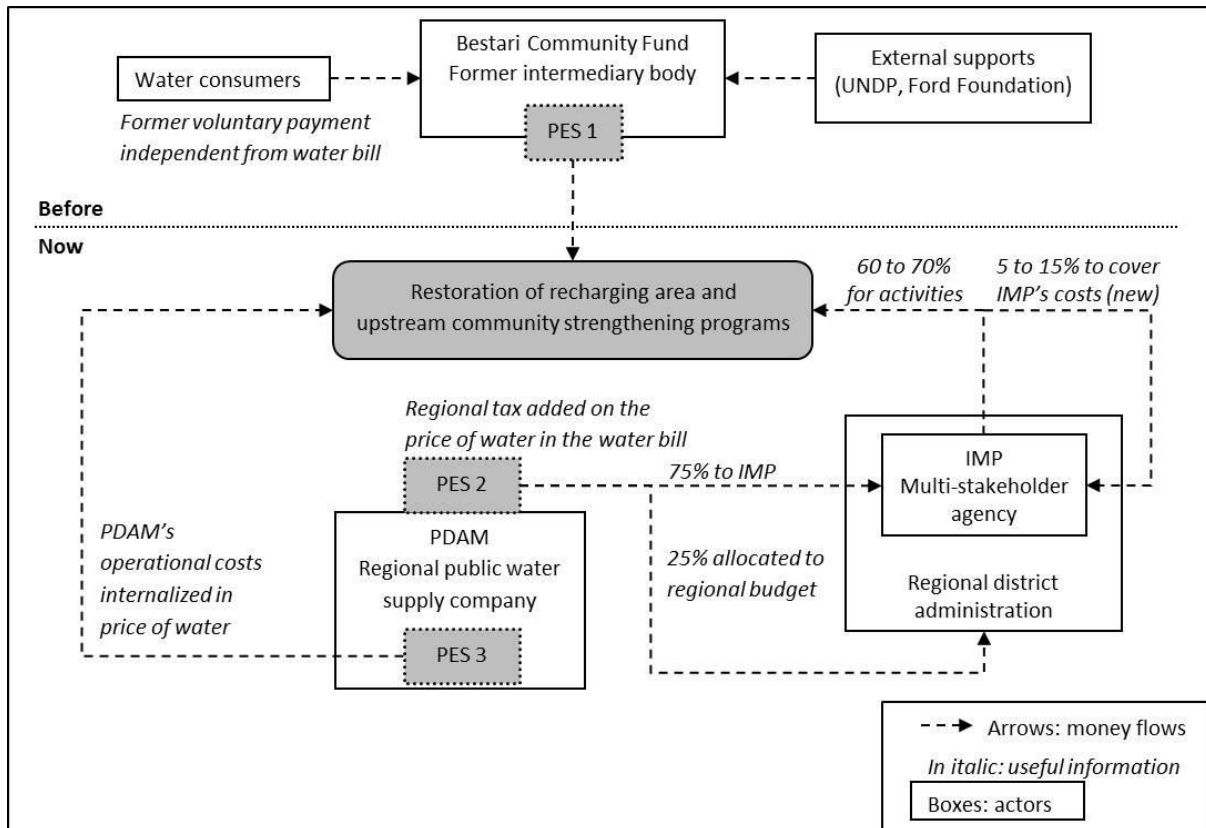


Fig 1¹²³

Regulation and impacts analysis

Those two case studies highlight the diversity of balance between public and private regulation based on a unique principle: a beneficiary pays a provider to maintain a service.

The Cidanau case, oldest than the Lombok case, shows the influence of the Costa Rica's experience on the existence of intermediaries and private regulation. However, the specificity of such scheme (Cidanau) consists in the conclusion of a collective contract. Moreover, the public regulation only takes part of the mechanism as general rules of contractual law (mutual agreement, respect of the contract...). Public regulation is not used as a specific framework for PES. Indeed, the legal framework concerning conclusion of contracts is determined by the third book of the Indonesian Civil Code of 1847 on the law of obligations. The article 1320 establishes the criteria of validity: the agreement must express the mutual consent of two individuals who have the capacity to contract. Its purpose must be specific and relate to an allowable cause¹²⁴.

The originality also comes from the contractual relationship between beneficiaries and intermediary on one hand, and between this intermediary and a provider on the other. The other particularity of this mechanism is that is a collective contract: one farmer signs for all others. As a consequence, contracts are not negotiated and considered as membership contracts, and if one of farmers breaches its contract, all other contracts are broken.

¹²³ Pirard (R.), de Buren (G), Lapeyre (R), "Do PES Improve the Governance of Forest Restoration?", *Forests*, 2014, n° 5, pp. 404-425.

¹²⁴ (*KUHP*, 1847, art 1320§1 à §4)

The absence of public regulation is also encountered in the Lombok case which had known three generations of PES, even more complicated. Each of generation was based on public regulation, even was its intensity and degree. The first one, developed in 2007, was based on decrees and laws which framed the scheme more or less. It led to a hybrid PES based on contractual agreement and public tax. The law clarified the situation, with a decree and a law, by determining more exactly beneficiaries of services, and regulating the funds collected.

In 2009, a second generation of PES took place. It was based on monthly charges paid by beneficiary to provider. A district regulation of environmental services definitely entrusted the management of PES and the management of funds to public agency which was supposed to work closely with civil society.

A third generation emerged in the 2000's and lived with the second one. It was a mix of private and public regulation, even if the private one seems to be predominant. The scheme provides that a local government company concludes a contract with farmers and the management of funds is directly made between them.

We can make some remarks as regard to these experiences. The Cidanau case shows a good example of the absence of public regulation in favour of an institutionalisation of the mechanism and a strong presence of intermediaries. Nevertheless, studies emphasised criticisms: too many intermediaries created a gap between goals of PES and providers. Indeed, because contracts were not negotiated their content was neither explicated nor understood by farmers. This lack of information led to a lack of transparency and put into question the participation of farmers in the implementation of PES. Moreover, the lack of dialogue between providers and the beneficiaries hindered the flow of knowledge and experiences which may have facilitated the appropriation of the mechanism by providers. Consequently, the effectiveness of the scheme was quite impossible.

Maybe this is the reason why the Lombok adopted a different approach of PES scheme. It chose a strong legal framework of the mechanism which was softened in 2011. This mechanism is based on a coexistence of two mechanisms, one mandatory and another voluntary. These two tools give a strong place to public authority, even it is a contractual partner or the « framer » of a mandatory tax scheme. Consequently, it is not a subsidy regime (voluntary contract paid by state) but an hybrid form of PES: a tax and a contract directly concluded with a public authority.

Which convergence between public policy and PES in Lombok case? The Lombok case offers shows a high degree of convergence between public policies and the PES itself, and both are to a great extent intertwined¹²⁵. In that experience, action for environmental management is given in private hands, building on the assumption that beneficiaries and providers of a given environmental service will find an agreement based on their common interest for conservation. But this recognition of the key role of public intervention may even lead to the statement that “PES are not first of all about moving from public policies to market allocation”¹²⁶. Further, some authors¹²⁷ actively promote the development of markets for

¹²⁵ Pirard (R.), Broughton (E.), “What’s in a Name? Market-Based Instruments for Biodiversity”, *Analyses*, IDDRI, Sc. Po, IFRI, n° 3, May 2011, pp. 4-31 ; Pirard (R.), Payments for Environmental Services (PES) in the public policy landscape: “Mandatory” spices in the Indonesian recipe, *Forest Policy and Economics*, 2012, n° 18, pp. 23-29.

¹²⁶ Vatn (A.), An institutional analysis of payments for environmental services. *Ecological Economics* 69, 2010 1245–1252.

sustainable environmental management, but also admit that “only the State can create and regulate demand for [environmental markets] on a large scale”. This case suggests a necessary relationship between PES and public policy for more PE efficacy. In that sense, although innovative instruments were developed in order to compensate for the lack of efficacy of public policies aimed at preserving the environment in a good condition, they certainly cannot stand by themselves and need to operate within the larger public policy framework¹²⁸. In that perspective, PES aimed at consolidate of States and their policies.

But we also can think PES as complement of public policy. In that sense, they are not a way for stakeholders to escape the control of public authorities but a way of complementing principles of public action like the polluter-pay principle in which one the user of the resource should bear the financial negative externalities, rather than the agent that faces the damage that should pay for the repair. At least, we can add that the implementation of the polluter-pays principle is seen as the responsibility of public authorities through the development and implementation of regulations¹²⁹.

VIII. FLOW OF KNOWLEDGE

The Indonesian case is close to the situation observed in south american countries. The PES literature provides increasing evidence on the drivers and motivations that explain ES providers’ responses to payments¹³⁰. First, consistent with the standard view of PES, studies have shown the importance of a number of external parameters, including economic ones, in farmers’ enrollment and land-use decisions in PES in developing countries: household income and livelihood diversification opportunities¹³¹, farm size¹³², level of payments and opportunity costs¹³³, and land tenure¹³⁴.

Yet other, non-economic, determinants also explain farmers’ participation and strategies. As a result, it seems to be necessary to overcome the idea that resource managers follow only an individual rationality prior to deciding whether or not to participate¹³⁵. Indeed many other behavioral studies have emphasized that internal factors (habit and cognition) as well as social factors (norms) largely complement external factors (finance and effort) when

¹²⁷ Bayon (R.), Jenkins (M.), “The business of biodiversity”, *Nature*, 2010, n° 466, pp. 184–185.

¹²⁸ Pirard (R.), Payments for Environmental Services (PES) in the public policy landscape: “Mandatory” spices in the Indonesian recipe, *Forest Policy and Economics*, 2012, n° 18, pp. 23-29.

¹²⁹ Pirard (R.), Billé (R.), « Paiements pour services environnementaux. De la théorie à la pratique en Indonésie », *Vertigo*, 2011, Vol. 11, n° 1, <http://vertigo.revues.org/10746>

¹³⁰ Lapeyre (R.), Pirard (R.), Leimona (B.), “Payments for Environmental Services in Indonesia: What if economic signals were lost in translation?”? *Land Use Policy*, 2015.

¹³¹ Zbinden (S.), Lee (D.R.), “Paying for Environmental Services: An Analysis Of Participation in Costa Rica’s PSA Program”, *World Development*, 2010, n° 33 (2), pp. 255-272 ; Kosoy (N.), Corbera (E.), Brown (K.), “Participation in payments for ecosystem services: Case studies from the Lacandon rainforest, Mexico”, *Geoforum*, 2008, n° 39, pp. 2073-2083.

¹³² Zbinden (S.), Lee (D.R.), “Paying for Environmental Services: An Analysis Of Participation in Costa Rica’s PSA Program”, *op. cit.* ; Kwayu (E.J.), Sallu (S.M.), Paavola (J.), *Farmer participation in the Equitable Payments for Watershed Services in Morogoro, Tanzania*, Sustainability Research Institute Paper n° 42, Centre for Climate Change Economics and Policy Working Paper n° 123, University of Leeds, Leeds, 2013.

¹³³ Bremer (L.L.), Farley (K.A.), Lopez-Carr (D.), “What factors influence participation in payment for ecosystem services programs? An evaluation of Ecuador’s SocioPáramo program”, *Land Use Policy*, 2014, n° 36, pp. 122-133.

¹³⁴ *Ibid.*

¹³⁵ Kosoy (N.), Corbera (E.), Brown (K.), “Participation in payments for ecosystem services: Case studies from the Lacandon rainforest, Mexico”, *op. cit.*

responding to incentives¹³⁶. On one hand, farmers most often display bounded rationality. The level of literacy and computational capacity as well the degree of information sharing and dissemination¹³⁷ might explain the extent to which participants enroll (or not) in PES and correctly interpret the contract. On the other hand, farmers in rural settings might display characteristics of bounded self-interest¹³⁸. When deciding about their land-use strategies, farmers also follow intrinsic pro-environmental and pro-social attitudes¹³⁹, and are motivated by their social image and reputation at the neighborhood level. Finally, enrolled farmers might also respond differently to incentives depending on how they perceive their involvement and decision-making power within the PES scheme¹⁴⁰.

Knowledge analysis

The Cidanau case shows the difficulty of ecological, economic and social assessment, mainly because of methodological complexity. From an ecological point of view, the difficulty consists in a lack of definition of biodiversity and ecosystem services. From an economic point of view, the problem deals with the lack of assessment or their unreliability. It is surprising because the economic aspect is quite important for farmers and their family.

In that case, the specific interest or way of living of farmers are not taken into account. This lack of interest take the form of collective and non-negotiable contractual agreement concluded between farmers and beneficiary. It is also highlighted by the non-inclusion of their habits, uses, environmental perception, and environmental needs. Consequently, the tool is quite not effective.

The Lombok case is quite similar to the Cidanau case, but we can note differences. First, neither private regulation, nor public regulation ensure the introduction of social or ecological knowledge during the design or implementation of the tool. But the PES is more effective because the contract is concluded voluntarily or is a subsidy. It is not a non-negotiated and collective agreement.

CONCLUSION

With Lombok case, we see the emergence of projects using the terminology "PES mandatory"¹⁴¹. Ultimate beneficiaries of the service, *i.e.* users of water, are forced through their representatives (the municipality) to finance these activities upstream. Payments by service beneficiaries are not made on a voluntary basis, where contracts are negotiated

¹³⁶ For instance: Van Noordwijk (M.) *et al.*, "Payments for Ecosystem Services (PES): evolution towards efficient and fair incentives for multifunctional landscapes", *Annual Review of Environment and Resources*, 2013, p. 37.

¹³⁷ Lapeyre (R.), Pirard (R.), Leimona (B.), "Payments for Environmental Services in Indonesia: What if economic signals were lost in translation?" *Land Use Policy*, 2015.

¹³⁸ *Ibid.*

¹³⁹ Kosoy (N.) *et al.*, « Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America », *op. cit.* ; Van Noordwijk (M.) *et al.*, "Payments for Ecosystem Services (PES): evolution towards efficient and fair incentives for multifunctional landscapes", *Annual Review of Environment and Resources*, 2013, p. 37.

¹⁴⁰ Zbinden (S.), Lee (D.R.), "Paying for Environmental Services: An Analysis Of Participation in Costa Rica's PSA Program", *op.cit.* ; Kwayu (E.J.), Sallu (S.M.), Paavola (J.), *Farmer participation in the Equitable Payments for Watershed Services in Morogoro, Tanzania, op. cit.*

¹⁴¹ Pirard (R.), Payments for Environmental Services (PES) in the public policy landscape: "Mandatory" spices in the Indonesian recipe, *Forest Policy and Economics*, 2012, n° 18, pp. 23-29.

between buyers and sellers of a given service. In these form of PES, payers have not agreed to any contract: water consumers and a few water companies have simply been forced through regulation to pay monthly (and relatively low) contributions. It possesses the great advantage of being an integral part of public policies and of making money collection achievable and sustainable. At the same time it is accepted by the city's residents because the funds are not managed by public authorities with poor governance records.

The role of public policy is reiterated to face facts: the dispersion of players, high transaction costs, the fear of free-riding on the part of some beneficiaries are all factors that drive private actors to seek the intervention of the public authorities¹⁴². But this intervention is likely to have a strong impact on the nature of the mechanism, which would be profoundly transformed to become a binding instrument and not voluntary. Nevertheless, could this form of PES represent a potential future for PES?

¹⁴² Pirard (R.), Billé (R.), « Paiements pour services environnementaux. De la théorie à la pratique en Indonésie », *Vertigo*, 2011, Vol. 11, n° 1, <http://vertigo.revues.org/10746>

CHAPTER 4 : Belgium

V. ORIGINLAITY OF THE TOOL

In Belgium, measures have been taken on the basis of agro-environmental measures implemented by the EU. The provision of agri-environmental aid, called AEM, established by the EU in the framework of the Common Agricultural Policy (CAP), was clarified by Regulation 1698/2005. According to this text, AEM consist in annual payments to farmers who adopt a voluntary approach, beyond the legal requirements, and over a period of 5 to 7 years. These payments shall cover additional costs and income foregone, or also the costs incurred resulting from the implementation of new practices. It is therefore a financial compensation to farmers is an economic instrument to protect the environment¹⁴³.

Originally attached to the pillar "market" of the CAP, AEM were displaced in 1999 in the second pillar for rural development. This has reinforced the promotion of the European Commission to extensive and multifunctional agriculture, much more in compliance with societal expectations.

In 2005, after the implementation of the FEADER, the European Commission asked Member States to develop national strategic plans and rural development programs to organize the allocation of aid, award criteria, payment modality, *etc.* Because agricultural situation depends on countries, the EU, in the 1698/2005 Regulation, let them flexibility to choose the types of aid that would be included in their programs, conditions of eligibility for aid, budgets, the minimum and maximum limits, etc.

In Belgium, the development of the European rural policy is the responsibility of the regions. While the Flemish Region has chosen a law and a specific framework related to AEM, the Walloon Region relied on a set of pre-existing, more general and not specific to this type of agricultural aid legislation. Indeed in Wallonia, the rules on rural development, referring to AEM, is based on laws of 1961 and 1975. At that stage, AEM did not fall under the 2nd pillar of the CAP. As a consequence, the reference to rural development is not envisaged in this legislation. The lack of updating and enriching the meaning of these two texts creates an ambiguity in the system and the nature of the measures developed in Wallonia. In this sense, neither the 1961 Act nor the 1975 constitute specific legal basis for basing AEM grants in Wallonia. This creates a legal regime exposed to hybridization and opening the possibility of an original legal instrument.

It was not until the decree of 8 December 1994, revised in 1999 and in 2004, and especially the Order of the Walloon Government (AGW) of 24 April 2008 on agro-environmental subsidies to consider the implementation of EAM in Walloon region.

In parallel, in accordance with the request of the EU, Belgium has adopted a national strategic plan, consisting of Flemish, Walloon and national components. In Wallonia, the plan is implemented by the regional rural development program called Pwdr 2007-2013. Agri-environmental payments correspond to one of the five measures of Axis 2. Under this program, the Walloon government has designated as a managing authority (one of three

¹⁴³ Born (C.-H.), "Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficient pour promouvoir une agriculture durable ? ", *CDPK*, 2011, n° 2, pp. 155-202.

instances requests by the EU) called “Département des aides de la DG03”. It is the only accredited paying agency. It is responsible for scheduling, execution and accounting of payments and administrative control on site, although delegation is possible in detail.

VI. MECHANISM

- **The (non-)voluntary aspect of PES in Walloon Region and payment by “beneficiaries”.**

As suggested by the title of the AGW of 24 April 2008, the regime of AEM implemented in Walloon law is analyzed as a subsidy mechanism, *i.e.* as an allowance funds lost, granted by the government to legal entities under public and private law as well as individuals to support the development of activities considered relevant to the general interest¹⁴⁴. Walloon AEM fall within this definition: a public authority, the region, finances (non-repayable) eco-effective agricultural practices which benefit the whole community on behalf of the Region.

Generally, grants are awarded through a unilateral administrative act and are often the subject of a regulatory framework. In Walloon Region, law does not provide any explicit authorization to the Government to conclude agreements with farmers¹⁴⁵, but they do not prohibit it either. Indeed, the AGW of 24 April 2008 qualifies agri-environmental measures as "subsidies". However, on closer look, the granting of AEM in Walloon Region is not without similarities with the contractual tool¹⁴⁶.

In this particular case, there is an agreement between the parties in the transaction: farmer have to take the initiative and accept the grant award. As with any subsidy system, the **farmer takes freely the initiative to engage itself in an AEM and must accept its conditions.** It is the principle of contractual freedom¹⁴⁷, even if specifications are defined statutorily and not subject to negotiation. It is the same as pre-formulated standard contract. This partly refers to the PES approach in south countries.

In addition, if measures seem to be contracts, they cannot be treated as a public service concession, nor public works concession¹⁴⁸. Furthermore, agri-environmental measures are not intended to a mechanism of public contract.

Nevertheless, several aspects of the mechanism let think about a PES according to Muradian definition, and even to Wunder’s one: the region did not benefit economic interest directly from the implementation of the AEM, even if the farmer participate to its environmental policy¹⁴⁹. Then, the farmer could only be granted by a compensation for additional costs and the loss of income due to commitments¹⁵⁰, and not remuneration.

¹⁴⁴ Renders (D.), Bombois (Th.), Vansnick (L.), « La définition de la subvention et ses rapports avec la notion d’aide d’Etat », in Renders (D.) (dir.), *Les subventions*, Larcier, 2011, pp. 11-161.

¹⁴⁵ Born (C.-H.), “Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficace pour promouvoir une agriculture durable ?”, *CDPK*, 2011, n° 2, pp. 155-202.

¹⁴⁶ « *L’accord de volonté (manifesté) entre deux ou plusieurs personnes, destiné à produire des effets de droit, qu’il s’agisse de donner naissance à des obligations, de transférer un droit subjectif, de modifier ou d’éteindre un droit ou une convention préexistant* » : Wery (P.), *Droit des obligations, vol. I, Théorie générale du contrat*, 2e ed, 2011, Larcier, p. 60.

¹⁴⁷ Art. 1134, al. 1er, C. civ.

¹⁴⁸ Born (C.-H.), “Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficace pour promouvoir une agriculture durable ?”, *op. cit.*

¹⁴⁹ C.J.U.E., 25 mars 2010, aff. C-451/08, *Helmut Müller GmbH et crts*, points 49 et s.

¹⁵⁰ Art. 39 du règlement (CE) n° 1698/2005.

Moreover, the farmer takes the initiative to engage himself in AEM, without answering a public tenders (voluntary aspect). Finally, specifications which defines the commitments of the farmer cannot be compared as a public contract¹⁵¹.

At least, when the producer applies for AEM, he committed itself for a specified period. In Walloon Region, this involvement is for a continuous period of five years. This commitment is formalized by the initial request, signed and dated by the applicant. So, we could wonder if the relationship developed between the farmer and the Walloon Region should not be construed as a contract.

The choice in favor of the Muradian's broad definition of PES used to study under the terminology of PES measures taken by the Walloon Region on the basis of the European policy of AEM. In this sense, the measures developed in the Walloon Region would represent a form of PES within the meaning of Muradian if we consider that, through the State, the community, as beneficiary of services, finance their production. Thus, measures taken in Walloon Region can be regarded as "*transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources*".

- **Payments and monitoring**

Walloon law provides that grants shall be paid, without exception, in five annual tranches¹⁵². The delay in payment time allows the administration to make the administrative and on-site control before the calculation of the aid. It permits to reduce or exclude payment if farmer fails to fulfil its obligation.

Different types of control are exercised by relevant authorities to ensure compliance with the conditions of eligibility for aid commitments and the compliance by farmers. Principles and methods of control are set out in the European regulation¹⁵³. Those controls focus on three objects. As regards compliance with the eligibility requirements and fulfilling commitments, two types of control must be exercised annually. On one hand, administrative checks are carried out for all aid applications and cover all elements that it is possible and appropriate to control by administrative means¹⁵⁴. On the other hand, on-the-spot checks must be made each year on a sample of 5% of farms engaged in AEM¹⁵⁵. In this case, they cover all the commitments and obligations of the beneficiary which can be checked at the time of the visit.

However, as regards the conditionality, administrative and on-the-spot checks are also performed. But only 1% of farms applying for grants (including AEM) are subjected to such control¹⁵⁶. This low pressure control does not encourage farmers to comply with conditionality, to the detriment of its ineffectiveness.

¹⁵¹ Renders (D.), Bombois (Th.), Vansnick (L.), « La définition de la subvention et ses rapports avec la notion d'aide d'Etat », in Renders (D.) (dir.), *Les subventions*, Larcier, 2011, pp. 11-161.

¹⁵² Conformément à l'art. 39.4 du règlement (CE) n° 1698/2005.

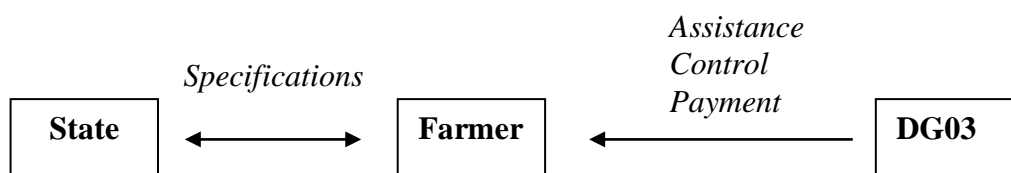
¹⁵³ Art. 74.4 du règlement (CE) 1698/2005 ; art. 10 et s. et art. 19 et 20 du règlement (CE) n° 65/2011, qui renvoient à différentes dispositions du règlement (CE) n° 1122/2009.

¹⁵⁴ Art. 11.1 du règlement (CE) n° 65/2011.

¹⁵⁵ Art. 12.1 du règlement (CE) n° 65/2011.

¹⁵⁶ Born (C.-H.), "Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficient pour promouvoir une agriculture durable ? ", *CDPK*, 2011, n° 2, pp. 155-202.

Fig. 1:



- **Mechanism membership**

Effectiveness of the system is ensured by the establishment of mechanisms for assistance to farmers and a control and sanction system. The assistance allows reaching adhesion of farmers and control permits to guarantee the respect of specifications.

Today, AEM generate a massive support from the Walloon farmers. In 2011, approximately 50% of farms are engaged in one or more agro-environmental practices, which corresponds to the overall goal set by the PwDR 2007-2013. This resounding success among farmers is largely due to the continuity and stability of the Walloon AEM regime and effort mentoring, advocacy and communications mobilized. **Awareness of farmers, especially young one, and their willingness to participate in the collective effort for the environment also contribute.** However, some operators still refuse to join the program or decide not to join it, because of delays payment, complexity of the procedure, the control pressure, or simply because of lack of information¹⁵⁷.

The implementation of AEM requires that the advisor of DGO3 monitors the implementation of proposed measures. Its role is crucial to ensure both the environmental relevance of the measures chosen for the land and to let the farmer to better adapt to the environmental issues of his approach¹⁵⁸. This assistance appears to be a very important factor for adhesion and effectiveness of mechanism.

Adhesion to mechanism differs from methods requested. It strongly influences the overall environmental impact of the program. It seems that the most successful AEM in the Walloon Region are hedges, winter soil cover, grassy headlands and natural grasslands. Furthermore, there is a growing success of AEM for the protection of surface waters (rivers) in areas of large cultures¹⁵⁹. It is noted that the participation is actually very strong for some undemanding measures (called "green light"), such as the maintenance and upkeep of hedges or winter soil cover, and significantly lower for other more stringent measures (called "deep green"), such as the environmental Action Plan. For some methods, the objectives of Pwdr 2007-2013 in terms of rate of commitment were fulfilled, for others not.

- **Limits of the tool**

¹⁵⁷ Born (C.-H.), "Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficace pour promouvoir une agriculture durable ?" *op. cit.*.

¹⁵⁸ *Ibid.*

¹⁵⁹ Cellule Etat de l'environnement wallon, *Tableau de bord de l'environnement wallon 2010*, SPW-DGARNEDEMNA-DEE, 2011, p. 177.

But this tool has legal and non-legal limitations. First, as all voluntary tools, farmers can choose not to get involved in the program. So, if public authority wants to reach environmental target by the contractual way and without command and control rules, it cannot be sure of the ownership to the instrument. The initiative belongs to farmer. So, public authority cannot impose the ownership to AEM. But we can wonder if it is a real limit in case of willingness of farmer is to act in favor of environment.

Secondly, the issue of sustainability measures is problematic, because the freedom to subscribe to the scheme allows the farmer not to renew his contract. This illustrates the precarious generated by AEM. This point is very important for selected plots at high environmental value, such as grasslands of high biological value¹⁶⁰.

- **Environmental efficacy**

During his commitment, the farmer must comply with one or several methods envisaged in the specification provided in the Order. In the Walloon Region, the Pwdr 2007-2013 details quantitative and qualitative objectives pursued by each method. Globally, it aims the protection of groundwater and surface water, soil protection, development of nature, protection of air and climate, preservation of landscape heritage and conservation of animal heritage and agricultural plant. To varying degrees, each method contributes to one or more of these objectives.

Sometimes, the positive impact on the environment results from the cumulative effect of a large number of commitments, even if they are little binding. Sometimes, the impact directly results from the practical implementation of targeted measures, with high environmental value. The appreciation of this impact is very difficult¹⁶¹. It requires to put clear and measurable objectives and the establishment of a regular scientific monitoring, based on pertinent agri-environmental indicators¹⁶². Moreover, expenses should not be disproportionated to the environmental effect obtained. This is the question of the assessment of the efficiency of aid, which requires to look for alternatives to achieve the same objectives. For instance, funding AEM less restrictive seems more questionable. This is the case of "light green" aid (for instance, aid for the maintenance of hedges). These grants represent a considerable expense, but environmental effects are limited. Moreover, these aid included in the budget may avoid the creation of useful measures. In the Walloon system, subsidy would be more efficacy and efficient if it was more focused on some practices and / or geographic areas or environments that have specific environmental problems¹⁶³. The Walloon region has funded many scientific studies on the environmental impact of AEM¹⁶⁴. It appears largely positive.

If we examine the evolution of the Walloon regulations of AEM, we note that the nature of subsidized methods has changed a little since 1994, but the level of demand and targeting measures were strengthened¹⁶⁵. Meanwhile, the amount of the corresponding

¹⁶⁰ Born (C.-H.), "Quelques réflexions juridiques sur le régime de mesures agro-environnementales en Région wallonne", In Born (C.-H.) et Haumont (F.) (dir.), *Actualités du droit rural. Vers une gestion plus durable des espaces ruraux ?*, Larcier, 2011, pp. 255-275.

¹⁶¹ *Ibid.*

¹⁶² Commission européenne, *Elaboration d'indicateurs agroenvironnementaux Destinés au suivi de l'intégration des préoccupations environnementales dans la Politique agricole commune (COM(2006)508 final)*.

¹⁶³ Born (C.-H.), "Quelques réflexions juridiques sur le régime de mesures agro-environnementales en Région wallonne", *op. cit.*

¹⁶⁴ Born (C.-H.), "Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficient pour promouvoir une agriculture durable ?", *op. cit.*

¹⁶⁵ *Ibid.*

premiums was significantly increased for some methods, which made them more attractive. This adaptation, based on the work of technical evaluation and monitoring by indicators, led to a significant improvement of the ecological relevance and success of the targeted measures.

Regulation analysis and impact of mechanism

We can underline that this regulation plays are not private regulation, even if there is a form of standard contract, through specifications, because of the voluntary participation of farmers. The whole process is governed by legally binding provisions from EU, national and Wallonia regulations and soft law (as National Strategic Plan). It seems to be a very clear process because there is no intermediary, no groups of farmers nor leader, and the payer is the societal community through State.

Efficacy, effectiveness and efficiency of the mechanism are considered through several modalities of implementation. First, assistance given to farmers by the DG03 ensures support, transparency of information, communication and the sufficient dialogue to allow farmers not only to be informed about required method but also to determine the best ways to reach the goals stated.

The PES scheme seems to show a good effectiveness, even if it is subjected to some limits or risks of demobilization. Despite a massive support to PES, some reluctance are persistent because of payment delays from the administration. Moreover, the irregularity of the monitoring and the limited period of subsidies neither encourage farmers to respect their obligation nor encourage them to get involved in the scheme after a first period of implementation. It create a risk of ineffectiveness of the tool.

At least, even if the PES tool is voluntary, once farmer are involved in the relationship they must respect specific methods required by public regulation. We note an unequal adhesion to methods: the less stringent are preferred and the most one are not chosen. It have an impact of the effectiveness of the tool.

From a social point of view, the mechanism allow sto small farms to continue their activities thanks to subsidies. In this sense, AEM have both environmental and social function¹⁶⁶.

VII. FLOW OF KNOWLEDGE

In the Wallon Region, agro-environmental can be obtained for the realization of 11 commitments called « méthodes de production »¹⁶⁷. Eight methods consist in plots development (sodded bands...) or management of prairies (late mowing, refuge areas...). These methods were determined by crossing ecological data and experiences of farmers. Several methods can be put into place cumulatively on a same plot¹⁶⁸.

Within some limitations, all plots in Walloon Region are eligible¹⁶⁹. The question is which plots, within the farming, is exactly concerned. From an environmental point of view,

¹⁶⁶ *Ibid.*

¹⁶⁷ Voir : art. 2 de l'AGW du 24 mars 2008.

¹⁶⁸ Art. 2, § 4, et annexe 2 de l'AGW du 24 avril 2008

¹⁶⁹ Art. 5 de l'AGW du 24 avril 2008.

the answer is important because some plots (swamps, stony soil...) are those which have the most ecological interest. Their integration in the AEM scheme allow the farmer to receive subsidy for plots which will be undeveloped. Legaly, determining the funding for plots is difficult because relevant provisions applying for them are dispersed between european regulation, belgium regulation...

Knowledge analysis

It is difficult to put all knowledge together because legal text are too dispersed and have more or less binding nature. From an environmental point of view, quantitative and qualitative targets set in Pwdr for methods are difficult to assess because they require a range of criteria which combine a regular scientific assessment, a calculation of the efficiency of the measure... Nevertheless, results seem positives.

Strengths of the system consist in determining effective practices in public regulation. These methods are the successful result of scientific data and experiences on the ground.

On the contrary, effects of methods are not entirely satisfactory. Sometimes, the virtuous effect is linked to a cumulative implementation of methods, and sometimes it comes from the implementation of a unique method. In conclusion, the efficacy of the mechanism is observer but it contained some variations.

