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Bridging the gap between forest conservation and poverty alleviation: the Ecuadorian Socio Bosque program

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ABSTRACT

The Socio Bosque program is a national conservation agreement scheme of the government of Ecuador. Socio Bosque consists of the transfer of a direct monetary incentive per hectare of native forest and other native ecosystems to individual landowners and local and indigenous communities who protect these ecosystems, through voluntary conservation agreements that are monitored on a regular basis for compliance. Two years after its creation, the program now includes more than half a million hectares of natural ecosystems and has over 60,000 beneficiaries. The characteristics of Socio Bosque make it a good example of a national conservation agreement scheme from which important lessons can be drawn: it is part of a clear government policy, combines ecosystem conservation with poverty alleviation, incentivizes and monitors local socio-economic investment, is transparent and straightforward, and has generated nation-wide participation of local and indigenous communities and farmer households. Socio Bosque furthermore sheds light on how benefit sharing mechanisms for national REDD+ strategies could work in practice.

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1. Introduction

Direct payments for the conservation of ecosystems have become increasingly popular (Ferraro and Kiss, 2002). Especially well documented is the concept of Payments for Ecosystem Services (PES) (Bishop et al., 2009; Engel et al., 2008; Farley and Costanza, 2010; Kemkes et al., 2010; Wunder, 2005; Zabel and Roe, 2009) and the literature on PES offers important insight in issues related to conservation payments. PES is considered a more direct way to achieve conservation goals than for example Integrated Conservation and Development Projects as it is more targeted and conditional on compliance (Landell-Mills and Porras, 2003; Ferraro and Kiss, 2002). PES has also been proposed as a response to the lack of effective command and control measures, failing market

mechanisms for positive externalities of certain types of land management and are considered an effective way to channel resources to traditionally abandoned rural populations (Corbera et al., 2009). The most common ecosystem services considered in PES schemes are regulation of freshwater flows, carbon storage, provision of habitat for biodiversity, and scenic beauty (Wendland et al., 2010).

Governments play an important role in regulating ecosystem services because public goods and benefits are involved. However, as the ecosystems that provide the services are often privately owned, policies should aim at supporting landowners to maintain the provision of services over time (Kemkes et al., 2010). Several examples of large scale government PES programs exist. In 1997, Costa Rica launched its program for payments to private landowners through

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multiyear renewable contracts paid by the national FONAFIFO fund (Arriagada et al., 2009; Miranda et al., 2006; Zbinden and Lee, 2005). Over the years the Costa Rican PES program has developed different modalities such as forest conservation, reforestation, agro-forestry, natural regeneration and forest management (Pagiola, 2008; Daniels et al., 2010). The accumulated area under the forest protection modality amounted to 650,451 ha in 2009 according to FONAFIFO (2010). Evaluations of the program have indicated that the program has contributed positively to forest retention and recruitment (Morse et al., 2009) but it has also been argued that effectiveness of the program could be improved by means of better spatial targeting, focusing stronger on areas with higher deforestation threat and importance for ecosystem services (Daniels et al., 2010; Sánchez-Azofeifa et al., 2007; Sierra and Russman, 2006; Wünscher et al., 2008).

Mexico's government program of Payment for Hydrological Environmental Services of Forests was launched in 2003 for areas of hydrological importance where other policies had been ineffective and is financed with water fees (Muñoz-Piña et al., 2008). After adaptive management the program now targets specific areas using criteria related to forest type, forest cover, deforestation threat, importance for hydrological services, and location in protected areas and priority mountains (Muñoz-Piña et al., 2008). With respect to poverty alleviation, it was observed that the program is successful in reaching an important part of the poorest population, but that for reaching the poorest of the poor special outreach is needed as this part of the population has less contact with government institutions (Muñoz-Piña et al., 2008). The Mexican program is a clear example of how in such national PES schemes technical arguments related to for example efficiency of the payments, need to be balanced with political (e.g., target population, equity, environmental goals), institutional (implementing capacity) and social (e.g., fairness, participatory processes, land tenure security) requirements.

China has some very large national PES programs, notably the Natural Forest Conservation Program (NFCP) and the Grain to Green Program (GTGP), which is also known as the Sloping Land Conversion Program (Bennet, 2008; Chen et al., 2009; Gauvin et al., 2009; Liu et al., 2008). While the NFCP focuses on forest conservation, the GTGP provides incentives for the conversion of cropland on steep slopes to forest and grassland in order to reduce soil erosion. Another example of a national PES program is the Working for Water Programme in South Africa that aims at the eradication of invasive alien plants in mountain catchments in order to restore biodiversity, improve hydrological functioning and alleviate poverty (Turpie et al., 2008).

The term PES suggests that ecosystem services can be well defined and valued, that payments are somehow related to the value of the services that are being provided and that markets exist (Corbera et al., 2009; Engel et al., 2008). In practice, this is frequently not the case and often payments are in effect for conservation activities rather than for concrete ecosystem services (Corbera et al., 2007; Vatn, 2010; Wunder, 2005) such as for example in several public conservation payment schemes where no services are directly traded. This leads Muradian et al. (2010) to define PES 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”. They categorize initiatives according to: importance of the economic incentive, directness of the transfer and degree of commodification. They typify the national public payment schemes of Mexico and Costa Rica described above, as having a relatively low importance of the economic incentive as there are other non monetary reasons that motivate conservation activities, a low degree of directness between providers and beneficiaries of conservation activities as it is the state that represents the beneficiaries, and a low degree of commodification as payments are based on conservation activities and not on market transactions. National government-financed PES programs are sometimes just called direct payments for conservation (Ferraro and Kiss, 2002; cited by Engel et al., 2008), which is terminology that can facilitate communication with potential beneficiaries as it does not generate the impression that commodities are specifically being valued and traded when this is not the case.

