Optimal ownership of a public project, an application to conservation concessions

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Abstract

This paper addresses the issue of the management of land resources which yield conservation externalities. It focuses on the impact of ownership of a project on the investment incentives of different parties, when the project generates non-excludable benefits. The main application is a conservation project, where a conservation NGO and a governmental agency make non contractible investments, which generate an opportunity cost that has to be paid to a third party, typically a local community, in order to prevent her from destroying the value of the public project. It is shown in this context that, contrary to the result of Besley and Ghatak (2001), it is not always true that the project should be granted to the most caring party. Indeed, in some cases, granting ownership to the least caring party allows both parties to tie their own hands and leads them to maximize their investments.

The results have some implications for studying the respective roles of governmental agencies, NGOs and local communities in the management and ownership of conservation concessions, which are an increasingly used tool for conservation in developed as well as developing countries. The insights of the model are applied to a conservation concession project on a communal forest in East Kalimantan, Indonesia.

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1 Introduction

What is the best way to manage land resources which yield conservation externalities? Up to recently, the traditional respond to this issue has been to establish national parks or conservation areas. However, this approach has revealed a number of shortcomings and is nowadays under question, from the point of view of academics, as well as of active conservation organizations. In the mean time, a trend towards privately owned conservation projects, by conservation NGOs, private landholders or even private firms (Earth Sanctuaries Ltd for example in Australia) has been observed, with various degrees of success from a conservation viewpoint. What is the current state of the debate? Are privately owned conservation areas likely to be a good substitute to national parks? In other words, what are the respective incentives of conservation stakeholders in these various configurations of ownership?

To answer that question, one can first look at the shortcomings of the national parks approach. The establishment of national parks entails at least a limitation of use rights by local residents and sometimes land appropriation and population resettlement. One frequent criticism of this approach is the political cost of limiting the property rights of landowners or residents. For example, Innes, Polasky and Tschirhart (1998) expose the drawbacks of the land appropriation approach on species protection in the US. This issue is even more dramatic in developing countries. Cernea and Schmidt-Soltau (2003) estimate that between 190 000 and 250 000 people were adversely affected by the establishment of national parks in nine countries of Central Africa, often without any compensation. This overtaking and negation of indigenous peoples' rights is ethically indefensible, and concern about forest dependant people livelihood is increasing.

Furthermore, beyond aggravating poverty among these highly exposed populations, this approach generally backfires on the security of the protected areas. The second critic of the State driven approach indeed concerns its efficacy. A recent report by WWF-Forest Alliance relates that only 1% of forest protected areas, most of which are under State control, can be considered as fully secure, and 60% are seriously threatened. The example of Brazil shows that even though indigenous people's rights have now been recognized on large areas of forest, their uses of the resource are largely prohibited. Meanwhile, no reliable monitoring system is provided for, and no adequate compensation is offered in exchange of these limitations put on their use rights. Local people thus exploit the resource illegally, selling for example mahogany to buyers for a fraction of its commercial price.

Such a State driven approach to forest management is under serious question today, from an ethical as well as an efficacy point of view. These critics also pertain to the general questioning of the logic of public provision of public good and a shift in economic policy leading to a retreat of the State from production activities.

Some authors (Ferraro and Simpson (2002), Ferraro (2001), Conrad and Ferraro (2000)) have presented the advantages of a contractual approach over public provision of conservation. Direct payment mechanisms aim at enabling those who benefit from environmental services to reward directly those who provide such services. Providers and demanders can be anyone, individuals or communities, NGOs or governments. Conservation payments are an increasingly used tool for conservation in developed as well as in developing countries. In Europe, 14 nations have spent an estimated $ 11 billion between 1993 and 1997 to divert over 20 million hectares into long term set aside and forestry contracts (OECD 1997). In the US, the Conservation Reserve Program spends about $ 1.5 billion per year to contract for 12-15 million hectares. In developing countries, and in particular in Central and South America where they have been pioneered by Conservation International, conservation concessions are a special case of this contractual approach. Under a conservation concession agreement, national or local authorities or local communities agree to protect natural ecosystems in exchange for a steady stream of structured compensation, which emanates from conservation NGOs, governments or any other investors, including private investors.

This contracting approach has two main advantages. The first concerns its efficacy. It has come clear that forest conservation, in the face of competing land uses, requires that local people obtain some direct or

indirect financial benefit from forest resources. This cannot be ignored by any regulatory policy. The contracting approach acknowledges the importance of taking into account the incentives of the local stakeholders for which conservation must be made more profitable than poaching or illegal logging in order to have a chance to be sustainable.

The second advantage derives from a direct application of the theory of public goods due to Lindahl and Samuelson. These contractual instruments are additional tools which allow various investors other than governments to invest in conservation. Conservation NGOs or other private investors value the project and they have a willingness to pay that should be taken into account in the public good provision decision. This is essential, if we consider that biodiversity is a global public good: a national government does not aggregate the World's preferences, so additional tools for better taking into account the preferences of the rest of the world are needed. A natural question that arises is then: how does this feed back on governments' incentives to invest.

