IMPLEMENTING PAYMENTS FOR ECOSYSTEM SERVICES IN BRAZIL:

LESSONS FROM THE OASIS PROJECT

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LESSONS FROM THE OASIS PROJECT

Abstract

This study examines the experience of the Oasis Project of payments for forest conservation associated with watershed protection in Brazil. The Oasis Project, sponsored by private and public donors and led by the Brazilian NGO “Fundação Grupo Boticário de Proteção à Natureza” (FGBPN), in association with municipal (local) governments, is already operating in three Brazilian municipalities (São Paulo/SP, Apucarana/PR and São Bento do Sul/SC). The results show that the Oasis Project is one of the most successful Brazilian experiences of Payment for Ecosystem Services aiming at forest conservation in rural properties. Nevertheless, there are important problems and challenges yet to be solved, and this paper focuses on the lessons that can be learned from the Oasis Project.

Key Words: Payment for ecosystem services; watersheds; economic instruments

Highlights:

• Proposal for a new calculation for the payment to landowners of the Oasis Project.

• Variables not only environmental but also economic and social as the opportunity cost.

• Performance indicators to assist in the monitoring of the Oasis Project.

• Definition of financial resources to support the Oasis Project.
1. Introduction

There is an increasing perception about the importance of conserving environmental services for human well-being, including biodiversity conservation and regulation of climate, soil conservation, carbon storage, nutrient cycling and water resources, among many others. There are many different definitions for environmental services in the literature, for example, those that proportionate the conditions and processes to life support and, direct or indirectly, contribute to human survival and well-being (Medeiros & Young, 2011; FAO, 2007; ISA, 2007; Robertson e Wunder, 2005).

However, there is wide criticism to regulation restricted to command and control instruments, such as fines and other penalties for those that do not comply with the environmental legislation. The main reason presented is the lack of flexibility to economic agents solve these problems. Some authors (Young, Mac-Knight & Meireles, 2005; May, 2005) discuss these issues in the context of Brazilian forest conservation, with the similar result that command and control policies have been insufficient to reach the desired goals of conservation.

Therefore, the use of economic instruments is important to provide flexibility in the compliance of environmental targets, as a complementary tool to the command and control approach. In Brazil, there are already some interesting experiences of economic instrument in environmental policy\(^1\), including the payment for watershed protection, described in this article.

A system of payments for environmental (or ecosystem) services (PSE) has a very simple logic: to increase the income of economic activities compatible with

\(^1\) See YOUNG (2005) and MEDEIROS & YOUNG (2011).
conservation, in order to encourage the sustainable use of natural resources, at the same time penalizing predatory activities. In an “ideal” system, the “polluter” or “user” has to pay in order that the “protector” receives. So there is an incentive for the goods and services freely provided by the natural environment that are of interest, direct or indirect, of human beings. Hence, a PES is a self-interest system based on the economic assumption that agents tend to change their behavior and attitudes according to the incentives or penalties, in order to maximize their profits or utility, as far as those who benefit from the externalities provided by conservation are willing to pay for that.

The main objective of this article is to analyze a PSE program established in Brazil called Oasis Project, and to evaluate its main positive and negative aspect, in order to contribute to the establishment of similar initiatives.

1.1. Context

This study focuses on the PSE program called “Oasis Project”, coordinated by the NGO Foundation Grupo Boticário of Nature Protection (FGBPN) in association with municipal governments and sponsoring partners, such as the Mitsubishi Corporation Foundation for the Americas, Credit Suisse Hedging-Griffo Institute, and the Water Supply and Sanitation Company of the State of Paraná (SANEPAR). Currently, the Oasis Project is established in three Brazilian municipalities: Apucarana (Paraná State - PR), São Paulo (São Paulo State - SP) and São Bento do Sul (Santa Catarina State - SC). Besides them, there are other municipalities in advanced negotiation to implement the Oasis Project in their territory.

The Oasis Project consists of a PES focused on watershed protection through native forest conservation in privately owned land. The first experiences were
implemented in São Paulo (SP) and Apucarana (PR) and, because of that, were subject of this study (the implementation in São Bento do Sul started only in 2011). The idea is to benefit landowners who historically conserve forests and springs in their properties, but also to encourage forest recovery, since both contribute positively to the protection of water flows (FGBPN, 2011a).