CONCLUSION

The voluntary nature of AEM in Walloon Region secures adhesion of the agricultural world, traditionally loath to constraints. In fact, it helps to promote a constructive cooperation between government and farmers, and create a **positive attitude toward environment. This is not the case of the command and control approach**¹⁷⁰. This sensitizing effect of the agricultural sector to environment is undoubtedly a major achievement of the program. In addition, because of their mass success and because of the cumulative effect of thousands of engagements, even if they are not binding, AEM contribute to reduce the overall pressure from intensive agricultural activities across the landscape.

This voluntary approach is also justified because of the relative inefficacy of the command and control approach to achieve environmental objectives, such as habitat protection.

Finally, the crucial role of AEM is to maintain small marginal farms, which can continue their extensive practices. The subsidies giving by AEM permit them to survive. In this sense, AEM have both environmental and social function¹⁷¹. On that point, Belgium is close to Indonesia or Costa Rica.

Conclusion Part 1 (PES) and theoretical perspectives

¹⁷⁰ Commission européenne, DG Agriculture et développement rural, *Agri-Environment Measures. Overview on General Principles, Types of Measures, and Application*, mars 2005, p. 9, <http://ec.europa.eu/agriculture/publi/reports/>

¹⁷¹ Born (C.-H.), "Le régime de subventions agro-environnementales en Région wallonne : un choix pertinent et efficient pour promouvoir une agriculture durable ? ", *CDPK*, 2011, n° 2, pp. 155-202

The first part of this report devoted to PES highlights two points: the relationship between public regulation and private regulation, and the role played by public regulation on knowledge mobilized within PES (I). In addition, it accounts for factors involved in the success or failure of the instrument (II).

I. The place of public regulation in PES mechanism

• Balance between public and private regulation

The observation and analysis of public and private regulation in the various PES lead to several conclusions. First of all, **the presence of each kind of regulation is variable**: some PES have very low public intervention or absent (Vittel), while other reflect a strong public intervention (Wallonia Region). This intervention can concern different aspects of PES. It can deal with the framework of the process, the establishment of places of discussion (science policy interfaces) (Wallonia), conditions and eligibility rules for PES and / or grant of payments / subsidies (Indonesia, Costa Rica).

This variability refers to the emerging concept of normative densification. This concept is not defined exactly¹⁷², but it still has sufficient features to greatly distinguish it from any other legal phenomenon best known as legislative inflation for example¹⁷³. The normative densification relativized the law as unique normativity. This is the example of PES case studies analysed in the report. In principle, the normative nature of the law allows public authority to organise and sanction the life in society. Whether soft law challenging this principle, the normative densification increases the phenomenon because it tends to recognize other natures of normativity (scientific, social...). This situation refers in particular to self-regulation that is that people self-organize their private or professional relationship on the basis of standards they have determined themselves¹⁷⁴. The design and implementation of PES observed in the different case studies reflect this trend in favour of a withdrawal of the law in the relationship, or at least, in favour of a reorganization of the place of law in the relationship. Actually, we notice several normative phenomena which tend to relativize the place and the role of law in regulating human activity¹⁷⁵. This sometimes takes the name of competition normativities¹⁷⁶. From our report perspective, it is illustrated by the balance between public regulation (the law) and private regulation (i.e. contractual agreement) to organize a transaction, relationships... It relates to a new way of governing by "instruments"¹⁷⁷, whatever they are. This new form of regulating behaviour is observed in PES through the use of contractual instrument and the involvement of a growing number of private or semi-private actors in the payment mechanism. However, the contractual approach promotes a new governance to the benefit of private actors, because it questions the role of the State and its public regulation in the relationship¹⁷⁸.

¹⁷² *Densification normative. La naissance d'un processus*, C. Thibierge (et al.), Mare Martin, 2013.

¹⁷³ R. Savatier, « L'inflation législative et l'indigestion du corps social », *Dalloz* 1977, *Chronique* 43 ; J. Carbonnier, « Essais sur les lois », *Répertoire du notariat Defrénois*, 1979, 1995 (2^{ème} édition), pp.307 et ss.

¹⁷⁴ J. Chevallier, « L'Etat régulateur », *Revue française d'administration publique*, 2004, n° 3, p. 200 ; G. Timist, « La régulation. La notion et le phénomène », *Revue française d'administration publique*, 2004, n° 1, p. 206.

¹⁷⁵ C. Thibierge, « Conclusion », *In Densification normative. La naissance d'un processus*, C. Thibierge (et al.), Mare Martin, 2013, p. 1143.

¹⁷⁶ B. Frydman, « Comment penser le droit global ? », *In La science du droit dans la globalisation*, J.Y. Chérot, B. Frydman (dir.), Bruylant, 2012, pp. 46 et ss.

¹⁷⁷ P. Lascoumes, Y. Le Galès, *Gouverner par les instruments*, Presses de Science Po, 2004.

¹⁷⁸ A. Langlais, « Jeux et enjeux juridiques autour des PSE », *Atelier international PESMIX*, 11, 12, 13 juin 2014, Montpellier.

A second point drawn from the analysis of public and private regulation within PES concerns the **dissociation between success of the PES and strong public intervention** (Vittel case). More precisely, the lack of public regulation does not necessarily entails the failure of the PES. The Vittel case is particularly indicative of this observation. However, because this case study is quite accurate, it would probably be wrong to assert a general principle. In addition, we may assume that **public regulation could intervene to contribute to the success of the PES** in order to recreate the conditions for success (especially observed in the Vittel case). Consequently, public regulation would not framed the mechanism, but ensures, punishes and controls the compliance of conditions of design and implementation of PES.

This specific role of public regulation finds its theoretical justification in the conceptual tool called internormativity. This concept is defined in two different meanings¹⁷⁹. The first evokes the passage of a standard of a normative system to another, or inter-influence of different nature of standards (legal, social, economic...). The second meaning refers to contacts between normative systems, power relationships, and interaction observed between two or more normative systems. The relationship between actors of the systems is highlighted.

In the context of our report, only the first definition holds our attention. In this sense, PES involve a plurality of norms which interact and organize (one might say, regulate) the factual situation. The internormativity observed here is a tangle of standards (social, economic, legal) related to various regulations (public or private). This concept applied to regulations observed within PES reveals an absence or a presence of internormativity, and a scale. For example, while the Vittel case reports a low internormativity between public regulation and private regulation, in favour of the second, if the AEM in the Walloon Region reflects the opposite. In between, Costa Rican and Indonesian cases illustrate the phenomenon of internormativity in its highest degree, to the extent that the framing of the overall process and its terms are sometimes supported by regulation and sometimes by another.

- The role of public regulation in knowledge mobilised

The observation of knowledge within PES implies to take into account science policy interfaces (SPIs) implemented in the various mechanisms. The analysis of these SPIs leads to conclusions about the place and role of public regulation. On one hand, **there is a variety of knowledge used within the mechanisms**, from the scientific data (Indonesia, Costa Rica, Belgium) to experience on the ground (France).

This observation refers to the first meaning of internormativity. The flow of knowledge is considered here in an interdisciplinary perspective, crossing standards and data of different nature (social, scientific, economic...). We can make two observation. On one hand, the different mechanisms do not propose the same degree of internormativity, insofar as the nature of mobilized data is highly variable. On the other hand, the normative influence, (understood as the weight of a given standard in the final decision¹⁸⁰) is also variable. In view of case studies, it appears that the weight of a scientific data will depend on the number and

¹⁷⁹ Sur ces définitions, voir : A.-J. Arnaud (dir.), Dictionnaire encyclopédique de théorie et de sociologie du droit, 2^{ème} édition, LGDJ, 1993 ; K. Benyekhlef, Une possible histoire de la norme. Les normativités émergentes de la mondialisation, Thémis, 2008, p. 797 ; J.-G. Belley, *Réactif, activation, phases et produits*, In Le droit soluble. Contributions québécoises à l'étude de l'internormativité, J.-G. Belley (dir.), LGDJ, 1996, p. 21.

¹⁸⁰ A. Pomade, « La force normative d'un avant-projet et la force normative de son émetteur: connexion ou dissociation? » In *Force normative. Naissance d'un concept*, C. Thibierge (et al.), Bruylant, LGDJ, 2013, pp. 499-515 et ss.

nature of the other standards mobilized in the process. This normative influence¹⁸¹ refers to the concept of normative force which allow to assess the degree of influence of a standard.

Using this concept in the present report allows us to make the link between standard mobilized and the legitimacy of the final decision. More precisely, the consideration of social or economic data helps to legitimize the final decision. The legitimacy of the legal norm remains a big question, which is often studied in perspective of the validity of legal norms¹⁸². However, in PES scheme, we cannot speak about the legitimacy of a legal norm (or public regulation). It is a double legitimacy: the legitimacy of the final decision on the design of the PES and its implementation, and a procedural legitimacy¹⁸³ which implies that the design and the implementation process meet the expectations of stakeholders to carry their membership¹⁸⁴ (in other words, the recipients of the tool). Procedural legitimacy finds its origin in the Habermasian theory of communicative action¹⁸⁵ based on ethical discussion¹⁸⁶. According to Habermas, legitimacy is gained through the procedure. It excludes any reference to meta-positive values or some deity¹⁸⁷. This procedural aspect is enriched by a discursive dimension. In this sense, the validity can only be gained if all stakeholders reach to an agreement at the end of a discussion process¹⁸⁸. Procedural legitimacy then implies that the final decision derives its legitimacy¹⁸⁹ from proof and discursive process¹⁹⁰. The legitimacy is not a pre-condition. This positioning resolutely focuses on the idea of "participation"¹⁹¹ and permits to qualify the legitimacy of the standard as a "procedural legitimacy"¹⁹². This mechanism is particularly effective and efficient in the Vittel case, but much less present in Indonesia and Costa Rica case studies.

¹⁸¹ C. Thibierge (et al.), *Force normative. Naissance d'un concept*, Bruylant, LGDJ, 2013.

¹⁸² Voir notamment : A. Pomade, *La Société Civile et le droit de l'environnement. Contribution à la réflexion sur les théories des sources du droit et de la validité*, LGDJ, 2010 ; F. Ost, M. Van de Kerkhove, *De la pyramide au réseau. Pour une théorie dialectique du droit*, Publication des FUSL, 2002 ; M.-J. Falcon Y Tella, *Concepto y fundamento de la validez del derecho*, Civitas, 1994.

p. 113 ;

¹⁸³ J. Habermas, *De l'éthique de la discussion*, Champs Flammarion, 1999.

¹⁸⁴ J. Chevallier, *Vers un droit postmoderne ?*, In *Les transformations de la régulation juridique*, J. Clam et G. J. Martin (dir.), LGDJ, Coll. Droit et société, 1998, p. 34 ; P. Talla Takoukam, *Les individus et le droit de l'environnement*, In *Mélanges en l'honneur de Michel PRIEUR*, Pour un droit commun de l'environnement, Dalloz, 2007, p. 674.

¹⁸⁵ Y. Sitomer, *Habermas et la sociologie du droit*, In *La sociologie du droit de Max WEBER*, J.-P. Heurtin et N. Molfessis (dir.), Dalloz, Coll. l'esprit du droit, 2006, p. 67.

¹⁸⁶ S. Goyard-Fabre, *Le droit et la société aujourd'hui*, In *Penser la justice*, CRDP Midi-Pyrénées, Coll. Savoir et faire, 1998, p. 190 ; J. Habermas, *Droit et démocratie*, Gallimard, 1997, pp. 169 et ss. ; du même auteur : *De l'éthique de la discussion*, Champs Flammarion, 1999, pp. 16-19. L'auteur explique ce que signifie « éthique de la discussion » ; du même auteur : *Ethique de la discussion*, Grasset, 2003, p. 24.

¹⁸⁷ J. Habermas, *De l'éthique de la discussion*, *De l'éthique de la discussion*, Champs Flammarion, 1999, p. 17 ; P.-A. Perrouy, *Légitimité du droit de désobéissance*, In *Obéir et désobéir : le citoyen face à la loi*, P.-A. Perrouy (édité par), éditions de l'Université de Bruxelles, Collection de philosophie politique et juridique, 2000, p. 72.

¹⁸⁸ J. Habermas, *De l'éthique de la discussion*, Champs Flammarion, 1999, p. 17

¹⁸⁹ D. Burdeau, *L'Etat de droit est-il un Etat de valeurs particulières ?*, [En ligne] <http://www.aixmrs.iufm.fr/formation/filières/ecjs/reflexions/etatdroit.html/>

¹⁹⁰ V. Petev, *Réflexion sur la postmodernité et les limites du législateur*, art. précit., p. 306 ; J. Chevallier, *Le débat public en question*, In *Mélanges en l'honneur de Michel PRIEUR*, Pour un droit commun de l'environnement, Dalloz, 2007, p. 500.

¹⁹¹ S. Robin-Olivier, *Consultations, négociations, accords... : recherche sur les voies de développement du droit dans l'Union européenne*, In *Approche renouvelée de la contractualisation*, S. Chassignard-Pinet et D. Hiez (dir.), PUAM, 2007, p. 68.

¹⁹² F. OST, *Conclusion générale : le temps virtuel des lois postmodernes ou comment le droit se traite dans la société de l'information*, In *Les transformations de la régulation juridique*, J. Clam et G. J. Martin (dir.), LGDJ, Coll. Droit et société, 1998, p. 436

The analysis of SPIs leads the observation that the framing of knowledge within the mechanisms plays a role in the success of PES. This framework requires:

- To mobilise knowledge from the design to the implementation of the tool
- To consider inclusion of knowledge in a broadest sense
- To exploit the knowledge collected at the stage of the implementation of PES

This implies to take into account three categories of knowledge at least: scientific data (raw data, surveys...), scientific knowledge and work (assumptions, scenarios, statistics...) and experience on the ground (practices, traditions...). The Vittel case is the most complete. Moreover, it implies to consider two types of knowledge: knowledge mobilized before and during the process put in place by the PES (Costa Rica, Belgium) and knowledge collected at the end of the implementation of the PES (Belgium).

The originality highlights by case studies is that **the nature of framework (public or private) does not seem to impact on the effect of the PES**. Specifically, no matter whether it is public regulation or private regulation, only the degree of framework of knowledge seems to be a determining factor for the success of PES (Vittel). This observation well aware of the “secondary” role of public regulation, and confirmed its possible role of “assistance”. In this sense, in cases where private regulation show failures or shortcomings, relays could be taken by public authority to fill the gaps. This flexibility allows to make the hypothesis that an incomplete public regulation would be supported by private regulation. This perspective is in current thinking about the development of a legal postmodernity¹⁹³, admitting the articulation of law with new forms of normativity, particularly in terms of adaptation or coexistence¹⁹⁴. These comments fits the current thinking which promote that an unlimited legal normative production could lead to an unworkable law¹⁹⁵.

II. Success factors of the tool

The research has highlighted key success factors of the PES, or at least, elements that impact on the success of the tool. Firstly, these criteria concern actors or stakeholders

¹⁹³ P. Puig, *Hiérarchie des normes : du système au principe*, RTD civ. 2001, p. 749, [En ligne] <http://www.dalloz.fr> ; J. Chevallier, *L'Etat post-moderne*, 3ème édition, LGDJ, Coll. Droit et société, 2008 ; D. De Bechillon, *La structure des normes juridiques à l'épreuve de la postmodernité*, RIEJ 1999, n° 43, pp. 1 et ss. ; A.-J. Arnaud, *Du jeu fini au jeu ouvert. Réflexions additionnelles sur le Droit postmoderne*, Revue Droit et société 1991, nos 17-18, pp. 38 et ss. ; F. OST, *Le rôle du droit : de la vérité révélée à la vérité négociée*, In *Les administrations qui changent ?*, Colloque des 19 et 20 mai 1994, organisé par le Centre d'étude et de recherche sur l'administration publique (CERAP), l'École doctorale de droit et le Centre de droit comparé de l'Université de Paris I Panthéon-Sorbonne, Paris, G. Timsit et A. Claisse (dir.), PUF, 1996, pp. 73 et ss. ; B. Frydman, *Les Transformations du droit moderne*, Rapport réalisé à la demande de la Fondation roi Baudouin dans le cadre de la réflexion prospective « Citoyen, Droit et Société », septembre 1998, p. 9. Pour une conception de la postmodernité en tant que modernité « dépassée », voir : V. Petev, *Réflexion sur la postmodernité et les limites du législateur*, In *Légistique formelle et matérielle*, Actes du 10ème séminaire du Valais du 24 au 27 septembre 1997, organisé par le Centre d'étude de technique et d'évaluation législative de Genève et l'Institut universitaire Kurt Bosh, Sion, C.-A. Morand (dir.), PUAM, 1999, p. 302.

¹⁹⁴ Y. Boisvert, *Le postmodernisme*, Boréal, Coll. Boréal express, 1995, p. 17 ; N. De Sadeleer, *Les approches volontaires en droit de l'environnement. Expression d'un droit postmoderne ?*, In *Les approches volontaires et le droit de l'environnement*, Contributions au colloque des 8 et 9 mars 2007, Rennes, N. Hervé-Fournereau (dir.), Presses universitaires de Rennes, 2008, p. 52.

¹⁹⁵ S. Aubert, « PSE et service public : les modalités de l'intégration des instruments de gestion des ressources forestières à Madagascar », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

involved in the relationship or concerned by the impact of the PES, and secondly, they concerns knowledge mobilized within the mechanism.

The French and Indonesian case reveal that the participation of stakeholders in the design and implementation of PES is an important part of its effectiveness and efficacy. Where participation is low, information is opaque and there is no spaces for dialogue, their involvement is residual. It is particularly the Cidanau case in Indonesia. The lack of dialogue and transparency hinder the success of the mechanism. On the contrary, where the discussion is supported and where intermediaries play a strong role in the communication and dialogue, the mechanism carries a profitable dynamic to PES. It is the emblematic case of Vittel in France. This comment comes in line with the current new way of thinking “public action”, which is defined as the actions of public institutions and of a plurality of public and private actors from civil society which act jointly in multiple interdependencies to produce forms of regulation of collective activities¹⁹⁶. It means that a concerted and collective action generate successful decision.

These observation also refer to an emerging concept in law, well known in political science and management: empowerment¹⁹⁷. Some authors have developed definitions of this concept of empowerment¹⁹⁸. Depending on the context, it can refer to a theory, a framework, a plan, a goal, an ideology, a process, a result¹⁹⁹ or a consequence²⁰⁰. At an individual level, empowerment is defined as the capacity of people to promote self-esteem, self-confidence, initiative and control²⁰¹. Some authors speak about a “social recognition processes”, or the capacity of people to meet their needs, to solve their problems and to mobilize the necessary resources to feel in control of their own lives²⁰². Here we could say that this approach refers to the awareness of stakeholders PES to have a crucial role to play in the administration of the tool. In a collective sense, empowerment refers to a process which implement cooperation, synergy, transparency and flow of information. It is the result of a strong participation in political and collective actions and requires the active involvement of people. Intervention strategies can consist in interpersonal communication methods, focus groups, seminar training, workshop, financial and logistical support or monitoring activities. The PES case studies do not reflect a form of successful empowerment. However, they highlights the potential. By the lack of public regulation, the Vittel case corresponds to the characterization of empowerment. In contrast, Indonesia and Costa Rican cases tend to another vision of empowerment more focused on a public perspective. In this perspective, empowerment allows to change the current structures and power relations between the various public and private bodies, stakeholders and individuals²⁰³. Whatever the chosen dimension is, the success of

¹⁹⁶ J. Commaille, « sociologie de l'action publique », In L. Boussaguet, S. Jacquet et P. Ravinet (dir.), Dictionnaire des politiques publiques, 3^{ème} édition, Presses de Sciences Po, 2009, p. 519.

¹⁹⁷ M.H. Bacqué, C. Biewener, *L'empowerment, une pratique émancipatrice*, La Découverte, 2013 ; M.H. Bacqué, Empowerment et politiques urbaines aux Etats-Unis, *Géographie, économie, société*, 2006, n° 1, Vol. 8, pp. 107-124 ; A.G. Gagnon, P. May, Empowerment et diversité culturelle : quelques prolégomènes, *Métropoles*, 2010, n° 7 ; J. Friedmann, *Empowerment : the politics of alternative development*, Blacwell, 1992.

¹⁹⁸ J. Rappaport, Studies in Empowerment : introduction to the Issues, *Prevention in Human Services*, 1984, pp.1-17.

¹⁹⁹ Hawley et E. Mc Whirther, Empowerment in counselling, *Journal of Counseling & Development*, 1991, pp. 222-227.

²⁰⁰ C.H. Gibson, A concept analysis of empowerment, *Journal of Advanced Nursing*, 1991, pp. 354-361.

²⁰¹ A. Eisen, Survey of neighborhood-based, comprehensive community empowerment initiatives, *Health Education Quarterly*, 1994, pp. 235-252.

²⁰² C.H. Gibson, A concept analysis of empowerment, *Journal of Advanced Nursing*, 1991, p. 359.

²⁰³ S. Sherwin, No Longer Patient: Feminist Ethics and health Care, *Temple University Press*, 1992.

empowerment is related to factors such as individual support or information²⁰⁴, because it involves collaborative relationships.

This study of PES success factors should be linked with a reflection on governance. Appeared in the wake of globalization of the economy, the concept of governance then came crystallize a need to renew the relationship between civil society and decision-making powers²⁰⁵. In the case of PES, the concept is used, especially in Indonesia, Belgium and Costa Rica, as the implementation process of environmental policy which purpose is to ensure the management of natural resources by actors concerned²⁰⁶ and to inform on methods of land management²⁰⁷. The governance of biodiversity has evolved over the past decades. First seen in terms of nature reserves considered as tools of governance²⁰⁸, questions about the role of the capitalist system in the degradation of the environment have questioned the organization of biodiversity conservation in the 70's and 80's. The concepts of eco-political and sustainable development are part of these developments. Biodiversity becoming closely linked to socio-economic issues, it then enrolled in a perspective of sustainable development²⁰⁹. Today, the governance of biodiversity shows various illustrations such as bioprospection²¹⁰, and generally refers to the rational use of resources by humans²¹¹. Whatever is the design of PES, they are an illustration of the renewed governance of biodiversity.

Local governance is an important factor of the success of PES. The social acceptability of conservation program depends on the place given to the collective organization of governance²¹². For better environmental and social performance, factors of success PES are identified as a participatory approach, a deliberative strategies to reduce conflicts²¹³, the ability to make compromises on the full compliance of payments²¹⁴, the negotiation about what you are going to do²¹⁵, and a trustworthy relationship²¹⁶. It is necessary to think the ways

²⁰⁴ P.S. Chally, Empowerment through teaching, *Journal of Nursing Education*, 1992, pp. 117-120 ; R. Beaulieu, J. Shaminan, G. Donner, D. Pringle, Empowerment and Commitment of Nurses in Long-term Care, *Nursing Economic*, 1997, Vol. 15, n°1.

²⁰⁵ D. Bourcier, Comment s'accorder sur les normes ?, Le Droit et la Gouvernance face à Internet, *Lex Electronica*, 2006, Vol.10, n° 3 : <http://www.lex-electronica.org/articles/v10-3/bourcier.htm>

²⁰⁶ C. Eberhard (dir.), *Droit, gouvernance et développement durable*, Paris, Karthala, 2005.

²⁰⁷ H. Rey-Valette H., et al., *Guide pour la mise en œuvre de la gouvernance en appui au développement durable des territoires*, © Cemagref, CNRS, Geysier, Inra, Supagro, Université Montpellier 1. Diffusion INRA-Montpellier, 2011.

²⁰⁸ D. Dumoulin-Kervan, Les politiques de conservation de la nature au cœur de l'internationalisation et de la convergence des ordres politiques, *Revista de la CEPAL*, Numéro spécial en français, Sélection d'articles 1995-2004, 2005, pp. 71-86.

²⁰⁹ E. Rodary, La gouvernance de la biodiversité et le développement, *In Regards sur la Terre*, Presses de Science Po, 2008, Chapitre 4.

²¹⁰ F. Thomas, Biodiversité, biotechnologies et savoirs traditionnels. Du patrimoine commun aux ABS, *Revue Tiers Monde*, 2006, n° 188, pp. 825-842 ; T. Dedeuwaerdere, Bioprospection, gouvernance de la biodiversité et mondialisation, *Les Carnets du Centre de Philosophie du Droit*, 2003, n° 104.

²¹¹ J.P. Raffin, De la protection de la nature à la gouvernance de la biodiversité, *Ecologie et Politique*, 2005, n°30, pp. 97-109.

²¹² U. Pascual "Social equity matters in Payments for Ecosystem Services", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²¹³ U. Pascual, "Social equity matters in Payments for Ecosystem Services", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²¹⁴ S. Engel, "What have we learnt on designing PES? A critical economist's view", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²¹⁵ M. Antona, table ronde « Les PSE : des instruments environnementaux ou de développement ? », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²¹⁶ B. Landreau, « Programme gouvernemental 'Socio Bosque' en Équateur – Présentation et analyse de la première initiative de PES national en Amérique du Sud », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

of improving the involvement of stakeholders in the decision making process and the recognition of values and identities associated to ecosystems. It is also important to question how an adaptive approach to PES governance can be built, focusing on the best participation²¹⁷. It consist in finding the best balance between flexibility and legal certainty.

Working paper

²¹⁷ A. Karsenty *et al.*, Du Sud au Nord : regards croisés sur les Paiements pour Services Environnementaux. Synthèse et débats de l'atelier international PESMIX, Cahier de BIODIV'2050 : INITIATIVES, novembre 2014.

Conclusion Part 1 (PES) and theoretical perspectives

The first part of this report devoted to PES highlights two points: the relationship between public regulation and private regulation, and the role played by public regulation on knowledge mobilized within PES (I). In addition, it accounts for factors involved in the success or failure of the instrument (II).

III. The place of public regulation in PES mechanism

- Balance between public and private regulation

The observation and analysis of public and private regulation in the various PES lead to several conclusions. First of all, **the presence of each kind of regulation is variable**: some PES have very low public intervention or absent (Vittel), while other reflect a strong public intervention (Wallonia Region). This intervention can concern different aspects of PES. It can deal with the framework of the process, the establishment of places of discussion (science policy interfaces) (Wallonia), conditions and eligibility rules for PES and / or grant of payments / subsidies (Indonesia, Costa Rica).

This variability refers to the emerging concept of normative densification. This concept is not defined exactly²¹⁸, but it still has sufficient features to greatly distinguish it from any other legal phenomenon best known as legislative inflation for example²¹⁹. The normative densification relativized the law as unique normativity. This is the example of PES case studies analysed in the report. In principle, the normative nature of the law allows public authority to organise and sanction the life in society. Whether soft law challenging this principle, the normative densification increases the phenomenon because it tends to recognize other natures of normativity (scientific, social...). This situation refers in particular to self-regulation that is that people self-organize their private or professional relationship on the basis of standards they have determined themselves²²⁰. The design and implementation of PES observed in the different case studies reflect this trend in favour of a withdrawal of the law in the relationship, or at least, in favour of a reorganization of the place of law in the relationship. Actually, we notice several normative phenomena which tend to relativize the place and the role of law in regulating human activity²²¹. This sometimes takes the name of competition normativities²²². From our report perspective, it is illustrated by the balance between public regulation (the law) and private regulation (i.e. contractual agreement) to organize a transaction, relationships... It relates to a new way of governing by "instruments"²²³, whatever they are. This new form of regulating behaviour is observed in PES through the use of contractual instrument and the involvement of a growing number of private or semi-private actors in the payment mechanism. However, the contractual approach

²¹⁸ *Densification normative. La naissance d'un processus*, C. Thibierge (et al.), Mare Martin, 2013.

²¹⁹ R. Savatier, « L'inflation législative et l'indigestion du corps social », *Dalloz* 1977, *Chronique* 43 ; J. Carbonnier, « Essais sur les lois », *Répertoire du notariat Defrénois*, 1979, 1995 (2^{ème} édition), pp.307 et ss.

²²⁰ J. Chevallier, « L'Etat régulateur », *Revue française d'administration publique*, 2004, n° 3, p. 200 ; G. Timist, « La régulation. La notion et le phénomène », *Revue française d'administration publique*, 2004, n° 1, p. 206.

²²¹ C. Thibierge, « Conclusion », *In Densification normative. La naissance d'un processus*, C. Thibierge (et al.), Mare Martin, 2013, p. 1143.

²²² B. Frydman, « Comment penser le droit global ? », *In La science du droit dans la globalisation*, J.Y. Chérot, B. Frydman (dir.), Bruylant, 2012, pp. 46 et ss.

²²³ P. Lascoumes, Y. Le Galès, *Gouverner par les instruments*, Presses de Science Po, 2004.

promotes a new governance to the benefit of private actors, because it questions the role of the State and its public regulation in the relationship²²⁴.

A second point drawn from the analysis of public and private regulation within PES concerns the **dissociation between success of the PES and strong public intervention** (Vittel case). More precisely, the lack of public regulation does not necessarily entails the failure of the PES. The Vittel case is particularly indicative of this observation. However, because this case study is quite accurate, it would probably be wrong to assert a general principle. In addition, we may assume that **public regulation could intervene to contribute to the success of the PES** in order to recreate the conditions for success (especially observed in the Vittel case). Consequently, public regulation would not framed the mechanism, but ensures, punishes and controls the compliance of conditions of design and implementation of PES.

This specific role of public regulation finds its theoretical justification in the conceptual tool called internormativity. This concept is defined in two different meanings²²⁵. The first evokes the passage of a standard of a normative system to another, or inter-influence of different nature of standards (legal, social, economic...). The second meaning refers to contacts between normative systems, power relationships, and interaction observed between two or more normative systems. The relationship between actors of the systems is highlighted.

In the context of our report, only the first definition holds our attention. In this sense, PES involve a plurality of norms which interact and organize (one might say, regulate) the factual situation. The internormativity observed here is a tangle of standards (social, economic, legal) related to various regulations (public or private). This concept applied to regulations observed within PES reveals an absence or a presence of internormativity, and a scale. For example, while the Vittel case reports a low internormativity between public regulation and private regulation, in favour of the second, if the AEM in the Walloon Region reflects the opposite. In between, Costa Rican and Indonesian cases illustrate the phenomenon of internormativity in its highest degree, to the extent that the framing of the overall process and its terms are sometimes supported by regulation and sometimes by another.

- The role of public regulation in knowledge mobilised

The observation of knowledge within PES implies to take into account science policy interfaces (SPIs) implemented in the various mechanisms. The analysis of these SPIs leads to conclusions about the place and role of public regulation. On one hand, **there is a variety of knowledge used within the mechanisms**, from the scientific data (Indonesia, Costa Rica, Belgium) to experience on the ground (France).

This observation refers to the first meaning of internormativity. The flow of knowledge is considered here in an interdisciplinary perspective, crossing standards and data of different nature (social, scientific, economic...). We can make two observation. On one hand, the different mechanisms do not propose the same degree of internormativity, insofar as the nature of mobilized data is highly variable. On the other hand, the normative influence,

²²⁴ A. Langlais, « Jeux et enjeux juridiques autour des PSE », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²²⁵ Sur ces définitions, voir : A.-J. Arnaud (dir.), Dictionnaire encyclopédique de théorie et de sociologie du droit, 2^{ème} édition, LGDJ, 1993 ; K. Benykhlef, Une possible histoire de la norme. Les normativités émergentes de la mondialisation, Thémis, 2008, p. 797 ; J.-G. Belley, *Réactif, activation, phases et produits*, In Le droit soluble. Contributions québécoises à l'étude de l'internormativité, J.-G. Belley (dir.), LGDJ, 1996, p. 21.

(understood as the weight of a given standard in the final decision²²⁶) is also variable. In view of case studies, it appears that the weight of a scientific data will depend on the number and nature of the other standards mobilized in the process. This normative influence²²⁷ refers to the concept of normative force which allow to assess the degree of influence of a standard.

Using this concept in the present report allows us to make the link between standard mobilized and the legitimacy of the final decision. More precisely, the consideration of social or economic data helps to legitimize the final decision. The legitimacy of the legal norm remains a big question, which is often studied in perspective of the validity of legal norms²²⁸. However, in PES scheme, we cannot speak about the legitimacy of a legal norm (or public regulation). It is a double legitimacy: the legitimacy of the final decision on the design of the PES and its implementation, and a procedural legitimacy²²⁹ which implies that the design and the implementation process meet the expectations of stakeholders to carry their membership²³⁰ (in other words, the recipients of the tool). Procedural legitimacy finds its origin in the Habermasian theory of communicative action²³¹ based on ethical discussion²³². According to Habermas, legitimacy is gained through the procedure. It excludes any reference to meta-positive values or some deity²³³. This procedural aspect is enriched by a discursive dimension. In this sense, the validity can only be gained if all stakeholders reach to an agreement at the end of a discussion process²³⁴. Procedural legitimacy then implies that the final decision derives its legitimacy²³⁵ from proof and discursive process²³⁶. The legitimacy is not a pre-condition. This positioning resolutely focuses on the idea of "participation"²³⁷ and

²²⁶ A. Pomade, « La force normative d'un avant-projet et la force normative de son émetteur: connexion ou dissociation? » *In Force normative. Naissance d'un concept*, C. Thibierge (et al.), Bruylant, LGDJ, 2013, pp. 499-515 et ss.

²²⁷ C. Thibierge (et al.), *Force normative. Naissance d'un concept*, Bruylant, LGDJ, 2013.

²²⁸ Voir notamment : A. Pomade, *La Société Civile et le droit de l'environnement. Contribution à la réflexion sur les théories des sources du droit et de la validité*, LGDJ, 2010 ; F. Ost, M. Van de Kerkhove, *De la pyramide au réseau. Pour une théorie dialectique du droit*, Publication des FUSL, 2002 ; M.-J. Falcon Y Tella, *Concepto y fundamento de la validez del derecho*, Civitas, 1994.

p. 113 ;

²²⁹ J. Habermas, *De l'éthique de la discussion*, Champs Flammarion, 1999.