It has been recognized that public conservation payment schemes have the potential to not only address environmental issues but also contribute to poverty alleviation (Grieg-Gran et al., 2005). However, also reports exist of PES schemes that are not able to contribute as expected to poverty alleviation (Muradian et al., 2010). Corbera et al. (2007) and Pascual et al. (2010) indicate that in order to have pro-poor conservation payments, environmental efficiency and social equity have to be carefully balanced. For example, when only environmental efficiency would be considered small landowners who have little land to side aside for conservation or communities in remote places might be excluded from programs. For pro-poor programs equity in access to programs and in received benefits is key, as well as the role of the institutions to determine fairness criteria (Corbera et al., 2007; Pascual et al., 2010; Van Hecken and Bastiaensen, 2010). Without specific targets and measures included in the design, benefits do not necessarily reach the population that most needs support. Van Hecken and Bastiaensen (2010) argue that fairness should also be analyzed at the global level, as local and national payments schemes in developing countries often generate global benefits without receiving international support from free-riding wealthier nations.

In this paper we will describe a national scheme for monetary conservation incentives structured through conservation agreements: the Socio Bosque program of Ecuador. Conservation agreements are a transparent, voluntary, and participatory alliance, in which the owners or administrators of a resource agree to protect the natural value of an area in exchange for direct, ongoing, and structured economic incentives to offset the costs of conservation. In particular, the agreements specify a mutually agreed set of conservation actions, benefits, and criteria for monitoring to ensure transparent provision and fair distribution of benefits based on conservation performance (Gjertsen and Niesten, 2010; Niesten et al., 2010; Mora et al., 2010).

Socio Bosque is a national government program that transfers direct economic incentives to rural families and local and indigenous communities that voluntarily commit to comply with clearly agreed conservation activities. The program has quickly grown since its creation in 2008. It has

some specific characteristics that make it a good example of a national conservation agreement scheme from which lessons can be drawn. The program specifically has the objective to combine ecosystem conservation with poverty alleviation. For that reason it incentivizes and monitors local socio-economic investment. The program is transparent and relatively straightforward, and has generated nation-wide participation of local and indigenous communities and farmer households. Socio Bosque furthermore sheds light on possible benefit sharing mechanisms for REDD+. REDD+ is a suite of policies, institutional reforms and programs that provide developing countries with monetary incentives to reduce greenhouse gas emissions and enhance economic growth by halting or preventing the destruction of their forests. The acronym stands for Reducing Emissions from Deforestation and forest Degradation “plus” conservation, sustainable management of forests, and enhancement of forest carbon stocks. Socio Bosque is part of Ecuador’s national REDD+ strategy that is currently under construction, specifically under the component of incentive-based policies, in this case for the conservation of forests.

We will describe the technical design of Socio Bosque, the political decision making process, results of the program since its creation, the first conclusions that can be drawn from the program, implications for REDD+ and possibilities for replication.

2. The design of the Socio Bosque program

2.1. Political will and mandate, local experiences

Ecuador, with a total surface area of almost 26 million ha, has about 10 million ha of ecologically native forests left. These are forests with native species which are the result of natural succession, and include old growth forests as well as regenerated secondary forests. Such forests generate important ecosystem services, such as carbon storage, water cycle regulation and provision of habitat for biodiversity. Ecuador is one of the world’s mega-diverse countries, and counts with 18% of the world’s bird species, 18% of its orchids, 10% of its amphibians and 8% of its mammals (Mittermeier et al., 2004). Many of these species are associated with natural forests and other natural ecosystems. However, in a study based on information collected for the period 1990–2000, Ecuador’s deforestation rate was estimated at 198,000 ha a year (Sánchez, 2006) which is one of the highest rates in South America. Currently, this information is being verified and updated by the Ministry of Environment of Ecuador.

The national policy framework of Ecuador has a strong mandate to slow deforestation rates. The current national development plan (*Plan Nacional para el Buen Vivir*) has the specific goal to reduce deforestation rates with 30% until 2013 (SENPLADES, 2009). Other relevant goals in the national development plan are: decrease the ecological footprint so it does not exceed Ecuador’s bio-capacity by 2013; reduce poverty with 20–25% in urban areas and with 50% in rural areas by 2013 (SENPLADES, 2009). The plan also includes specific policies to protect biodiversity and water sources and

to promote the adaptation to – and mitigation of – climate change.

In this political context, in 2008, the Ministry of Environment of Ecuador (MAE), the governmental institution that has the main responsibility for complying with the environmental goals of the national development plan, became interested in the design and implementation of a national conservation agreement program with the double objective to conserve forests and alleviate poverty. In the country experience with conservation agreements already existed at the local level due to a pilot conservation agreement project with indigenous communities in Northwestern Ecuador. In 2005, three community centers named El Encanto, Corriente Grande, and Capulí of the indigenous Chachi people in Esmeraldas province, worked together with their Federation of Chachi Centers of Esmeraldas (FECACHE) and several conservation and development organizations to design and implement a conservation agreement. Through the agreement, a community conservation area was established of 7200 ha of tropical humid forest in one of the most biologically diverse and threatened regions of the planet, the Chocó hotspot (Mora et al., 2010). The voluntary agreement specified a direct annual payment for each conserved ha conditional on compliance. The local community centers decided to invest those resources in piped drinking water, medical supplies, education, creation of micro-enterprises, a community emergency fund, and salaries for community forest rangers.