The aim of this paper is then to study the role of public and private responsibility in conservation. Increased involvement of NGOs in conservation raises two main issues. The first is inherent to public good provision, and is due to the non excludability of the benefits generated by the investments of NGOs in biodiversity protection, which shall encourage free riding by the government. One can indeed wonder whether the increased participation of NGOs does not crowd out governmental participation. For example, in Indonesia, since 1997, the PKA's (the government agency for Nature Protection and Preservation) budget has decreased by 40%, while NGOs' involvement has been growing. The second issue is linked to the complexity of investments in conservation. There are many informational problems associated to the protection of biodiversity, because of biological uncertainty, natural variability or hidden private information. Moreover, there is an inherent difficulty in monitoring performance in conservation activities. All of this contributes to contractual incompleteness. The issue of investment incentives in a conservation project is then strikingly similar to the one addressed by the economic literature on property rights and incomplete contracts in the context of firms' organization. This paper will then apply the ideas from this literature to the context of conservation.

Contractual incompleteness and the free riding effect are hence two major forces shaping the structure of partnerships between NGOs and the Government in the provision of conservation. How are the investment incentives of the parties affected in this context? Contractual incompleteness and free riding reinforce each other and lead to underinvestment. Non excludability of benefits makes breakdown from cooperation in a conservation project attractive. This is the free riding effect. Meanwhile, as contracts are incomplete, agents cannot commit ex-ante to any investments levels, so that they can easily walk away from negotiation. Contractual incompleteness also leads them to underinvest since some of the return of their investment will be dissipated during the bargaining over the surplus generated by their investments.

However, there is something specific to conservation projects: local stakeholders exert a pressure on the value of the project. If investors free ride, so that local stakeholder do not receive sufficient compensation, conservation is not made an attractive option to them, and the land ends up being converted (illegally or not) to agriculture or logged down. Local stakeholders have the ability to destroy the conservation benefits of the project to the investors. The existence of this opportunity cost of conservation, which is observable, will then be another major determinant of the optimal allocation of property rights over the project. It constitutes an additional instrument, which affects (negatively) the negotiation break down payoffs and hence the incentives of the parties to invest in conservation.

The aim of the paper is then to study the role of property rights in this situation. The general question is: What is the optimal ownership structure of an asset, when the value created by the investments constitutes a public good, in other words when disagreement payoffs are affected by the nature of externalities generated by the investments of both parties? Investments affect break down payoffs (and hence incentives to walk away from the relationship) not only through the private cost of investment, but also because of the nature of externalities they generate. In the case of a private good, granting ownership to a party is the best way to induce her to invest, because she will get the full benefit of her investment. This may no longer be true with a public good because benefits are not excludable, so that ownership loses this positive incentive effect.

The property rights issue in the context of incomplete contracting when public goods are concerned is studied in section 2 through a review of the literature. Section 3 presents the model. The main conclusion of the model is that, contrary to what has been stated in the preceding literature, it is not always optimal to grant ownership of the project to the most caring party. In some cases, allocating ownership to the party which has a lower valuation for the project allows both investors to tie their own hands and maximize their investments in conservation. The insights of the model are applied to the case of conservation concessions in section 4. Section 5 concludes. The appendix provides for a numerical example of a conservation project with two investors: a conservation NGO and a governmental agency. There always exists a transfer such that the optimal ownership structure is reached, since it is the efficient one. Yet, the example provided tackles the question whether the parties have enough incentive to reach the efficient ownership structure, in the absence of an additional transfer between them.

2 Review of the literature

The relation between asset ownership and investment incentives in a private good context has been largely investigated, in particular by Hart and Moore (1990). These authors consider a situation where two agents make complementary investments in a relationship-specific asset. Ownership of the asset allows the agent to exclude others from the use of the asset. The distribution of property rights over the assets determine the bargaining power of the agents over the returns to investment which enhances the productivity of theses assets, which in turn determines the incentives to invest. Only the owner gets the full return of his investment, while the others under invest because some of the return of their investment is dissipated during the bargaining process. Asset ownership raises the outside option of the agent: if the agent-owner walks away from the negotiation, he gets the full benefits of his (and other players') investments, while the others get zero. Asset ownership of a private asset always increases the bargaining power of an agent in surplus sharing, and thereby raises his investment incentives. The agent whose investment decision is the most important should always own the asset he works with.

Besley and Ghatak (1999, 2001) extend the issue of optimal ownership of an asset to the case of a public good. Ownership of the asset hands over the owner the decision to continue or to abandon the project in the case negotiation breaks down. This definition will be adopted in the present paper. Besley and Ghatak (2001) consider that the outside option (or equivalently the disagreement payoff) is higher for the owner than for the non owner. A key assumption in their model is that the marginal return to a given type of investment is higher in the event of disagreement when the party that made this investment is the owner. Following Hart, Shleifer and Vishny (1997), this assumption can be interpreted as saying that part of the return of the investment of a player is embodied in her human capital and cannot be realized if she is fired. In this context, asset ownership, as in the case of a private good, increases the bargaining power of an agent, and hence his investment incentives. It should then be allocated to the agent who values the project more. With transfers being possible between the parties, granting ownership to the highest valuation party raises the marginal returns to investment of all players. Nevertheless, assuming that the outside option of the owner is higher than the outside option of the non owner presumes that part of the benefits is excludable, which does not fit with the case of a pure public good.