²³⁰ J. Chevallier, *Vers un droit postmoderne ?*, *In Les transformations de la régulation juridique*, J. Clam et G. J. Martin (dir.), LGDJ, Coll. Droit et société, 1998, p. 34 ; P. Talla Takoukam, *Les individus et le droit de l'environnement*, *In Mélanges en l'honneur de Michel PRIEUR, Pour un droit commun de l'environnement*, Dalloz, 2007, p. 674.

²³¹ Y. Sitomer, *Habermas et la sociologie du droit*, *In La sociologie du droit de Max WEBER*, J.-P. Heurtin et N. Molfessis (dir.), Dalloz, Coll. l'esprit du droit, 2006, p. 67.

²³² S. Goyard-Fabre, *Le droit et la société aujourd'hui*, *In Penser la justice*, CRDP Midi-Pyrénées, Coll. Savoir et faire, 1998, p. 190 ; J. Habermas, *Droit et démocratie*, Gallimard, 1997, pp. 169 et ss. ; du même auteur : *De l'éthique de la discussion*, Champs Flammarion, 1999, pp. 16-19. L'auteur explique ce que signifie « éthique de la discussion » ; du même auteur : *Ethique de la discussion*, Grasset, 2003, p. 24.

²³³ J. Habermas, *De l'éthique de la discussion*, *De l'éthique de la discussion*, Champs Flammarion, 1999, p. 17 ; P.-A. Perrouy, *Légitimité du droit de désobéissance*, *In Obéir et désobéir : le citoyen face à la loi*, P.-A. Perrouy (édité par), éditions de l'Université de Bruxelles, Collection de philosophie politique et juridique, 2000, p. 72.

²³⁴ J. Habermas, *De l'éthique de la discussion*, Champs Flammarion, 1999, p. 17

²³⁵ D. Burdeau, *L'Etat de droit est-il un Etat de valeurs particulières ?*, [En ligne] <http://www.aixmrs.iufm.fr/formation/filières/ecjs/reflexions/etatdroit.html/>

²³⁶ V. Petev, *Réflexion sur la postmodernité et les limites du législateur*, art. précit., p. 306 ; J. Chevallier, *Le débat public en question*, *In Mélanges en l'honneur de Michel PRIEUR, Pour un droit commun de l'environnement*, Dalloz, 2007, p. 500.

²³⁷ S. Robin-Olivier, *Consultations, négociations, accords... : recherche sur les voies de développement du droit dans l'Union européenne*, *In Approche renouvelée de la contractualisation*, S. Chassagnard-Pinet et D. Hiez (dir.), PUAM, 2007, p. 68.

permits to qualify the legitimacy of the standard as a "procedural legitimacy"²³⁸. This mechanism is particularly effective and efficient in the Vittel case, but much less present in Indonesia and Costa Rica case studies.

The analysis of SPIs leads the observation that the framing of knowledge within the mechanisms plays a role in the success of PES. This framework requires:

- To mobilise knowledge from the design to the implementation of the tool
- To consider inclusion of knowledge in a broadest sense
- To exploit the knowledge collected at the stage of the implementation of PES

This implies to take into account three categories of knowledge at least: scientific data (raw data, surveys...), scientific knowledge and work (assumptions, scenarios, statistics...) and experience on the ground (practices, traditions...). The Vittel case is the most complete. Moreover, it implies to consider two types of knowledge: knowledge mobilized before and during the process put in place by the PES (Costa Rica, Belgium) and knowledge collected at the end of the implementation of the PES (Belgium).

The originality highlights by case studies is that **the nature of framework (public or private) does not seem to impact on the effect of the PES**. Specifically, no matter whether it is public regulation or private regulation, only the degree of framework of knowledge seems to be a determining factor for the success of PES (Vittel). This observation well aware of the "secondary" role of public regulation, and confirmed its possible role of "assistance". In this sense, in cases where private regulation show failures or shortcomings, relays could be taken by public authority to fill the gaps. This flexibility allows to make the hypothesis that an incomplete public regulation would be supported by private regulation. This perspective is in current thinking about the development of a legal postmodernity²³⁹, admitting the articulation of law with new forms of normativity, particularly in terms of adaptation or coexistence²⁴⁰. These comments fits the current thinking which promote that an unlimited legal normative production could lead to an unworkable law²⁴¹.

²³⁸ F. OST, *Conclusion générale : le temps virtuel des lois postmodernes ou comment le droit se traite dans la société de l'information*, In *Les transformations de la régulation juridique*, J. Clam et G. J. Martin (dir.), LGDJ, Coll. Droit et société, 1998, p. 436

²³⁹ P. Puig, *Hiérarchie des normes : du système au principe*, RTD civ. 2001, p. 749, [En ligne] <http://www.dalloz.fr> ; J. Chevallier, *L'Etat post-moderne*, 3ème édition, LGDJ, Coll. Droit et société, 2008 ; D. De Bechillon, *La structure des normes juridiques à l'épreuve de la postmodernité*, RIEJ 1999, n° 43, pp. 1 et ss. ; A.-J. Arnaud, *Du jeu fini au jeu ouvert. Réflexions additionnelles sur le Droit postmoderne*, *Revue Droit et société* 1991, nos 17-18, pp. 38 et ss. ; F. OST, *Le rôle du droit : de la vérité révélée à la vérité négociée*, In *Les administrations qui changent ?*, Colloque des 19 et 20 mai 1994, organisé par le Centre d'étude et de recherche sur l'administration publique (CERAP), l'École doctorale de droit et le Centre de droit comparé de l'Université de Paris I Panthéon-Sorbonne, Paris, G. Timsit et A. Claisse (dir.), PUF, 1996, pp. 73 et ss. ; B. Frydman, *Les Transformations du droit moderne*, Rapport réalisé à la demande de la Fondation roi Baudouin dans le cadre de la réflexion prospective « Citoyen, Droit et Société », septembre 1998, p. 9. Pour une conception de la postmodernité en tant que modernité « dépassée », voir : V. Petev, *Réflexion sur la postmodernité et les limites du législateur*, In *Légistique formelle et matérielle*, Actes du 10ème séminaire du Valais du 24 au 27 septembre 1997, organisé par le Centre d'étude de technique et d'évaluation législative de Genève et l'Institut universitaire Kurt Bosh, Sion, C.-A. Morand (dir.), PUAM, 1999, p. 302.

²⁴⁰ Y. Boisvert, *Le postmodernisme*, Boréal, Coll. Boréal express, 1995, p. 17 ; N. De Sadeleer, *Les approches volontaires en droit de l'environnement. Expression d'un droit postmoderne ?*, In *Les approches volontaires et le droit de l'environnement*, Contributions au colloque des 8 et 9 mars 2007, Rennes, N. Hervé-Fournereau (dir.), Presses universitaires de Rennes, 2008, p. 52.

²⁴¹ S. Aubert, « PSE et service public : les modalités de l'intégration des instruments de gestion des ressources forestières à Madagascar », *Atelier international PESMIX*, 11, 12, 13 juin 2014, Montpellier.

IV. Success factors of the tool

The research has highlighted key success factors of the PES, or at least, elements that impact on the success of the tool. Firstly, these criteria concern actors or stakeholders involved in the relationship or concerned by the impact of the PES, and secondly, they concern knowledge mobilized within the mechanism.

The French and Indonesian case reveal that the participation of stakeholders in the design and implementation of PES is an important part of its effectiveness and efficacy. Where participation is low, information is opaque and there is no space for dialogue, their involvement is residual. It is particularly the Cidanau case in Indonesia. The lack of dialogue and transparency hinder the success of the mechanism. On the contrary, where the discussion is supported and where intermediaries play a strong role in the communication and dialogue, the mechanism carries a profitable dynamic to PES. It is the emblematic case of Vittel in France. This comment comes in line with the current new way of thinking “public action”, which is defined as the actions of public institutions and of a plurality of public and private actors from civil society which act jointly in multiple interdependencies to produce forms of regulation of collective activities²⁴². It means that a concerted and collective action generate successful decision.

These observations also refer to an emerging concept in law, well known in political science and management: empowerment²⁴³. Some authors have developed definitions of this concept of empowerment²⁴⁴. Depending on the context, it can refer to a theory, a framework, a plan, a goal, an ideology, a process, a result²⁴⁵ or a consequence²⁴⁶. At an individual level, empowerment is defined as the capacity of people to promote self-esteem, self-confidence, initiative and control²⁴⁷. Some authors speak about a “social recognition processes”, or the capacity of people to meet their needs, to solve their problems and to mobilize the necessary resources to feel in control of their own lives²⁴⁸. Here we could say that this approach refers to the awareness of stakeholders PES to have a crucial role to play in the administration of the tool. In a collective sense, empowerment refers to a process which implements cooperation, synergy, transparency and flow of information. It is the result of a strong participation in political and collective actions and requires the active involvement of people. Intervention strategies can consist in interpersonal communication methods, focus groups, seminar training, workshop, financial and logistical support or monitoring activities. The PES case studies do not reflect a form of successful empowerment. However, they highlight the potential. By the lack of public regulation, the Vittel case corresponds to the characterization

²⁴² J. Commaille, « sociologie de l'action publique », In L. Boussaguet, S. Jacquet et P. Ravinet (dir.), Dictionnaire des politiques publiques, 3^{ème} édition, Presses de Sciences Po, 2009, p. 519.

²⁴³ M.H. Bacqué, C. Biewener, *L'empowerment, une pratique émancipatrice*, La Découverte, 2013 ; M.H. Bacqué, Empowerment et politiques urbaines aux Etats-Unis, *Géographie, économie, société*, 2006, n° 1, Vol. 8, pp. 107-124 ; A.G. Gagnon, P. May, Empowerment et diversité culturelle : quelques prolégomènes, *Métropoles*, 2010, n° 7 ; J. Friedmann, *Empowerment : the politics of alternative development*, Blackwell, 1992.

²⁴⁴ J. Rappaport, Studies in Empowerment : introduction to the Issues, *Prevention in Human Services*, 1984, pp.1-17.

²⁴⁵ Hawley et E. Mc Whirther, Empowerment in counselling, *Journal of Counseling & Development*, 1991, pp. 222-227.

²⁴⁶ C.H. Gibson, A concept analysis of empowerment, *Journal of Advanced Nursing*, 1991, pp. 354-361.

²⁴⁷ A. Eisen, Survey of neighborhood-based, comprehensive community empowerment initiatives, *Health Education Quarterly*, 1994, pp. 235-252.

²⁴⁸ C.H. Gibson, A concept analysis of empowerment, *Journal of Advanced Nursing*, 1991, p. 359.

of empowerment. In contrast, Indonesia and Costa Rican cases tend to another vision of empowerment more focused on a public perspective. In this perspective, empowerment allows to change the current structures and power relations between the various public and private bodies, stakeholders and individuals²⁴⁹. Whatever the chosen dimension is, the success of empowerment is related to factors such as individual support or information²⁵⁰, because it involves collaborative relationships.

This study of PES success factors should be linked with a reflection on governance. Appeared in the wake of globalization of the economy, the concept of governance then came crystallize a need to renew the relationship between civil society and decision-making powers²⁵¹. In the case of PES, the concept is used, especially in Indonesia, Belgium and Costa Rica, as the implementation process of environmental policy which purpose is to ensure the management of natural resources by actors concerned²⁵² and to inform on methods of land management²⁵³. The governance of biodiversity has evolved over the past decades. First seen in terms of nature reserves considered as tools of governance²⁵⁴, questions about the role of the capitalist system in the degradation of the environment have questioned the organization of biodiversity conservation in the 70's and 80's. The concepts of eco-political and sustainable development are part of these developments. Biodiversity becoming closely linked to socio-economic issues, it then enrolled in a perspective of sustainable development²⁵⁵. Today, the governance of biodiversity shows various illustrations such as bioprospection²⁵⁶, and generally refers to the rational use of resources by humans²⁵⁷. Whatever is the design of PES, they are an illustration of the renewed governance of biodiversity.

Local governance is an important factor of the success of PES. The social acceptability of conservation program depends on the place given to the collective organization of governance²⁵⁸. For better environmental and social performance, factors of success PES are identified as a participatory approach, a deliberative strategies to reduce conflicts²⁵⁹, the ability to make compromises on the full compliance of payments²⁶⁰, the negotiation about

²⁴⁹ S. Sherwin, *No Longer Patient: Feminist Ethics and health Care*, Temple University Press, 1992.

²⁵⁰ P.S. Chally, *Empowerment through teaching*, *Journal of Nursing Education*, 1992, pp. 117-120 ; R. Beaulieu, J. Shaminan, G. Donner, D. Pringle, *Empowerment and Commitment of Nurses in Long-term Care*, *Nursing Economic*, 1997, Vol. 15, n°1.

²⁵¹ D. Bourcier, *Comment s'accorder sur les normes ?*, *Le Droit et la Gouvernance face à Internet*, *Lex Electronica*, 2006, Vol.10, n° 3 : <http://www.lex-electronica.org/articles/v10-3/bourcier.htm>

²⁵² C. Eberhard (dir.), *Droit, gouvernance et développement durable*, Paris, Karthala, 2005.

²⁵³ H. Rey-Valette H., et al., *Guide pour la mise en œuvre de la gouvernance en appui au développement durable des territoires*, © Cemagref, CNRS, Geysier, Inra, Supagro, Université Montpellier 1. Diffusion INRA-Montpellier, 2011.

²⁵⁴ D. Dumoulin-Kervan, *Les politiques de conservation de la nature au cœur de l'internationalisation et de la convergence des ordres politiques*, *Revista de la CEPAL*, Numéro spécial en français, Sélection d'articles 1995-2004, 2005, pp. 71-86.

²⁵⁵ E. Rodary, *La gouvernance de la biodiversité et le développement*, *In Regards sur la Terre*, Presses de Science Po, 2008, Chapitre 4.

²⁵⁶ F. Thomas, *Biodiversité, biotechnologies et savoirs traditionnels. Du patrimoine commun aux ABS*, *Revue Tiers Monde*, 2006, n° 188, pp. 825-842 ; T. Dedeuwaerdere, *Bioprospection, gouvernance de la biodiversité et mondialisation*, *Les Carnets du Centre de Philosophie du Droit*, 2003, n° 104.

²⁵⁷ J.P. Raffin, *De la protection de la nature à la gouvernance de la biodiversité*, *Ecologie et Politique*, 2005, n°30, pp. 97-109.

²⁵⁸ U. Pascual "Social equity matters in Payments for Ecosystem Services", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²⁵⁹ U. Pascual, "Social equity matters in Payments for Ecosystem Services", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²⁶⁰ S. Engel, "What have we learnt on designing PES? A critical economist's view", Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

what you are going to do²⁶¹, and a trustworthy relationship²⁶². It is necessary to think the ways of improving the involvement of stakeholders in the decision making process and the recognition of values and identities associated to ecosystems. It is also important to question how an adaptive approach to PES governance can be built, focusing on the best participation²⁶³. It consist in finding the best balance between flexibility and legal certainty.

²⁶¹ M. Antona, table ronde « Les PSE : des instruments environnementaux ou de développement ? », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²⁶² B. Landreau, « Programme gouvernemental 'Socio Bosque' en Équateur – Présentation et analyse de la première initiative de PES national en Amérique du Sud », Atelier international PESMIX, 11, 12, 13 juin 2014, Montpellier.

²⁶³ A. Karsenty *et al.*, Du Sud au Nord : regards croisés sur les Paiements pour Services Environnementaux. Synthèse et débats de l'atelier international PESMIX, Cahier de BIODIV'2050 : INITIATIVES, novembre 2014.

Part 2: Habitat banking

Habitat banking is well known in United States and particularly developed in California which is one of the first States which have put in place such mechanism. This kind of compensation has a similar manifestation in France through the CDC Biodiversité which experiencing this process since 2008.

Chapter 1 : Introduction

VII. BRIEF DEFINITIONS

3. U.S.A.

Among various biodiversity compensation mechanisms in United States, there are the permittee-responsible mitigation, which is a tailored compensation that not transfers responsibility. In that case, the compensation can be concomitantly or subsequent. There are also in-lieu fee, which consist in giving money to a compensation fund that transfers responsibility. This kind of compensation is subsequent. But we chose to analyze the most original tool which consist in being implemented in advance to residual damages and that transfers responsibility. Strongly present in U.S.A., and encountered under the generic term of “banking”, this mechanism is more experiments in France.

Banking includes mitigation banking which led then to conservation banking, umbrella banking and grass banking. Mitigation banking can be used as a generic term, synonymous of banking, or aimed directly the wetland mitigation banking (under the Clean Water Act). Mitigation Bank is a site, or suite of sites, where resources (*i.e.* wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation bank are governed by a mitigation banking instrument²⁶⁴.

Conservation banking applies to endangered species (under the Endangered Species Act). Conservation Bank is a parcel of land containing natural resource values that are conserved and managed in perpetuity, through a conservation easement held by an entity responsible for enforcing the terms of the easement, for specified listed species and used to offset impacts occurring elsewhere to the same resource values on non-bank lands²⁶⁵.

Umbrella banking is an instrument sustained by only one entity which develops a regional multi-site banking program.

Grass banking consists in giving grazing to farmers while theirs are restored. Because it is placed at the margin of the initial banking, we should not study this last one.

4. Europe and France

²⁶⁴ R. Orndoff, Mitigation and Conservation Banking, <http://www.nmfwa.net/uploads/conference/presentations/Banking.pdf>

²⁶⁵ 2003 USFWS Guidance for the Establishment, Use, and Operation of Conservation Banks? https://www.fws.gov/endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf

Habitat restoration measures are not explicitly required under the Habitats Directive²⁶⁶ or Birds Directive²⁶⁷. In theory, they should be undertaken where it is necessary to return a habitat or species population to Favorable Conservation Status, and as such may be part of management plans for Natura 2000 sites. Many E.U. Member States (as United Kingdom) have developed Biodiversity Action Plans that include habitat restoration targets²⁶⁸. As a result, some habitat restoration projects are underway in the EU, and many are funded under the LIFE Nature program. Therefore, there is a possibility that restoration based on compensatory measures could provide little added value, *i.e.* merely replacing what a Member State would have carried out anyway. However, in practice, restoration rates are very low for most habitats in most Member States. Furthermore, with increasing pressures from climate change, habitat restoration measures will become increasingly important for adaptation purposes and the gap between habitat restoration needs and delivery will probably widen²⁶⁹.

In Europe, habitat banking are still developing. Markets in biodiversity units are not apprehended by international law nor by European law. Reflections on such systems are underway, including the Conference of the Parties to the Convention on Biological Diversity²⁷⁰ and the European Commission²⁷¹, but there is still no legally binding framework²⁷².

In this regard, the Commission considers that clearing banks might have an interest in the implementation of Article 6 § 1 of the Habitats directive. However, it considers that clearing banks are a little feasible option under Article 6 § 4, given the strict criteria for the protection of network consistency²⁷³.

In France, compensation is part of the implementation of the hierarchy "Avoid-reduce-offset" (ERC in French) arising out of European texts²⁷⁴. This hierarchy aims to achieve a "no net loss" of biodiversity. In that way, habitat banking should be considered as the last possibility for offsetting the negative impacts of the project which could not be avoided or reduced. Thus, it concerns the significant residual damage. As a result, the compensation is

²⁶⁶ [Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043>](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043)

²⁶⁷ Directive 2009/147/EC of the European parliament and of the council of 30 November 2009 on the conservation of wild birds, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0147&from=EN>

²⁶⁸ <http://www.ukbap.org.uk/>

²⁶⁹ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

²⁷⁰ CDB, décisions IX/11 et X/21 : <http://www.cbd.int/decision/cop/?id=11654> and <https://www.cbd.int/decision/cop/?id=12287>

²⁷¹ Livre vert sur les instruments fondés sur le marché en faveur de l'environnement et des objectifs politiques connexes, COM (2007) 140 final, 28 mars 2007, pt. 4.3.

²⁷² Born (C.H.), Dupont (V.), Poncelet (C.), « La compensation écologique des dommages causés à la biodiversité : un mal nécessaire? », *Aménagement-Environnement*, n° 3, 2012, pp. 12-40.

²⁷³ Commission Européenne, Guidance document on Article 6(4) of the «Habitats Directive» 92/43/EE, janvier 2007, pp. 14 et 15.

²⁷⁴ Directive 2011/92/UE du Parlement européen et du Conseil du 13 décembre 2011 concernant l'évaluation des incidences de certains projets publics et privés sur l'environnement, Directive 2001/42/CE du 27 juin 2001, relative à l'évaluation des incidences de certains plans et programmes sur l'environnement, Directive 92/43/CEE sur la conservation des habitats naturels de la faune et de la flore sauvages, et instituant le réseau Natura 2000.

necessarily subsidiary and exceptional²⁷⁵. The compensation is intended to compensate the negatives impacts of a project by leading *ex situ* actions in order to maintain biodiversity in an equivalent status or better. The compensation demand can emerge in two frames: it may be an entirely voluntary request, or a demand resulting from a regulatory obligation

In Germany, eco-accounts are used to simplify and particularly optimize the planning and the realization of mitigation and habitat banking within the environmental impact assessment (EIA) and other impact coverage systems. Since 1998, eco-accounts scheme is installed in many municipalities and governmental administrations. In general, an eco-account should be developed out of a landscape plan which covers the whole surface of a municipal district. The potentials of these landscapes within the districts for ecological improvement measures are evaluated. The appropriate and available lots are transferred to a Pool of Appropriate Lots (PAL). As soon as a measure on one of these lots is realized, it can be transferred into the eco-account and be used as a habitat banking for any impact.

VIII. HABITAT BANKING AND REGULATION

The relationship between habitat banking and regulation in this project consists in analyzing the role played by public authority and public regulation in the design and the implementation of such mechanism in U.S.A., France, and Germany.

The issue does not consist in analyzing regulations of the whole forms of compensation (obligatory, voluntary, *a posteriori*, by anticipation...) but only the set of regulations about one sort of mechanism: habitat banking. In other words, **the goal of this present research is to determine the way of developing and implementing habitat banking in those three countries, through illustrative cases, in order to determine the better articulation between private and public regulations to build the balance between ecology, economics, social and law.**

IX. ISSUE – RESEARCH

In the same way that for PSE issues, the actual problem is to know if the relationship created by the mechanism of habitat banking is included in a strong legal framework developed by public authority or if the majority of the mechanism is regulated by private actors and excluded from any legal framework.

As a consequence, several questions should be answer: is there a unique form of habitat banking, or at least, is it the same mechanism in U.S.A., France and Germany? What is the respective part of public regulation and private regulation in the whole mechanism? Are those mechanism effective and efficient to protect biodiversity? What can be improved?

X. CASE STUDIES SELECTED

For this analysis, four cases are selected. The two first ones are in U.S.A. On one hand, the California case because it is the pioneer of banking. One the other hand, the

²⁷⁵ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014.*

Wisconsin case because it is another variant of mechanism. The third case is the Plain of Cossure in France which highlights the mechanism developed by the unique body created for habitat banking: the Caisse des dépôts et consignations Biodiversité (CDC Biodiversité). The last case is the eco-account scheme in the region of Baden-Württemberg in Germany.

Based on cases studies, this part of the project will:

- Analyze the design and the implementation of biodiversity compensation to determine the part of public regulation and the part of private regulation. It will give opportunity to appreciate the role of public authority and its aloofness in regulation area, to assess the choice of a contractual instrument and its efficacy, the opportunity of a public or a private regulation...
- Establish a “grille de lecture” of regulation on biodiversity offset. It permits to identify the degree of State intervention, the effectiveness and efficacy of the measure.
- At least, it gives opportunity to compare case studies and to propose a best way of regulation for biodiversity offset (which kind of regulation for which context, which needs?).

Those issues implies answering several questions: is there a gradation in regulation? What degree of regulation should be adopted to ensure effectiveness and efficacy of biodiversity offset? What kind of regulation should be adopted to ensure the ecological efficacy of biodiversity offset? What kind of regulation should be preferred to ensure the social acceptability of biodiversity offset? Does the law should precisely define the way of using instruments to make them effective? What kind of legal framework can make biodiversity offset, more relevant, legitimate, effective, and if so how?

XI. KNOWLEDGE

The second issue discussed in this report is the role of law in the flow of knowledge mobilized within habitat banking. We wonder how public regulation can improve values of ecosystems in habitat banking, or if it is important to prescribe a socio-economic evaluation in legal rules.

Because this analysis focuses on the balance between law and the knowledge mobilized within habitat banking, it concerns the role of public regulation in the collection, the introduction and the circulation of knowledge within habitat banking.

XII. PLAN:

Chapter 1: U.S. Banking

Chapter 2: France

Chapter 3: Germany

Chapter 1 : U.S. Banking

IV. INTRODUCTION OF BANKING (MITIGATION AND CONSERVATION BANKING)

- **Origin of banking**

Ecosystem service markets are almost all in some way based on (or similar to) wetland markets²⁷⁶. Wetland regulation in the United States is rooted in the U.S. Federal Water Pollution Control Act of 1972²⁷⁷, and the Clean Water Act amendments of 1977²⁷⁸ which provide for the protection of waters of the United States under the Interstate Commerce Clause of the U.S. Constitution²⁷⁹. Congress designated the Army Corps of Engineers (Corps) to administer § 404 for waters of the United States with oversight from the U.S. Environmental Protection Agency (EPA). Through judicial interpretation, waters of the United States includes wetlands²⁸⁰. Most development activities that affect waters of the United States fall under § 404 of the Clean Water Act, and thus require a permit from the Corps.

As part of the 404 program, the permittee must mitigate wetland damage, a process through which they avoid all possible impacts, minimize unavoidable impacts, and provide compensatory mitigation of unavoidable impacts, *i.e.*, create, restore, or preserve wetlands such that there is no net loss of cumulative wetland ecosystem function. In the early years of this regulation (until the mid-1990s), compensatory mitigation was usually performed on-site by the permittee (also often called the “developer” or “impactor”), resulting in the creation or restoration of numerous, small mitigation sites with limited ecological value in comparison to existing reference, less disturbed wetlands. During this period, regulations also began promoting off-site compensatory mitigation by permittees. Although this was thought to promote better mitigation, the ecological values of these compensation sites were also often extremely low, and the permittee, often a private land developer or a state department of transportation, did not want to be in the business of ecological restoration²⁸¹.

In response to slow § 404 permitting and high permittee-responsible mitigation costs throughout the early 1990s, entrepreneurs and regulators proposed creating large, consolidated areas of constructed wetlands, known as “mitigation banks,” as pre-impact or advance mitigation. In conjunction with entrepreneurial mitigation bankers, developers, and EPA staff, Corps districts developed the regulatory guidance necessary to define, create, and

²⁷⁶ Mead (D.L.), “History and Theory: The Origin and Evolution of Conservation Banking”, in *Conservation and biodiversity banking*, Caroll. (N.) (eds), 2008, pp. 9-11.

²⁷⁷ Federal Water Pollution Control Act of 1972, Pub. L. n° 92-500, 86 Stat. 816, 1972. Codified as 33 U.S.C. §§ 1251–1263, 1265, 1281–1292, 1311–1326, 1328, 1341–1345, 1361– 1376 (2006).

²⁷⁸ Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566, 1977. Codified as 33 U.S.C. §§ 1281a, 1294–1297 (2006).

²⁷⁹ U.S. Constitution art. I, § 8.

²⁸⁰ Downing (D.M.) *et al.*, “Navigating Through Clean Water Act Jurisdiction: A Legal Review”, *Wetlands*, 2003, pp. 475 et ss.

²⁸¹ BenDor (T.), Doyle (M.), “Markets for Freshwater Ecosystem Services”, in *Water Markets*, Gardner (D.), Simmons (R.), (eds), (forthcoming)
<http://www.perc.org/files/Doyle%20BenDor%20fresh%20water%20markets.pdf>

maintain markets for mitigation of wetlands by overseeing the banks and the trades that occurred²⁸².

Wetland mitigation banking allows private, third-party companies to speculatively restore wetlands, which can then be sold as credits to developers who do not wish to perform their own compensatory mitigation (See Figure 1). In order for a mitigation bank to be created, and credits from that bank sold, the mitigation banker must have the site approved by an Interagency Review Team (IRT) which is made up of personnel from the Corps, EPA, and other local or federal natural resource agencies (*i.e.* U.S. National Marine Fisheries Service, U.S. Fish and Wildlife Service, and state departments of environmental conservation)²⁸³.

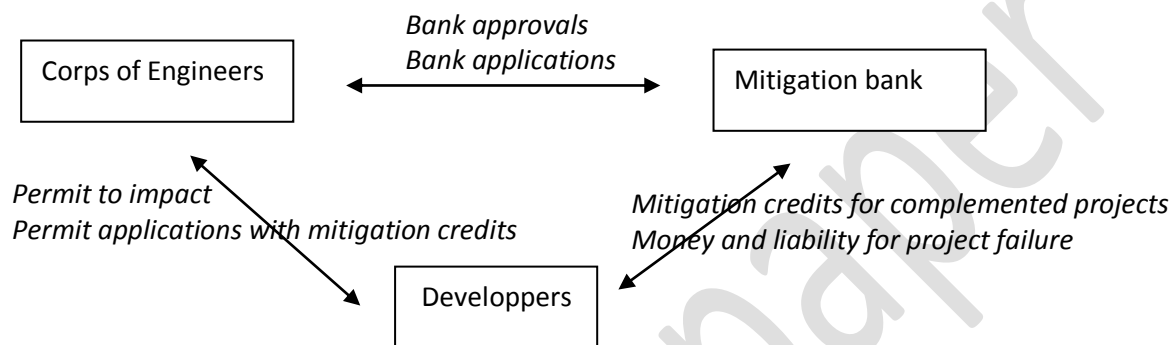


Fig. 1: Relationships between agencies, developers, and mitigation bankers in the originally conceived structure of compensatory mitigation banking. Note that once developer have purchased compensatory mitigation credits, the liability for mitigation site failure is transferred from the developer to the mitigation bank. Furthermore, a key requirement of mitigation banking is that wetlands should be restored in advance of impacts.

After mitigation banking, another mechanism of banking was put into place and called conservation Banking. It aims the conservation of endangered species. In 2003, the firsts guidelines concerning those banks were published²⁸⁴. The legal framework seems not to be binding and such dispersed at the Federal level²⁸⁵.

- **The history of Banking in California**²⁸⁶

Since the mid-1980s, the State of California and others have actively sought to prevent the inadequate, small, fragmented habitat reserves that often resulted from project-by project mitigation. One approach has been the creation of conservation and mitigation banks. Banks are generally large, connected, ecologically meaningful areas of preserved, restored,

²⁸² Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, 60 Fed. Reg. 58,605–58,614 (Nov. 28, 1995).

²⁸³ Compensatory Mitigation for Losses of Aquatic Resources: Final Rule, 73 Fed. Reg. 19,594–19,705 (2008), 33 C.F.R. § 332 (2008).

²⁸⁴ Guidance for the Establishment, Use, and Operation of Conservation Banks” May 2, 2003.

²⁸⁵ Born (C.-H.),”Les banques de conservation dans le cadre de l’Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme”, Workshop construction et régulation des marchés d’environnement (CoReME), Nice, 23 janvier 2014.

²⁸⁶ State of California Natural Resources Agency Department of Fish and Wildlife, Report to the Legislature, January 2014.

enhanced, or constructed habitat (for example, wetlands) that is set aside for the express purpose of providing mitigation for project impacts to habitats.

Banking by the State has been guided by various laws and policies: The Sacramento-San Joaquin Valley Wetland Mitigation Bank Act in 1993, The California Wetlands Conservation Policy in 1993, the Official Policy on Conservation Banks in 1995.

Since 1993, the Department has participated statewide in the planning, review, approval, establishment, monitoring, and oversight of 33 conservation banks (that provide mitigation for impacts to listed species and habitats) and 28 wetland mitigation banks (that primarily provide mitigation for wetland impacts) to which it is signatory.

Guidance for the federal agencies involved in banking, including U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), Natural Resources Conservation Service (NRCS), U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA), has evolved over time: Formal policy on the establishment, use, and operation of mitigation banks in 1995, Formal policy on the establishment, use and operation of conservation banks in 2003, Federal Rule on Compensatory Wetland Mitigation in 2003 and 2008.

As new guidance developed at the State and Federal levels, the State and Federal agencies saw the need for working closely together to align our processes and practices. Interagency working groups have successfully integrated our approaches and created joint procedures and templates to guide prospective bankers.

- **The legal basis for Banking**

The mechanism of banking is based on a strong legal framework. The terms “conservation bank” and “mitigation bank” are defined in Fish and Game Code section (§)1797.5. A conservation or mitigation bank is privately or publicly owned land managed for its natural resource values. In exchange for permanently protecting, managing, and monitoring the land, the bank operator is allowed to sell or transfer habitat credits to project proponents who need to satisfy legal requirements for mitigating the environmental impacts of projects²⁸⁷.

The California Department of Fish and Wildlife (CDFW) is in the process of producing Guidelines for Conservation and Mitigation Banking program. It is the Fish and Game Code Section 1799.1 that requires CDFW to prepare Guidelines in coordination with interested parties. The Guidelines are intended to help clarify and facilitate the bank review process for bank sponsors, the public, and the staff of CDFW.