This local experience and examples of national schemes for conservation payments in other countries formed the basis to start designing what is now known as the Socio Bosque program. Socio Bosque consists of the transfer of a direct monetary incentive per hectare of native forest and other native ecosystems to individual landowners and local and indigenous communities who agree to conserve these ecosystems, through voluntary conservation agreements that are monitored on a regular basis for compliance. The goals of the program as defined by MAE are: (1) protect over 3,600,000 ha of forest and other native ecosystems, thereby conserving globally important biodiversity, reducing greenhouse gas emissions from deforestation, protecting soils and water, and controlling natural disasters, (2) increase income and protect human capital in the poorest rural communities of the country, with a target group of between 500,000 and 1,500,000 people.

Design and political acceptance of the program at all levels of the government was relatively fast: the first design activities started around March 2008 and the program was officially established through a ministerial agreement in November 2008. The first agreements with beneficiaries were signed in December 2008. The program is being operated by the Ministry of Environment, which within its institution has created an implementing team for Socio Bosque with staff in the central office in Quito as well as in different regions of the country where promoters socialize the program and receive and verify applications. All costs of the program are covered by public funds, which are designated yearly by the National Secretary for Planning and Development (SENPLADES). The total budget for the first two years of operation amounts to US\$ 8.5 million, of which about 70% is directly for the incentives, 15% for monitoring, and the rest for other operational costs.

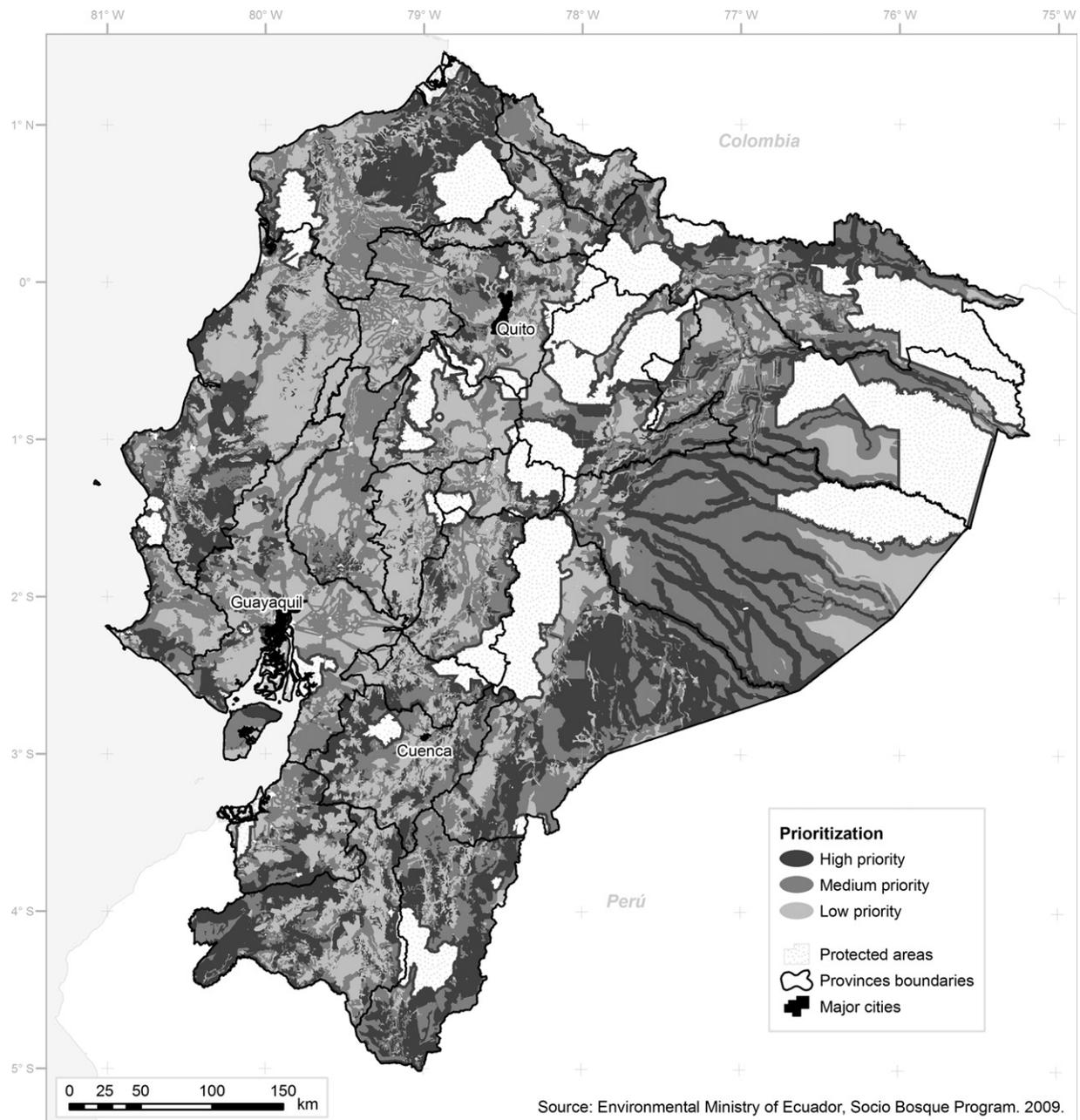


Fig. 1 – Map of priority areas for Socio Bosque.
Source: Ministry of Environment, Ecuador.

Table 1 – Incentive level table for Socio Bosque conservation areas.