The Oasis Project started in São Paulo in 2006, with resources form the Mitsubishi Corporation Foundation for the Americas and support from FGBPN (FGBPN, 2011b). The positive evaluation has encouraged the replication of the experience, and Apucarana joined the Project in 2009, through the municipal laws nº 058/09 and nº 241/09, establishing a financial partnership with SANEPAR, in which SANEPAR transfers 1% of its receipts obtained in the municipality to the Environmental Municipal Fund. With these resources, the municipality pays the landowners participating in the Project, with technical support of FGBPN.

2. Material and Methods

2.1. Evaluation of the current methodology to calculate payment values

The first stage of the study was to analyze the current methodology to calculate payment values in São Paulo and Apucarana. Only 14 properties participate in the Oasis Project in São Paulo, with an average area of 60 hectares, and located in the extreme South of the municipality, in the Guarapiranga watershed (around 4 million people). Most importantly, these properties do not have agriculture as their main objective (they are usually leisure properties), and monthly payments oscillate between R$ 100 and R$
7.000,00, depending on environmental characteristics such as water density, forest conservation and sanitation conditions.

The Oasis Project in Apucarana presents a contrasting reality, with smaller average area (24 hectares), but all of them dedicated to agricultural production. The number of properties is much larger: at the end of 2011 there were 133 properties participating in the program, with a total of 385 identified springs; in 2012 the number of properties increased to 184, with 613 springs. Monthly payments range from R$ 80 to R$ 597. Since the net income per property is around R$ 500 per month, payments for environmental services mean an income increase from 18% to 100%, depending on the production and property characteristics (FGBPN, 2011a).

The current methodology to calculate payments is based only on environmental aspects, paying equally properties that have many different characteristics, including total area dedicated to conservation. This creates a distortion in payment values, since there is no direct proportion the conservation area and its opportunity costs. Therefore, it is the program that pays the highest value per hectare (in average) when compared to similar experiences in Brazil: Minas Gerais (Extrema) e Espírito Santo (ProdutorES de água).

Another problem is the arbitrary point system introduced to benefit properties according to the number of springs and the connectivity with other properties, since payments grow at a geometric ratio. The next section presents a simple, linear model suggested to solve these problems in future applications of the Oasis Project.
2.2. Proposition of a new methodology

The new methodology proposed changes many aspects in the calculation of payments for environmental services, as used in Apucarana and São Paulo without, nevertheless, altering the main spirit of the Oasis Project: to benefit privately owned land with forest conservation that helps to protect watersheds.

The idea is to combine a compensation for the opportunity cost of land devoted to conservation with a bonus system for the environmental services identified in the property and/or best agricultural practices adopted. Therefore, not only environmental variables are considered, but also economic and social criteria are included in the calculation of the payments.

2.2.1. Groups of variables

The first stage was to elaborate groups of variables that are related to one of the three elements considered as crucial for the Project: springs, forest conservation and agricultural practices. Hence three grades are given (N1, N2 e N3) to summarize these different criteria:

- N1: Water quality
- N2: Conservation quality
- N3: Agricultural quality

Inside each grade, variables are weighted so each property receives financial resources due to environmental, economic and social criteria.

Table 1 synthesizes grades and respective components.

Table 1: Grades and respective components
2.2.2. Reference variable – X:

<table>
<thead>
<tr>
<th>Grade: Water quality</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Protected springs; protected rivers, streams and lakes</td>
</tr>
<tr>
<td>Conservation quality</td>
<td>Formation of corridors; natural area; existence of private reserves (RPPN); % of conserved area</td>
</tr>
<tr>
<td>Agricultural quality</td>
<td>Certified organic agriculture; rotation of cultivations; contour plowing/farming</td>
</tr>
</tbody>
</table>

A proxy for the opportunity cost of land was defined based on the reference value of the land. “X” corresponds to 25% of the rent value of the land, suggesting a very simple PSE. In other words, this reference value is based on low productivity activities, such as extensive cattle ranching.

The idea is that it is easier to compensate a landowner dedicated to low productivity cattle ranching than a high productivity cultivation land. So a PSE is more likely to become effective where the opportunity cost of land is cheaper. The “X” variable represents the minimum compensation unit per hectare of land. The total payment will also depend on other characteristics of the property (Variable “Z”).