Furthermore, a Senate Bill (SB) 1148 (Pavley), Ch. 565, Statutes of 2012, effective January 1, 2013 established a process for CDFW review and approval of mitigation and conservation bank applications and new fees for program services, administration, and oversight by CDFW. Through legislative findings and declarations, this new statute reinforced the values and importance of conservation and mitigation banks in providing for the conservation of important habitats and habitat linkages, taking advantage of economies of scale that are often not available to individual mitigation projects, and simplifying the state regulatory compliance process while achieving conservation goals. Among other things, the legislation also acknowledged a desire for greater transparency to ensure mitigation requirements are fully met when employing banks, and that the monitoring of banks to ensure long-term conservation of species and habitats is scientifically valid.

²⁸⁷ California Department of Fish and Wildlife, Official Website
<https://www.dfg.ca.gov/habcon/conplan/mitbank/>

The Legislature also recognized in §1797(h) that mitigation and conservation banking is an important conservation mechanism in California because banks provide a more efficacy of regulatory, environmental benefits, and economic advantages. Properly developed and monitored banks have demonstrated their value and efficacy and are important tools in mitigating impacts to resources and in conserving a wide range of habitat lands²⁸⁸.

In a statewide team effort in 2006, CDFW and other state and federal agencies entered into a Memorandum of Understanding (MOU) (updated and renewed in 2011) to guide how the parties would work together to develop and use combined or coordinated approaches to mitigation and conservation banking, such as standardized banking program documents and guidance. The agencies represented in this effort include: the California Natural Resources Agency, California Department of Fish and Wildlife, US Army Corps of Engineers, US Fish and Wildlife Service, US Environmental Protection Agency, US Department of Agriculture - Natural Resources Conservation Service, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, and State Water Resources Control Board.

- **Documents used in the process of banking**

A Bank Enabling Instrument (BEI): is an agreement between a mitigation bank sponsor, bank property owner, and the signatory agencies that have jurisdiction over the wetland resources to be conserved and managed by the mitigation bank and for which credits will be established. The BEI identifies the conditions and criteria under which the bank will be established, managed, and operated. The BEI, including its required exhibits, describes the location of the bank site, the bank service area, the numbers and types of credits to be established and how they will be released, and how the bank will be managed and conserved in perpetuity. It describes allowable activities and access, and identifies requirements such as environmental site assessments and appropriate monitoring programs. The BEI, once completed and finalized, must be signed by CDFW to be approved.

The Conservation Bank Enabling Instrument (CBEI): is an agreement between a conservation bank sponsor, bank property owner, and the signatory agencies that have jurisdiction over the threatened or endangered species habitat or other sensitive resources to be conserved and managed by the conservation bank and for which credits will be established. Currently, until a CBEI template is finalized, a CBEI is derived from the standard template BEI, and contains essentially the same provisions and exhibits as the BEI.

Conservation easement: The biological resources protected by a conservation or mitigation bank must be conserved in perpetuity, typically by granting a conservation easement to an eligible Federal or State resource agency or non-profit conservation organization. A conservation easement, established according to California Civil Code section 815, *et seq.*, preserves land and resources in perpetuity while allowing property owners to retain many private property rights. It constitutes an interest in the land that is binding on future owners. The conservation easement prohibits activities on and uses of the bank property that might otherwise interfere with the functioning of the bank.

Long term management plan: Management of the bank property is essential to assure a bank continues to provide high quality habitat, and is key to the success of a mitigation or conservation bank. The purpose of the Long-Term Management Plan is to ensure the bank property is managed, monitored, and maintained in perpetuity for its natural resource values.

²⁸⁸ State of California Natural Resources Agency Department of Fish and Wildlife, Conservation and Mitigation Banking Guidelines, August 2014.

The long-term management plan establishes objectives, priorities, tasks, and reporting requirements. Management actions are tailored to achieve desired outcomes for the covered species and habitat, and must be designed to adapt to changing environmental factors (adaptive management).

- **Conditions for bank candidate**

Banks which want to be a conservation or a mitigation bank must present four documents: a draft prospectus, a prospectus, a bank agreement package and amendments:

A draft prospectus (optional) is a brief, concept level proposal that is optional but recommended when a bank sponsor is scoping the concept for a bank or contemplating a specific mitigation or conservation bank idea, or for those new to the banking process. This step is intended to identify potential obstacles early so that the bank sponsor may rectify the issues, revise the proposal, or decide not to pursue the bank prior to investing in the full requirements of formal prospectus review. The bank sponsor may elect to submit an optional draft prospectus to CDFW for comment and consultation. CDFW may request a site visit to the proposed bank location.

Prospectus: The bank sponsor must submit a prospectus to CDFW. It is a written summary of the proposed bank. FGC §1797.5(h) requires that it contain “*a sufficient level of detail to support informed department review and comment*” The prospectus allows CDFW to determine if the bank proposal is adequate to support development of a full bank agreement package. The prospectus review process allows for early collaboration among CDFW and the bank sponsor to clarify the intent for the proposal and to identify potential benefits and issues. See the Checklist for Prospectus for a complete list of the information required. CDFW will visit the site of the proposed bank. The prospectus will be reviewed and evaluated by CDFW to determine if it is acceptable (see Chapter 5 for Considerations for Determining Acceptability), and whether the bank sponsor may submit a draft bank agreement package.

The bank agreement package means the bank enabling instrument including all of its exhibits and attachments as required by the interagency checklists. Checklists can be found at <http://www.dfg.ca.gov/habcon/conplan/mitbank/templates.html>²⁸⁹.

Amendment is defined in Chapter 1. A bank sponsor seeking to amend a CDFW-approved bank must submit a complete bank amendment package (as defined in FGC §1798.6(a)) to CDFW.

During the process of creation of a bank, the candidate has several status. It is an approved bank means a bank CDFW has determined to be acceptable and for which the bank agreement has been signed by CDFW²⁹⁰, then an established bank, means the bank agreement has been signed, any security provided, and the land has been protected by recording a conservation easement or transferring fee title²⁹¹. The Interagency review team or “IRT” means the group of federal, tribal, state, or local regulatory or resource agencies with authorities and/or mandates directly affecting, or affected by the establishment, operation, or use of a mitigation or conservation bank. The members of the IRT vary depending on the resources conserved by the bank and the location of the bank in the state. The IRT is sometimes referred to as the Mitigation Bank Review Team (MBRT) or Conservation Bank Review Team (CBRT), depending on the agencies involved²⁹².

²⁸⁹ State of California Natural Resources Agency Department of Fish and Wildlife, Conservation and Mitigation Banking Guidelines, August 2014.

²⁹⁰ *Ibid.*

²⁹¹ *Ibid.*

²⁹² *Ibid.*

Banks are usually private or public. A privately owned conservation or mitigation bank is a free-market enterprise that offers landowners economic incentives to protect natural resources, and saves project proponents time and money by providing them with the certainty of pre-approved compensation lands to meet their mitigation needs²⁹³. A publicly owned conservation or mitigation bank offers the sponsoring public agency advance mitigation for large projects or multiple years of operations and maintenance²⁹⁴.

- **What lands are appropriate for banking?**

Bank sponsors should carefully select proposed bank sites to assure they will provide the maximum conservation value and sustainable mitigation for sensitive species, habitats, and wetlands impacts²⁹⁵. The [CDFW Regional Banking Coordinator](#) in the area of your bank is a great resource when considering where to locate a prospective bank. Bank sites that encompass the following features are encouraged by CDFW:

- Support significant, high value biological resources, or where restoration is planned and feasible.
- Contribute to a regional reserve system, conceptual area protection plan, or recovery strategy.
- Are of sufficient size, are connected to other conserved lands, and that support contiguous habitat that will sustain their long-term biological integrity and viability.

Generally, lands that meet one or more of the following criteria are not appropriate for conservation/mitigation banking:

- Department owned or conserved lands.
- Land used as mitigation for a previous project(s).
- Land already designated or dedicated for passive park or open space use, where that use is generally compatible with sustaining biological values.
- Land purchased for designated purposes which are not consistent with habitat preservation, where the use of the land is irrevocably limited to the incompatible activity (e.g., lands purchased for roads, landfills, etc.).
- Land acquired by a public entity (e.g., with State Bond Act funds) or provided to a jurisdiction for park or natural open space purposes. These criteria excludes land purchased by state and local agencies specifically for the purposes of mitigation or mitigation banking assuming the funding source is appropriate.
- Lands with existing easements that are incompatible with the purposes of the bank.

- **Actual implementation of the banking in U.S.A**

In March 2013, 105 banks were approved by the FWS in 10 states. Among them, 80 were in California. The function of banks is essentially lucrative and private: 73% are private commercial banks, 5% are public commercial banks and 2% are private non-profit banks. Species concerned by banks are not many. That is why it is not possible to use the banking for

²⁹³ California Department of Fish and Wildlife, Official Website <https://www.dfg.ca.gov/habcon/conplan/mitbank/>

²⁹⁴ *Ibid.*

²⁹⁵ California Department of Fish & Wildlife, Bank Site Selection Considerations.

a number of species²⁹⁶. Credits does not benefit from a fixed-price from a bank to another. It can various from 1836 to 400 000 dollar²⁹⁷.

V. MITIGATION BANKING

During the 1997-1998 legislative session in Wisconsin, a bill that would have established a wetlands mitigation banking program was narrowly defeated²⁹⁸. Other states have instituted wetland protection programs involving mitigation banking²⁹⁹.

These programs receive intense scrutiny because they allow for some wetland loss³⁰⁰. Environmentalists balk at these programs because they do not believe that artificially created wetlands will sufficiently or efficiently sustain wetland species or withstand the test of time³⁰¹. In addition, some environmentalists are opposed to state level wetland regulation rather than federal because business competition among states may lead to relaxed permitting by state governments³⁰². Other groups, primarily developers and farmers, oppose wetland mitigation programs because of the expense involved³⁰³. However, some developers seem eager to support private mitigation banking programs because they believe these will generate flexibility in the permitting process³⁰⁴.

6. Definition and mechanism

A mitigation bank protects, restores, creates, and enhances wetland habitats. Credits are established to compensate for unavoidable wetland losses. Use of mitigation bank credits must occur in advance of development, when the compensation cannot be achieved at the development site or would not be as environmentally beneficial. Mitigation banking helps to consolidate small, fragmented wetland mitigation projects into large contiguous preserves which will have much higher wildlife habitat values. Mitigation banks are generally approved by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency³⁰⁵.

²⁹⁶ Several protected species are adapted to banking mechanism: vernal pools species (30) ; California tiger salamander (18), San Joaquin kit fox (11), coastal California gnatcatcher (8), burrowing owl, valley elderberry longhorn beetle, bluetail mole skink, giant garter snake, golden-cheeked warbler, and sand skink.

²⁹⁷ Office of Policy Analysis, *A Preliminary Analysis of the Conservation Banking Programme and Results from a Survey of US FWS Staffs*, 2013.

²⁹⁸ A.B. 492, 93rd Leg., Reg. Sess. (Wis. 1997) (assembly bill substitute 1). This was a proposed "Act to create section 23.321 of the statutes; relating to: requiring the department of natural resources to consider wetland compensatory mitigation and granting rule-making authority."

²⁹⁹ Arkansas, California, Florida, Illinois, Louisiana, Maine, Maryland, Minnesota, New Jersey, North Carolina, Oregon, Texas, Virginia, Washington, and Wyoming.

³⁰⁰ Dugan (M.), "Citizen Participation in Wetlands Planning in the Pacific Northwest", *Journal of Environmental Law & LIro.*, 1994, n° 29, pp.31-32.

³⁰¹ Johnson (J.S.) *et al.*, "Bogged Down Trying to Define Federal Wetlands", *TEX. WESLEYAN L. REV.*, 1996, n° 481, p. 497.

³⁰² Le Desma (M.G.), "A Sound of Thunder: Problems & Prospects in Wetland Mitigatin Banking", *Columbia Journal Environmental Law*, 1994, p. 500.

³⁰³ Dennison (M.), Berry (J.F.), *Wetlands: guide to science, law, and technology*, 1993.

³⁰⁴ Blumm (M.C.), "The Clinton Wetlands Plan: No Net Gain in Wetlands Protection", *Journal Land Use and Environment*, 1994, p. 226.

³⁰⁵ California Department of Fish and Wildlife, Official Website <https://www.dfg.ca.gov/habcon/conplan/mitbank/>

Wetland mitigation is a process whereby wetland values that have been lost or degraded are restored through compensatory efforts. Mitigation banking is a kind of transferable development right program that enables a developer to create, restore, or enhance wetlands to compensate for future projects that will destroy other wetlands³⁰⁶. Once a developer receives a permit to fill in a wetland from the government regulator (*i.e.* the Corps) and has shown that further wetland loss cannot be avoided or lessened, he must then buy credits from a wetland preservation group. A mitigation banking firm restores, preserves or creates other off-site wetland areas (although as part of the same watershed), computes the cost of doing so and then compensates for its costs by using the money it receives from tax credits it has sold to developers. The amount of credits a developer will purchase depends on the wetland being degraded and the wetland being restored³⁰⁷. (See next Figure 1.)

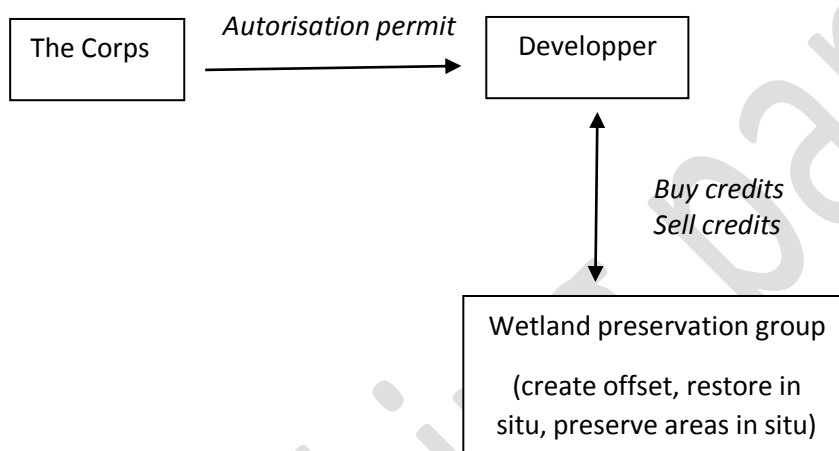


Fig. 1

- **Banks and sites**

Wetland mitigation comes in two forms, on-site or off-site and it is managed in three different ways, developer banks, public banks and private banks.

On-site mitigation forces the developer to hire another who is in the business of environmental restoration, monitor the growth and stability of the on-site wetland creation project, and pay for added costs of the permit requirement. The problem with this type of mitigation is that the developer is usually not in the business of environmental restoration, nor does he have an interest in doing so directly. Most developers are more interested in the ultimate goal of transforming the land to reap its economic benefits than worrying about environmental mitigation after their primary goal is reached. Furthermore, these small wetlands and piecemeal efforts do not promise to sustain wetland areas over time. However, the Environmental Protection Agency (EPA) and the Corps prefer on-site mitigation because it occurs within the same watershed as the impacted wetland thereby lending to the no-net-loss theory.

³⁰⁶ Blumm (M.C.), "The Clinton Wetlands Plan: No Net Gain in Wetlands Protection", *Journal Land Use and Environment*, 1994, p. 226.

³⁰⁷ Bolger (J.L.) "Creating Economic Incentives to Preserve Unique Ecosystems : Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? ", *Marquette Law Review*, 2000, Vol. 83, pp. 625-658.

Off-site mitigation allows a developer, the government or a private entity, to establish a new wetland or improve a degraded wetland not on the property being developed. If a developer uses an off-site bank it is only to satisfy his permitting requirements. Commercial off-site banks, both public and private, carry the burden of managing and continuing the bank; thus, developers do not have to ensure the success of the wetland.

Developer banks, also called "single-user" banks, make up the majority of the mitigation banks in existence. Only one developer will « use » developers use them because they are very expensive to create, run and manage. This form of mitigation is criticized because the expense involved is so high that only certain developers can benefit from it, leaving others without a means of mitigation. In addition, the prevalence of single-user banks has constrained the ability of other types of mitigation banking to improve the economic efficiency and environmental effectiveness of wetland regulation because only a single developer who can make the large, up-front investment will receive the benefits of such a bank. However, these banks do have benefits. Using this type of bank can quicken the permit application process for a developer³⁰⁸.

The government owns and manages public banks. Unlike developer banks, more than one permit applicant can benefit from this type of bank. A developer purchases credits from the bank to provide for his compensatory permit requirement. These banks benefit those development projects where on-site mitigation would be futile or impossible. However, most of these banks can only be used for certain wetland impacts. These banks are also expensive to start and governments have trouble finding upstart monies. In addition, critics scrutinize how the government spends the money that it earns from such selling credits.

Private banks, linked to private wetland mitigation banking, has existed since the early 1980's, but remains a controversial practice. Private wetland mitigation bank sites must be approved by the Corps and the EPA and in theory work much the same as single-user and public commercial banks. Even though, the mitigation does not occur on-site, it does occur within the same watershed thereby achieving the goal of no-net-loss. The government regulates private mitigation banking. However, banks are owned by private entities, either nonprofit or for-profit. Once all the credits in the bank have been sold, the land is then held in perpetuity by the government or a conservation group³⁰⁹.

- **Example of mitigation banking in california: *Cabrillo Basin: The First Port Mitigation Bank***³¹⁰

In 1982, the Port of Los Angeles proposed a marina project for the Cabrillo Basin that created several dozen new acres of open water from dry land. This raised the question of whether the Port could get credit for this wetland creation to offset later fills? The Los Angeles Inner-Harbor Mitigation established precedential rules for a mitigation bank.¹⁶⁰ It was a no net loss, in-kind protection of habitat value (temporal and spatial), acre-for-acre policy. This Agreement was negotiated with three resources agencies-the U.S. Fish & Wildlife Service, the National Marine Fisheries Service, and the California Department of Fish & Game. Because there were no endangered species impacts, the U.S. Fish & Wildlife Service participated under their Fish and Wildlife Coordination Act authority while NMFS and DFG each had a trustee role regarding fisheries impacts. They agreed that the Port could

³⁰⁸ Bolger (J.L.) "Creating Economic Incentives to Preserve Unique Ecosystems: Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? ", *Marquette Law Review*, 2000, Vol. 83, pp. 625-658.

³⁰⁹ *Ibid.*

³¹⁰ Hartmann (J.), "The Southern California Wetlands Recovery Project: The Unfolding Story", *Golden Gate University Law Review*, 2000, Vol. 30, Issue 4, pp. 885-967.

create a specific type of wetlands (mudflats) in one place *prior to* destroying that same type of wetland elsewhere. If they created twenty-five acres, then they could "debit" that "account" through a series of fills. Notably, the state and federal regulatory agencies, the California Coastal Commission and the U.S. Army Corps of Engineers, played no role in the negotiations, but acquiesced to the agreement worked out by the resource agencies and the Port.

7. Case of Wisconsin: the choice of regulation

Filling, dredging and development of wetlands was exempt from federal regulation until the 1970's. During the onslaught of environmental legislation passed in that era, none related to wetland management. However, the federal government attained jurisdiction over wetlands through section 404 of the Clean Water Act (CWA). The purpose of the CWA was to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Congress intended to limit the scope of the act to address activities that affect interstate commerce and not all bodies of water in the United States. Congress' primary concern was waters used in interstate commerce and waters that together form a hydrologic chain. Courts have read the CWA to allow the Corps to regulate wetlands because they are considered waters of the United States. The CWA provides the Corps with jurisdiction over waters used in interstate commerce³¹¹.

However, because no specific statute regulates wetlands, the EPA and the Corps battle over which agency has jurisdictional control over a wetland area. The agencies have agreed to work together with regard to enforcement. However, which group has what regulatory control is still unclear. The United States Attorney General gave the EPA the final administrative authority for determining the reach of waters subject to regulation under § 404. But the EPA also agreed to allow the Corps to continue to decide jurisdiction issues. The EPA will subvert the Corps' authority in special situations that involve technical or policy questions. In addition, while the Corps is responsible for granting or denying wetland activity permits, the EPA is responsible for the regulations that the Corps uses in its determinations. Furthermore, the EPA can veto a permit authorized by the Corps in special situations. The EPA and the Corps will not get involved with management of wetlands unless destruction or degradation of the wetland could affect interstate commerce. The test for determining whether an activity affects interstate commerce is very broad. Thus, the EPA and the Corps have chosen to limit their exercise of authority over certain wetland domains. Nonetheless, prohibited discharges which theoretically affect interstate commerce include any land-degrading activities that stir up and move around the surface of wetlands, even if this displacement involves no more than soil and sediment from the roots of an uprooted tree falling to the ground.

The federal government will evaluate a permit to impact a wetland using the following criteria: avoidance, minimization, mitigation, and compensation. Under "avoidance," a permittee must demonstrate that proposed impact to the wetland cannot be avoided by other feasible methods. The crux of this test is whether a project's purpose and success depend upon its location at the proposed site. If the impact cannot be avoided then it must be minimized. Finally, mitigation and compensation require the permittee, as part of the permit approval, to replace or pay for the value of the lost wetland acreage. This evaluation process is called sequencing. Under the traditional regime of compensatory mitigation developers are responsible for restoring, maintaining or creating the type of ecosystem they destroy during

³¹¹ Bolger (J.L.) "Creating Economic Incentives to Preserve Unique Ecosystems: Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? ", *op.cit.*

the development process once they have shown that impact to the wetlands cannot be minimized.

It is interesting to look after Wisconsin's regulation and to compare it with the Federal regulation to analyze articulations.

Presently, wetlands in Wisconsin are regulated through a mix of federal, state and local controls. First, the Corps regulates the filling or dredging of any wetland that exists on waters which are considered federally navigable waters under the Clean Water Act (CWA). When a developer applies for a permit to fill in wetland that exists in a federally regulated watershed, he must comply with the CWA unless he qualifies for a nationwide permit. The CWA generally requires compensatory mitigation if the wetland is over acres in size. A nationwide permit allows an activity to proceed without a permit regardless of its impact on a wetland.

In addition to the conditions the Department of Natural Resources (DNR) has placed on nationwide permits, it can also veto any permit granted by the Corps under the CWA. The state can exercise this power when it evaluates a federally granted permit. If the impact of the filling or dredging will affect the state's water quality standards, it can veto the permit. Wisconsin, taking a strict wetland conservation approach, has developed several conditions in which a general permit authorized through federal law will be deemed impermissible. Second, the DNR also regulates some dredging activities and any other activities which significantly impact wetlands. The numerous water quality standards created by the DNR also provide it with the authority to regulate wetland development.

Third, a wetland can fall under local authority through zoning laws if it is larger than five acres. To do this, the DNR created wetland inventory maps of all the wetlands in the state larger than five acres for zoning authorities to reference. Wetlands which exist in a Shoreland Zoning area are under State jurisdiction and are regulated by the DNR. However, the permitting process in Wisconsin does not extend authority to the DNR to consider mitigation as part of the permit requirement. Currently, Wisconsin is losing wetlands because the DNR does not have the authority to include mitigation of wetlands in the permitting process.

- **Wisconsin proposed legislation: Assembly Bill 492**

The Wisconsin DNR's frustration with its inability to adopt a wetlands mitigation banking policy prompted it to ask the Natural Resources Board to direct the DNR to pursue legislation authorizing the DNR to develop a compensatory mitigation program for permitted wetland loss. Hence, Assembly Bill 492 was introduced. This proposed legislation was a general grant of authority to the DNR through a line in the Department of Transportation's (DOT) budget proposal introduced by Senate leadership. The intent of the bill was to allow the DNR to create a program for wetlands mitigation banking through its adoption of administrative rules. Essentially this program would have allowed for the DNR to require mitigation when wetlands would be impacted. This would include allowing an applicant to purchase credits from a mitigation bank. The bill directed the DNR to promulgate rules that would be at least as strict as federal law governing wetland compensatory mitigation, but the rules may not require more extensive wetland compensatory mitigation than is required by federal law. It was defeated because opponents were concerned that a general grant of authority would not provide enough guidance for the DNR to create a successful and comprehensive program.

Wisconsin must act now, especially with the huge real estate boom and sprawl that the state is seeing. More and more strip malls, neighborhoods, and industries are replacing the

country's prairies, forests, and wetlands. Economic growth is vital to state progress, but biodiversity and genetic diversity are also key components to success and survival.

Wisconsin should adopt regulations to permit private entities to establish private wetland banks. High-grade wetlands under five acres in size could then be protected from general permitting. Furthermore, permits for low-grade wetlands should require preservation or enhancement of high-grade wetlands. By first including the smaller wetlands that are lost each year in the state's wetland inventory and requiring mitigation for high-grade wetland destruction regardless of size would ultimately result in a no-net-loss average system of wetland mitigation.

The majority of wetlands still exist in Wisconsin and private mitigation can restore degraded wetlands as well. If the state does not adopt a comprehensive program, those entities that establish banks will go unregulated and further inconsistencies will be added to wetland preservation. In addition, banks could differ in content and efforts creating failed, superficial attempts at preservation and creation. Although, the DNR will still ultimately be responsible for determining if the applicant passes the permit requirements, regulations are necessary to guide private entities and ensure that wetlands are built properly.

One of the main reasons that Assembly Bill 492 was defeated in Wisconsin's last legislative session was because some feared that a general grant of authority to the DNR would give excessive or even abusive wetland control to the state. However, politics aside, the focus needs to turn to instituting a cogent and enforceable wetland conservation program because time is of the essence with regard to land development. Once wetlands are gone they are difficult if not impossible to replace, especially because getting those values back takes great effort, time and money. Wetlands that are filled or dredged for development are impossible to replace once a stadium or farm rests upon them. However, degraded wetlands can be built back up and pristine wetlands can be preserved and both types can be increased in acreage through private mitigation banking programs. Many sources have published suggested guidelines to follow and important factors to consider when developing regulations for mitigation banking. The Corps' Institute for Water Resources listed seven relevant factors to include in a comprehensive mitigation banking program:

- (1.) Early sale of credits to facilitate a reasonable and timely return on capital.
- (2.) Banking agreements with regulatory agencies that establish bank standards for performance, monitoring, maintenance, and long-term management.
- (3.) Risk allocation for mitigation failure that is restricted to events within a credit supplier's control.
- (4.) Flexible mechanisms, such as higher trading ratios and performance bonds, for allocating liability in the event of failure.
- (5.) Rules to determine how credits will be defined and their level assessed.
- (6.) Flexible regulatory systems and avoidance of price controls to ensure consistency in mitigation requirements and a wiser market.
- (7.) Integration of mitigation banking with regional and local watershed planning initiatives.

Other important criteria to include are adequate design of the project and appropriate site selection to lessen probability of failed attempts. Educating the public about the value and importance of wetlands is another important guideline. Furthermore, the goals and purposes of each mitigation bank should be clearly and precisely described to ensure that they are achieved.

Wisconsin is in a good position to adopt legislation that allows for the establishment and management of private mitigation banks. The DNR already follows comprehensive guidelines when regulating a developer's compensatory mitigation requirement. The DNR created an Advisory Committee composed of various interest groups environmental, real estate, commercial industry, federal, local, and Native American to aid in the drafting of comprehensive, state specific guidelines. The Committee worked for over two years to draft a comprehensive regulation. To get the support of the developers and environmentalists in the state, next time around, the legislature should propose a more specific and comprehensive bill that includes a specific purpose and other means of achieving its ends rather than a simple line in the state budget.

8. Who benefit from this mechanism?

Essentially two groups, state departments of transportation and major developers, have, to date, taken advantage of wetland mitigation banking projects, through mostly federal, but some state wetland mitigation laws³¹². Several states have implemented state mitigation projects. However, the majority have not. The Environmental Law Institute reported that almost seventy-five percent of existing mitigation banks were used for highway and harbor development.

9. Impact of Mitigation banking

- **Advantages: a real protection of wetlands**

Mitigation banking provides an incentive for landowners with wetlands on their property to maintain the wetlands. Then, it prevents takings litigation by developers. At least, it restores high-grade wetlands that have been polluted or degraded, preserves healthy and functional wetlands in existence and even enhances wetland areas to promote their expansion and growth. Unfamiliar to many other environmental conservation efforts, mitigation banking conserves and protects land without robbing the resource of its economic values.

In addition, adopting such a program would allow the creation of high quality wetlands to be controlled and run by those people who are qualified to do so and not by developers whose priority is development, not long-term wetland restoration and preservation. In theory, private wetland mitigation banking has the potential to create wetland acreage gains. This can happen if the permitting process for developing wetlands remains strict and the program regulates high value wetland areas regardless of size and prevent general permitting by the Corps. However, at least at the federal level, wetland mitigation is only triggered during the permit process when wetlands over two acres in size are impacted and the activity is not an exempted one. Thus, states should consider enacting laws that authorize their agencies to get involved with wetland preservation and conservation efforts to prevent those wetlands from going unregulated³¹³.

- **Additional benefit**

³¹² Liebesman (L.R.), Plott (D.M.), "The Emergence of Private Wetlands Mitigation Banking", *Natural Resources and Environment*, 1998, p. 341.

³¹³ Bolger (J.L.) "Creating Economic Incentives to Preserve Unique Ecosystems: Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? ", *Marquette Law Review*, 2000, Vol. 83, pp. 625-658.

In summary, mitigation banks have several advantages over project-by-project mitigation sites, including³¹⁴:

-Advance Mitigation or Mitigation Before Impacts. Wetlands and other habitats can be protected or created prior to project impacts in order to reduce or eliminate temporal loss of habitat values and function.

-Large Reserve Size. Mitigation required of many small isolated impacts can be consolidated into larger areas of permanently protected habitat in order to contribute to larger intact ecosystems, which are likely to withstand environmental changes, including climate change, better than smaller isolated areas.

-Contribute to Conservation and Recovery. Banks can be established in strategic locations to add to already conserved lands, and provide critical habitat needs such as protecting core populations or linkages.

-Improved Resources and Expertise. Banks can leverage and consolidate financial resources, planning, and biological expertise in order to improve the chance of successful establishment and long-term management of habitats protected to offset impacts.

- Cost reductions over “do it yourself” compliance (due to the economies of scale a large habitat bank generates and passes on to credit buyers/users), together with cost certainty³¹⁵.

- **Disadvantages**

Wetlands mitigation banking is controversial because people think that the permitting process for filling in wetlands will be lowered, and it will thus, be too easy for a developer to destroy rare habitats. In Wisconsin, the Sierra Club and Wisconsin's Environmental Decade are opposed to a wetlands mitigation banking policy because they fear that it will be inconsistent with other legislation that protects the water quality of the state's wetlands.

Other opponents see mitigation as allowing for the destruction of long-standing, natural wetlands only to be replaced by new artificially created ones that may not be able to be sustained over time³¹⁶.

It has been demonstrated that wetland mitigation works in the US have not approached ‘no net loss’ and it has been suggested that even the ‘40,000 acres conserved’ by conservation banking is ‘modest’ compared to the overall area affected by development. However, even this figure has been challenged³¹⁷.

In other areas many projects never reached the level of success purported and others have been plagued by serious problems. While it has been reported that losses have slowed³¹⁸, negative reports have continued to flow: approximately 80% of wetlands built for mitigation

³¹⁴ State of California Natural Resources Agency Department of Fish and Wildlife, Report to the Legislature, January 2014.

³¹⁵ California Department of Fish and Wildlife, Official Website <https://www.dfg.ca.gov/habcon/conplan/mitbank/>

³¹⁶ Bolger (J.L.) “Creating Economic Incentives to Preserve Unique Ecosystems: Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? “, *op. cit.*

³¹⁷ Burgin (S.), « Mitigation banks’ for wetlands conservation: a major success or an unmitigated disaster?», *Wetland Ecology and Management*, 18 June 2009.

³¹⁸ Baker (B.), “Washington Watch: government regulation of wetlands is under siege from all sides”, *Bioscience*, 1999, p.869.

did not become fully functional. Such failures have resulted in ‘considerable debate’ around whether to continue the practice³¹⁹.

10. Conclusion on wetland mitigation banking

Nationally, projected net loss amounts to over 20,000 acres and over 50% of the acreage of wetlands now in banks. This acreage loss probably also results in a loss of wetland functions and is therefore inconsistent with federal guidelines issued in 1995. This cumulative loss of wetlands should be compared to the estimated 79,300 acres of annual net loss in the United States in the period 1982–1992 and the 300,000 acres enrolled in the Wetland Reserve Program (WRP) in 1992–1995³²⁰. It should be mentioned that mitigation banks can be established in conjunction with or supplemental to

WRP projects, thus taking advantage of the large potential for cost-effective wetland restoration on willingly supplied, often dispersed farmland, especially on lands for which WRP easements have been offered, but not accepted by the US Department of Agriculture. While most mitigation banks are now organized by watershed, 68% of the projected net loss of wetland acreage due to banking is taking place in those banks. Thus, it is only after the overall impact of banking on wetland acreage and function is adequately addressed that the definition of the service area becomes important.

The concentration of wetlands that is occurring with mitigation banking is a complex issue that needs to be addressed on a bank-by-bank basis with reference to the functions that wetlands can provide in different positions on the landscape and the value of these functions as they provide ecosystem services to a site specific human population.

Wetland mitigation banking as an environmental planning tool has a number of unresolved problems, including biological and hydrological difficulties in restoring wetland functions and values, legal or institutional difficulties in creating appropriate mechanisms for credit exchanges and long-term assurance³²¹, and, as demonstrated here, difficulties in achieving no-net-loss of acreage through appropriate use of mitigation ratios and compensation methods.