Category	Range (ha)	Incentive level (US\$/ha/year)
1	1–50	30
2	51–100	20
3	101–500	10
4	501–5000	5
5	5001–10,000	2
6	>10,000	0.5

2.2. Spatial targeting

Spatial targeting of conservation incentive programs is important as it allows for obtaining multiple benefits in a more efficient way (Hajkowicz et al., 2008; Wendland et al., 2010; Wünscher et al., 2008). In the design of Socio Bosque a balance was sought between technical arguments for efficiency, and political and financial viability. Socio Bosque targets natural ecosystems that are privately owned. The land can either be communal land of indigenous or peasant communities or be owned by individual families in accordance with the national legislation on land tenure. Originally, Socio Bosque

only focused on native forests, of which about 6 million ha are privately owned (unpublished data Ministry of Environment Ecuador). From 2009 onwards, it also includes páramo ecosystems, which are native Andean high altitude grasslands, crucial for regulation of freshwater flows. About 0.5 million ha of páramo ecosystems are privately owned (unpublished data Ministry of Environment Ecuador).

Spatial targeting was done through a ranking system, using three main criteria: (1) deforestation threat; (2) importance for the three ecosystem services: carbon storage, water cycle regulation, and habitat for biodiversity; (3) poverty levels (Ministry of Environment of Ecuador, 2008). As a proxy for deforestation threat distance to roads and navigable rivers was used. Carbon storage was based on default values of the Intergovernmental Panel on Climate Change for above ground biomass of the different types of native ecosystems in the country. For water regulation, catchments areas were classified according to their importance for water provision to lower catchment areas. Importance of areas for biodiversity was defined on the basis of the relative percentage of ecosystems represented in the national protected areas system (lower percentages indicating higher priority). The indicator used for poverty was the unsatisfied basic needs index, which is available for Ecuador at the parish level, the lowest administrative division in the country. The resulting map, indicating areas with high, medium or low priority is shown in Fig. 1. Protected areas (indicated with the color white in Fig. 1) were originally excluded for implementation but in a later phase it was decided that families or communities that live within protected areas but have legal land titles from before the date of creation of the protected area, can also participate. Socio Bosque currently prioritizes implementation in areas with priorities 1 and 2, but can adapt its prioritization depending on the amount of applications.

It is recognized that the prioritization map is rather general, but the advantage is that it could be generated quickly on the basis of readily available information and by using transparent and easy to understand criteria. Over time the map can be improved when new information comes available, such as updates of the country's carbon map (Bertzky et al., 2010).

2.3. Incentive levels and duration of agreements

Two crucial elements of the program, incentive levels and duration of the agreements, were extensively discussed by policy makers and specialists. Different proposals were analyzed, such as differentiated incentive levels depending on opportunity costs, in order to avoid transferring more than necessary to prevent land conversion in some areas, or transferring not enough to be attractive in other areas (Wünscher et al., 2008; Pagiola, 2008). In some areas even without incentives deforestation might not take place because of lack of profitable alternatives or for cultural reasons as in some indigenous communities, thereby making additionality questionable. However, in practice opportunity costs have the disadvantage to be very variable in space and time and have high uncertainty in data-scarce situations. Furthermore, traditional opportunity cost calculations have limitations for the estimation of effective compensation as they do not take into account risk aversion of land owners (Benítez et al., 2006;

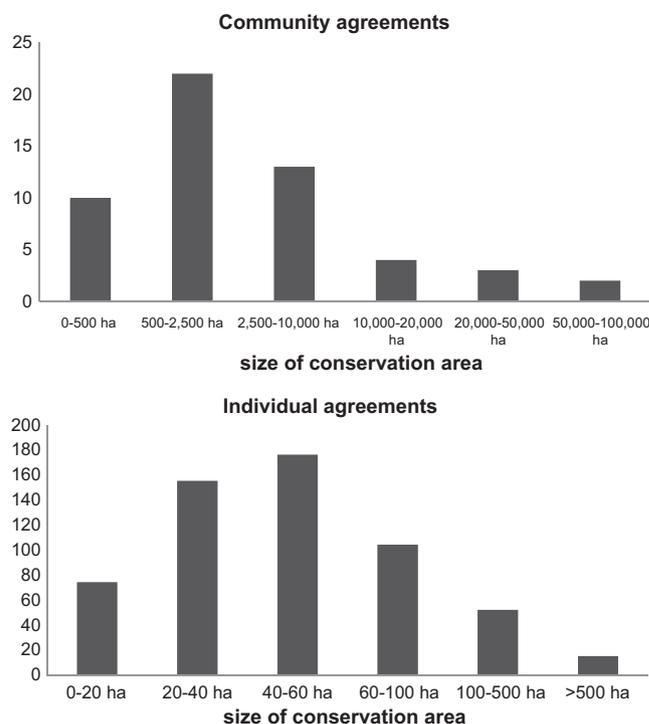


Fig. 2 – Distribution of number of conservation agreements over conservation area size classes, for agreements with communities and with individual families.

De Koning et al., 2007; Knoke et al., 2008). Also, an important objective of Socio Bosque is poverty alleviation, so financial efficiency or additionality were not the only criteria considered by the involved policy makers. They furthermore considered that different levels of incentives depending on the specific location of a landowner would be cause of intense social debate and would not be politically viable. Therefore, a transparent and simple system of incentive levels was defined that only depends on the size of the area put under conservation. Size was used as a variable to address social equity, as it corrects for very high incentives per family when individual farms are big or when communities have many hectares available per family belonging to the community.

For the first 50 ha of the conservation area, the incentive is US\$ 30 per hectare per year, from ha 51 to 100, the incentive decreases to US\$ 20 per hectare per year and decreases further for additional ha according to Table 1. For example, a landowner that enrolls 75 ha in Socio Bosque, would receive a total incentive of $50 \times \text{US\$ } 30 + 25 \times \text{US\$ } 20 = \text{US\$ } 2000$ per year. It should be noticed, that each participant of Socio Bosque can freely decide how many of the hectares of forest or páramo ecosystems that he, she or the community owns wishes to enroll in the program. In order to receive the incentive, the participants need to comply with the delivery of a social investment plan and comply with conservation obligations discussed below in Sections 2.4 and 2.5.