The impact of asset ownership on investment incentives in the case of a private good and in the context described by Besley and Ghatak (2001) is the following: ownership of an asset bestows a greater outside option on the owner, and a greater outside option means a higher bargaining power in surplus sharing, and hence higher incentives to invest. However, these two positive relationships: between ownership of an asset and outside options of the owner; and between outside options and higher investment incentives; may fall apart when a public good is concerned.

A public good is defined by the non excludability and non rivalry of the benefits it generates. If benefits are not excludable and non rival, an agent can walk away from the relationship and still enjoy the benefits of his, and (more importantly) of his partners' investments. The outside option is then positive for all players (whereas

the outside option of an agent who does not own a private good is zero because there is no benefit he can capture). Investment in a public good benefits to all agents and increases all agents' default payoffs. The first consequence of this is that the positive relationship between asset ownership and higher outside option (and higher bargaining power) of the owner falls down. Since costs are, contrary to benefits, excludable, when the owner has to bear more costs than the non owner (which is likely), the relationship can even be reversed: asset ownership may decrease the default payoffs. The second consequence is to break the positive relationship between a greater outside option and investment incentives. With non excludable benefits, a higher disagreement payoff means a higher incentive to free ride, rather than to invest.

The core of the problem here comes from the fact that default payoffs are positive, what induces players to free ride. One way to decrease incentives to free ride is then to cut down default payoffs (see Matoushek, 2001). Default payoffs are minimized when parties can commit to abandon the project in the case negotiation breaks down.

A conservation project generates an opportunity cost for local stakeholders, which corresponds to the forgone development revenue of the land (in agriculture or logging). If local stakeholders are not compensated enough, they may use the asset (the land) in this alternative way, which actually destroys the conservation value of the project. This amounts for a third party (the local stakeholders) to exercising an outside option and annihilate the value of the default payoffs of the conservation parties, when the latter were unable to make conservation attractive to her.

One way to decrease the default payoffs of investors in order to increase their investment incentives is then to rely on the (often de facto) right of a private party to use the project in an alternative way that destroys the public value of the project. How can this commitment be made credible? One way is to allocate ownership to the low valuation party, since the threat of termination is credible when in her hands. This would mean that it may be socially more efficient for investors to tie their own hands by delegating the project to the least interested party, what allows them to sharply decrease their break down payoffs and increases their investment incentives. Another source of credibility is the power of the private party to destroy the public project. This actually would reinforce the argumentation of those who call for the strengthening of the rights of local people and the advocates of community based forest management.

3 The model

There are two players: the two investors in the public project: the government (G) and the NGO (N). The project is ''public'' in the sense that the benefits it generates, once G and N have invested, are non rival and nonexcludable to G and N.

The project generates an opportunity cost, B which is borne by the local users of the resource. This drives the investors to pay a cost in order to ensure the compliance of this third party. It is a compensation for the compliance of a party who does not care about the public value of the project and who is able to destroy its value. In the example of a national park, it can be interpreted as the cost which has to be paid to prevent poaching or illegal logging. In the case of a conservation contract, it is the compensation for the lost development revenues.

Timing:

At date 1, the players decide on the ownership structure. As in Besley and Ghatak (2001), it is considered that ex ante ownership provides some form of credible commitment to maintain the ownership structure ex-post. (Since parties will choose the joint-surplus maximizing ownership structure, it is in their interest to make such an ownership commitment. Besley and Ghatak (2001) consider that one way to do so is to consider a design phase at the first stage of the game in which the owner undertakes certain actions which require his continued presence until the completion of the project.)

There are two possible ownership structures: ownership by G, ownership by N.

At date 2, the two investors realize their investments. Let $Y=(y_{G},y_{N})$ denote the vector of investment decisions. These investments are sunk and cannot be changed.

Investments generate a non-verifiable cost: $C(y_{i})$. Dealing with conservation, this could correspond to the cost of the resources affected to the protection or the restoration efforts of the area (reintroduction of particular species, amelioration of the water supply, effort for the prevention of fire or salinity...). There is a quality dimension of these efforts which is not contractible. The size of these investments has also an influence on the amount of the opportunity cost: $B(y_{G},y_{N})$, which has to be paid to the third party.

At date 3, G and N bargain over whether to continue with the project. Transfers (between G and N and the transfer to the private party) are realized at this stage. If the private party does not receive any, or sufficient transfer, she exercises her outside option, which destroys the value of the public project.

The opportunity cost is paid at this last stage of the game; whereas the other investment costs are paid in period 2 and are sunk at date 3. However, the size of this cost is determined by the decisions taken at date 2.

As usual in the incomplete contract literature, the levels of investment in the project cannot be specified ex-ante. They cannot be guaranteed by an up-front payment. Following the incomplete contract literature, I consider that the parties bargain over the surplus once the investment is sunk using Nash bargaining, and the choice of investment depends upon the share of the surplus received by the investing party, who can here be either one of the two investors.

The ownership structure is important in defining the default payoffs in stage 3 because it affects the size of the investments at date 2, the size of the opportunity cost, and who has to pay for it.

As in Besley and Ghatak (2001), it is assumed that the owner has the residual control rights. Ownership determines who chooses to go ahead with the project in the event negotiation breaks down: the owner decides whether to continue or to stop the project. This gives the owner some bargaining power, although this is balanced by the fact that she then has to pay the outside option, which decreases her disagreement payoffs and hence her bargaining power. The higher the disagreement payoff of a party, the stronger is her position in the bargaining game. The party that values the project more has a higher bargaining position, but is hurt more in case the project stops. She will then be ready to give a positive transfer to the low valuation party in order to secure provision of the public project in the cases where the low valuation party would prefer to stop the project, whereas the reverse is not true.