Nevertheless, the concept of wetland mitigation banking is a sound one, so long as it is recognized that a spatial redistribution of wetlands, and therefore wetland functions and ecosystem service values, is inevitable through the operation of banks. This is inherent in the concept of no-net-loss of wetlands, whether by acreage or function. Mitigation banking, as a market-oriented environmental policy tool, has the potential to exploit opportunities where low value wetlands on high-value real estate can be converted while high-value wetlands on lower-value real estate are restored, created, or enhanced. This same potential to be simultaneously cost-effective and environmentally beneficial applies to mitigation banking for land categories other than wetlands, such as forest, groundwater recharge zones, urban parks or parking areas, or even low-cost housing. Thus, it is a planning tool with considerable

³¹⁹ Ten Kate (K.), Bishop (J.), Bayon (R.), *Biodiversity offsets: views, experience, and the business case*, IUCN, Cambridge, and Insight Investment, London, 2004.

³²⁰ Weibe (K. D.), Tegene (A.), Kuhn (B.), “Property rights, partial interests, and the evolving federal role in wetlands conversion and conservation”, *Journal of Soil and Water Conservation*, 1995, pp. 627–629.

³²¹ Marsh (L. L.), Porter (D.R.), Salvesen (D.A.) (eds.), *Mitigation banking: Theory and practice*, Island Press, Covelo, California, 1996, 289 pp.

potential, especially when integrated with overall planning activities such as watershed planning³²².

Even if the correct decisions are made in negotiating wetland mitigation, the best current outcomes appear to be a slowing of the rate of biodiversity decline. The outcome for wetland mitigation may not be an ‘unmitigated disaster’ but it is, at best, modestly successful³²³.

VI. CONSERVATION BANKING

Habitat conservation banking is a recent development in ecosystem service markets. Conservation banking occurs when habitat for a recognized (listed) threatened or endangered species is impacted and offset with habitat preservation, enhancement, restoration, or creation at a different location. Conservation banking is a similar concept to wetland and stream banking, whereby compensation is performed in one location to offset similar impacts at multiple locations³²⁴. The advantage of conservation banking is that the conservation bank sites are often large, contiguous, and sited more strategically (to protect habitat) than impact sites. Like wetland banking, this can produce economies of scale leading to higher quality restoration and ecological benefits not seen in small, fragmented conservation areas³²⁵.

Conservation banking was first introduced in California by the U.S. Fish and Wildlife Service (FWS) to distinguish banks developed specifically for federally listed endangered species from banks specifically designated for wetland mitigation. Unlike stream and wetland mitigation, which now is subject to very specific federal regulation, conservation banking remains regulated by an FWS guidance document. Although this guidance is comparable to early wetland/stream banking guidance documents, the stated goal of conservation banking is to conserve species, which can only be achieved through restoration or enhancement of the habitat needs of that specific species. Thus, while habitat conservation banks operate almost identically to wetland or stream mitigation banks, their evaluation (by a review team similar to the Mitigation Bank Review Team (MBRT)) is held to species-specific criteria, rather than general criteria used to evaluate wetlands and streams. Fisheries mitigation banks are perhaps the most relevant conservation banks in the context of fresh water markets, although very few trades have occurred. In two cases in California, over 100 acres were restored to create the habitat specifically needed for a federally listed endangered species. This area included tidal marsh habitat primarily acquired as habitat for delta smelt, as well as Sacramento River floodplain habitat for several fish species, including Chinook salmon. In contrast to markets for wetlands, streams, and water quality, fisheries banks have exhibited little market activity (trades) or research interest to date, but we expect change as more regions experiment with implementing habitat conservation banks.

³²² Brown (Ph.), Lant (C.L.), “The Effect of Wetland Mitigation Banking on the Achievement of No-Net-Loss”, *Environmental Management*, 1999, Vol. 23, n° 3, pp. 333–345.

³²³ Burgin (S.), « Mitigation banks’ for wetlands conservation: a major success or an unmitigated disaster?», *Wetland Ecology and Management*, 18 June 2009.

³²⁴ Doyle (M.W.), Ben Dor (T.) “Evolving Law and Policy for Freshwater Ecosystem Service Markets”, *William and Mary Environmental Law and Policy Review*, 2011, Vol.36, Issue 1, pp. 153-191.

³²⁵ Schwartz (M.W.), “Choosing the Appropriate Scale of Reserves for Conservation”, *Annual Review of Ecology and Systematics*”, 1999, pp. 99-100.

5. Definition of conservation banking

Conservation banking is a “market-based program that provides “credits,” or units of trade related to habitat or species of interest at the bank site, to landowners that undertake conservation activities, which they may then sell to parties that need to mitigate unavoidable impacts to a species”³²⁶. In that way, conservation banks are “permanently protected lands that contain natural resource values, which are conserved and permanently managed for species that are endangered, threatened, candidates for listing as endangered or threatened, or are otherwise species-at-risk”³²⁷.

Conservation banks represent a new approach to endangered species management that has the potential to dramatically improve the plight of endangered species while radically reducing the cost of doing so. Recognizing this potential, the U.S. Department of the Interior recently released *Guidance for the Establishment, Use, and Operation of Conservation Banks* to provide “a collaborative incentive based approach to endangered species conservation, which if used in coordination with other tools available to the service, can aid in the recovery of species”³²⁸.

A conservation bank generally protects threatened and endangered species habitat. Credits are established for the specific sensitive species that occur on the site. Conservation banks help to consolidate small, fragmented sensitive species compensation projects into large contiguous preserves which have much higher wildlife habitat values. Other agencies that typically participate in the regulation and approval of conservation banks are the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service³²⁹.

The objective of conservation banking is to “offset adverse impacts to species”, and to “...provide an economically effective process that provides options to landowners to offset the adverse effects of proposed projects to listed species”³³⁰.

It pursues a double objective: an ecologic one which consist in the effectiveness of the preservation of the species, and an economic one which consists the economic viability of the bank and the reduction of costs of the mitigation for developers³³¹.

Conservation banking was modeled after the US wetland mitigation banking system, so there are many similarities between the two programs. However, unlike the wetland mitigation system, species offsets do not have a stated ‘no net loss’ principle, but rather a species recovery goal.

Like wetland mitigation, conservation banking is regulated by federal agencies (US FWS and NMFS). Additionally, the California Department of Fish and Game (CA DFG) regulates conservation banking of species listed as threatened or endangered in California. Conservation banking is primarily prominent in California, with more and more activity

³²⁶ Office of Policy Analysis, *Conservation Banking Overview and Suggested Areas for Future Analysis*, 2013, 17 pp.

³²⁷ US Fish & Wildlife Service (USFWS), *Conservation Banking. Incentives for Stewardship*, 2012, <http://www.fws.gov/endangered/>

³²⁸ Mills (C.S.), “Incentive and the ESA: Can Conservation Banking Live Up to Potential?”, *Duke Environmental Law and Policy Forum*, 2004, Vol. 14, pp. 523-561.

³²⁹ California Department of Fish and Wildlife, Official Website <https://www.dfg.ca.gov/habcon/conplan/mitbank/>

³³⁰ FWS Guidelines 2003, pp. 3-4, <http://www.fws.gov/habitatconservation/wind.pdf>

³³¹ Born (C.-H.), “Les banques de conservation dans le cadre de l’Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme”, Workshop construction et régulation des marchés d’environnement (CoReME), Nice, 23 janvier 2014.

happening in the US Northwest and Southeast. There are not yet official regulations for conservation banking like wetland and stream mitigation, but agency guidance was created in 2003 to allow public and private conservation banks or in-lieu fee programs³³².

The California Conservation Banking Program is modeled after the federal wetlands mitigation program but without the regulatory framework or standards. It was conceived to address challenges encountered by conservation planners and managers³³³.

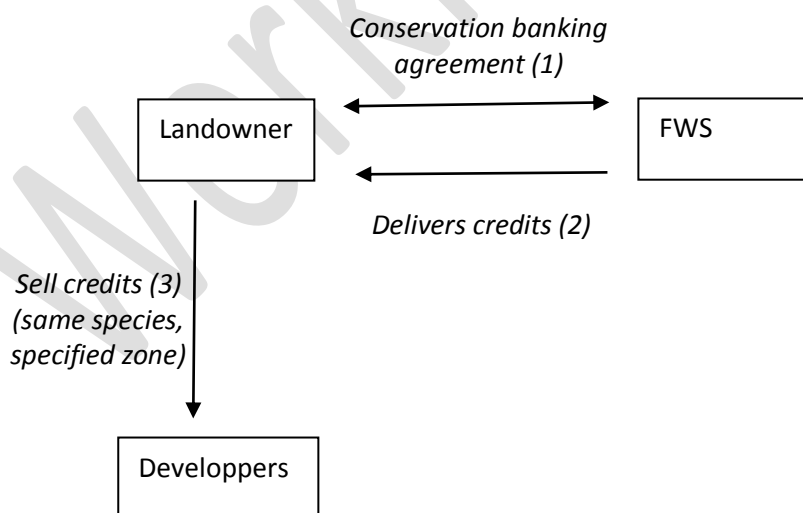
6. Mechanism: process of creation of a conservation bank

To create a bank conservation is a complex and a long-term process (several years) and ask for the participation of experts and public administration. The Fish and Wildlife Service (FWS) gives a real attention to guarantee the ecological interest of lands used as conservation banks. It a long-term risk investment³³⁴.

There are some base conditions for the landowner. (Figure 1) He had to conclude a Conservation Banking Agreement (CBA) with the FWS (1). This agreement determines obligations of each party, legal conditions for the creation of the bank, modalities of monitoring and management of the bank, relevant authorities, financial guarantees, obligation of information, ways of delivering credits... Then, he must agree to a conservation easement, he should adopt a adopter a long-term management plan, provide long-term financing for the management and the monitoring of lands.

Once the contract concludes and when conditions are verified, FWS delivers credits to landowner who can then sell them under the control of FWS (2). The landowner can sell credits (in a zone (called service area) delimited by National Wildlife Refuge (NWF)) to developers who are obliged to compensate damages causes to a listed species which is present in the bank. There is an obligation of equivalence (3). (See next figure 2).

Fig.



³³² US FWS, Guidance for the Establishment, Use, and Operation of Conservation Banks, 2003, available at <http://www.fws.gov/Endangered/pdfs/MemosLetters/conservation-banking.pdf>

³³³ Bunn (D.A.), Moyle (P.B.), Johnson (C.K.), Maximizing The Ecological Contribution of Conservation Banks, *Wildlife Society Bulletin*, 2014, pp. 1-9.

³³⁴ Born (C.-H.), "Les banques de conservation dans le cadre de l'Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme", *op. cit.*

Depending on the process of banking, the landowner, who owns lands where there are habitats or endangered species, is committed to the conservation of those ecosystems. These natural resources are then converted in credits or market units to be sold by the owner to promoters who need compensate the impact of their activity. The establishment of a fair and equitable exchange unit is essential to the success and smooth functioning of the market. If the exchange unit does not correctly reflect the environmental objectives set, the market could lead to a degradation of the environment and its ecosystem services rather than their protection³³⁵. (See next figure 3).

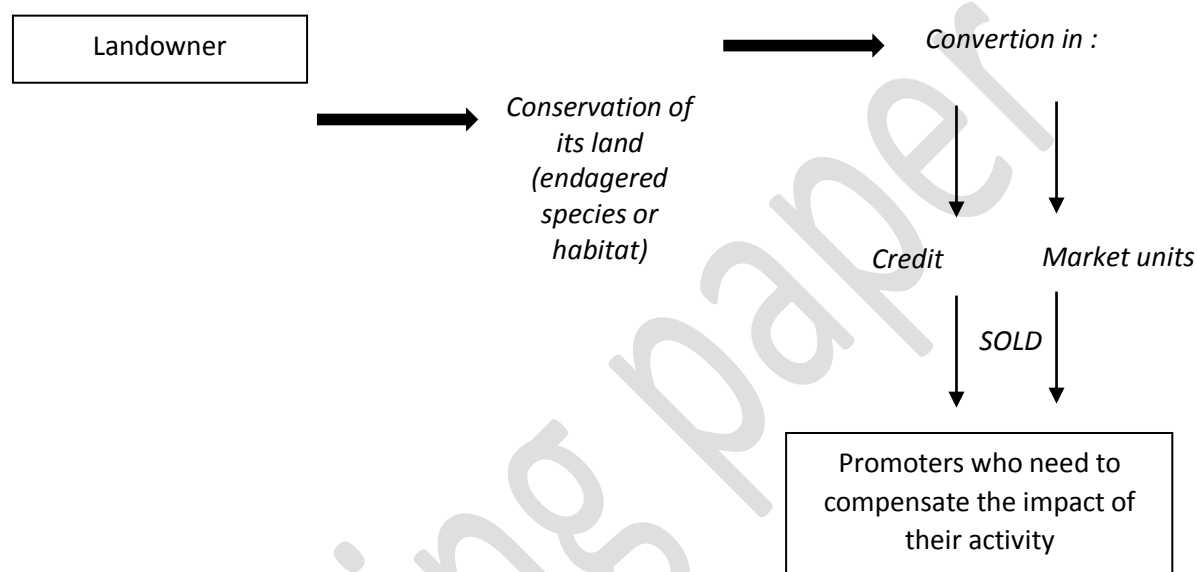


Fig. 3

Banking concerns two types of offset scheme: in-situ offset and ex-situ offset. Furthermore, it proposes three kinds of mechanism. The first one is the developer bank, which represent the majority of banking experiences. In that context, only one developer, the one who create the bank, will use it³³⁶. Individual landowners may employ conservation measures on their own land that are intended to minimize and mitigate the extent of the incidental take. These mitigation measures may be undertaken either adjacent to the development, or “off-site.”³³⁷

The second mechanism is the public bank. State is the owner and the manager of the conservation bank and several developers could benefit from it.

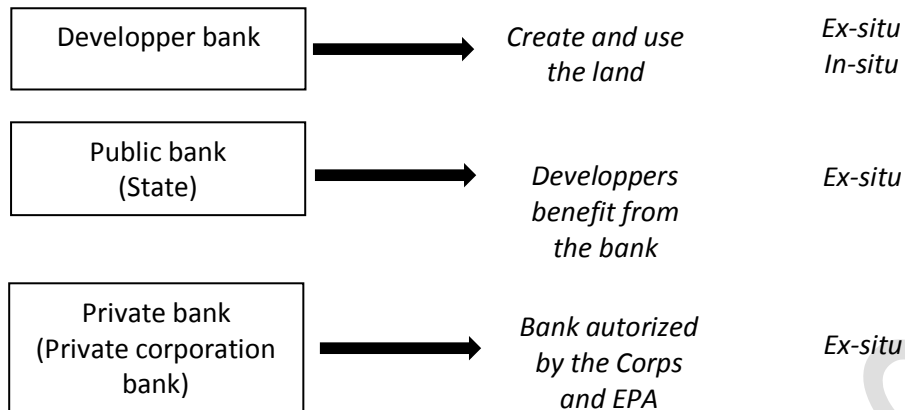
The third one, existing from the 80’s, is the private bank. It is owned by a private corporation and authorised by the Corps and the Environmental Protection Agency. These last two mechanisms do not operate in-situ but ex-situ. (See next figure 4)

³³⁵ CH. Born, V. Dupont, C. Poncelet, “La compensation écologique des dommages causés à la biodiversité : un mal nécessaire? », *Aménagement-Environnement*, n° 3, 2012, pp. 12-40.

³³⁶ Born (C.-H.), “Les banques de conservation dans le cadre de l’Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme”, *op. cit.*

³³⁷ Mills (C.S.), “Incentive and the ESA: Can Conservation Banking Live Up to Potential ?”, *Duke Environmental Law and Policy Forum*, 2004, Vol. 14, pp. 523-561.

Fig. 4



- **Estimation of conservation banking in California**

Analysis of data obtained on the 29 conservation banks in California revealed several trends in the conservation banking program. The number of new banks approved peaked in 1997 and has since declined, with no new banks approved in the state program since 2008. The average bank size has decreased over the years from an average size of 971 acres (approx. 393 ha) in the first 8 years to an average size of 424 acres (approx. 172 ha) in second 8 years. All new banks since 1997 have been stand-alone banks, evaluated without the benefit of regional planning analyses. The Santa

Rosa Plain banks were established within the planning area of the Santa Rosa Plain Regional Plan for Vernal Pools, but this plan does not cover the full range of taxa and natural communities typically addressed in a regional conservation plan.

- **The management of the safekeeping of the site**

To sell credits, the landowner is obliged to accept a conservation easement to a third party (NGO, Public trust...). This dismembers the title and forbids him to build or exploit its site. For instance, he cannot use motor vehicles or he is limited in the livestock density. This is a perpetual conservation easement.

The landowner is also obliged to provide a management and monitoring plan which aims at a long-term and adaptive management of the site (learning by doing).

At least, the landowner must ensure the financial monitoring and management of the site on a long-term perspective (nonwasting endowment).

Each year more conservation banks are being planned and approved to mitigate development impacts on species of concern. Conservation bankers and wildlife agency biologists must work together to evaluate and negotiate the conservation value of potential new bank sites. Nationwide, most conservation banks are likely to be established as standalone banks without regional planning. It is therefore important that standardized criteria be used to prioritize and select new bank sites with the best ecological values to mitigate development impacts on species of concern. Ranking sites by their EVM scores, which is based on information available to state and federal wildlife staff, provides a framework for evaluating banks where regional planning is lacking. The limited state and federal funding

forregional conservation planning should be applied to regions where species of concern are wide-ranging.

Furthermore, full rehabilitation of a habitat is expected to be more time consuming and costly the more biodiverse and ecologically complex a habitat is. There is therefore a private motivation to rehabilitate quickly and simply³³⁸.

7. Impact of conservation banking

• **Effectiveness**

On a strict ecological view, it is still difficult to value the effectiveness of the mechanism because no global assessment of results has been studied. Nevertheless, it is considered that results are globally positive because 62% of banks work well. But it is not a scientific assessment because it is a survey result.

• **Ecological advantages**³³⁹

- It permits larger sites with greater ecological value, better located, especially when they are identified as part of a recovery plan for a specific species³⁴⁰.
- Conservation banks play a strong role in the viability of populations of the species concerned.
- It makes easier connectivity within the site and the neighboring sites.
- It increases effectiveness of compensation thanks to an appropriate management by specialized and legally responsible persons.
- It increases effectiveness because of the long-term monitoring.
- It encourages the preservation of habitats of species for private owners, who can enhance land of low economic value.

Small populations in habitat fragments are also vulnerable to chance events (such as fire) that may lead to local extinctions unless the habitat patches are functionally connected to others, in which case they may persist as metapopulations.

In such situations extinctions in one patch may be overcome by immigration from other functionally connected patches, i.e. the rescue effect. Thus it is particularly important for small patches to be connected ecologically. Ecological connectivity is also necessary to enable foraging movements, migrations, the genetic exchange through pollination and dispersal, and increasingly dispersal and colonisation in relation to climate change.

Consequently, the restoration or creation of habitats that restore functional connectivity can provide considerable conservation benefits provided these are of appropriate types and quality (e.g. sufficiently wide) and in key locations. Although as noted below the restoration of fully functional habitats is often very difficult and slow, the creation of habitats

³³⁸ Vatn (A.) *et al.*, *Can Markets Protect Biodiversity ? An Evaluation of Different Financial Mechanism*, Department of International Environment and Development Studies, Noragric, Noragric Report n° 60, June 2011.

³³⁹ Fox (J.), Nino-Murcia (A.), "Status of Species Conservation Banking in the United States", *Conservation Biology*, 2005, Volume 19, n° 4, pp. 996-1005 ; Ruhl (J.B.), Glen (A.), Hartman (D.), "A Practical Guide to Habitat Conservation Banking Law and Policy", *Natural Resources & Environment*, 2005, Volume 20, n° 1, pp. 26-32.

³⁴⁰ Indeed, permittee-responsible mitigation occurs rather on small scattered compensation sites and not necessarily well located for the threatened species.

that can facilitate movements between habitat patches (e.g. by providing sufficient cover) or buffer habitats is often feasible³⁴¹.

- **The potential for large scale measures**

One of the main advantages of aggregated offsets and habitat banks over case-by-case compensation of damage is that they can affect large blocks of contiguous habitat, as a result of pooling of measures. Small areas of habitat are vulnerable to degradation and will not have complete species communities. Thus there are considerable advantages to creating large areas of habitat, especially for some species of high conservation concern. Such considerations are widely adopted in existing offset schemes, where additional credits are given to measures that restore or enhance large areas of habitat³⁴².

Large areas are also increasingly important as a contribution to climate change adaptation. It is expected that large habitat patches will be more resilient to climate change because their key species are likely to be in favorable condition and therefore better able to accommodate new pressures³⁴³.

Economical advantages³⁴⁴

- Economies of scale.
- Lower costs for developers and transfer of responsibility.
- No interim losses (perdes intermediarias) because the compensation is anticipated.

A range of economic benefits can be observed within the habitat banking and offset trading systems around the world. Habitat banking can introduce new market incentives for private landowners to undertake conservation actions on their land. In particular it provides an incentive for those undertaking compensation actions (offsets) to go beyond the minimum required, because they can sell the excess. Habitat banking can also solve timing issues between the occurrence of residual adverse impacts on the environment (debits) and the delivery of offsets (credits). It can also facilitate a faster and more efficient land use planning process³⁴⁵.

Habitat banking systems benefit from a number of economies of scale compared to the delivery of mitigation and individual offsets as need for them arises. Economies of scale arise at several stages in the compensation process, including:

- Negotiating for and purchasing larger areas of land;
- Investing in larger biodiversity restoration/creation projects;
- Coordination of responsibilities amongst public agencies across a smaller number of projects;
- Ongoing management of the (larger) credit sites; and

³⁴¹ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

³⁴² *Ibid.*

³⁴³ Berry (P. M.) *et al.*, *Meta-analysis of adaptation and mitigation measures across the EU25 and their impacts and recommendations how negative impacts can be avoided. Minimisation of and Adaptation to Climate change Impacts on biodiversity (MACIS)*, 2008.

³⁴⁴ J Ruhl (J.B.), Glen (A.), Hartman (D.), "A Practical Guide to Habitat Conservation Banking Law and Policy", *Natural Resources & Environment*, 2005, Volume 20, n° 1, pp. 26-32.

³⁴⁵ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, *op.cit.*

- Monitoring costs for regulators and compliance costs for smaller number of credit providers³⁴⁶.

Administrative advantages³⁴⁷

This mechanism leads to transparency of the process of creating banks, of the granting of credit and the sale of credits.

- **Additional advantages**

The most fundamental reason why conservation banks have enormous potential is that their use turns the standard incentive scenario on its head. Initially, the presence of an endangered species represented a tremendous cost because it could halt development entirely. Conservation banking offers a “market-based approach [that] provides greater environmental protection at a lower cost”.

Conservation banks provide further advantages over HCPs (Habitat Conservation Plan). As with tradable permits under the Clean Air Act, credits can be purchased by anyone. A non-profit organization wanting to protect a particular species could purchase several credits, resulting in the permanent protection of that species.

Conservation banks could be incorporated into large mutual fund-like conservation-backed portfolios for investment. These conservation bank “mutual funds,” which incorporate many different parcels possibly owned by many different owners, could hedge risks across these parcels and create a sound investment for individuals who may have no interest in endangered species themselves.

Conservation banks are also compatible with other uses outside of species conservation. For example, the land used for a conservation bank could support recreational opportunities, and Native American reservation land could be used for conservation banks, providing a source of income for Native American residents.

A final economic advantage to conservation banking is that it allows valuable habitat to be protected in perpetuity.

Effective monitoring of the biodiversity impacts is an essential component of any of offsets and habitat banking scheme. Monitoring is necessary to:

- Ensure legal compliance, with respect to:
 - Actions/processes (*i.e.* types of species used for habitat creation, area of habitat created, methods used for works).
 - Biodiversity impacts *i.e.* credits and overall biodiversity gain, and where possible their additionality (by comparison with sites over time).
- Facilitate adaptive management of individual projects.
- Provide scientific feedback on the effectiveness and cost of particular measures (*i.e.* habitat restoration) to authorities responsible for schemes.
- Provide feedback to other stakeholders, *i.e.* conservation organizations and local communities etc.
- Inform policy development³⁴⁸.

³⁴⁶ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

³⁴⁷ Caroll (N.), Fox (J.), Bayon (R.), *Conservation & Biodiversity Banking. A Guide to Setting Up and Running Biodiversity Credit Trading Systems*. London/Sterling VA, Earthscan, 2008, 298 pp.

- **Ecological disadvantages**

- It is difficult to determine credits.
- It tends to "uninhibited" behavior of promoters because the compensation is immediately available and it carries a transfer of responsibility.
- Additionality unproven ('preservation credits' awarded for protection of existing populations).
- Space-reconfiguration of the habitat network for the existing species to other less appropriate (including re-creation of habitat where the species was not present).
- Higher stochastic extinction risk when sites are not numerous (e.g. natural disaster destroying the site).

- **Economical disadvantages**

- Risks of bank failures in the event of insufficient demand.
- The lucrative nature seems to be problematic because the primary objective is not conservation and it could lead to speculative behavior, especially if demand of credit is very strong (to the detriment of other species and other habitats).
- The fact that governments which issue licences can also create their own banks can be problematic because the goal is not primarily conservation but urban development.
- A major obstacle to the creation of a market offset credits is the difficulty of establishing a methodology for evaluating and determining a unit of exchange³⁴⁹. The elements of biodiversity and the ecological services it provides are easily fungibles at a temporal level, spatial or ecosystem types³⁵⁰. Another difficulty is the assessment of the environmental performance and the determination of net gain obtained. Finally, the owners not directly involved in the definition and implementation of habitat banking, such a device could encourage them to pay less attention to the avoidance and reduction of impacts profit compensation measures.

- **Administrative disadvantages**

- Absence of a 'regulation' which provide a binding legal framework and subject to public participation.
- Not enough data to assess the ecological effectiveness.
- Long and complex approval process. This can dissuade candidates.
- Significant costs for the administrative management of the Federal Government.

- One major problem, however, is endemic to conservation banks in general: the inevitable tradeoff between currency adequacy and the robustness of the market.

- **Other difficulties**

Habitat re-creation does have the potential to contribute to positive action for stabilizing and reversing some biodiversity loss, particularly when carried out in the proximity of existing habitats. Ruderal and early several stages are more likely to be replaceable than

³⁴⁸ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

³⁴⁹ Camproux-Dufrène (M.P.), «La création d'un marché d'unités de biodiversité est-elle possible?», *R.J.E.*, 1/2009, pp. 69 et ss.

³⁵⁰ Salzman (J.), Ruhl (J.B.), «Currencies and the commodification of environmental law», *Stanford Law review*, 2000, p. 657.

longer-established and ancient habitats, especially those that are reliant upon specific management intervention or development of ancient micro-habitat such as subterranean rotting timber or rot holes.

These older and more biologically specialized resources are more difficult to replicate or replace. Furthermore, there are species whose habitat is likely to prove almost impossible to re-create and habitat bankings are unlikely ever to succeed. Even in apparently successful projects, a short-term inventory of species may not reflect the assemblage that can (or should) realistically be recreated. Plant and animal communities change over time, whether in response to the maturation of newly created habitats, or as a consequence of local or more widespread changes in land management or climate change. In the case of many terrestrial habitats there is greater uncertainty over the potential outcome of habitat creation and timescales needed for the habitat to mature are longer. Where differences between re-created and original habitat are particularly pronounced, much greater areas of new habitat will be needed to enhance the probability that the most vulnerable organisms have been accommodated. Even using such an approach, there is likely to be further deterioration of the overall stock of important biological interest, especially as there will almost certainly be lag times between the destruction of habitat and the creation of new habitat. It therefore follows that in the majority of cases the concept of habitat banking is unlikely to confer particular advantages except perhaps within highly dynamic environments where recreation timescales are generally a matter of years rather than decades. We must therefore conclude that only where all alternatives have been explored and rejected for sound practical reasons should the creation of compensatory habitat be considered³⁵¹.

8. Conclusion on conservation banking

Some points are very interesting in the perspective of a transposition in Europe³⁵²:

- Eligibility of violations of highly endangered species without reason of overriding public interest ; this question seems as important as the need to ensure a strong application of the sequence-avoid-reduce-offset and directly determines the level of destruction that may be caused to the species and, as a corollary, the demand for credit and the "market" that could be created.
- The importance of establishing a population level to reach for the concerned species and to authorize the destruction that species only if the level is reached.
- The importance of science and in particular the conservation biology and population ecology for the establishment of banks and the market (creating banks, credit definition, credit allocation, damage assessment.
- The importance of implementing and monitoring compliance with the rules on compensation to determine the demand and therefore the profitability of banks to create conservation.
- The importance of planning spatially the localization of sites for restoration (and the service area) to reconstruct a robust network of interconnected populations of the species, according to its ecological requirements.

³⁵¹ Morris (R.K.A), *et al.*, "The creation of compensatory habitat—Can it secure sustainable development ?", *Journal for Nature Conservation*, 2006, pp. 106-116.

³⁵² Born (C.-H.), "Les banques de conservation dans le cadre de l'Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme", Workshop construction et régulation des marchés d'environnement (CoReME), Nice, 23 janvier 2014.

-The fundamental question: do we prefer moving species where they do not disturb anyone or compensate financially missed opportunities to owners and occupants and make a voluntary land policy?

Regulations analysis and impact of mechanisms

In U.S.A., the Clean Water Act and the Endangered Species Act guided the mechanism. They did not cover its process, but they inspired its purpose through the need of protecting endangered species. In 2003, the mechanism was covered by guidelines. If the process of granting credits to owners and authorization project to developers follow administrative procedures, using banking remains voluntary and contractualised. Examples of California, Oregon and Wisconsin will illustrate the different manifestations of the mechanism.

The mechanism of banking in USA is strongly based on a mixed regulations:

It is built on the CWA or the ESA, depending on the nature of banking (mitigation or conservation banking). Whereas mitigation banking refers to a legal framework which propose a more or less stringent public regulation (Senate bill, Guidelines, Memorandum), conservation banking is legally framed by the Fish and Wildlife Service guidance which is a less stringent public regulation. In both cases, public regulation was enriched year after year to offer a quite complete legal framework (modalities of banking implementation, relationship between actors...).

The mechanism by itself is made up of public regulation (framed process, criteria, approval process...) and private one (agreements, contracts). It is a cumbersome administrative process.

Globally, we note the very institutionalised nature of the mechanism, both at the stage of its design and implementation monitoring, because it mobilised federal agencies for control, public banks and private banks. It implies a three-part relationship: a developer, a bank and agencies.

Legally, there is not only a dismemberment of the right of ownership, but also a liability shift from the developer to the bank.

Mitigation banking and conservation banking present advantages and disadvantages. Mitigation banking permits an environmental benefit because it offers a long-term plan for monitoring, managing and maintaining biodiversity. Furthermore, lead to protect, restore, create and enhance wetlands habitats. In that way, the mechanism present a potential efficacy. This efficacy is reinforced by the management of lands given to specialists. Indeed, they permit a growth of wetland sites managing by specialists and for who the development is a priority. Particularly, conservation banking offers the possibility of a protection prior to impact, to contribute to conservation and recovery of ecosystem, improve biological expertise and consolidate financial resources. Finally, it proposes a protection and restoration of larger, more functional and longer-lasting ecological systems, no temporal loss of ecological function because protection/restoration is completed before the impacts occur, management and ownership by endangered species and wetland professionals, "no Net Loss" in wetland acres at minimum, often with a gain of wetland acres, and a permanent protection in the form of a conservation easement or fee title held by a qualified conservation entity, enforced by a qualified third party. From an ecological view, it permits larger site with greater ecological value and better located. Conservation banks play a strong role in the viability of population

of the species concerned, and sites are managed by specialized and responsible persons. That permits the effectiveness of compensation. At least, this effectiveness is increased by the long-term monitoring. This creates a virtuous circle.

Those two mechanisms are incentives tool appropriated for major developers for the economy of scale it gives. Consequently, they are efficient tools.

But the mechanism of banking also presents disadvantages. Some of the cons say that it creates artificially wetlands, it is an expensive operation, and gives the opportunity to the developer to destroy easily rare habitats. This also tends to uninhibit the developer because of the transfer of responsibility. Furthermore, it is inconsistent with other legislation that protects the quality of water of the State. That is why some argue that the distinction between local, state and federal regulation is a bad issue. This is the case in Wisconsin in which one of the large problems given to State in the banking management is discussed. On one hand, there may be not enough private actors, and on the other hand, rules may not be enough flexible as regards federal regulation. Cons also argue that additionality is unproven, it creates a risk of extinction if sites with endangered species are not enough numerous (in a case of disaster destroying the site). At least, some criticize the absence of the regulation which provides a binding legal framework subject to public participation.

Despite its strengths on paper, such a mechanism is extremely complex to implement. It is difficult to ensure both the efficacy, efficiency, effectiveness and fairness. The low degree of "substitutability" of "outstanding" biodiversity makes the determination of countervailable very delicate and requires considerable technical expertise, often with no guarantee of success. A host of obstacles, technical, administrative or financial, may hinder the implementation of measures and fix them. Furthermore, monitoring is often poorly framed. Above all, the compensation can be perceived by the operators or by the authority itself, such as recognition of a "right to kill" in which the commitment to compensate justifies any harm to biodiversity.