Duration was another crucial aspect of the conservation agreements. Policy makers insisted on long term commitments and defined that agreements should last 20 years, after

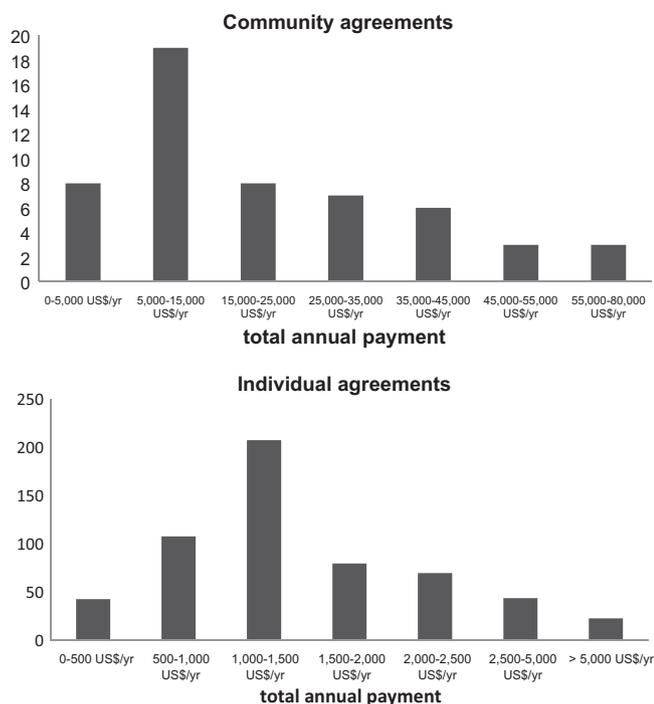


Fig. 3 – Distribution of number of conservation agreements over total annual payment classes, for agreements with communities and with individual families.

which they can be renewed. Although it was anticipated that such a commitment could be an obstacle for landowners, in practice most landowners do not consider this a reason for not applying.

2.4. Individual and community investment plans

The government is very clear about the importance for Socio Bosque to have direct and verifiable benefits for poverty alleviation and local development. A specific instrument was designed to guide and follow this process, called social investment plans. Each applicant to Socio Bosque needs to fill in a form that request basic information about how the applicant(s) are planning to use the monetary incentive. The applicants have the flexibility to use the incentive according to their needs and preferences but are guided among different categories of investment. The use of the investment plans in indigenous and peasant communities has the additional advance that it allows for more transparent decision-making processes related to communal land. Communities are requested to document the decision-making related to the application to Socio Bosque and the community agreements on how the use the incentive. They also have to show that their internal decision making procedures have been respected. The objective of these requirements is to reduce the risk that some community members are misinformed about the programs details or excluded from its benefits. The Socio Bosque program provides training to communities to strengthen their capacities for the preparation, implementation and evaluation of their investment plans.

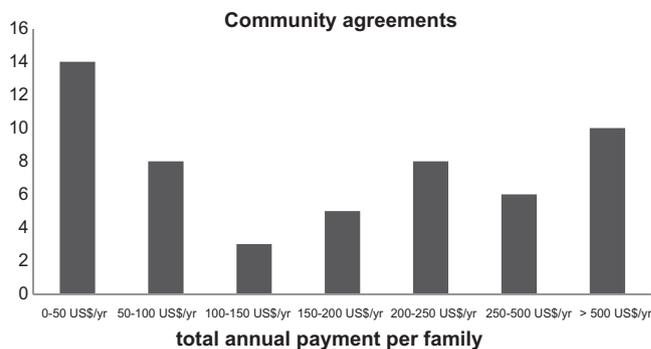


Fig. 4 – Distribution of number of conservation agreements over total annual payment per family classes, for agreements with communities.

2.5. Monitoring and consequences of non-compliance

A key aspect of any conservation agreement is its conditionality (Mora et al., 2010). This means that the conservation actions agreed upon in the agreement should be well defined and be regularly monitored. Details on conservation action

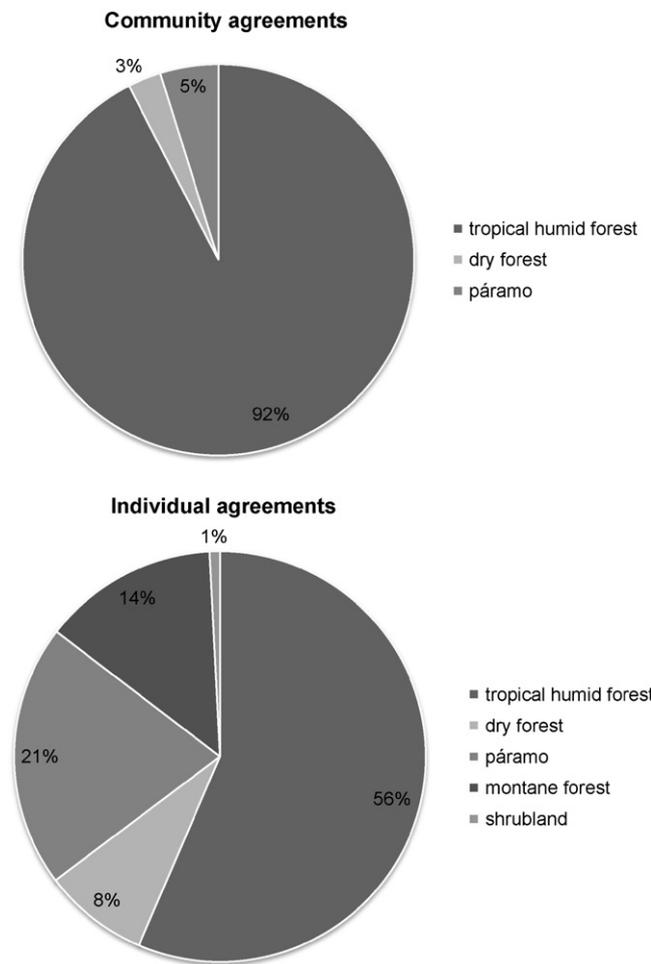


Fig. 5 – Distribution of conservation areas over main ecosystems, for agreements with communities and with individual families.