The two investors, G and N, value the project to different degrees. The respective valuations by the government and by the NGO are :

$\theta_{G}V(y_{G},y_{N})$ and $\theta_{N}V(y_{G},y_{N})$
where $\theta_{G}>0$, $\theta_{N}>0$ are the valuation parameters of G and N.

Without loss of generality, it is considered that the NGO values the project more: $\theta_{N}>\theta_{G}$

Assumption 1:

$V'(y_{G},y_{N}))\{\partial y_{G}\}>0$, $V'(y_{G},y_{N}))\{\partial y_{N}\}>0$,
with $V''(y_{G},y_{G})<0$

The appendix (available upon request from the author) presents the analysis for either substitute or complement investments.

θ_{G} and θ_{N} are supposed to capture the different preferences of the agents, and V is assumed to be symmetric with respect to both its arguments.

Assumption 2:

Because this public project is non excludable and non rival, each party benefits from the other's investment:
theta $_{G}$V($0_{,}y_{N}$)>0, and
theta $_{N}$V($y_{G,}0$)>0

This implies that the default payoff of the non owner is positive since he benefits from the other's investment without having to pay the opportunity cost.

Assumption 3:

The value of the opportunity cost is positively correlated and convex with the investment level of the two investors (for example the efforts made in water supply improvement, against fire or salinity, or more generally in restoration of the area will also enhance the agricultural value of the land):

What is more, B and its first derivative B' are assumed to be symmetric with respect to their two arguments.

Two things should be well understood. Firstly, the benefits of investment in terms of conservation and in terms of enhanced agricultural value of the land are mutually exclusive. Secondly, the benefits in land value are not externalities generated by the investments; they are rather what has to be bought off to the third part to ensure her compliance (in fact they do not come true because at equilibrium, the land is allocated to conservation and not to agriculture). This explains why B appears as a cost.

The first best level of investment is defined by:

Max$_{y_{G}, y_{N}}$ ($\theta_{G} + \theta_{N}$)V($y_{G,}y_{N}$) - C(y_{G}) - C(y_{N}) - B($y_{G,}y_{N}$),0]

The project is socially efficient when the public value of the project (minus the cost of investment) is higher than the private outside option.

In the absence of any contracting problem, the parties will choose the level of investments that maximize their joint surplus. The joint surplus maximizing level of investment by each party solves a Lindahl-Samuelson type rule.

However, when the parties do not take their investments decisions cooperatively, the owner follows the program:

Max$_{y_{i}}$theta $_{i}$V(y_{i}, y_{j}) - B(y_{i}, y_{j}) - y_{i}
s.t. $y_{i} \geq 0$

and the non-owner

Max$_{y_{j}}$theta $_{j}$V(y_{i}, y_{j}) - y_{j}
s.t. $y_{j} \geq 0$

We obtain the first lemma:

Lemma 1:

If investments are perfect substitute, the non owner contributes nothing and totally free rides on the owner of the project.

This leads to the first proposition:

Proposition 1:

In general, when the marginal opportunity cost is not too high, non cooperative investments levels are suboptimal. With perfect substitute investments, non cooperative investment levels are always suboptimal.

All proofs are omitted here and are contained in an appendix, available upon request to the author.

Underinvestment comes from the fact that each player does not internalize the positive externality of his investment on the other player's welfare. It is obvious that asset ownership decreases investment incentives, because the owner must bear the outside option alone. The two players must then agree on cost sharing to raise efficiency.

The model is solved backwards: the outcome of the bargaining game at stage 3 is anticipated by the agents and determines their investment incentives at stage 2. The bargaining game is solved first, and the study of the investment incentives follows.

3.1 The bargaining game

According to the timing of the game, each investor chooses her investment level at date 2. Then, at date 3, the two players bargain on whether to cooperate and share costs, with transfers being possible at that stage.

Ownership matters because it defines the default payoffs. Indeed, the owner of the project has to pay the opportunity cost, which corresponds to the outside option of the private party. The default payoffs are the payoffs the players receive in case negotiation breaks down. They are different according to who owns the project since the owner has to bear the opportunity cost. Another source of difference is the different valuations of the project by the players. In case of break-down in negotiation, the owner decides to go on with the project only if she receives a positive payoff after having paid for the opportunity cost. In that case, since she receives the benefits of the public good, without having to pay the opportunity cost, the other party receives a positive break-down payoff (denoted DP^i).

The players adopt Nash bargaining. They split their renegotiation surplus half, half, over the disagreement point.

The transfer from player j to player i, when i is the owner is:

$$t_{j}^{i} = [theta \_{j} - theta \_{i})V(Y) + B(Y) - DP^ j + DP^ i]/2$$

The idea is the following: When player N is willing to go on with the project alone, G cannot be induced to contribute, there is no transfer, G free rides on the NGO. When the disagreement payoffs of G and N are such that the NGO does not want to go on with the project alone, the government, if he wants the project to be completed, has to induce the NGO by giving her a positive transfer.