These risks can be reduced by a strict legal framework, which is currently lacking. It should precise the grounds of general interest which can justify the damage to biodiversity, the hierarchy of measures to reduce the impact of the plan or project, the types and extent of damage to compensate, the content of habitat bankings, the procedure for securing them, the means to implement them (planning, permits, monitoring, adjustment procedures, control and sanctions procedures, etc.) and finally, their funding patterns³⁵³. Then, to borrow the difference between State approach and Federal approach, one possibility is to strongly regulate the market and create an independent environmental authority regulation³⁵⁴. It is essential to clearly define market modalities on one hand, and to ensure strict control on the other hand. It is also important to develop a reliable methodology for determination of exchange credits that takes into account the ecological functions and ecosystem services, and to circumscribe the action of the clearing banks in a specific service area (pool areas, biogeographic region or range of a species). This could also be a solution toward the spatial non-fungibility of biodiversity³⁵⁵. Finally, it is imperative to include biodiversity market units in the hierarchy "avoid, reduce, offset" and to include clear and specific environmental objectives in these markets.

³⁵³ CH. Born, V. Dupont, C. Poncet, "La compensation écologique des dommages causés à la biodiversité : un mal nécessaire?", *Aménagement-Environnement*, n° 3, 2012, pp. 12-40.

³⁵⁴ Martin (G.J.), «Le marché d'unités de biodiversité: questions de mise en œuvre», *R.J.E.*, 2008, p. 98.

³⁵⁵ CH. Born, V. Dupont, C. Poncet, "La compensation écologique des dommages causés à la biodiversité : un mal nécessaire?", *op. cit.*

9. KNOWLEDGE

Each credit is individual on each bank. On the contrary of the german eco-point system, there is no fungible unit (see chapter 4).

Conservation and mitigation banking mobilize knowledge to be put in place. For example, to be an eligible land in the context of conservation banking, lands should contain endangered species or its habitat, it also should respond to ecological criteria. There must be a real interest for the conservation of a listed species, for instance in the case of recovery plans which spatially identify prioritized areas for protection. This refers to a specific ecological approach founded on the concept of population viability and ecological network. This requires a form of expertise³⁵⁶. Same criteria are observed for wetlands.

- **How to identify wetlands?**

Wetlands are a specific type of ecosystem that contains variations in form. Nonetheless, they all contain characteristics attributable to both land and water ecostructures. However, the mixture of land to water ratio varies between wetlands, and depends to some extent on seasons and location. Wetlands are, therefore, difficult to identify because of their disparate characteristics. Governments, scientists and conservationists have striven mightily, although mostly in vain, to define precisely what constitutes a wetland³⁵⁷. The federal government got into the act when, through the CWA, Congress defined wetlands as "*those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions*"³⁵⁸. As applied, this definition requires an area to include all of the following characteristics to be considered a wetland: wetland hydrology (the presence of water at or near the surface for a period of time), hydrophytic vegetation (wetland plants), and hydric soils (periodically anaerobic soils resulting from prolonged saturation or inundation).

Along with the numerous definitions of wetlands that exist, attempts to classify wetlands into different specific categories also produce inconsistent results. Federal agencies, such as the FWS, create most classification systems. However, the FWS's classification system only provides for distinguishing wetlands in different parts of the country, and not for a thoroughgoing, national classification system. Groups have struggled with wetland classification because most wetlands exhibit characteristics common to other types of land, some overlap into each other, and they can change type over time. Thus, labeling them with a concrete classification denies their inherent dynamic nature, thereby creating inconsistencies and conflicts in classification systems. In addition, the Corps classification of wetlands is used to determine which areas fall within its regulatory jurisdiction under section 404 of the CWA. However, the Corps's system only serves to distinguish between those wetlands that relate to interstate commerce and those that do not.

³⁵⁶ Born (C.-H.), "Les banques de conservation dans le cadre de l'Endangered Species Act (USA) : quelques réflexions sur les Fondements écologiques du mécanisme", Workshop construction et régulation des marchés d'environnement (CoReME), Nice, 23 janvier 2014.

³⁵⁷ Dennison (M.S.), Berry (J.F.), Wetlands: guide to science, law, and technology, Noyes publications, 1993.

³⁵⁸ 40 C.F.R. § 230.3(t) (1999).

Wisconsin has developed a classification system as well. This system of classification delineates wetlands in the state first by class (*e.g.* forested, upland), second, by subclass (*e.g.* mud, organic), third by hydrologic modifier (*e.g.* river, lake) and if necessary, fourth by a special modifier (*e.g.* farmed, excavated). This guide also explains generally what areas are included in the mapping classification system and what areas are not³⁵⁹.

CDFW encourages bank sponsors to consider multiple factors when selecting a site for a new bank, including ecological value of wildlife habitat and landscape considerations, adjacent land uses, and management factors such as threats, conflicting uses, encumbrances, and major restoration needs. Bank sponsors should consider what resources are likely to be impacted in the area in the future and existing credits that may already be available to mitigate impacts to those resources. A critical element required to create a new bank is a location that will provide high conservation value and sustainable mitigation for impacts to wetlands, threatened or endangered species, or other sensitive resources. Bank sites that make a valuable contribution to the habitat protection objectives of CDFW by contributing to a regional conservation strategy and are connected to other conserved lands are encouraged by CDFW. CDFW has prepared many strategic conservation initiatives (independently and in cooperation with others) to identify the habitat areas and linkages in California that are essential for conservation of sensitive resources. The information and sources are available to the public, and should be used by bank sponsors when considering sites for new banks.

Several sources on information come from:

- California State Wildlife Action Plan³⁶⁰: The State Wildlife Action Plan examines the status of wildlife and prescribes actions to conserve wildlife and vital habitat before they become rarer and more costly to protect. This plan identifies specific conservation projects and actions to secure sensitive habitats and habitat linkages.
- California Essential Habitat Connectivity Project³⁶¹: This project identifies large remaining blocks of intact habitat and modeled linkages between them that need to be maintained, particularly as corridors for wildlife. This collaborative project offers a GIS habitat connectivity map, an assessment of the biological value of the identified connectivity areas, and guidance for implementing local and regional connectivity plans.
- California Areas of Conservation Emphasis (ACE) II³⁶². This mapping model compiles and analyzes spatial information on California's species diversity, rarity, and sensitive habitats. ACE II provides a summary of biological richness and biodiversity “hot spot” analysis, and is a tool for conservation decision making.
- CDFW Lands Viewer³⁶³: The Lands Viewer provides geospatial data about CDFW lands and facilities, including more than 1 million acres of Ecological Reserves and Wildlife Areas. Additional information for some of these lands may be found at the CDFW lands program webpage.
- Biogeographic Information and Observation System (BIOS). BIOS is a system designed to enable the management, visualization, and analysis of biogeographic data

³⁵⁹ Bolger (J.L.) “Creating Economic Incentives to Preserve Unique Ecosystems : Should Wisconsin Adopt a Private Wetlands Mitigation banking Policy ? “, *Marquette Law Review*, 2000, Vol. 83, pp. 625-658.

³⁶⁰ www.dfg.ca.gov/SWAP/

³⁶¹ www.dfg.ca.gov/habcon/connectivity/

³⁶² www.dfg.ca.gov/biogeodata/ace/

³⁶³ www.dfg.ca.gov/lands/viewer/

collected by CDFW and its partner organizations. Specifically of benefit to bank sponsors are two data sets:

- California Protected Areas Database (CPAD): CPAD is a GIS inventory of all fee-protected open space in California. It includes lands permanently protected by almost 1,000 agencies or nongovernmental organizations for open space purposes ranging from small neighborhood parks to large wilderness areas. Conservation easement data are also available. Additional information is available at www.calands.org.
- Wildlife Conservation Board (WCB) Approved Projects: This dataset is a comprehensive list of WCB projects from Board inception in 1949 to present. It includes conservation easements, fee title properties, land exchanges, and restoration and enhancement projects.
- Atlas of the Biodiversity of California³⁶⁴: The Atlas is a guide to California's biodiversity, the variety of plants and animals found throughout the state. This published book is a collection of maps, photographs, artistic illustrations, and short essays about the state's biological resources, pressures affecting them, and activities to sustain them. Although the Atlas is a worthwhile information source, the data available through ACE II described above are more current.
- California Gap Analysis Report³⁶⁵: The term "gap analysis" refers to a GIS evaluation of the conservation status of plant communities, vertebrate species, and the number of different species on existing biological reserves. The report identifies landscapes that contain large numbers of potentially unprotected vegetation types and vertebrate species. Such areas can then be studied in more detail as candidates for additional management and conservation efforts to fill gaps in the reserve network.
- EcoAtlas Wetland and Aquatic Resources³⁶⁶: EcoAtlas provides maps and tools to create a complete picture of aquatic resources in California, including stream and wetland maps, restoration information, and monitoring results with land use, transportation, and other information important to the state's wetlands.
- Federally-listed Endangered Species Recovery Plans (US Fish and Wildlife Service - USFWS)³⁶⁷: The USFWS creates recovery plans for federally-listed threatened and endangered species that include significant information about the steps needed to achieve recovery. A recovery plan identifies critical habitat essential for the recovery of the species which is mapped in detail in the recovery plan and is typically available to the public. The USFWS website allows searches for recovery plans by state and species name.
- Science and Collaboration for Connected Wildlands Regional Connectivity Analyses³⁶⁸: As an extension of the California Essential Habitat Connectivity Project described above, South Coast Wildlands is working to create local and regional connectivity analyses that are at a finer scale. This tool may be helpful for bank sponsors looking to create banks in the San Francisco bay area, California desert, south coast, or Carrizo Plain.

- **wetland values**

³⁶⁴ www.dfg.ca.gov/biogeodata/atlas/

³⁶⁵ www.biogeog.ucsb.edu/projects/gap/gap_rep.html

³⁶⁶ www.ecoatlas.org

³⁶⁷ www.fws.gov/endangered/species/recovery-plans.html

³⁶⁸ www.scwildlands.org/projects/Default.aspx

Unlike the bleak image that has been traditionally linked to swamps, bogs and marshes, wetlands offer many economic, medical, recreational and environmental values³⁶⁹. In reality, wetlands are continually renewable natural resource which provide many benefits. For example, they house rare and diverse species of animals and plants that can be studied and learned from and even economically exploited. In addition, they act as spongelike reservoirs during torrential rain storms and fast snow melts, thereby assisting with flood control.

At least, several exchange units may be used. Regulations 2008 provide not only based on functional equivalency units, but also the lost surface (acres) or any other appropriate measures³⁷⁰. This results a great flexibility which permitted to develop many evaluation methods³⁷¹. However, in practice, the exchange unit most used by clearing banks is the number of hectares. By far the cheapest and easiest to implement, this method does not meet the objectives of the compensation at a qualitative level, because it does not take into account precisely the ecological functions and ecosystem services provided by wetlands³⁷².

This table collects several values of lands and biodiversity taken into account³⁷³:

	Wildlife and Habitat Values	Landscape Values	Climate Change
Ecological value	<p>Fish and wildlife presence, use, and diversity</p> <p>Endangered, threatened, rare, declining species or habitats (special habitat use)</p> <p>Presence of non-native and/or invasive species, proportion of native vs. invasive</p> <p>Site and resource viability (Consider the long-term ability to retain or enhance resources of interest considering unit size and long-term outlook for adjacent and upstream lands).</p>	<p>Juxtaposition with other conservation lands.</p> <p>Contribution to wildland connectivity and corridors.</p> <p>Relationship of area to existing or planned conservation planning efforts.</p> <p>Water - Sources, availability, reliability, quality, rights.</p>	<p>Potential to help facilitate adaptation to climate change (Examples of how lands might facilitate adaptation to climate change include the establishment or improvement of corridors, reliable water sources, and topography that allows upward migration of plants and animals)</p> <p>Potential of climate changes to diminish key wildlife habitat values (Climate change threats to current resource values include likely drying of wetlands, changes of habitat type, and loss of coastal marshes to the sea.)</p>

	Management factors	Management Objectives and Needs
	<p>Cultural resource protection/preservation</p> <p>Physical modifications and improvements (Consider types,</p>	<p>Consider likely management challenges and opportunities. Of particular focus should be issues of</p>

³⁶⁹ Salvesen (D.), "Wetlands: mitigating and regulating development impacts", *Urban Land Institute*, 1990.

³⁷⁰ Compensatory Mitigation Guidelines, § 230.98(o).

³⁷¹ Bean (M.), Kihlsinger (R.), Wilkinson (J.), *Design of U. S. Habitat Banking, systems to support the conservation of wildlife and at-risk species*, Environmental Law Institute, 2008, p. 45.

³⁷² CH. Born, V. Dupont, C. Poncet, "La compensation écologique des dommages causés à la biodiversité : un mal nécessaire? », *Aménagement-Environnement*, n° 3, 2012, pp. 12-40.

³⁷³ California Department of Fish & Wildlife, Bank Site Selection Considerations, <https://nrm.dfg.ca.gov/documents/ContextDocs.aspx?cat=MitigationBanking>

Management	<p>sizes, and condition of buildings, roads, levees, etc. Consider whether they are a positive or negative attribute, likely management and maintenance needs, and public use opportunities.)</p> <p>Contaminant presence or potential</p> <p>Threats (Threats include things like suburbanization, conversion to agriculture or more intensive agriculture or change in crop types, i.e. pasture to vineyard, loss of water, etc.)</p> <p>Other issues, encumbrances, rights (Consider anything else important, positive or negative, including encumbrances or title restrictions that will affect management of the property.)</p>	<p>such magnitude that they may influence the very decision to select the land for conservation purposes.</p> <p>Critical inventory and monitoring needs.</p> <p>Ongoing habitat/wildlife management requirements.</p> <p>Major restoration needs.</p>
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Knowledge analysis

Wetlands are difficult to identify because of their disparate characteristics. Furthermore, along with the numerous definitions of wetlands that exist, attempts to classify wetlands into different specific categories also produce inconsistent results. Federal agencies, such as the FWS, create most classification systems. However, the FWS's classification system only provides for distinguishing wetlands in different parts of the country, and not for a thoroughgoing, national classification system. Sometimes, identification factors are highlighted in the banking scheme: wetland hydrology (the presence of water at or near the surface for a period of time), hydrophytic vegetation (wetland plants), and hydric soils (periodically anaerobic soils resulting from prolonged saturation or inundation. This show that knowledge taken into account strongly depends on States and contexts.

CDFW encourages bank sponsors to consider multiple factors when selecting a site for a new bank, including ecological value of wildlife habitat and landscape considerations, adjacent land uses, and management factors such as threats, conflicting uses, encumbrances, and major restoration needs.

Globally, a lot of sources of information are available to banks. They come from institutions, organizations, reports, academic work, experiences on the ground. Consequently, le problème se semble pas venir de la collecte des données en amont, (identification des terres...), mais des données récoltées en aval afin d'évaluer l'efficacité du mécanisme.

Chapter 3: France

VI. INTRODUCTION

In France, ecological compensation for the negative impact of development was initiated by the law of Nature Protection 1976. It aimed developments impacting natural habitats listed in the Natura 2000 network or wetlands, and since 2006, for impacts on the habitats of protected species. More recently, the laws of the Grenelle Environment I and II have reinforced the notion of ecological compensation by making it mandatory and strengthening the Environmental Authority. Formally, when a development proposed is an overwhelming public interest³⁷⁴, and when it is impossible to avoid or to reduce environmental impacts, the developer has an obligation to compensate the impacts by an action regarding ecological added value of an equivalent natural space or near ecologically connected.

France has announced its willingness to awareness of the need to preserve biodiversity and not in order to create a market for biodiversity³⁷⁵.

Like USA, France has (recently) developed a form of banking. This is an offer of compensation to answer a compensation claim. In France, there is two kind of compensation claim³⁷⁶.

The first one is the voluntary offsetting. It is a compensation which does not depend on regulatory obligation. A developer can choose to compensate impacts for his own reasons, without conditioning his project to the acceptance of administration. This kind of voluntary step often takes place in a soft law context. In France, this approach is rare for several reasons. The main one is that compensation is allowed for in legal texts which application scale is large.

The second one is the regulatory offsetting. They are considered as conditions of acceptance of a project by the administration. There are two kind of situations in which they must be proposed. The first one is texts which provide an obligation to propose a measure of compensation without which the decision of the administration could be unlawful: in case of damages to Natura 2000 network³⁷⁷, to protected species and their habitats³⁷⁸, to ecological continuity³⁷⁹... The second one is texts which proposed action of compensation but which not oblige administration to ask for them to the developer. The developer can propose them, but the administration is not obliged to take care of them in its decision: compensation to land clearing³⁸⁰, compensation for cutting-plant which composes a sand-dune fixation³⁸¹...

³⁷⁴ Defined as "the interest of public health and public safety or other imperative reasons of overriding public interest, including those of social or economic nature.

³⁷⁵ Pappalardo (M.), « Donner une valeur à l'environnement : la monétarisation, un exercice délicat mais nécessaire. Conseil Général au Développement Durable », *La Revue, Service de l'Économie, de l'Évaluation et de l'Intégration du Développement Durable (SEEIDD) du Commissariat Général au Développement Durable (CGDD)*, 2010 ; <http://www.developpement-durable.gouv.fr/developpementdurable/>

³⁷⁶ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014.*

³⁷⁷ Art. L.414 C.env.

³⁷⁸ Art. L.411-2 C. env.)

³⁷⁹ Art. L.371-2 et L. L.371-3 C.env.

³⁸⁰ Art. L.341-6 du Code forestier.

In all cases, the administration can prescribe measures on its own, without any regulatory obligation. The trend is in that direction.

In many cases, the petitioner must make proposals for habitat banking in the environmental study which aims to inform the competent authority on the impact of the project. Some criteria are required to validate proposed measures. Aiming no net loss for biodiversity, there are: the equivalence, the additionality and the continuity of measures³⁸².

The competent administrative authority (the prefect or the mayor) may decide on relevance of the proposed measures, and may choose to go beyond prescribing larger steps (including surface-term importance of ecological measures) if he considers that it is necessary.

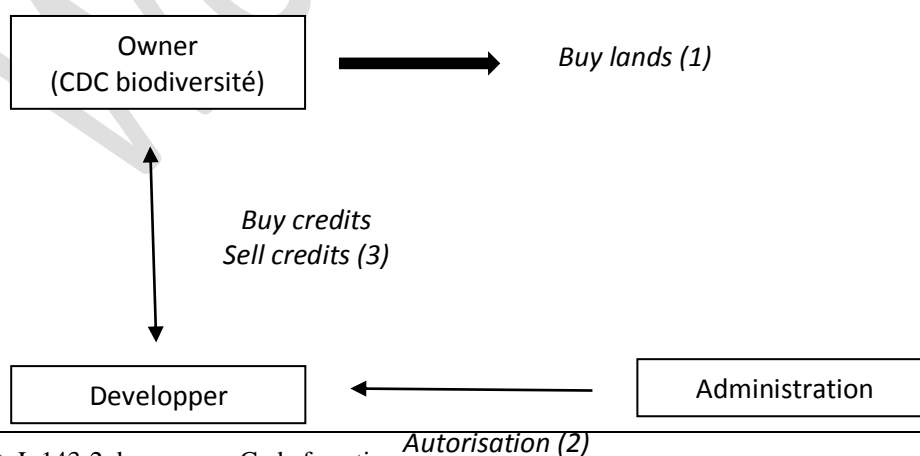
The decision of the administration which contains the requirements for compensation is an administrative act which may be subject to review by the administrative judge in case of appeal by a person with an interest in acting. The judge may decide to cancel the decision if he considers that the habitat bankings required by the administration are insufficient to satisfy the legal obligations and interests to protect. It may also reverse the decision on procedural external legality if insufficient measures proposed in the environmental study habitat bankings³⁸³.

VII. OFFER OF COMPENSATION BY CDC BIODIVERSITÉ: MECHANISM

To answer this compensation claim, offers of compensation are usually made on demand based on needs expressed by the developer. This is what we call a “tailor” compensation. However, there is a new original kind of offer. Made in advance, it is developed on existing legislation.

This mechanism is organized by the landowner, CDC Biodiversity, created under the auspices of the *Caisse nationale des dépôts et consignations*.

It consists in buying a land subjected to significant anthropogenic pressure in order to restore or rehabilitate it (1). Then, the owner proposes the land to developers (3) who have received an authorization from the public authority to conduct offset measures or to buy offset credits (2). In general, it consists in creating a natural asset reserve (called RAN) in order to propose an offset offering. (See next Figure 5)



³⁸¹ Art. L.143-2 du nouveau Code forestier.

³⁸² MEDDE, *Lignes directrices nationales sur la séquence éviter, réduire et compenser les impacts sur les milieux naturels*, version provisoire du 31 octobre 2012.

³⁸³ CE, 12 novembre 2007, Société Vicat SA, n° 295347, CE, 14 octobre 2011, Société OCREAL, n° 323257.

Because the *ex-post* compensation not to avoid a net loss of biodiversity, there is a strong interest to implement compensation by offering based on an earlier ecological restoration damage³⁸⁴. The legal system of compensation in France allows an operator, who have generated a gain on a natural ecological environment, to transform the amounts invested in assets, that is to say, into tradable shares, becoming owner. A developer who has to pay compensation can then buy these assets to the amount that may clear its legal obligations to compensation. The first experiment of Natural Assets Reserve (RAN) is conducted by CDC's website Biodiversity Cossure.

- **Existence of a RAN?**

There is a "market clearing". However, the question of the existence of a market of "fungible compensation biodiversity units" remains³⁸⁵. The concept of RAN takes into consideration conservation banks created under the Endangered Species Act and mitigation banks. This "French" banking is growing under the leadership of the Ministry of Environment, with no regulatory development. The question of the use of these assets is hotly debated.

At the heart of the controversy, the question is whether the development of RAN would not lead to a securitization of biodiversity (une titrisation de la biodiversité), with the creation of tradable fungible units with reference to the carbon market.

The units issued by RAN correspond to securities which come up with evidence of the realization of benefits compensation on selected surface areas. The nature of compensation may be adjusted according to the needs of each developer.

Titles do not create real rights on components of the environment, but only personal rights relating to the implementation of the measures. Furthermore, these securities do not lead to transfer of ownership.

Acceptance of securities to satisfy offset obligations will depend on the discretion of the administration and if necessary the judge.

About fungibility and transferability of securities: there is no methodology which permits their comparison. The strict assessment of equivalence criterion implies that each securities only answer to the specific needs of a very limited number of developer with comparable impacts (this limits the possibilities of exchange). This forbids the development of markets for fungible units.

A regulatory changes could involve a less of equivalence criteria and a development of methodology to define disaggregated equivalence rules. It also involves the development of a mechanism for controlling the reality of action, an organization of transfer of responsibility, a binding force to the criteria of additionality and permanence, etc.

The establishment of the first bank of natural assets is an opportunity to confront the theoretical elements proposed in the literature to a successful experience performing in a European context. It also helps to ask the regulation action of the public body responsible for

³⁸⁴ Ten Kate (K.), Treweek (J.), Ekstrom (J.), *The use of market-based instruments for biodiversity protection – The case of Habitat Banking* EFTEC (Ed.), 2010.

³⁸⁵ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014*, p 19.

the conservation of nature, because it establishes legal frameworks within which economic operators realize their choices³⁸⁶.

According to MEDDE, this banking approach also aims to develop an adapted offer for small-developers. By developing the compensation to them, it will become easier to oblige administrations to impose their compensation measures. However, it seems that the development of RAN also aims to meet the demand of the great developer.

Indeed, according to the document of the call for projects, the administrative authority verifies the relevance (la pertinence) to the developer contractors to fulfill their obligation of compensation through an experimental operation. It is also mentioned that, under the condition of acceptance by the competent authority and opinions consulted (as CNPN or CODERST instances), experimental operations may be used to compensate ex-ante impacts of projects, according to the following principles: habitats, species and functionalities covered by the experimental operations must be the same as habitats, species and functionalities impacted by a project using an experimental operation under the compensation; the experimental operations must be used to compensate impacts to habitats or species on the experimental site at the time of appraisal; the experimental operations can only be used to compensate impacts located on nearby areas and identical to impacted ecological functionality.

- **CDC Biodiversité**

The CDC compensation based on the principle of "no net loss" is a possible answer. This principle implies to preserve what exists in a territory (in terms of habitats, species and ecological functions) and to replace what accommodations considered as priorities come to remove. This idea is possible via the 1976 law which set up an avoid-reduction-offset mechanism. But the measures of evasive action and reduction cannot cancel all the effects of the operation. There are still residual impacts. If they are ignored, they lead to a biodiversity loss. The traditional principle of compensation does not completely respond positively to that³⁸⁷.

The CDC Biodiversité, launched in 2006, responds to the consumer-pays principle. This is a common point with the PES approach. This is the first time that appears an operator providing technical and financial action piloting long-term for species, habitats and ecological services provided by nature. The objective of the creation of the CDC Biodiversité is to drain more resources to the actors of biodiversity for natural areas, to improve the coherence of grassroots actions and reinforce functional ecological networks, to help the professionalization of actors of biodiversity whose institutions suffer from weak environmental contribution.

According to the logic of the National Biodiversity Strategy, CDC Biodiversité is committed to develop operational solutions supporting developers' project and the preservation of nature, to create a monitoring tool for the implementation of habitat bankings (this tool should be under the consideration of a regulatory authority), to initiate reflection on innovative tools for financing preservation of nature at the economics / biodiversity interface.

CDC Biodiversité has two tasks: a demand driven approach and a supply approach³⁸⁸.

³⁸⁶ Vatn (A.) *et al.*, *Can Markets Protect Biodiversity?. An Evaluation of Different Financial Mechanism*, Department of International Environment and Development Studies, Noragric, Noragric Report n° 60, June 2011.

³⁸⁷ Piermont (L.), Thiévent (P.), Quenouille (B.), « Un opérateur de la Biodiversité au service des infrastructures écologiques : une proposition de la Société Forestière », *PCM*, 2007, n° 10, pp. 18-21.

³⁸⁸ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014.*

The first one aims at assuming the obligations of market clearing: Supported by the CDC for 20 to 30 years, control by the administration that everything is done right, contract between CDC and local operators, pilot stage of a habitat banking (steps = 1: land security: identify land that meets the requirements of compensation and then secure it (may acquire), 2: implementation of the compensation action (technical + financial management) + monitor operations throughout (20-30 years), 3: reporting to the administrative authorities + scientific + developers).

The second one, the supply demand, is still experimental. It consists in anticipating potential compensation claims. The operator pre-finance the positive actions with the aim of enhancing later as compensation. It is an innovative approach that seduce for 3 reasons: it permits to respond to environmental challenges which require a rapid response but which are unanswered; to ensure that at the time of impact, the compensatory action is already effective and thus satisfies the principles not net loss, it permits to pool the funds of several habitat bankings which aim the same habitat and so conduct large-scale operations, more profitable for biodiversity³⁸⁹.

In all cases, CDC Biodiversité contracts in its name with local actors, either for specific missions (Standby land...), or over the long-term (conservation management, monitoring, control). It drives accompanying measures. It accompanies the contracting authority in its communication on financial positive actions. It acts as a financial operator and compensation operator.

VIII. PLAINE DE CRAU CASE STUDY

The pilot site is located in the Plaine de Crau, in the Provence-Alpes-Cotes d'Azur (PACA) region in the Western part of Marseille. It is the last semi-arid steppe in Western Europe and contains several rare and threatened species of bird (Pin-tailed Sandgrouse, Little Bustard, Lesser Kestrel etc.), insects (endemic specie of grasshopper) and plants. These steppes used to cover 40 000 ha (98,842 acres) in the 17th century and only 11 500ha (28,417 acres) were remaining in 1990, which are partially fragmented due to human activities. Multiples factors are driving the degradation of this habitat, including³⁹⁰:

- The Plaine de Crau lies at the crossroads of major circulation axis in the South of France (Rhône Valley, Mediterranean and Languedoc regions), which results in intensive development of roads, railways, maritime and fluvial transport as well as pipe-lines.
- The development of new activities linked to the port of Marseille (industry, logistic, wind power plant, etc), which creates new needs in terms of transport, lodging and energy.
- Farming and the development of greenhouses and arboriculture since the 80's.
- Pollution from a municipal dump as well as from military land included in the site area.

Different conservation tools have been put in place to protect and manage the specific habitats of the Plaine de Crau. In particular, the Plaine is included in the Natura 2000 network.

³⁸⁹ Piermont (L.), Thiévent (P.), Quenouille (B.), « Un opérateur de la Biodiversité au service des infrastructures écologiques : une proposition de la Société Forestière », *op. cit.*

³⁹⁰ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

Most of the remaining steppe (7 411 ha) is classified as a National Nature Reserve³⁹¹. In addition, the Conservatoire du Littoral et des Rivages Lacustres has purchased part of the littoral zone to implement conservation actions.

The traditional land-use of the Plaine de Crau was dedicated to extensive pastoral activities and represented an area of transhumance with ewe herds. Extensive livestock production and seasonal grazing has played an essential role in the creation of the original habitat. Such practices have diminished in recent decades, to be replaced by industrial orchards, which have contributed to damage thousands of hectares of the steppes. Sale of land used for arboriculture represents an opportunity for environmental rehabilitation of the Plaine de Crau and the possibility of reintroducing extensive pasture activities, which support the balanced use and management of the steppes.

CDC Biodiversité bought a 357 ha plot in September 2008, in accordance with local and national environmental agency, to serve as the first *in situ* experiment of habitat banking in France. Through this project, CDC Biodiversité commits to provide biodiversity offset before impacts from development occurs, convert abandoned orchards into grazing pastures and ensure the durability of the offset measures on the long term. In addition, it plans to aggregate offsets from several developers and thus allow a more coherent approach to compensation and better conservation outcomes³⁹².

This creates the first French natural reserve assets in 2009. Besides the cost of land acquisition, several million euros were given to ecological rehabilitation of the environment in order to replenish a dry herbaceous vegetation which provide an enabling several emblematic fauna species habitat Crau. Since 2010, CDC Biodiversité focuses on land management, (including pastoralism) and on the valuation of assets (valorisation des actifs), that is to say, the sale of credits created by the restauration of the Cossure steppe.

CDC Biodiversité will receive the authorization from the administration to sell credits and it will sign a contract with all developers buying credits to ensure their commitment for 30 years³⁹³.

The valuation of the transaction will be realized through the sale of "natural assets" Cossures which correspond to a unit area³⁹⁴. The Cossure operation generates as many units as of hectares on which it is conducted, or 357 units. These units are listed in a register kept by the DREALs PACA. The price of the unit or service compensation linked to Cossure transaction is valued at 39 000 euros per hectare. It is based on the full cost of the transaction estimated at 12 million euros. This cost includes the costs of land acquisition, rehabilitation costs, development, ecological and pastoral management and administration, but also a scenario of selling units. It takes into account various technical and financial risks. Assets were sold to compensate the realization of several logistics platform projects including St. Martin-de-Crau.

As the site experiment is adjacent to the National Nature Reserve, the banking experiment is expected to locally increase the ecological coherence. It is also expected to

³⁹¹ Decree n°2001-943 of October 8th 2001 creating the Nature Reserve of the Coussouls de Crau (Bouches-du-Rhône).

³⁹² EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, *op. cit.*

³⁹³ *Ibid.*

³⁹⁴ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014*, p.3

improve biodiversity connectivity between the Crau and the Camargue, linking currently disconnected different parts of the Crau Nature Reserve.

- **Mechanism of Cossure**

Legally, two agreements were signed between CDC Biodiversity and MEDDE. These agreements concerned the conditions of realization of the RAN and the conditions for experimentation, especially in view of the ecological equivalence between assets and offset impacts.

These agreements provide that the CDC Biodiversité is committed to biodiversity conservation management of the site, based on écopastoralism, for 30 years. After this period, CDC Biodiversité will be committed to ensuring the sustainability of the ecological role of the site³⁹⁵. First, a framework agreement with CDC Biodiversité which recognizes its ability to make RAN and provide conditions for implementation. Second, a convention concerning the experimentation which defines both possible ecological equivalence between assets from Cossure and accommodations which impact the compensation area, and the requirement for land grazed (obligation de pâturage) and scientific experiments in restoration ecology³⁹⁶. These agreements provide, among other things, that CDC Biodiversité is committed to ensuring the sustainability of the site as habitat favorable to local birds for a period of thirty years. After the trentenales obligations, ownership of CDC Biodiversité becomes full.

Based on these agreements, CDC has developed an ecological management plan within which specific ecological objectives indicators are defined. It will also realize annual reporting on the project activities and results. Additionally, project performance will be overseen by a third party, most likely the DIREN. Beside the role of the DIREN as the control entity for the project, additional public agencies are sitting on the steering committee.

The uses of the resource site Cossure are governed by both property right and conventions established between CDC Biodiversity and the Ministry in charge of Ecology. The property right is the acquisition of private right on plots of orchards by CDC Biodiversité. The agreements govern the action of CDC Biodiversité on these plots, with the aim of allowing the transform of funds committed to marketable assets. This conventional agreement is coupled with a contractual agreement between CDC Biodiversity and developers who acquired assets: the amount of sold assets includes the management of the corresponding plots over thirty years. Beyond this period, formally, the property right is exercised and allow CDC Biodiversité to dispose of its property.

Next Table summarizes the identified goods and services and their users in 2011³⁹⁷. Five potential goods and services exist in the current situation. This is important for such particular resource and also on such a small area (357 ha): generation of natural assets, scientific experimentation, sheep farming, conservation of nature and hunting.

³⁹⁵ *Ibid.*

³⁹⁶ Meddtl et CDC Biodiversité, 2010b, *Convention relative à l'opération expérimentale Cossure entrant dans le cadre de l'expérimentation nationale d'offre de compensation 2010- 2016.*

³⁹⁷ Chabran (F.), Napoléone (C.), « Les conditions du développement des banques d'actifs naturels en France. Analyse du régime institutionnel de la première Réserve d'Actifs Naturels française », *Développement durable et territoires*, 2012, Vol. 3, n° 1, pp. 1-14.