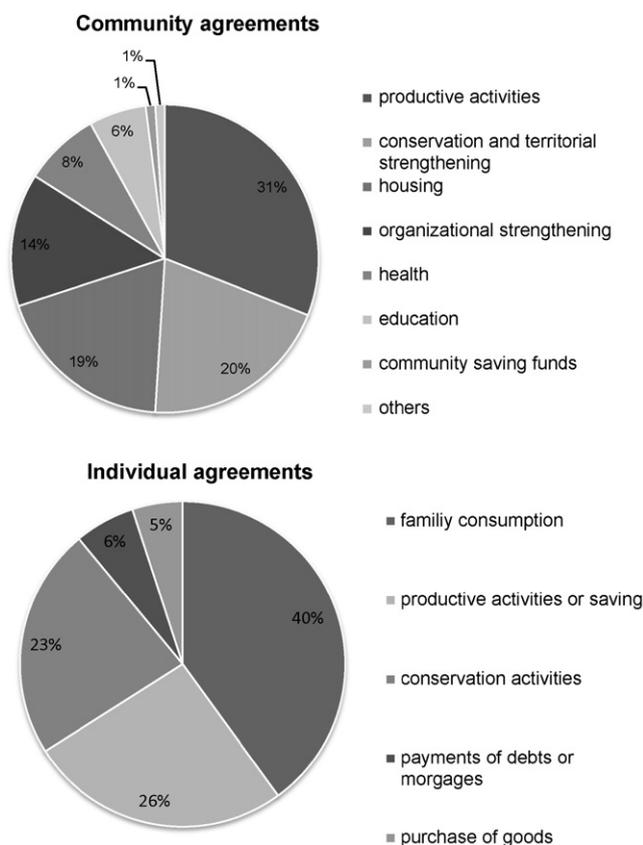


Fig. 6 – Investment in different categories according to investment plans of communities and individual families.

and consequences of non-compliance are documented in the publicly available operations manual of Socio Bosque. Some key elements of the agreement involve the prohibition to: convert the conservation area to other uses, burn the conservation area, or log trees. Only subsistence hunting is allowed as well as harvesting of non-timber forest products. Owners have to delimit the conservation area and report any external impacts to the Ministry of Environment.

For monitoring of compliance with maintaining the conservation area, a combination of interpretation of satellite images, interpretation of aerial photography and field verification is used. The use of the generally more costly aerial photography and field visits is more intensive in areas with high cloudiness, relative small conservation areas and where disturbance processes of natural vegetation are relatively small-scale, such as selective logging (Coral, 2010).

Subsistence hunting and harvesting of non-timber products can promote the “empty-forest” syndrome (Redford, 1992). Detailed monitoring of biological indicators regarding populations of plants and animals is not yet implemented and should be considered for future application.

The incentives are suspended in case of minor issues of non-compliance or the agreement can be terminated indefinitely in case of major issues of non-compliance that affect the conservation area. In case a participant decides to retire before the end of the agreement, a fraction of the total accumulated incentive received needs to be restituted. This fraction

decreases with the number of years the beneficiary has participated (Ministry of Environment of Ecuador, 2010).

Monitoring of the socio-economic impacts of the program is done through analysis of the social investment plans. These plans give detailed information on how the incentives are being used by families and communities. The analyses are combined with field visits to specific communities to evaluate the investments.

3. Results of the first two years Socio Bosque

3.1. Conservation areas

Despite the logistical challenge a national conservation agreement scheme implies, Socio Bosque has grown fast since its official creation in November 2008. As of October 2010, 527,503 ha are officially enrolled and accepted in the program. Of this total, 68,730 ha are owned by individual families (576 agreements) and 458,773 ha by communities (54 agreements), 71% of which are communities of the Kichwa, Shuar, Cofán, Sápara, Siona, Chachi and Shiwiari indigenous peoples, 21% are peasant communities, and the remaining 7% are Afro-Ecuadorian communities. Defining beneficiaries as the total amount of members of families participating in the agreements, the numbers of beneficiaries of the agreements with individual families is 1985 and of the agreements with communities 60,720.

On average, agreements with communities are for much larger areas than those with individual families. Fig. 2 shows the distribution of number of conservation agreements over conservation area size classes for agreements with communities and with individual families. While 97% of the individual agreements concerns conservation areas of less than 500 ha, 81% of the community agreements are for conservation areas of over 500 ha, with 17% for areas over 10,000 ha. The sizes of the agreements are directly reflected in the total annual payments. While 85% of the community agreements involve incentives of over US\$ 5000 per year, this is the case in only 4% of the individual agreements (Fig. 3). Of the communities 35% receive more than US\$ 35,000 per year. However, if the incentives of the community agreements are expressed as the amount per family that is member of a community (Fig. 4) it is illustrated that only 19% of the community families receive more than US\$ 500 per year, while this is 92% of the individual families that participate. Although most of the communities do not distribute the incentive over each family but rather invest in activities considered beneficial for the community as a whole, and in spite of the fact that transaction costs of control and patrolling probably decrease with increasing size of the conservation area, these first results show that the incentive table (Table 1) might need to be adapted over time in order to increase equity. This needs to be confirmed with more information from future enrollment.