When G is the owner, the disagreement payoffs of both players are more likely to be zero, since G values the project less. In that case, the government terminates the project if he receives no transfer. Only the prospect of a positive transfer received from NGO can then induce G to invest.

These transfers are credible because the owner has a credible threat of termination in the configuration where those transfers take place. Transfers happen only if the owner has invested. If there is no transfer, the owner decides to terminate the project. It is hence in the other party's interest to keep his promise and give the transfer.

Since theta $\_{G}$<theta $\_{N}$, G is the low valuation party. When made the owner, G is less often willing to undertake the project alone than N is. N has to induce G to invest, in the cases where G would abandon the project whereas N would be willing to continue. This happens whenever the opportunity cost is higher than G's valuation and lower than N's. N can induce G to invest by giving him a positive transfer in the case he has invested. This transfer is credible. Indeed, in this range of values, if G does not receive any transfer, he does not go on with the project and the value of the project is destroyed. Concerning N, she gets sufficient utility from the continuation of the project in this range of values to be willing to give a positive transfer to G. Anticipating the positive transfer, G will invest at the second stage. In those situations, if N was the owner, she would undertake the project alone, and G would not participate.

Result 1: Public-NGO partnership occurs more often when the low valuation party is the owner, in the sense that it occurs under the same ranges of values of the opportunity cost than under N's ownership, and under all the additional values for which the NGO would have been willing to invest alone.

The anticipation of the outcome of this bargaining game determines the investment incentives of the agent at the preceding stage.

3.2 Incentives to invest under the different ownership structures

Three cases arise depending on the scale of the opportunity cost relative to the parties' benefits:

Case 1: When $B(Y)<\theta_{G}V(Y)$: the opportunity cost is smaller than both parties' valuations. Both parties value the project enough to be willing to go on with the project even if they are forced to proceed unilaterally.

Transfers are nil, the non-owner will always free ride on the owner and investment levels are suboptimal (they correspond to the non-cooperative case). NGO ownership is then the best solution, since the NGO values the project more and sets a higher level of investment in case she is the owner, than the Government does.

Proposition 2: When the opportunity cost is not so high relative to the project benefits that either the NGO or the government would want to abandon the project if it is forced to proceed unilaterally, allocation of ownership to the party who has the highest valuation is welfare enhancing.

Case 2: When $\theta_{G}V(Y)<B(Y)<\theta_{N}V(Y)$. The opportunity cost is situated between the two parties' valuations of the project. This means that the low valuation party would want to abandon the project if she was forced to proceed unilaterally, while the high valuation party would like to continue.

In this ''intermediary'' situation, G-ownership improves upon N-ownership. If N is the owner, she invests since $B(Y)<\theta_{N}V(Y)$. Knowing this, G cannot be made to contribute and then free rides on N. If, on the contrary, the low valuation party is the owner, the high valuation party has to make a positive transfer in order to induce her to internalize the positive externality of her investment on the high valuation party's welfare and thereby induce her to invest.

Allocating ownership to the low valuation party strategically compels both parties to participate, whereas only the high valuation party would invest if she was the owner, while the low valuation party would free ride. Affecting negatively the disagreement payoffs allows reaching a more efficient level of provision. By granting ownership to the low valuation party, the disagreement payoffs are nil in a larger number of cases, what compels both parties to come more often to an agreement on ex-post surplus sharing .

Lemma 2: When the opportunity cost lies between the two parties' valuations, allocating ownership to the low valuation party induces parties to cooperate and maximize the joint surplus.

The impact on parties' welfare follows:

Proposition 3: When the opportunity cost is such that only the high valuation party would be willing to go on with the project if negotiation breaks down, low valuation party ownership is welfare enhancing.

Case 3: When $(\theta_{G}+\theta_{N})V(Y)>B(Y)>\theta_{N}V(Y)$. The opportunity cost is so high relative to each party's benefit, that neither the NGO and the government would want to proceed with the project unilaterally. Still, it is low enough that the project is socially desirable: in that situation, the investment incentives of both parties are identical under either ownership structures.

When N is the owner, she invests if there is a positive transfer from the government to the NGO. When G is the owner and invests, there is a positive transfer from N to G.

The players have to cooperate in order to reach a positive level of investment. Who owns the project does not affect the level of investment; it only determines who makes the transfer. Corollary: In the case where the opportunity cost is so high that neither party would go on with the project if forced to proceed unilaterally (but still low enough so that provision is socially desirable), the ownership structure is irrelevant.

4 An application to conservation concessions

The ideas developed in this paper shed some light on two very actual issues. The first issue concerns the relevance of establishing conservation projects negotiated directly between conservation NGOs and private landholders; and the main message is that these ''direct'' deals may induce free riding from the government and thereby drive away from optimal investment levels. The second issue is related to the debate on local communities' empowerment and on devolution of ownership rights to communities. The main message is here that these two approaches have very different implications on the investment incentives of conservation investors.

4.1 The impact of conservation concession deals on investment incentives

The model developed in this paper can encompass most of the regulatory instruments used in conservation. Land appropriation and the establishment of national parks would fall in what was considered as case 1: the government is the owner and provider of conservation and the NGO does not intervene. Conservation contracts between NGOs and States would fall in the ''intermediary case'': G owns the project, and N is the initiator of the project and provides a transfer to G. Conservation contracts with private landholders or communities are a special case, where the third parties, which do not value conservation per se, remain the owner of the land to be protected. What is the impact of these new conservation tools on investment incentives of conservationists.