Biens et services de la ressource	Utilisateurs (et type de droit détenu)	Régulations		Bases légales des régulations
		Privées	Publiques	
Création, stockage et vente d'actifs naturels pour des compensations écologiques	CDC Biodiversité (droit de disposition)	Droit de propriété de CDC Biodiversité		Code civil
			Convention cadre et convention relative à Cossure entre le Ministère de l'Ecologie et CDC Biodiversité	Droit des contrats
			Loi de protection de la Nature (76-629) permettant la compensation écologique et dispositions modificatives suivantes.	Code de l'environnement
Expérimentations scientifiques d'écologie de la restauration	UMR IMEP - Université d'Avignon - CEN PACA (droit d'usage)	Convention entre CDC Biodiversité et Université d'Avignon		Droit des contrats
Pâturage ovin	Elevéurs (droit d'usage)	Conventions de pâturage		Code Rural
			Plan de gestion de Cossure	Convention relative à Cossure entre Ministère de l'Ecologie et CDC Biodiversité
Habitat de biodiversité remarquable	CEN PACA Associations de protection de l'environnement		Inventaire Znieff* I et II	Code de l'environnement (Article L411-5)
			Inventaire Zico**	Directive européenne "Oiseaux" (transposée dans le code de l'environnement)
			Réseau Natura 2000 (ZPS*** « Crau »)	
Chasse	Chasseurs (droit d'usage)	Plan de chasse		Code de l'environnement (Article L422-27)

* Zone Naturelles d'Intérêt Écologique, Faunistique et Floristique
** Zone Importante pour la Conservation des Oiseaux sur la totalité du terrain
*** Zone de Protection Spéciale

It seems clear that the internal consistency of the device is primarily due to the balance between public and private plans, from which one the institutional regulation is the expression.

Regulation analysis

In France, the regime Avoid Reduce Offset (ARO) established by the 1976 Act give impulsion to the approach promoted by CDC Biodiversité and linked to banking. But really the mechanism is optional, voluntary and contracting. Experience of Cossure, in Var, will confront the French example with experiments implementation in US in order to make theoretical and practical observations.

The French banking, which aims at buying a land subjected to signifiant anthropogenic pressure in order to restore or rehabilitate it, was developed "à droit constant". In consequence, there is no specific legal framework for the mechanism. Nevertheless, we note two kinds of regulations in the implementation process. Public regulation comes from a framework agreement concluded between main banking actors: CDC biodiversité and MEDDE. It is also made up of environment conservation tools (Natura 2000 ; Réserve naturelles nationales) which can be applied lands opened to banking lands. Private regulation

is developed through agreements concluded with the CDC biodiversité. On that agreement, the CDC has developed a management plan which is a kind of self-regulation because it was created by a stakeholder: the CDC. The three-part relationship is institutionalised by a private regulation: the CDC biodiversité as public institution, the developer and public authority which grant the authorisation to the developer.

In the same way of Banking, there is a transfer of responsibility from the developer to the bank.

In France, compensation is part of public policy in environmental protection. It should achieve these goals while allowing the development of human activities. This presents a connection with PES. The project of the CDC biodiversité in the Plaine de Crau is the only natural asset reserve which activates at the stage of contract. Other operations launched as part of the call for the MEDDE project are still in the conceptualization stage.

The French willingness to implement a first natural active bank represents an opportunity to question public authority's regulation turned to the conservation of nature, because this regulation establishes frameworks within economic traders realize their choices³⁹⁸.

Furthermore, offset projects are developed without affecting legislation. No regulatory changes have been undertaken to organize the acceptance by the administration of units issued. In its call for proposals, the MEDDE also notes that the public and private developers and private are required to comply with regulatory requirements relating to the protection of nature focusing on their project, especially the sequence of avoidance and mitigation of impacts, and to seek compensation as a last resort. The environmental authority gives an advice on compliance with these principles and quality of habitat banking in view of the residual impacts. The administrative authority and the advisory bodies (such as the National Council for the Protection of Nature) check, during the approval process, that habitat banking envisaged via an experimental operation fully complies with the requirements of restoring the ecological situation (for example, with regard to protected species, maintaining a favorable conservation status of local populations of the species affected by the project)³⁹⁹.

IX. IMPACTS OF MECHANISM

3. Advantages

The results in the field of ecology of restoration (écologie de la restauration) seem to be encouraging in the short term (the site was reopened and the return of the local heritage bird was verified^{400 401}).

Can this sustainability be ensured by other ways?

³⁹⁸ Fanny Chabran et Claude Napoléone, Les conditions du développement des banques d'actifs naturels en France. Analyse du régime institutionnel de la première Réserve d'Actifs Naturels française, *Développement durable et territoires*, Vol. 3, n°1, Mai 2012, <http://developpementdurable.revues.org/9199> ; DOI : 10.4000/developpementdurable.9199

³⁹⁹ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014.*

⁴⁰⁰ Fanny Chabran et Claude Napoléone, Les conditions du développement des banques d'actifs naturels en France, *op. cit.*

⁴⁰¹ Meffre (B.), Sauguet (F.), Wolff (A.), *Plan de Gestion du site de « Cossure » - Version intermédiaire 2011-2015*, CEEP, Chambre d'Agriculture des Bouches-du-Rhône, CDC Biodiversité, 2011.

- Regarding scientific experiments, their regulation consist in the Convention Cossure and an agreement for provision of services (convention de prestation de services) service between CDC Biodiversité and the University of Avignon. They are both non-perennial systems (2009-2012).
- Sheep grazing is regulated by land grazed agreements between grazing CDC Biodiversité (the owner) and farmers for a period of six years renewable. They can be blocked or non-renewed.
- Hunting is not allowed to Cossure and cannot guarantee any continuity.
- The habitat function for the local avifauna is one possible way. The site Cossure is not included in the Natura Reserve, but is part of the Natura 2000 network and is registered in three ecological inventories Znieff and Zico. The Natura 2000 network, like Znieff and Zico, cannot be adapted or modified easily. However, legally, these devices are not against third party, that is to say, they can oppose themselves to the property right of CDC Biodiversity.
- Government regulation of the site are not sufficient to ensure the sustainability of the resource over the long-term.

4. Disadvantages

This experiment has been criticized on two plans: the sale of natural assets and the governance of the mechanism⁴⁰².

Then, two factors seems to aggravate safekeeping of mechanism. First, the failure of the authority independance. The analysis of the institutionnal framework of ressources of the Cossure site asks the question of the coherence of the legal framework. With such regulated ecosystem as the coussouls of Crau, accommodations still to be accepted. This apparent inconsistency between two public policies explain a large share of observed conflict: on one hand, a policy on the conservation of habitat important habitats and on the other hand, regional development policy. The decisions come from the same institution: the environmental authority, represented by the prefect of the region, is involved in policies which regulate competing uses of impacted areas. The consistency of the legal framework would require, as a minimum, to confer an environmental authority (or create it?) all the independence that requires the legitimacy of decisions inherent in the long-term preservation of an environment.

Taking an example: the concept of "overwhelming public interest". In field work, the notion of overwhelming public interest is never questioned by stakeholders, including opponents, if it leads to authorize accommodations in support of social causes considered legitimate (for example public health). But the economic argument (jobs) justified on their own the destruction of important environments. This creates strong local opposition. We are in the presence of a mechanism based on legal rules which protect environmental conservation, but which oppose promptly to local interests.

Imbalance between regimes from the resources: Two main regulation framework are used on the Cossure site: the legal corpus on environmental protection and the property right. Environmental protection is not enforceable against third parties or for a limited time, while property right does not know time limit. We are faced with an inconsistency between the regime that generates a risk to the sustainability of the functionality of the site. By

⁴⁰² Ten Kate (K.), Treweek (J.), Ekstrom (J.), *The use of market-based instruments for biodiversity protection – The case of Habitat Banking* EFTEC (Ed.), 2010.

comparison, there is a nature reserve near the site Cossure (the Nature Reserve coussouls Crau) which exercees similar functions (habitat of important biodiversity and pastoralism). A legal mechanism (the National Nature Reserve) prevents any economic development is co-managed between farmers and environmentalists and others have access (hunting is authorized on species non-heritage). Less extensive than on the site Cossure (there is no generation assets or ecological restoration) and a more coherent, the institutional regime of the reserve Crau is not called into question. We conclude that the main inconsistency of the institutional regime of the site Cossure consists in the lack of independence of the legal system for controlling the operation (environmental authority). It also reflects an imbalance between the temporality associated to public conventions and timelessness of ownership.

Impact of mechanism

This mechanism permits an action already effective at the time of impact, and a long-term protection: 30 years then perpetuity. This encourages the ecology of restoration and present a flexibility and an easy process to modify action on lands.

But this presents disadvantages: the governance of the mechanism through the failure of the authority independence (prefect of region), inconsistency between property right and legal corpus of environmental protection, sale of natural assets.

X. KNOWLEDGE

Several remarks can be made concerning the relationship between the Cossure case and knowledge. First, the assets of the RAN are generally accepted by the administration as habitat bankings if the developer demonstrates territorial and ecological equivalence between Cossure operation and the loss or damage is to be compensated. To facilitate the definition of equivalence, methodologies were developed within the scientific monitoring of the Cossure operation⁴⁰³. The Scientific Committee of CDC Biodiversité validated a framework of ecological and territorial equity. He considers that the RAN Cossure is potentially eligible to compensate residual impacts of development projects:

- On Mediterranean upland plain (milieux secs), with no geographical limitation to the dry Crau.
- Touching metapopulations of important species.
- Affecting the environment in general.

For example, the Scientific Committee of CDC Biodiversité, based on studies of the Little Bustard, says that the RAN Cossure represents an action that can compensate residual impacts affecting the Little Bustard populations distributed between the Aude and Haute Provence. This eligibility recognizes the existence, in the Little Bustard Mediterranean metapopulation, of a sedentary population, particularly between populations dry Crau of Wine tasting and Aix en Provence.

Second, the impact of the economic purpose of the environmental management of the site can ask. The economic rationality of a developer is to reduce the cost of its development and therefore to choose the least costly priority restorations (which is not necessarily the most

⁴⁰³ Wemaëre (M.), Ferté-Devin (A.), *Rapport sur l'analyse de l'offre et la demande en compensation en France, programme de recherche INVALUABLE, Bruxelles, janvier 2014*, p.3

ecologically relevant). Within Cossure experience, economic constraints guide the ecological management of the site: they change the orders of preference in the choice of target species. This observation does not permit to make a definitive assessment on the efficiency of market mechanisms of natural assets under environmental conservation. However, keep in mind that the functioning of the market have an effect on public conservation action.

Third, the plant engineering and landscape (within the CDC Biodiversité) is a multidisciplinary team based on knowledge and experience⁴⁰⁴: landscapers, landscape management specialists, technician of trees, designer-GIS technician. Its dual expertise landscape and plant engineering enables it to offer solutions that integrate all the constraints: aesthetic, technical and economic. It has a view to reconciling sustainability space and cost control in the proper direction to sustainable development.

Its activities can be divided into 3 areas:

1) Design and project management of landscaping

- The study of landscape projects (creation or rehabilitation) includes site analysis, its components, the project design from draft to documents for businesses. This can lead to collaborate with other designers (architects, planners, etc.) and consultants (hydraulic engineer, ecologist, etc.).

2) Management and monitoring of existing outdoor spaces

- Differentiated management plan is established from a diagnostic and a remapping of all site components (plants, soil, furniture, etc.). It shows the possible work to be done over 10 years (investment and maintenance) to maintain and / or enhance heritage. It provides an estimation of the work by proposing expenditures according to the emergency priorities determined in agreement with the client.
- The landscape master plan studies the landscape potential of a site, offers scenarios and the best zoning program in adequation with the wishes of the contracting authority and the constraints of the site development program.
- The diagnosis of outdoor spaces is intended to study the technical aspects of landscape and existing development, of a park to rehabilitate or specifications and technical documents. It offers solutions for sustainable redevelopment.
- The maintenance support and management proposes to establish the specifications for maintenance contracts, site monitoring, periodic inspections of maintenance, the annual update of state spaces, etc. It defines the set of actions to preserve and enhance natural areas.
- The landscape study analyzes the components of a territory, its strengths (points forts) and weaknesses with the aim of minimizing the impact of a development, determining where to build, etc.

3) Expertise, diagnostics and plant engineering

- Vegetable expertise is to achieve a phytosanitary diagnosis of forest and ornamental trees in harsh environments (urban, peri-urban, along infrastructure) and / or used by the public (park, homes, etc.).
- The management plan includes a diagnostic of each tree or group of trees and determines the set of actions to be taken in the short, medium and long term as well as adequate expenditure for the purpose of maximum tree preservation, security people and sustainability of the environment.

⁴⁰⁴ <http://www.cdc-biodiversite.fr/nos-metiers/paysage-et-ingenierie-vegetale/>

Fourth, the habitat banking experimentation in the Plaine de Crau aims to primarily convert arboriculture land into sustainable grazing areas for ewe herds as well as suitable habitats for the many endangered bird species found in the area⁴⁰⁵. To do so, a 357 ha piece of land (882 acres) has been identified next to the National Nature Reserve in the steppe part of the Plaine de Crau. Previously an arboriculture domain (the “Cossure” domain), it fell into bankruptcy two years ago and exploitation stopped. The rehabilitation and conservation of the site’s biodiversity will be evaluated and optimized through a management plan. The outcome of the project will be to offset development impacts on biodiversity only, with a focus on protected habitats and species.

Fifth, CDC Biodiversité has contracted with the co-manager of the Crau Nature Reserve (the CEEP association) and the University of Avignon to compile initial state, fauna and flora inventories of the site, as well as develop monitoring and evaluation indicators, in order to assess the success of the operation.

Knowledge analysis

As in U.S.A., it seems to be a strong capacity of mobilized knowledge. The equivalency criterion is very important because of its lack of fungibility. Developer must demonstrate territorial and ecological equivalence between Cossure operation and the loss or damage is to be compensated. This implies ecological, economic and social knowledge. In the Cossure case, multidisciplinary team on knowledge and experience were put into place. This leads to the creation of a strong pool of knowledge and data which probably could be used in other cases. Furthermore, to facilitate the definition of equivalence, methodologies were developed within the scientific monitoring of the Cossure operation. At least, as in the PES scheme in Vittel case, a strong monitoring and assessments were put in place to value the result of the operation. This contributes to the efficacy of the mechanism.

Within Cossure experience, economic constraints guide the ecological management of the site: they change the orders of preference in the choice of target species. This observation does not permit to make a definitive assessment on the efficiency of market mechanisms of natural assets under environmental conservation, but keep in mind that the functioning of the market have an effect on public conservation action.

⁴⁰⁵ EFTEC, IEEP *et al.*, *The Use of Market-Based Instruments for Biodiversity Protection. The Case of Habitat Banking*, Technical Report for European Commission DG Environment, 2010, <http://ec.europa.eu/environment/enveco/index.htm>

Chapter 4: Germany

The following legal analysis is mainly based on the report written by Leonardo Mazza and Julian Schiller⁴⁰⁶. Some paragraphs have been taken *in extenso*.

VII. INTRODUCTION

Mitigation has a long tradition in Germany beginning in 1976, the Law of Nature Protection says that such impacts must be (if possible) avoided or (if avoiding is not possible) be mitigated and compensated with measures which have the same ecological functions and should be located in spatial context with the impact.

In reality, the compensation measures very often show a lack either of the spatial context or the functional coherence. In 1998 the law was changed for many types of impacts: now it is possible to mitigate for impacts caused by municipal plannings such as residential areas.

This was the beginning of the eco-account. Municipalities now can realize ecological measures like afforestations with local tree species, renaturalize rivers and creeks, initiate wetlands or dry sheep pastures, and they are allowed to shift the cost of the measures to the builder-owners: in addition to the regular land price the builder-owners pay for ecological compensation measures. (See next figure 6).

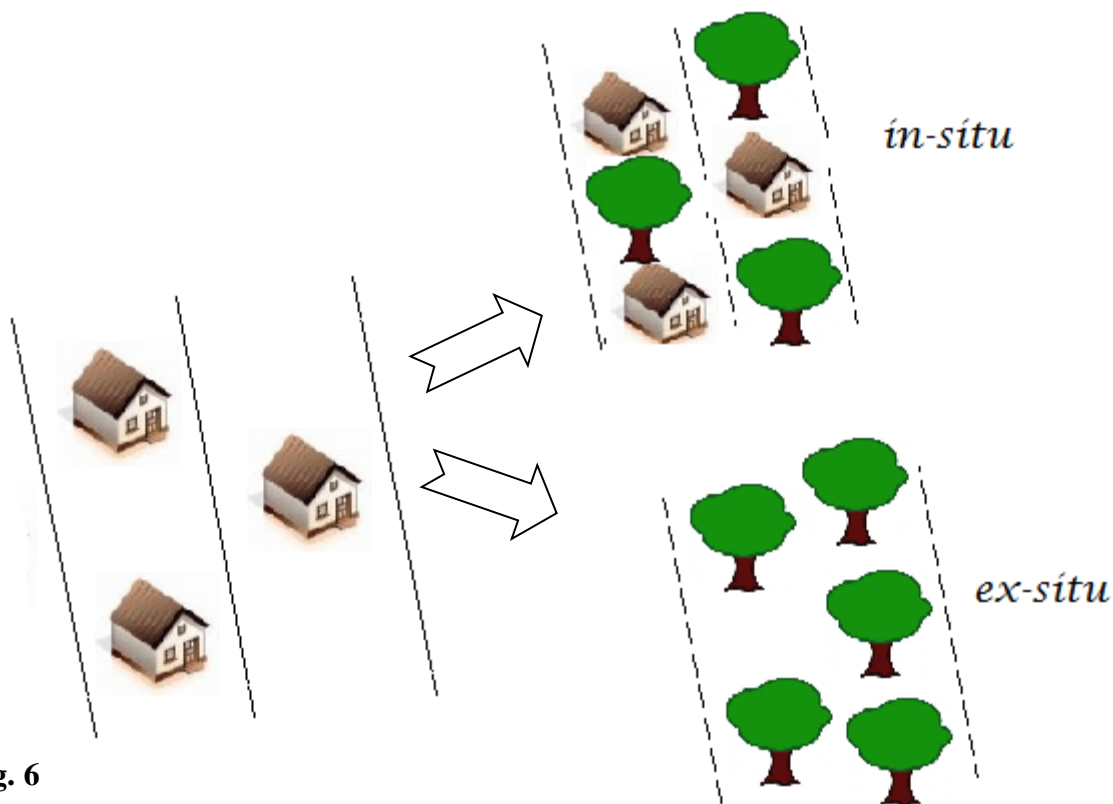


Fig. 6

⁴⁰⁶ Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

Eco-account funds can only support improvements in nature value, they cannot be used to achieve or maintain common land management standards. Examples of such measures are: returning sealed surfaces to a more natural state; restoration of green and brown field sites (including arable land), reforestation, restoration of rivers, provision of wintering habitats for animals.

3. The German impact mitigation regulation (IMT) and the creation of eco-accounts

A recent assessment of habitat banking schemes in the EU concluded that Germany is the EU country from which the strongest demand for compensation arises⁴⁰⁷. Indeed, Germany appears to be one of the countries in Europe which has, since 1976, some of the most stringent requirements in place as regards the offsetting of residual impacts on the environment⁴⁰⁸. Since the Nature Conservation Act was enacted in 1976, the IMR has become its most important and effective instrument for planning authorities to evaluate the environmental impact of certain activities. It is similar to the requirement in the Environmental Impact Assessment (EIA) Directive, which aims to provide authorities with information about projects that is necessary to assess the likely significance of the environmental impact. For example, Article 5(3) of the EIA Directive states that a developer shall provide information about their project and a description of the measures envisaged to avoid, reduce, and (if possible) remedy its adverse environmental effects, and the authorities can then make a decision about a specific project. The core principle is to conserve and develop the capacity of nature and the landscape to perform their essential functions and to define the proper mitigation, compensation and substitution.

The demand for off-setting in Germany primarily arises from the Federal Impact Mitigation Regulation⁴⁰⁹ adopted in 1976 with the Federal Nature Conservation Act, which deals with the mitigation and compensation of impacts on nature and landscape, including those outside protected areas⁴¹⁰. The IMR is consistent with the “polluter-pays-principle” and introduces several duties for developers that are obliged to avoid impacts of their projects on nature and the landscape and to compensate any residual impacts⁴¹¹.

Polluters must obey the ground rules, *i.e.* the so-called mitigation, compensation and substitution hierarchy⁴¹². In brief, land developers who exert an impact on nature and the landscape that cannot be avoided should first mitigate such impact and then must abide by certain compensation and substitution measures with respect to the damages from such impact that cannot be mitigated. Compensation measures must be implemented in the correct functional context. However, if such implementation is not possible, substitution can be

⁴⁰⁷ GHK *et al.*, “Exploring potential demand for and supply of habitat banking in the EU and appropriate design element for a habitat banking scheme. Final report submitted to DG Environment”, 2013, http://ec.europa.eu/environment/enveco/taxation/pdf/Habitat_banking_Report.pdf.

⁴⁰⁸ In most Member States compensation tends to be required only in particular circumstances, for example where protected areas or other important sites are affected (GHK *et al.* 2013).

⁴⁰⁹ “Eingriffsregelung” or “Eingriffs-Ausgleichs-Regelung”

⁴¹⁰ Wende (W.), Herberg (A.), Herzberg (A.), “Mitigation banking and compensation pools: Improving the effectiveness of impact mitigation regulation in project planning procedures”, *Impact Assessment and Project Appraisal*, 2005, volume 23, n° 2, pp. 101-111. In: <http://www.ingentaconnect.com/content/tandf/iapa/2005/00000023/00000002/art00003>

⁴¹¹ For details on IMR evolution, see study xxxxxxxx (autre partir d’InVALUABLE)

⁴¹² Wende (W.), Herberg (A.), Herzberg (A.), “Mitigation banking and compensation pools: Improving the effectiveness of impact mitigation regulation in project planning procedures”, *op. cit.*

implemented. Given the two measures, the normal procedures for land-development offset include the following: a preliminary judgment about the impact of the development project; a determination of the most suitable method to estimate the landscape qualities and natural functions of the site; a judgment as to whether the impacts of the project can be avoided or minimised; designing compensation measures; weighting the project with relevant interests based on public opinion sampling; designing substitution measures for the impacts that cannot be mitigated; calculating and guaranteeing financial issues; and making a final decision about the compensation by using the balancing principle.

With respect to the practical performance of the compensation principle, another requirement was introduced in 1987 for permits in Germany. Thus, approval of a development project depends on whether the project's impact on an existing environment or landscape is acceptable (as determined by public opinion, in particular) under the compensation measures for the site. The new requirement made it essential to first do everything possible to repair negative impacts. Compensation measures became the dominant requirement for project approval.

But globally, there is no single legislative text that corresponds to the Impact Mitigation Regulation. The regulation can be derived from a range of legal requirements governing the compensation of impacts across different pieces of legislation. Furthermore, there were difficulties in ensuring legally satisfactory implementation, management and control of compensation measures. Indeed, the requirement was so strict that it presented many obstacles for developers in practice.

In this context, legislator created the eco-account tool which permits to make the implementation of the requirements of the IMR more operational.

The Second Phase of IMR is the Mitigation Banking and Compensation Pools. Due to the complex procedures, the strict constraints of hierarchical management and the unsatisfactory results of IMR implementation, Germany's Federal Building Code was amended in 1998 to optimize enforcement and implementation of compensation measures. These introduced spatial flexibility for developers having to carry out compensation measures for their developments.

This flexibility created the conditions for the development of "compensation (area) pools"⁴¹³ and ultimately the emergence of formalized eco-account schemes under the building law. Subsequently, this flexibility for compensation measures found its way into the nature protection legislation, first at Federal, then at the Länder level. Since 1998, the system of so-called "eco-accounts" has been installed in many municipalities in Germany⁴¹⁴.

In 2002, amendments to the Federal Nature Conservation Act introduced more spatial and temporal flexibility in the implementation of the requirement under the Impact Mitigation Regulation for developers to avoid avoidable impacts on nature and the landscape. This led to the emergence of advanced and aggregated offsets (pooled spaces and measures, as well as the so-called "eco-accounts")⁴¹⁵. The new ordinances, which offer off-site compensation in pools, commit to a much more elaborate examination of the question of how to realise the possibility of appropriate compensation at some distance from the impact. Furthermore, those

⁴¹³ Terms marked with an asterisk can be found in the Glossary at the end of the document.

⁴¹⁴ Küpfer (C.), "The eco-account: A reasonable and functional means to compensate ecological impacts in Germany". http://www.stadtlandfluss.org/fileadmin/user_upload/text_files/the_eco_account.pdf

⁴¹⁵ Darbi (M.), Tausch (C.), "Loss-Gain calculations in German Impact Mitigation Regulation", http://www.forest-trends.org/documents/files/doc_2404.pdf

Loss-Gain calculations in German Impact Mitigation Regulation,

amendments clarify the allocation of competences between the federal and the Länder level: Länder are given the competence to adopt further regulations to specify the definition of impact and to ensure the implementation of compensation measures. As consequence, each federal state has its own regulations regarding how to implement the IMR and how to handle the required land-development offsets in practice, which emerged not only because of the different context of landscape planning but also because no specified balancing and evaluation methods are defined at the federal level⁴¹⁶.

Later, an amendment to the Federal Nature Conservation Act in 2009 introduced the possibility of “storing offsetting measures”, *i.e.* setting out that anticipated interventions (*i.e.* restoration measures) may be recognized as compensation measures if they fulfil specific criteria. It is the first time that the term “eco-account” is mentioned in German legislation.

4. Eco-accounts: establishment of an enabling legal framework on a regional level

This development focuses on a specific case study: the setting up of eco-accounts in the German region of Baden-Württemberg, observed in previous work packages. In 2011, this region adopted a legal framework to set up such eco-accounts to comply with amendments in the national nature protection legislation.

In Baden-Württemberg there are two kinds of eco-accounts: those established under the Federal Building Code and those established under the Nature Conservation Act. In the present development, only the second one will be studied.

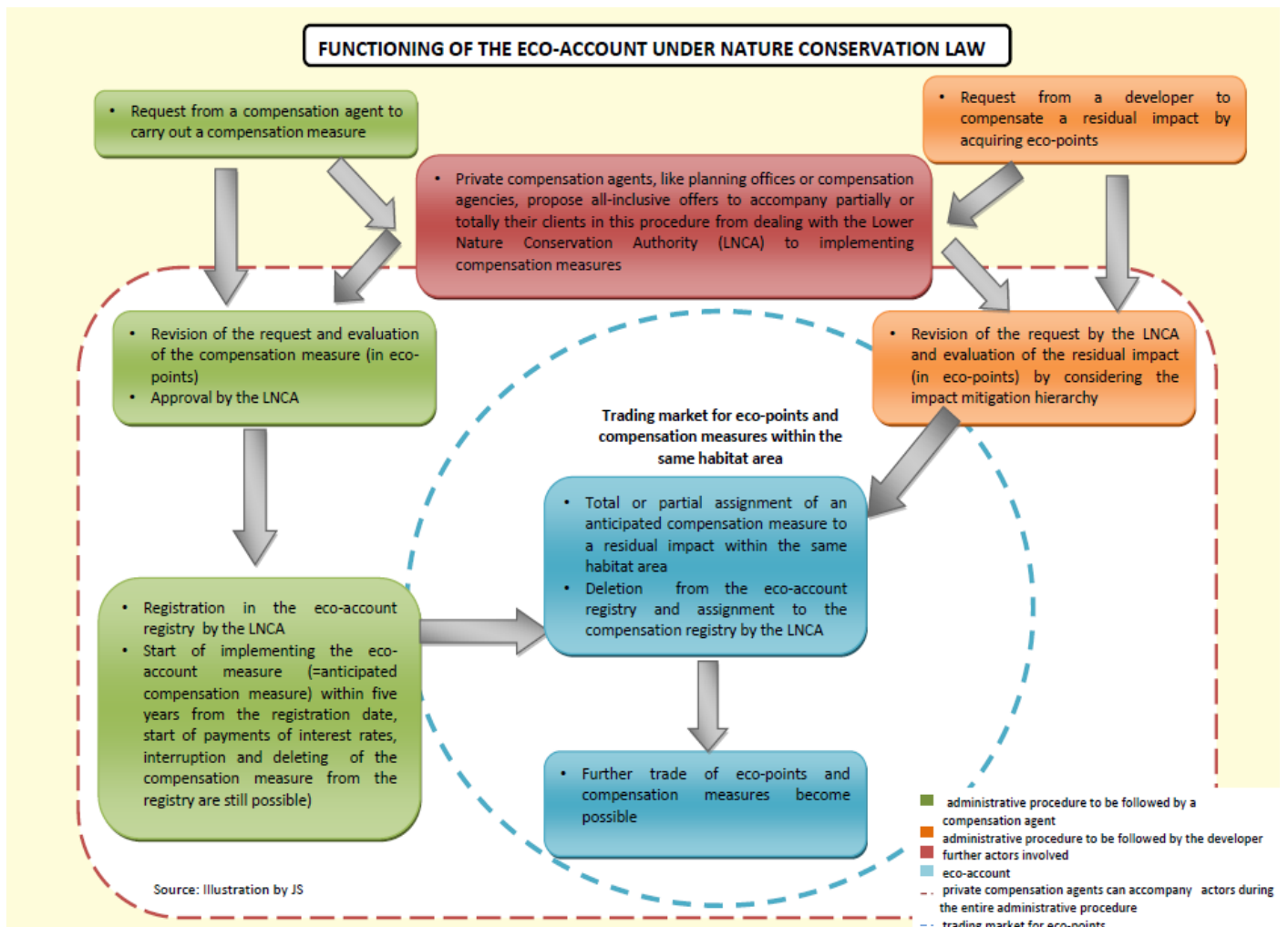
The revision of nature protection legislation in Baden-Württemberg in 2005/2006 was an opportunity to reiterate which impacts are targeted by the legislation (*e.g.* modification of the soil structure, development or major changes to building development...). It also defines the requirements for a compensation measure to be recognized as an eco-account measure that may be used for the compensation of future impacts. This is the same approach in U.S.A. and France.

VIII. ECO-ACCOUNT UNDER CONSERVATION LAW: MECHANISM

The eco-accounts under nature conservation law were historically largely inspired by the eco-accounts under building law. We can observe similarities. The eco-accounts under nature conservation law are managed by the Lower Nature Conservation Authorities (LNCAs), which are usually on a district level. The LNCAs are responsible for introducing and administering compensation registries at the level of the district. These registries may include both compensation measures that are clearly attributed to impacts from a specific development and anticipated compensation/eco-account measures that have been approved by the LNCA and are credited to the eco-account but not yet attributed (with information including habitat type, the original state of the area as well as the description of state after implementation of compensation measure...).

⁴¹⁶ Darbi, M.; Tausch, C. Loss-Gain calculations in German Impact Mitigation Regulation. Available online: http://www.forest-trends.org/documents/files/doc_2404.pdf

The following figure illustrates the mechanism of eco-accounts scheme⁴¹⁷:



L. Mazza and J. Schiller described the process in their report⁴¹⁸: “These eco-accounts are primarily used to compensate residual impacts arising from developments in areas not covered by a (legally binding) land development plan, e.g. developments linked to public utility infrastructure projects (like road construction and projects related to provision of gas, electricity, water, etc.)⁴¹⁹. The trading of eco-points between developers and compensation agents is possible as long as compensation measures and impacts are located in the same habitat area. One standardized evaluation model to attribute eco-points to compensation measures and impacts is recommended on a regional level (in Baden-Württemberg). An interest payment of 3% per year on registered compensation measures that have already been implemented is meant to incentivize compensation agents to use the eco-account scheme to implement anticipated compensation measures. Private compensation agents, like compensation agencies and planning offices, offer service packages to accompany partially or

⁴¹⁷ Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

⁴¹⁸ *Ibid.*

⁴¹⁹ The scope of application is regulated by the Federal Building Code (BauGB 1998: §35).

totally both developers and compensation agents during administrative procedures”. This fungibility is quite different from the habitat banking in U.S.A. and France.

The eco-account is a tool which aims at facilitating the implementation of the Impact Mitigation Regulation, but remains a completely voluntary scheme. Developers are no free to decide whether or not they are going to compensate the residual impacts, but they are free to use the eco-account tool to do so⁴²⁰.

Furthermore, although the planning and implementation of anticipated compensation measures is voluntary, measures that are listed in the compensation registry become binding as soon as residual impacts have been attributed to the anticipated compensation measure.

Eco-account regulation in Baden-Württemberg also defines further criteria compensation measures need to meet, including that eco-account measures must result in an improvement equivalent or above 10 000 eco-points and cover an area of at least 2000 m², these measures require the approval of the LNCA, a certification of the availability of the chosen land/area, and go beyond simply ensure preservation of the status quo (conservation of existing landscape).

Furthermore, compensation measures could not be accepted as anticipated compensation measures if they are basically limited to good agricultural practices or normal forestry and fishery management practices, if they focus on conserving the state of existing nature and landscape, but do not result in an improvement of the ecological balance of an area/the natural environment, and if they are implemented in an area on which measures that would result on the ecological deterioration of the area are in the process of being permitted.