Fig. 5 shows the distribution of conservation areas over different natural ecosystems. In the case of agreements with communities, 92% of the conservation area is in tropical humid forest, mostly in the Amazon region, while small portions are in dry forest and páramo. For agreements with individual families, just over half of the area is in tropical

humid forest, 21% in páramo, and important portions in montane and dry forests. Socio Bosque has beneficiaries in all 23 continental provinces of Ecuador.

3.2. Investment plans

A summary of all investment plans of individual families and communities is given in Fig. 6. Communities report to invest 31% of the incentive in productive activities such as agro-forestry, agriculture, aquaculture, and ecotourism. One fifth is invested in conservation and territorial consolidation, which includes control activities such as training, equipping and paying forest rangers, zoning and delimitation and legal resolution of land conflicts. Investment in housing includes improvement of buildings, construction of community water and sanitation systems and electrification. Organizational strengthening involves internal communication, computing equipment, transport, community meetings and training in for example administration and accounting. Health investments involve equipment for first aid centers, training and salaries of health promoters, emergency funds and systematization of traditional knowledge of the use of medicinal plants. With respect to education, communities use the incentives to pay for local teachers, infrastructure and equipment of local schools, transport for students and scholarships for community members. Interestingly, some communities have also started community solidarity funds for rotating micro-credits to community members or for special support for socially vulnerable groups such as women and the elderly.

Individual families report a 40% expenditure on family consumption, which includes nutrition, clothing, education and health. Just over a quarter is invested in saving and productive activities such as agro-forestry, eco-tourism and other micro-enterprises. Almost the same amount is used for conservation activities, such as zoning, delimitation, and payments for guards. Smaller portions are dedicated to payments of debts and the purchase of goods such as furniture and home improvement.

4. Discussion and conclusions

In the design of conservation payment schemes, many political, social and institutional issues need to be taken into account, including uncertainty, differences in local context, the capacity of government institutions to effectively communicate with the rural population, cultural diversity, perceived fairness by participants, and land tenure issues (Börner et al., 2010; Kosoy et al., 2008; Muradian et al., 2010; Petheram and Campbell, 2010; Sommerville et al., 2010; Van Hecken and Bastiaensen, 2010). For Socio Bosque it was considered of crucial importance to have a relatively straightforward design, in order have high transparency and to facilitate communication and socialization of the program to rural population with different levels of education. Key elements of the design are the voluntary nature of the program; the duration of the conservation agreements of 20 years after which they are renewable; incentive levels based on the size of the conservation area; and national spatial

priority setting on the basis of deforestation threat, importance for ecosystem services and poverty levels. The political will and mandate were crucial for the creation of the program, as well as the existence of local experiences. The political window of opportunity allowed for a fast development of the program: it took about half a year from the start of the design phase to the official launch. The total conservation area is now approaching that of the FONAFIFO program in Costa Rica.

4.1. Poverty alleviation

A distinctive feature of the Socio Bosque program is the objective to alleviate poverty. This requires finding a balance between environmental efficiency and social equity, including dimensions such as access to the program and a fair distribution of benefits (Corbera et al., 2007; Pascual et al., 2010; Van Hecken and Bastiaensen, 2010). As Vatn (2010) indicates, land distribution is a key issue. Poor people may not have a title of their land and this may create an obstacle to direct participation, while holding little land implies that it is hard to set aside any for conservation.

A main premise of Socio Bosque is to facilitate access of poor rural families and communities that have traditionally conserved natural ecosystems and are willing to do so in the future. Muñoz-Piña et al. (2008) mention for the Mexican PES program that reaching the poorest of the poor is a challenge as these communities are often in remote places and have little connections with government institutions. For this reason, socialization of Socio Bosque is indeed logistically complex and costly. However, communication and a clear explanation of the details of the program are very important and have to be done very thoroughly in order to avoid misunderstandings. It is also crucial to respect internal decision-making processes of indigenous and local communities and assure full participation of community members. In order to increase its effectiveness, Socio Bosque has established numerous alliances with organizations of civil society, such as conservation and development NGOs and indigenous and farmers organizations. In collaboration with the Ministry of Environment these organizations support local families and communities interested in Socio Bosque, by providing information on the program, preparing documentation for applications, and identifying conservation areas. In several cases additional activities are implemented, such as training of forest rangers, support on financial planning and management or investment in compatible productive activities such as agro-forestry or eco-tourism. This way Socio Bosque has become in some areas a driving force for local conservation and development action.

A key requirement to enroll in Socio Bosque is the presentation of a formal land title. This is necessary to be able to identify the legal rights holder and avoid land conflicts. However, some poor households and communities have land possession but have not formalized their ownership and can therefore not access the program. It is therefore important to support regularization of land ownership through land titling programs. A large land titling program is being implemented by the government at the moment but this is a costly and time consuming process.

Muradian et al. (2010) document several cases where poverty alleviation goals of conservation payments were not

obtained as expected due to a distribution of benefits that favor larger wealthier landowners. The main mechanism in Socio Bosque to address fair distribution is through decreasing payments per hectare with size of the increasing conservation area. The analysis of the applications so far indicates higher incentive amounts per family for individual agreements than community agreements. This is caused by the fact that the average size of community conservation areas per family member is smaller than expected when the designing of the program took place on the basis of secondary data. This can be corrected by adapting the categories in Table 1.