Conservation concessions are a contractual agreement, under which national authorities or local resource users agree to protect natural ecosystems in exchange for a steady stream of compensation payments from conservationists or other investors. They require a negotiated agreement between an investor and either a government or resource user.

In the case of a conservation concession with a State, the national government remains the owner of the protected area. This case corresponds to what is considered in the ''intermediary case'' of the model. The government would not undertake the conservation project by itself (otherwise a national park would already be in place), and is assimilated to the low valuation party. Conservation concession scheme allow some NGO, who values conservation more, to invest in order to create a conservation area on a land which would otherwise have been allocated to different purposes, logging for example. According to the results of the model, a transfer should be made from the high valuation party (NGO) to the low valuation one (the government agency) in order to induce the latter to invest. Existing conservation concessions arrange for such transfers. Some conservation concessions have for example been negotiated with the government of Guyana. In July 2002, Conservation International was granted a renewable 30 years Timber Sales Agreement to manage 80 000 ha of forest. The agreement involves payment of acreage fees and royalties comparable to an active timber concession. It also provides for other payments, namely aimed at community support, rangers training or monitoring, and which are assimilated as the non contractible investments in quality in the model above. Similar agreements have also been negotiated with the governments of Peru and Cameroon, and provide similar payments from the investing NGO to the concerned government.

A few conservation concessions have very recently been negotiated with communities. The Centre for International Forestry Research (CIFOR) has proposed to establish such a conservation payments scheme in

Setulang village in East Kalimantan, Indonesian Borneo. In Indonesia, communities have been awarded back their rights over their village forests during the decentralization process (revised basic forest law (UU41)). In many cases in East Kalimantan, rights have already been sold to logging companies, and forests turned into IPPK (Ijing Penabang dan Pemeringkan Kayu, the logging licenses). The village of Setulang has however resisted up to 11 offers by various logging companies to buy the rights over its 5 300 ha large village forest reserve to log it down. CIFOR has then proposed to offer some conservation payments to the community, through the form of a community-based conservation concession, in order to secure the conservation of this forest. The understanding of the proposal by CIFOR is that ''for an amount of money somewhat less than they are being offered by a logging company, Setulang people would agree to maintain the forest and to use it for non timber forest products extraction, limited timber for subsistence use and eco-tourism''. The proposal stated on a figure of US $ 30 000 ''to negotiate such a concession and make a conservation payment to the community for the first few years''.

The setting developed in this paper can help understanding the role of the different actors concerned by such a project: the local community, the conservation NGO and the (local) governmental agency; and the consequences of this configuration of ownership on the investment incentives of the investors in conservation. Let us reconsider the model of section 3 with the new roles of the three agents : the high valuation party N, the low valuation one G and the private party. The private party does not value conservation per se. It acts as an agent whose valuation parameter for conservation is 0. The NGO and the governmental agency still value conservation, with: $\theta_N > \theta_G > 0$. This assumption means that the villagers do not take into account the positive externality of conservation. The local government is more likely to take into account the externality of biodiversity protection, at least at the district level. That explains why the valuation parameter of the government is positive but lower than the one of the NGO, which is supposed to internalize the externalities of conservation at a higher scale than the government.

There are now three possible ownership structures: ownership by G, by N or by the private party. Establishing a conservation concession on a private land amounts to making the private party owner of the conservation project. The local community remains the owner of the protected area, and receives a payment from the relevant investors in conservation: NGOs, governments, or both.

According to the analysis developed in this paper, when a NGO negotiates a conservation concession directly with a community, G is inclined to free ride, which entails an efficiency loss. Indeed, if the NGO is the initiator of the project and decides to invest, the situation is identical to the case 1 of the model: the NGO invests as long as the benefits she gets from the project are larger than its costs, and the other party that values conservation less free rides. As investment is not contractible, no transfer can be made to G to induce him to invest. If the private party is the owner, G loses the threat of termination so that no transfer between N and G can be made credible. A transfer cannot be efficient either, since investments are not contractible. G then acts as a free rider.

However, there are some cases where a transfer from N to G may appear. Often, some specific investments are needed, which only the government is able to make. This is namely the case when security of land tenure is concerned. The biggest threat on the success of a conservation concession in most developing countries is indeed the insecurity of tenure rights. To come back to the example, Setulang village is in conflict with a logging company that illegally penetrates on its forest; and the situation with the adjacent villages is much tensed. The core of the conflict is the imprecise delimitation and recognition of the respective villages' forests, and the local government does not seem very eager on resolving the conflict. The security of protected areas cannot be ensured without the support and collaboration of the local government through its enforcement abilities. This amounts to saying that investments are complement: a specific investment by the government is necessary. Local governments in Indonesia, which are responsible for forest management since the decentralization laws, often back timer companies which represent fiscal (and often corruption-) revenues over conservation, which means forgone tax revenues. Although the central Government of Indonesia displays conservation objectives, the law is hardly enforced by local governments which seek to maximize their revenues and for which conservation is not an attractive option. The role of N if she wants a conservation project to be sustainable, is then to make conservation attractive to local governments. A transfer from the

investing NGO in order to induce the government to participate is needed. The question whether local governments should receive some money was a big interrogation during the design phase of the Setulang project. Some criticized this approach and claimed that it amounted to corrupting the local government. According to the insights of the model developed in this paper, this is not corruption, but rather a necessary transfer in order to induce the government to take a specific investment in the project. Without any transfer, the government will free ride.