The eco-account regulation creates a legal framework that serves as a basis for the trade of eco-points under nature conservation law. “The transfer or sale of compensation measures or eco-points is legally allowed, but it needs to be notified to the LNCA, which is responsible for modifying the entries in the eco-account registry. In case of trading the land on which a compensation measure was implemented together with its attributed eco-points all rights and obligations, especially those relating to safeguarding and maintenance, are transferred to the new owner. Should only the eco-points be bought, the implementation and maintenance of the compensation measure is still to be assured by the owner of the land on which the compensation measure was implemented. Whatever the scenario, in line with the polluter-pays-principle, the developer needs to fully assume responsibility for the compensation of his/her impacts and if necessary has to comply with his obligations (under the IMR) through additional contracts, beyond those resulting from the use of the eco-account. In practice, developers usually decide to purchase eco-points when they are not in a position to implement the necessary compensation measure(s).

The main actors involved in trading are developers and/or compensation agents. In the majority of cases, trading actions are facilitated by private compensation agents like planning offices or compensation agencies offering their specialized services. Any trading actions need to be notified to the LNCA⁴²¹.

⁴²⁰ Developers can decide to fulfil their obligations under the IMR not using the eco-accounts, but still use the evaluation models created for the eco-account scheme.

⁴²¹ Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

It is difficult to describe the eco-account system in detail at the national level because there is substantial diversity of organizational modes (who manages and how to manage the account) and of evaluation and balancing methods (e.g., biotope valuation procedures or compensation area coefficients). A unified eco-account system at the national level does not exist, although a unified IMR is in progress. However, there are common characteristics among the different eco-account systems that we can discover.

An eco-account system is a system for stocking, measuring, and accounting for compensation or substitution measures in a region that is based on related landscape planning. There are three key elements in an eco-account system: (1) a pool of appropriate lots (PAL), (2) a medium of exchange, like e.g. eco-points, and (3) eco-accounts. Generally speaking, as soon as a measure on one of the lots within the PAL is realised, the eco-accounts covering the entire surface of a region can be enlarged and used (or even traded in the form of eco-points) for measures to compensate or substitute impact.

Landscape plans in some states, such as in Baden-Württemberg, define the areas of existing high ecological value (“areas of maintenance”) and areas of high potential for “high quality biotopes”. Those potential areas of high ecological value will be carefully investigated and planned such that suitable measures can be implemented for ecological restoration. The planned areas are then defined as a PAL.

A PAL provides collection and concentration of usable areas that are prepared for compensation; additionally, a PAL guarantees cumulative compensation with respect to suitable sites by purchase or lease within a unified planning scheme. Once a landscape plan has been designed, the eco-account (i.e., an account for stocking advance compensation and substitution measures) is also defined because it is based on the PAL. When the responsible local government, the developer/polluter itself, or even a third-party agency implements the measures of the PAL or a subset of those measures, the ecological gain is accounted for in the eco-account.

How is the change in the eco-account calculated? In some states, including Baden-Württemberg, the eco-account is calculated in the form of eco-points. Eco-points are the credits that are given per lot, depending on the difference between the biotope qualities before and after the measurement and the acreage of the lot. The fulfilled eco-point can be added into the overall eco-account of the municipality (or region). The eco-account elicits the principle of a savings account, i.e. an ecological “credit” that is “saved up” by advanced compensation measures and later “debited” at an appropriate date. In contrast to bank accounts, eco-accounts cannot be “overdrawn”.

The diversity in accounting credits and implementation of eco-account systems is caused by the clearly defined responsibilities of federal and federal state governments in the Nature Conservation Act.

An eco-account system can be administered by different actors, including local governments (municipalities), private investors (developers), third-party agencies (land agencies) or statutory bodies (nature conservation foundations).

If local government administers the eco-account, it will be responsible for managing the PAL. It means to acquire the potential plot from private owners for fulfilling the specific offset measures or to implement measures on the plots that are owned publicly. For example, the municipality of Dettingen in the federal state of Baden-Württemberg runs its own eco-account system.

A private investor may also sign a contract with the responsible local governments to establish pooled spaces and measures and an eco-account owned by the developer. For example, the Rhineland-Westphalian Water Supply Service (RWW) in the Dorsten-

Schermbeck Cultural Landscape region. The contracts include that the RWW can implement environmental offset measures at its own pooled space, which can subsequently be counted as actual compensation and substitution measures for various impacts. This type of governance has financial advantages to that of merely relying on government budgets and is effective at implementing compensation measures for developers and local governments.

A private third-party agency may also manage an eco-account for purposes of economic benefit via the trading of eco-points. The precondition is to obtain official authorization. In this case, a separate supervisory structure must be implemented by the local government. The third party sell eco-points to the developers who must compensate their impact activities but do not have the opportunity to do it on their own. The land developer may sign a contract for a third party to manage a pooled space as part of the habitat bankings or may assess the ecological cost of its impact by calculating the number of eco-points to offset, which it will buy from the third party that is managing the eco-account⁴²².

Private third-party and local government are considered as compensation agents. To receive the payment to cover the costs of the compensation measure, compensation agents have to sell their eco-points to a developer. In case the compensation agent and the developer are the same entity/person, no financial transaction is necessary, as long as the eco-points attributed to the restoration measure are sufficient to offset the residual impacts. In most cases, the developer and the compensation agent are not the same entity, a transaction takes place. In these cases, time has often elapsed between the moment a compensation measure was registered and the moment it gets attributed to an impact. “In particular in the context of the eco-account under nature conservation law, this means that the compensation agent would have to ensure the initial financing of the compensation measure and carry all possible risks associated with this. This “time gap” often means that in practice the implementation of planned measures (that have been included in the compensation registry) only starts once the eco-account measure has been attributed to an impact and the compensation agent has received a payment that covers at least some of the costs associated with implementing the compensation measure.

Where this is not the case, compensation agents usually pre-finance the planning and sometimes the anticipated compensation measures themselves. To minimize the risks associated with the aforementioned “time gap”, compensation agents, like the compensation agencies, not only offer to sell eco-points to developers, but also act as intermediaries between developers and compensation agents in order to help the latter finance the compensation measure through the developer. Ideally, the temporal flexibility would lead developers to integrate their needs of compensation in their development plans at an early stage to ensure a certain planning reliability, *i.e.* five years before carrying out a development.

To incentivize the anticipated implementation of compensation measures and encourage private investment in compensation measures in the case of eco-accounts under nature conservation law, an interest payment of 3% a year is provided starting from the moment of registering an anticipated compensation measure in the compensation registry until the attribution to a residual impact, but at most for ten years. The calculation of the interest payment is based on the evaluation of a compensation measure in eco-points⁴²³.

⁴²² Morandeu (D.) Vilaysack (D.), *Compensating for Damage to Biodiversity: An International Benchmarking Study* http://www.forest-trends.org/documents/files/doc_3209.pdf

⁴²³ Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

In summary, land-development offset in an eco-account system may be implemented cooperatively by the government, private investors, statutory bodies, or land agencies. Local governments are in charge of developing the municipal landscape plans, which form the basis of the eco-account system⁴²⁴. Of course, the local governments can also undertake the practical measures themselves, if they choose to seek more profit. The developers are responsible for implementing the compensation and substitution measures or buying eco-points to offset the development project, which is considered to be an overall Pareto improvement. Third-party agencies (if they exist) derive profit from selling eco-points and are responsible for management of pooled spaces and measures and help the developers to meet the final balance of the environmental impacts.

IX. ECO-ACCOUTN SCHEME AND LAW

3. Property right

The principle is that compensation measures can be carried out on land with all kinds of status of property (private and public). Under the nature conservation law, a compensation agent needs to provide an acknowledgment of the availability of the land and a certificate from the municipality which proves that the lot chosen is not integrated in a future development project. This implies that compensation measures can only be carried out on land on which the future compensation measure is safeguarded in the long run and secured.

4. Responsibility

The Federal Nature Conservation Act 2009 set up the legal framework stating that off-setting is maintained and legally protected during the *relevant required period* which needs to be determined by the competent authority and the developer responsible for implementing, maintaining and securing compensation measures. In that sense, a compensation measure should be designed and safeguarded to remain functioning as long as the impact persists and the development exists. It is to ensure a long-term maintenance. This is a parallel situation in France and U.S.A. The period during compensation measures should have to be maintained is about 25-30 years. However, under nature conservation law, it is worth mentioning that the eco-account regulation does not explicitly refer to monitoring or control. As this type of eco-account has been set up only in 2011, there are no experiences with long-term monitoring and control and final conclusions cannot be drawn.

X. CASE STUDY: EXAMPLE OF AN ECO-ACCOUNT UNDER NATURE CONSERVATION LAW: USES OF THE ECO-ACCOUNT BY A PRIVATE FOUNDATION

This case study is extracted from the report of L. Mazza and J. Schiller⁴²⁵

⁴²⁴ Prokop (G.) Jobstmann (H.) Schönbauer (A.), Overview of Best Practices for Limiting Soil Sealing and Mitigating Its Effects in EU-27, <http://ec.europa.eu/environment/soil/sealing.htm>

⁴²⁵ Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

The majority of anticipated compensation measures registered in the eco-account registry in Baden-Württemberg were developed in the district “Ortenaukreis” and are mainly to be implemented by the same compensation agent, a registered private foundation (“Stiftung Naturschutz”). The strategy of this foundation involves buying land with high ecological improvement potential from other private actors, mainly farmers, to carry out anticipated compensation measures under the eco-account under nature conservation legislation (in order to trade the eco-points that will be attributed to them).

An example that can serve as an illustration of the anticipated compensation measures carried out is the transformation from cultivated land into extensive grassland on a lot in the scale of 11.518 m² in Rheinbischofsheim, an administrative entity of the city of Rheinau. To re-create a natural grassland layers of hay and flowers that are cut on local species rich grasslands were applied to the bare soil.

This compensation measure, aiming at improving several assets simultaneously (soil, water, biotope and specific species), was attributed 416 246 eco-points and was used to compensate impacts in the municipality of Ottersweier (Raststatt district) in the scale of 396 758 eco-points. Ottersweier which took already part in the pilot project in 2008, developed a land development plan in 2012 identifying an area of about one hectare to set up the house development project “Lindenbuckel-Falkenreben”. Whereas certain impacts from the development, especially species- and biotope-related impacts, were offset directly in the municipality itself, the price of land within the municipality on which restoration of the soil function could have taken place was too expensive. Therefore, buying an anticipated compensation measure from the “Stiftung Naturschutz” was a more cost-effective way to compensate for the residual impacts within this impact category.

The specificities of this case example consist in the following two points: Firstly, in the trading of eco-points across districts’ and administrative regions’ borders: the identification of a cost-effective compensation measure was considered easier by crossing borders instead of searching within the same administrative district; secondly, a municipality appears as “client”, i.e. the developer, using the eco-account under nature conservation legislation to compensate for its residual impacts.

Regulation analysis

Offset refers to an old tradition anchored in legal framework. Public regulation is dominating because the eco-account tool is a lawmaker’s creation to make the implementation of the IMR more operational. Consequently, it is a tool neither obtained by practice nor private regulation.

Nevertheless, we note a regulation mix. The mechanism implies agreements and rules, approval process... Moreover, public regulation applied to eco-accounts takes into account two dimension: a spatial one, which permits to distinguish offset in-situ and ex-situ, and a temporal one, which admits the compensation by anticipation.

The design of this mechanism is developed at two levels of regulation, at a federal level and at the landers level, and are complementary. Moreover, the diversity of implementation of the mechanism among landers create a lack of harmonization which is not corrected at the federal level.

At least, there is a three-part relationship: public authority (LNCA), public or private compensation agent, and the developer.

Two main differences between Banking and the CDC mechanism is that eco-points are fungible and there is no transfer of responsibility from the developer to the bank.

XI. IMPACTS OF ECO-ACCOUNT

4. Advantages

- **Economic aspect**

Even if it is not confirmed by interviews, it seems that using Internet tool led to decrease administrative cost via more time-saving procedures. Then, the introduction of a standardized evaluation model has increased the legal security and equal treatment and decreased costs in terms of time as former deliberative evaluations were replaced by quantitative approaches.

However, the organization of public debate and the promotion of operational tools implementing the IMR may increase financial costs for developers because the implementation of off-setting is more controlled than before.

Globally, the amount of financial means available for nature conservation does not seem to have increased since the introduction of the eco-account schemes, but interviewees confirmed that the efficiency of using available means increased due to a better targeted investment in nature conservation offering higher benefits for biodiversity⁴²⁶.

- **Ecological aspect**

Since the introduction of the eco-account under nature conservation law private actors and municipalities adopt a more positive and nature conservation oriented approach by recognizing advantages of the eco-account scheme. However, the eco-account under the nature conservation law does not yet fully work as a habitat bank: the implementation of most of the compensation measures in the eco-account registry only starts once the compensation measure has been attributed to an impact. In most cases, this does not appear to be a strong incentive leading to an early implementation of compensation measures. Nevertheless, the ecological efficacy of compensation measures carried out via the eco-account may be better secured, in comparison with traditional compensation measures, by the requirement for compensation agents to provide information on the state of the compensation measure and its value in eco-points when it gets attributed to an impact⁴²⁷. The benefits for biodiversity

⁴²⁶ For more details, consult: Mazza (L.), Schiller (J.), *The use of eco-accounts in Baden-Württemberg to implement the German Impact Mitigation Regulation: A tool to meet EU's No-Net-Loss requirement?*, Institute For European Environment Policy, A case study report prepared by IEEP with funding from the Invaluable and OPERAs projects, 2014.

⁴²⁷ *Ibid.*

promoted by the eco-account scheme is determined by two indicators: the impact-compensation-relation and the creation of habitat networks⁴²⁸.

As regards the ecological efficacy of the eco-account schemes, it seems that the eco-account have allowed implementing larger compensation measures that have been used to compensate a wider range of smaller impacts that would have been offset in isolation, with lower benefits to biodiversity. The legal framework encourages considering the potential to enhance existing ecological networks when choosing where to locate compensation measures, but in practice, the compensation registry does not provide information that would allow knowing the exact share of compensation measures that enhance an ecological network.

5. Disadvantages

One of disadvantages is the list of 63 protected species for which eco-points are attributed. Although special efforts to contribute to the conservation of endangered species are being “rewarded” under the eco-account, some stakeholders criticized that the list of species was too short, not scientifically sound and in particular that it fails to take into account the fact that some species might be very endangered locally. In addition, the umbrella organisation of nature protection groups in Baden-Württemberg claimed in 2009 that the evaluation model is overly focused on habitats and that species protection is not treated in a satisfactory manner. It suggested that biodiversity be granted more importance in the eco-account regulation⁴²⁹.

6. Long-term maintenance and monitoring of compensation measures

“According to literature, at the beginning of the 1990s, a range of studies suggested that there was a deficit in the implementation of compensation measures, especially in the building sector. The 2009 amendment introduced the notion of “relevant required period” by attributing the long-term responsibility for compensation measures to the developer. In principle, legislation clearly foresees the monitoring of compensation measures and the implementation of necessary long-term maintenance measures by competent authorities, which may require developers to submit a report on the matter. In addition, the 2002 amendment to the Federal Nature Conservation Act adopted a paragraph allocating legal competencies to the federal states to regulate further the maintenance and safeguarding of compensation measures. The legal frameworks regulating the control and monitoring of compensation measures, including different types of controlling before, during and after the

⁴²⁸ *Ibid.* Authors precise: Concerning the impact-compensation-relation: one compensation measure is attributed to 1,56 impacts and suggests that the eco-account scheme results in the implementation of larger compensation measures that may be used to compensate a wider range of smaller impacts that would otherwise have been offset in isolation, with lower benefits to biodiversity. In addition, such larger compensation measures can be better and more cost-effectively monitored in the long-run than a disparate range of smaller, on site compensation measures. Concerning creation of habitat networks: the creation of habitat networks and wildlife corridors is anchored in the Federal Nature Conservation Act 2009 stating that at least 10% of every federal state’s surface should encompass habitat networks. In the context of the IMR, the Federal Nature Conservation Act defines that when identifying land to implement compensation measures, the potential of the land to help re-connecting habitats should be considered. The eco-account regulation does not refer explicitly to habitat networks. In certain cases, where an overall compensation concept has been developed, the objective of contributing to the enhancement of a wider habitat network is achieved. Some interviewees considered that compensation in the context of the eco-account should remain flexible enough to accept compensation measures that do not contribute to an enhancement of the wider network, as this criterion will not always be easy to fulfil.

⁴²⁹ *Ibid.*

implementation of compensation measures, thus differ from one Land to another and are relatively vague. On the ground, it seems that longer-term monitoring has been carried out (at least) to a limited extent where local actors have assumed responsibility and shown interest in the long-term success of the compensation measures (e.g. municipality of Steinach/Baden, municipality of Ottersweier, district office Offenburg).

At present, monitoring is insufficient and sanctions appear to have been only very rarely applied. The persistent barrier of limited resources available for long term monitoring in public authorities (in this case more specifically the lower nature conservation authorities) is likely to continue to be an issue. The transparency offered by the compensation registries may help overcome this problem by creating the possibility for environmental NGOs to become more active in the field of auditing compensation measures and checking that they delivered what was promised, but there is no formal process in place for such a role at the present stage⁴³⁰.

Impact of eco-account scheme

The mechanism presents some advantages. As in France and U.S.A., the long-term mechanism permits and efficacy of the scheme.

The mechanism seems to be efficient because the introduction of a standardized evaluation model has increased the legal security and equal treatment and decreased costs in terms of time as former deliberative evaluations were replaced by quantitative approaches.

The mechanism presents an effectiveness, because since the introduction of the eco-account under nature conservation law more and more actors, especially private actors, but also municipalities adopt a more positive and nature conservation oriented approach by recognizing advantages of the eco-account scheme. This is also a strong ecological advantage.

The ecological efficacy of (anticipated) compensation measures carried out via the eco-account may be better secured, in comparison with traditional compensation measures.

The mechanism also produces:

- an economic efficacy.
- transparency and fairness of the compensation measures.
- additionality of compensation measures.
- higher benefits for biodiversity because effectiveness of using available means increased due to a better targeted investment in nature conservation
- the eco-account under the nature protection law have allowed implementing larger compensation measures that have been used to compensate a wider range of smaller impacts that would otherwise have been offset in isolation, with lower benefits to biodiversity.

Disadvantages of such mechanism is that monitoring is insufficient and sanctions appear to have been only very rarely applied. This could attempt to effectiveness of eco-account scheme. We could also ask if the fungibility of eco-points could attempt to the preservation of endangered species.

XII. KNOWLEDGE

⁴³⁰ *Ibid.*

Globally, analyzing both advantages and disadvantages of eco-account schema, we can note some dysfunctioning in the collection of knowledge, both due to practice and public regulation:

- habitats/species alongside soil and water quality. Those three areas have been chosen due to historical experience and methodological operability whereas other areas like the evaluation of landscape appearance have not yet gone beyond a qualitative evaluation approach.
- restricted list of acknowledged compensation measures is also thought to have a number of benefits, for example that LNCAs and planning offices can make the system work with fewer human resources: the longer and flexible the list, the more time and resource intense the approval process would be. In addition, a restricted list contributes to ensuring additionality because it restricts the scope of measures that are accepted as compensation measures to those for which additionality can be clearly demonstrated.
- A list of species was too short, not scientifically sound and in particular that it fails to take into account the fact that some species might be very endangered locally.

CONCLUSION

The German concept of land-development offset is comprehensive; it is universal for all land and does not apply only to special areas. The program focuses on the ecological impacts instead of focusing on the amount of special land usage. The first priority is to reach a balance for every natural function in its current context (Balance here refers to the principle of “no net loss”? As in France and U.S.A. The second priority is to balance each function with another function in the same context (or with the same function in another context). The integrated compensation measures, which combine compensation and substitution, are considered to be a comparatively developed mechanism in the world.

Compensation measures, not only restores land use but also focuses more attention on the sustainability of the entire ecological system, including biodiversity, the quality of human life, and other conditions regarding the co-existence of societal and ecological systems.

General conclusion

I. Legal analysis results

The third part of the INVALUABLE project focuses on the role of law in the design and implementation of MBIs for biodiversity and ecosystem services, through the legal analysis of payments for ecosystem services (PES) and habitat banking.

Globally, the legal analysis shows that the role played by public and private regulation respectively in the design and implementation of MBIS can be assessed through a public intervention gradient rather than as a binary system of private and public MBIS.

Furthermore, even if each kind of MBI studied (PES on one hand, and habitat banking on the other hand) shows convergent analysis both on regulation and knowledge, each of them also revealed differences. This conclusion will highlight these variations.

A. First observations: a wide range of mechanisms for a same MBI

To analyse PES, we choose a broad definition and decided to take into account the “source mechanism”: landowner concludes an agreement with a third party and receives payment for a practice which generates ecosystem services. Even with this conception of PES, we noticed the heterogeneity of process⁴³¹. In Costa Rica and Indonesia, we observed a mix of regulation, even if public one was quite absent. In contrast, we noticed two extreme cases. On one side, the Vittel case in France which perfectly shows the success of a PES without any public intervention. On the other side, Belgium which choose a subsidies mechanism based on public regulation. The analysis of habitat banking leads to same conclusions. Whereas France proposes a mechanism developed without changing the law, U.S. and Germany report to strong legal framework.

The analysis of the role of law toward knowledge used in such MBIS was less intermediate, even if the French Vittel case appears as an exception. In general, case studies shows that a strong intervention of public regulation in the collection, the circulation and the introduction of knowledge in process developed within MBIS can be useful to ensure the success of the tool.

Globally, there is not one kind of process or model for habitat banking nor PES which allows to claim that predominantly public regulation is the *sine qua non* condition for efficacy, efficiency and effectiveness of such MBI. In the same time, it is difficult to say that private regulation is the key for success of MBI.

To solve this ambiguity, it seems to be necessary to cross over the binary logic which opposes private and public and to think under a gradient logic. Before explaining in what such gradients consist in, we choose to explain first how we get them.

A. Why a two-gradient logic?

⁴³¹ Confirmation avec : atelier Psmix : doc synthèse de publi envoyé par A. Karsenty

To understand gradients observed from the analysis of case studies, it is important to briefly resume the balance between regulations within each MBI. The next table sums up them:

MBI	Public regulation	Private regulation	Effect ⁴³²
PES Indonesia	Low	High	Low
PES Costa Rica	Low	High	Low
PES France	Low	Very high	High
PES (MAE) Belgium	High	Low	High or Medium?
Banking U.S.	High	Low	High
Banking France	Low	High	Medium
Banking Germany	High	Low	High

This table only represent global observation of MBIS studied.

A second table, more complete, can enlighten on differences observed within MBIS about the degree of public authority intervention on one hand, and the degree of normative framework on the other hand. This last one refers to the degree of obligations created within the process, whether there is public or private regulation. This refers to the normative density.

MBI	Public regulation	Normative framework	Effects ⁴³³
PES Indonesia	Low	Low	Low
PES Costa Rica	Low	Low	Low
PES France	Low	Very High	High
PES (MAE) Belgium	High	High	High or Medium?
Banking U.S.	High	High	High
Banking France	Low	High	Medium
Banking Germany	High	High	High

This second table leads to firsts observations: low public regulation and low normative framework leads to low effects of the MBI, and high public regulation and high normative framework seems to lead to high effects to the MBI.

Crossing this table with the first one, another observation arises: high private regulation and high normative framework can lead to high effects of the MBI.

Consequently, the success of MBI seems not only depend on a balance between public and private regulation, but also a strong normative framework.

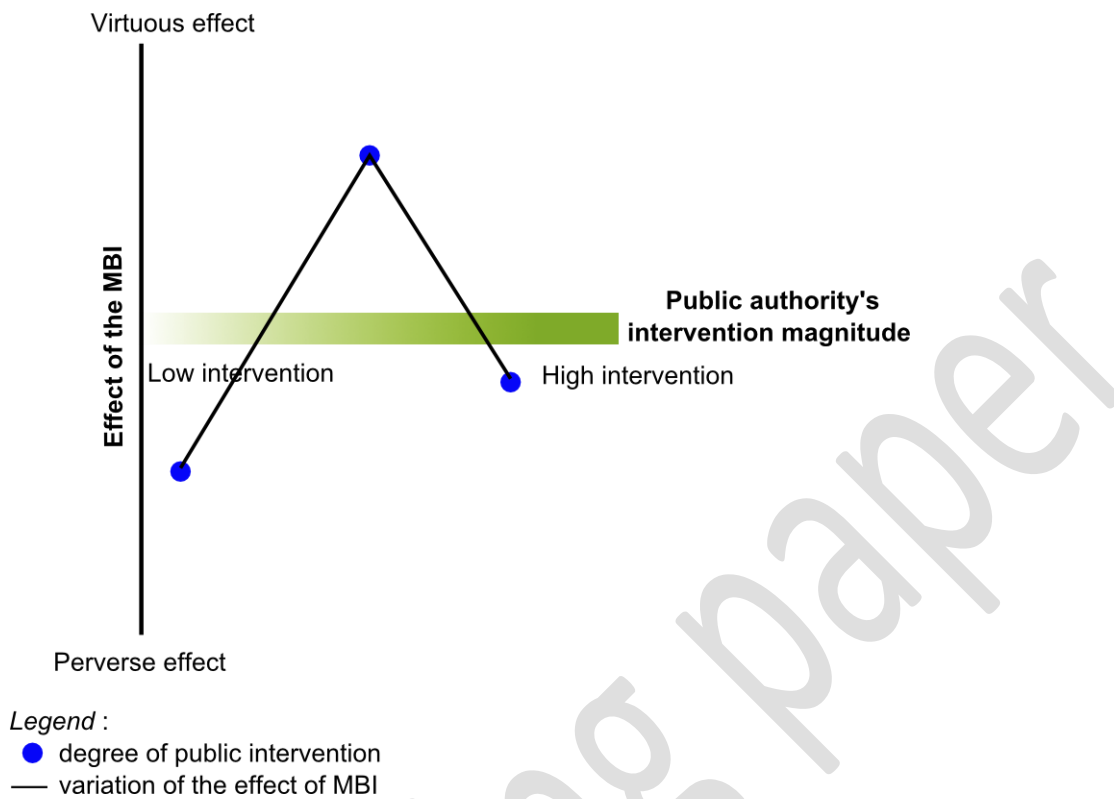
B. What a two-gradient logic consist in?

This balance can be expressed by to graphs:

⁴³² Economic, Social and Ecologic effects.

⁴³³ Economic, Social and Ecologic effects.

Public authority's intervention gradient



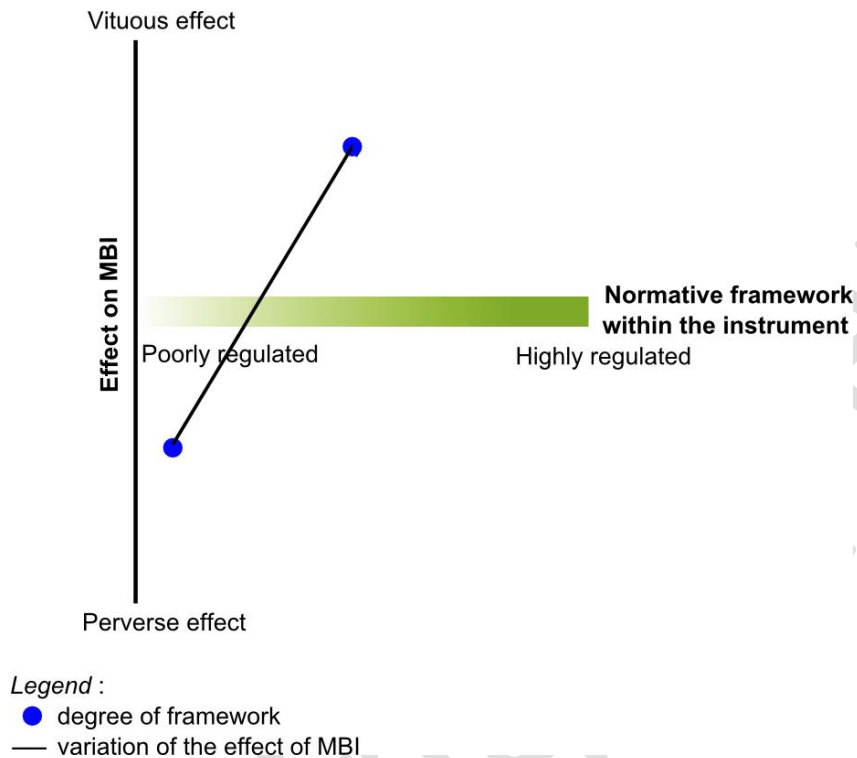
Graph 1 (simulation of variable intervention)

In this perspective, the gradient represents the magnitude (from the lowest to the highest) of public authority's intervention on process put in place within MBI. The interest and the originality of such model seems to be the potential of law adaptability. Indeed, this way of public authority action does not consist in framing an tool or its process as a whole, but intervening on specific aspects (*i.e.* "factors". See next developments) to ensure the success of the MBI.

The objective is to find the better ration public intervention / private intervention, according to local needs, contexts, socio-ecosystem practices...

This gradient logic emerges from the analysis of case studies, but we can wonder if it would not emphasise the emergence of a new form of law intervention.

Normative framework gradient



Graph 2 (simulation)

In that way, the gradient represents the magnitude (from the poorly regulated to the highly one) of normative framework observed within process put in place within MBIS. The interest and the originality of such model seems to be the effects corresponding to variability. This means that a strong framed MBI, including both strong process, knowledge taking into account, stakeholders... permit to conclude its successful.

However, it seems that social, economic or ecologic factors (*i.e.* “factors”. *See next developments*) also play a strong role in the final result.

The legal analysis then led us to understand the origin of such variations and the solutions to get better effect to MBIS. It appears that two kind of factors could intervene in effects. The first category refers to factors that affect the MBI result and on which public authority can directly act. The second category refers to factors that affect the MBI result but on which public authority cannot directly act.

The next part of this general conclusion will develop on this two categories.

C. Which key factors?

The first category is linked to previous first graph.

All along the legal analysis of case studies, some elements stand out. Their particularity is that they strongly influence the success of MBI. Some of them act upstream implementation of MBI and others downstream. Furthermore, we noticed that factors are linked to actors (stakeholders), knowledge and the monitoring of tool.

Actors are the first key factor of success of MBI. In Indonesian, Costa Rican and French PES case studies, we noticed the presence of intermediaries, whether directly in the contractual agreement between payer and beneficiary (Indonesia, Costa Rica), or around the relation in order to support it (France). Whereas in Costa Rica, the intermediary's intervention is not considered as harmful to PES, in Indonesia it is. Furthermore, it reveals the possible drift of such intervener. In contrast, the action developed by them in Vittel case has proved extremely profitable to the contractual relation and played a key role in the success of the tool. Those case studies also highlighted different levels of collaboration between stakeholders, from an open dialogue (France), to distorted information (Indonesia).

It results from the analysis that the implication of stakeholders in the process put in place within MBI involves profound effects on its efficacy, effectiveness and efficiency. This we can suggest that public authority could intervene on intermediaries engaged in the process (their role, their assistance mission...), on dialogue which takes place between stakeholders (through the strengthening of science policy interfaces, ensuring transparency of information, ensuring negotiations...).

Knowledge in the second key factor. In PES case studies in France and Costa Rica, and in habitat banking case studies in France and U.S., we noticed a significant difference in the taking account of knowledge in its broadest definition (scientific knowledge, experience on the ground...). Habitat banking accounts for an importance of scientific data, Costa Rican PES case study highlights a lack of knowledge, and Vittel French case constitutes the key example of the perfect matching between useful knowledge, be it scientific data or experience knowledge.

The place of knowledge is important because they play a strong role, upstream, in choose of spaces which can be subject of a PES of a habitat banking scheme, or in choose of stakeholders, or specific issues. Downstream, they lead to assess efficacy, efficiency and effectiveness of MBIS and the need to adjust practices.

Public authority could act on flow of information (knowledge mobilized...), data collection (through science policy interface...) and exploitation of data (crossing knowledge...).

Monitoring is the third key factor. French and Belgium case studies related to PES and German habitat banking account for an unequal monitoring on the implementation of MBIS. Whereas Vittel case study shows an ongoing monitoring from the design to the implementation of the tool, the Belgium case shows an insufficiency in the monitoring scheme at the stage of implementation. The eco-account scheme shows same problem. In those two last case, monitoring is insufficient and sanctions appear to have been only very rarely applied. However, it seems that an ongoing monitoring permits to adjust MBI to reach its effectiveness, efficacy and efficiency. The monitoring function can be assumed by a private authority (Vittel case), or a public one (Belgium and Germany), regardless of the MBI.

We can suggest that public authority take part to this monitoring system, upstream or downstream the implementation, to ensure its success

The second category is linked to previous second graph.

This second category cannot be totally under public regulation control. Indeed, factors behind it depends on a whole of circumstances more or less influenced by the law. They deal with ecologic, economic and social concerns and have a strong impact on actor's involvement.

The analysis revealed three factors which play a strong role in the success of MBIS, but on which public authority cannot act directly. The first one is the ecological concerns. The PES Vittel case in France and the habitat banking scheme in Germany show that a more positive and nature conservation oriented approach is possible from stakeholders and take part to the success of MBIS.

The second factor is the economic concerns. This factor is linked to stakeholders' economic situation. Clearly, it refers to their financial needs. In that way, a good payment can encourage them to get involved in the implementation of the tool.

The third factor is the social concerns. Belgium and Indonesian case study show the role of MBIS in stakeholders' education and socialization, and the collateral impact that it could produce on their family. This aspect is very important in the success of MBIS because it constitutes an extra motivation to join the MBI tool.

Public authority cannot act on those factors because they depends on more global economic, ecologic and social contexts. The action should take place at the stage of State's public policy and cannot be reduced to public authority's timely intervention on MBI.

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