A novel approach of Socio Bosque as compared to other national conservation payment schemes such as the ones of Mexico and Costa Rica is the use of investment plans. These plans allow for more transparent decision-making for communal land but are also an important tool to monitor socio-economic impacts of the program. As the program is still relatively new, it is too early to draw firm conclusions, but the investments plans show that economic incentives are being used for investments that address unsatisfied basic needs as well as for productive activities and community banking. This indicates that the program could have a multiplier effect that goes beyond the direct monetary value itself. This needs to be monitored and validated in more detail. For example, while the current monitoring identifies investments made in health, education, housing and productive activities, the next step is to monitor how these investments improve human well-being of families and community members. With increasing participation in the program, further analysis is also needed to identify if really the poorest part of the population is reached or if the targeting of that part of the population needs to be improved.

The total investment of Socio Bosque during the first two years of implementation was US\$ 8.5 million. These were all public funds without charging users fees such as in Mexican program (Muñoz-Piña et al., 2008). The average investment of Socio Bosque per hectare per year is US\$ 9.1. As a comparison, the average yearly available funds per hectare per year for the national protected area system is US\$ 0.82 for Ecuador and US\$ 1.95 for the Latin America and Caribbean region (Bovarnick et al., 2010). In the case of Socio Bosque, 70% of the investment consists of incentives that directly reach the beneficiaries and have an important benefit for human well-being.

Up to date willingness to participate in the program has been high and exceeds the speed of implementation. The implementation rate is mainly determined by annually allocated public funds, and, to a minor extent, to logistical capacity to process and verify all applications. This indicates that the incentive levels are attractive for a large amount of land owners, both because of the average income they generate as compared to alternative uses, and because the incentive is predictable and reliable while revenues from alternatives can be highly volatile and unpredictable. However, participation is not only motivated by economic reasons. Vatn (2010) reports that in some cases participation in payment schemes is seen as a way to strengthen rights over land. This is also the case for some participants in Socio Bosque who mention their perception that participation in a government program will help them in the consolidation of land tenure security of their forests or páramos that are often

subject to illegal invasions. In fact, the government is considering special legal assistance to participants in Socio Bosque to address this issue. Other complementary benefits that are being analyzed by national and local government institutions are the application of fiscal instruments, such as tax exemptions of local and national land-based taxes. Several communities mention that their organizations have been strengthened because of their participation in Socio Bosque due to the decision-taking process on how to invest the incentive for their community as well as due to the resources available for the organizational strengthening itself. Furthermore the Socio Bosque Programs supports participating families and communities through workshops on financial management and control and patrolling of conservation areas.

It is expected that the rate of application will eventually start to decrease due to two main reasons. First, as mentioned above, some households and communities have not yet formalized their ownership and will need to acquire land titles in order to apply. A second reason for declining rates of application to Socio Bosque could be that the current levels of the incentive can be uncompetitive in areas where land use alternatives exist with high revenues. An effective way to respond to this issue is through social learning and adaptive management (Cowling et al., 2008). Socio Bosque will perform permanent evaluations of the applications, and can adjust the incentive table accordingly, taking into account the lessons learnt. Also, it is clear that this type of programs should not be seen as a stand-alone solution but rather as an integral part of a broader policy approach that comprises a diversity of interventions, including regulation (Engel et al., 2008; Van Hecken and Bastiaensen, 2010).

4.2. Environmental benefits and REDD+

Environmental benefits of Socio Bosque will also be monitored over time, such as benefits for carbon storage, biodiversity conservation and water regulation. A preliminary analysis of Bertzky et al. (2010) indicates that areas where Socio Bosque has been implemented so far already store over 5% of the total biomass of the country. The same authors show that the first and second priority areas of Socio Bosque jointly store 62% of the national biomass carbon, third priority areas 14% and protected areas 24%. More detailed analyses will need to be executed over time to estimate the contribution of Socio Bosque to reducing national deforestation levels, but it is clear that Socio Bosque can play an important role for REDD+. The program is therefore an important element of the incentive-based policy component national REDD+ strategy of Ecuador. In this strategy, Socio Bosque is considered a positive incentive program for forest conservation that will be combined with the strengthening of other measures and activities such as effective control of illegal logging, reforestation programs, sustainable forest management, an effective MRV (Measuring, Reporting and Verification) system, territorial planning, capacity building, strengthening of legal and institutional frameworks, among others. Already some important lessons can be drawn from Socio Bosque for the implementation of REDD+. In a recent special issue of *Environmental Science & Policy* on REDD+ several authors have discussed the importance of issues such as local governance, rights of indigenous and local

communities, involvement of local communities in monitoring, and fair and direct distribution of benefits for forest conservation to the stewards of these forest (Corbera and Schroeder, 2011; Kanowski et al., 2011; Lyster, 2011; Skutsch et al., 2011). The economic incentives of Socio Bosque reach the real conservation stewards – families and communities that protect the forest – in a direct, transparent and equitable way. Not only can the environmental benefits be visualized but also can the socio-economic benefits for rural communities participating in such programs. Furthermore, the participatory processes generated around Socio Bosque and the permanent feedback received from beneficiaries, generate a wealth of information that can be used for defining social and environmental standards for national REDD+ programs.

REDD+ can also be a possible contribution to the financial sustainability of Socio Bosque, either through international cooperation for REDD+ or through future voluntary or compliance carbon markets. Other possibilities for sustainable financing exist, such as contributions from the hydropower sector as analyzed for Costa Rica by Blackman and Woodward (2010) or from other users of ecosystem services. The program could possibly also receive contributions to offset impacts of large scale projects. Such options should be evaluated over time.

Socio Bosque has a high potential for replication, and to date the government of Ecuador has received interest from various countries in Latin America to learn from the program. This has already generated several exchanges between governments. Mechanisms that consider both the environmental and human aspects of development by providing appropriate long term measures through which those affected can escape the poverty trap appears an effective way to improve both nature and society (Cao et al., 2009). It seems that Socio Bosque could be such as mechanism.

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