If investments are substitute, only N invests in conservation and compensate the private party for its opportunity cost, while G free rides. If investments are complementary, there exists a possible transfer from N to G, that induces the latter to invest in conservation and share the opportunity cost with N. Hence, if G has some specific investments to make, notably in order to make property rights secure, a transfer from N is necessary (and cannot be assimilated to corruption).

The conclusion here is that establishing conservation concession on private land by conservation NGOs, without involving local governments, leads to the free riding of the government, what may raise serious concern if the government's investment is an indispensable prerequisite for the success of the conservation project. This namely appears to be the case when the rights of the local community are threatened by conflicts that involve other private parties, for example adjacent communities or loggers.

4.2 Some insights on local communities' empowerment

There is today a large debate concerning the rights of indigenous people on forest land. Facing the poor efficacy of State forestry management, from a point of view of poverty alleviation, commercial exploitation, as well as conservation, voices are raised to call for a community based management system. Securing and strengthening rural communities' forest rights do make sense, because it will certainly favour a longer term involvement of local communities toward a more sustainable management. What is more, as the possibility of exploiting the resources often exists anyway due to a poor monitoring system, the official recognition of rural communities' rights will avoid a number of conflicts and help alleviate some destructive behavior driven by insecurity. However, it seems that there is some confusion about the ways to get there: transferring or returning ownership of forest areas to the private ownership of rural communities, strengthening local use and management rights in public forests, community based management, or co-management etc. and the different consequences of theses approaches.

This paper argues that a distinction should be made between the devolution of ownership and the strengthening and recognition of local users' rights. The analysis takes as a prerequisite the necessity of acknowledging the users' rights and of offering compensation for any restriction of these rights in a conservation goal, should it be under either private or public ownership. Yet, it was shown that the control rights over the project should not lie in the hands of the private users. This means that the devolution of ownership rights to communities is not always the best solution as far as the objective of conservation is concerned. On the contrary, in some cases, granting ownership of the project to the government is the way to maximize investment incentives of both the conservation NGO and the government; keeping in mind that the recognition of the users' rights and incentives is a necessary condition for the success of a conservation project.

As a conclusion, although some may argue that local governments are an impediment to conservation, the solution here appears to be sometimes to increase the stakes and interest of governmental agencies in conservation, rather than trying to bypass them, especially if they have some specific investments to take. Indeed, securing conservation as well as community rights often needs a vastly expended capacity of the State to enforce law in forest lands to avoid invasions, squatting and illegal logging. In many countries, and particularly in Indonesia, the option is not whether occupation will continue or not, but whether such penetration will take place in an illegal and perhaps violent and chaotic manner, or instead the government will be willing and able to steer it in an orderly way. Neither NGOs, nor local communities can be relied upon for these conflicts to be avoided.

5 Conclusion

The model developed in this paper shows that the optimal ownership structure of a conservation project depends on the respective valuations of the project by the investors, and on the size of the opportunity cost it generates.

It predicts that negotiating conservation concession with States or with local communities have different implications. Negotiating a conservation concession with governments leads to a higher level of investment from both the government and the conservation NGO. However, it is an essential prerequisite for the success of a conservation project that local stakeholders' rights are recognized. Recognition and strengthening of local users' rights is indispensable, but ownership devolution to local communities might lead to underinvestment by governmental conservation agencies and hence to a lower level of provision of conservation.

6 Lead for future research

Delegating ownership to the third party may have larger implications than those exposed in the preceding section. One should also consider the investment incentives of the private party, in the case where she would be made an investor, with the investment made part of a contract. The increasing use of ''market based instruments'' in conservation are equivalent to the delegation of ownership to third parties, but also often delegation of \ the production of conservation. These ''market based instruments'' are conservation programs developed on private land, in which the private landholders sign a contract with the State or a NGO and are the one that undertake all the investments considered above as y_{i}. Conservation concessions do not exactly fit this case because they aim at the intact preservation of forest areas. But some other contracts account for some specific actions that private landholders should undertake in order to increase conservation. These contracts specify that the landholder receives a payment based on quality improvement, which could corresponds to the investments y_{i}, and is reimbursed his opportunity cost and some observable costs (for example fencing costs), which can be considered as part of B. This introduces a moral hazard dimension in the non observable effort. These contracts could then have a different impact on efficiency, according to their design, and this needs to be studied more closely. The impact on the community's incentives of a conservation contract and contract design will be the object of a future article. There are issues of moral hazard and risk sharing inherent to such contracts, which may have in turn some impacts on the investment incentives of conservationists. An integrated framework would be a very useful tool to study the relevance of different conservation tools to different institutional situations.

Bibliography

Aghion, P., Dewatripont M. and Rey P. 1994. Renegotiation Design with Unverifiable Information. Econometrica 62: 257–282.

Bardsley, P. 2003. Missing Environmental Markets and the Design of Market Based Instruments. Paper presented at the 6th AARES Symposium, Canberra ACT.

Besley, T. and Ghatak M. 1999. Public-Private Partnerships for the Provision of Public Goods: Theory and an Application to NGOs. The Development Economics Development Paper Series, LSE.

Besley, T. and Ghatak M. 2001. Government versus Private Ownership of Public Goods. Quaterly Journal of Economics, Nov 2001: 1343–1373.

Cernea, M., Schmidt-Soltau K. 2003. Biodiversity Conservation versus Population Resettlement: Risks to Nature and Risks to People. International Conference on ''Rural Livelihoods, Forests and Biodiversity Bonn'', Germany.

Chatty, D. 2003. Reclaiming Eden, Biological and Cultural Conservationism. Harvard International Review, Spring

2003.

Chiu, S. 1998. Noncooperative Bargaining, Hostages, and Optimal Ownership. American Economic Review, vol. 88 no. 4: 882–901.

Coleman, 1990. Foundations of Social Theory. The Belknap Press of Harvard University Press.

Conrad, J. and Ferraro P. 2000. Habitat Conservation: the Dynamics of Direct and Indirect Payments. Discussion Paper, Cornell University.

De Meza, D. and Lockwood B. 1998. Does Asset Ownership Always Motivate Managers? Outside Options and the Property Rights Theory of the Firm. Quaterly Journal of Economics, CXIII, 361–386.

Dewatripont, M. and Tirole J. 1994. A Theory of Debt and Equity: Diversity of Securities and Manager-Shareholder Congruence. Quaterly Journal of Economics, 109: 1027–1054.

Dixit, A., Grossman, G. and Helpman, E. 1997. Common Agency and Coordination: General Theory and Application to Government Policy Making. Journal of Political Economy, vol. 105, No. 45: 752–769.

Dobson, A. P. 1998. Conservation and Biodiversity, The Scientific American Library.

Durand, F. 1999. La Question Foncière aux Indes Néerlandaises, Enjeux Economiques et Politiques (1619-1942), Archipel, No. 58: 73–88.

Eswaran M. and Kotwal A. 1984. The Moral Hazard of Budget-Breaking. The Rand Journal of Economics, Vol. 15, No. 4 (Winter, 1984): 578–581.

Falaschetti, D. 1999. Golden Parachutes: Credible Commitments or Evidence of Shirking? Working Paper, Washington University.

Ferraro, P. 2001. Global Habitat Protection: Limitations of Development Interventions and a Role for Conservation Payments. Working Paper, Cornell University.

Ferraro, P. and Simpson D. 2002. Direct versus Indirect Payments. Land Economics.

Glaeser, E. and Shleifer A. 1998. Non-For-Profit Entrepreneurs. NBER Working Paper, November 1998.

Hart, O. 1995. Firms, Contracts and Financial Structure. Clarendon Lectures in Economics, Oxford University Press.

Hart, O. and J. Moore 1988. Incomplete Contracts and Renegotiation. Econometrica, Vol. 56, No. 4: 755–785.

Hart, O. and Moore J. 1990. Property Rights and the Nature of the Firm. Journal of Public Economics, vol. 98, no. 6: 1119–1158.

Hart, O., Shleifer A. and Vishny R. 1997. The Proper Scope of Government: Theory and an Application to Prisons. Quaterly Journal of Economics, CXII, 1119–1158.

Holmström, B. Moral Hazard in Teams. Bell Journal of Economics, Vol. 13, No. 2 (Autumn 1982): 324–340.

Holmström, B. and Milgrom R. 1997. Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership and Job Design. Journal of Law, Economics and Organization, 7: 24–52.

Holmström, B. and Milgrom R. 1994. The Firm as an Incentive System. The American Economic Review, 84(4).

Innes, R., Polasky S. and Tschirhart J. 1998. Takings, Compensation and Endangered Species Protection on Private Lands. The Journal of Economic Perspectives, Vol. 12, No. 3: 35–52.

IUCN, ''Management Effectiveness of Protected Areas'', June 1999.

Laffont J.J. and Tirole J. 1992. Privatisation and Incentives. Mimeo, University of Toulouse.

Maskin, E. and Moore J. 1990. Implementation and Renegotiation. Review of Economics Studies, Vol. 66, No. 1: 39–56.

Maskin, E. and Moore J. 1998. Foundations of Incomplete Contracts. NBER Working Papers, No. 6726.

Maskin, E. and Tirole J. 1999. Two Remarks on the Property-Rights Literature. Review of Economic Studies, 66, 139–149.

Matouschek, N. 2001. Information and the Optimal Ownership Structure of Firms. Discussion Paper, Northwestern University.

Scher, S., White, A. and Kaimowitz D. 2003. A New Agenda for Forest Conservation and Poverty Reduction: Making Conservation Markets work for Low Income Producers. 2003 Forest Trends.

Shleifer, A. 1998. State versus Private Ownership. Journal of Economic Perspectives, vol. 12, No. 4: 133–150.

Simpson, D. 2002. What is Biodiversity Worth? And to Whom? Resources for the Future, Issue Brief.

Stoneham, G. 2003. An Overview of the Ideas and Information Needed to Develop and Implement MBIs. Paper presented at the 6th AARES Symposium, Canberra ACT.

Tirole, J. 1999. Incomplete Contracts: Where Do We Stand? Econometrica, Vol. 67, No. 4: 741–781.