2.2.3. Forest conservation variable– Z:

The variable Z refers to the area under forest conservation or restoration practices in hectares, in each property. This information is important since payments are done based on area under conservation or restoration, based on Equation (1):

\[
\text{Value PES} = Z \times X \times [1 + (N1) + (N2) + (N3)]
\]
This standard formula includes weights for each grade, suggesting (but not imposing, since municipalities are free to choose the specificities in the application of the equation) the following values:

- N1 (Water quality) ranges between 0 and 1;
- N2 (Conservation quality) ranges between 0 and 2.5;
- N3 (Agricultural quality) ranges between 0 and 1.5.

Hence, the minimum value that a property, per hectare of conserved area, would receive is 25% of the renting price for cattle raising (minimum land price) if the property does follow only the minimum requirements necessary to be accepted in the Oasis Project (basically, to follow the environmental legislation and the specific demands imposed by each municipality). On the other hand, according to the suggested weights, the maximum value of 1.5 times the renting price for cattle raising (or 6 times the minimum value, per hectare). Appendix 1 details all the variables presented in the suggested calculation.

Note that the proposed change does not change the main objective, which is to induce landowners to increase forest conservation in their properties, but only improve its application.

3. Results and Discussion
3.1. Results of simulation exercises with the new PES formula in Apucarana

A simulation exercise was carried out for the municipality of Apucarana, using the existing data basis of properties enrolled in the Project, but with the proposed equation (1).

To calibrate the model, it was assumed that the X variable (land renting price) values R$ 24/month. According to the characteristics of the properties in Apucarana, the minimum value to be paid, per hectare, if equation 1 were applied, would be R$ 11/hectare/month, while the maximum value (i.e., the property that is closer to the objectives of the Project) would be R$ 26/hectare/month. The average value in Apucarana would be around R$ 18 /ha. In absolute terms, considering the total conservation area in the property, the maximum payment would be R$ 1,160/month, while the minimum would be R$ 7/month (the disparity is a consequence of the difference in properties size), with an average value of R$ 176/property/month, a significant value in terms of average income in the region.

3.2. Other challenges and solutions in the Oasis Project

The definition of the best calculation of the values to be paid to rural landowners is not the only challenge to be addressed. This section discusses three other elements in the Oasis Project, but also to other PES systems: involvement of local authorities, the funding necessary for the payments, and the monitoring of properties.

3.2.1. Involvement of local authorities with the Program

The involvement of local authorities in PES systems faces a major challenge: how to conciliate the interests of rural landowners that want to maximize agricultural output, and the local agency responsible for the implementation of the program. It is important to consider the vast literature on the subject (for example, Medeiros &
Young, 2011; De Souza et al, 2008; De Marco Jr. & Coelho, 2003) that shows the complimentarily between agriculture and environmental protection, especially under agroforestry systems.

It is important to show (and, if possible, to prove with practical examples) the importance of environmental services conservation to increase agricultural productivity. Therefore, it is required that local authorities get involved in actions that can be presented as “best cases” and that PES systems are presented as a tool for development. In that sense, Apucarana is a good example since the municipal agency (SEMATUR) has acted in two fronts:

i) Directly through the coordination of the program, enhancing the perception of rural landowners about the importance of environmental services, especially water and soil conservation. SEMATUR employees help explaining how the payments values are calculated, and the program success has meant an increasing number of candidates: at the end of 2010, there 64 properties enrolled, at the end of 2011 the number of properties has risen to 133, and in January 2012 reached 184 properties.

ii) In the collaboration with the executive and legislative powers in Apucarana, including in the design of the Municipal Law (n.058/09) that establishes the legal basis that support the implementation of the Oasis Project locally.

Another important point for the success of a PES system is the presence of representatives of the rural producers in the executive board responsible for the execution of the Program. In the case of Apucarana, the presence of a well respected person with technical-scientific background and a successful local rural producer in the coordination of the program has helped in the dialogue with other landowners.
3.2.2. Financing the Project

The strategy adopted in the Oasis Project is to establish partnerships with water supply companies to finance the payments to the properties since the focus has been on watershed protection. In that sense, the PES is an incentive to improve the stability of water flows, with direct benefits to the water supply companies. However, there remains a strong resistance among the Brazilian rural sector in accepting that, as the main user of water resources, it is in their own benefit to establish a system where water consumers pay for forest conservation or best agricultural practices in upstream properties.

Due to this resistance, resources for PES systems are restricted to a small share of urban and industrial consumers, but mostly from public budget allocations. One example is the PES system established in the State of Espírito Santo, where resources come from tax collection and royalties from hydropower generation and oil and natural gas royalties. This establishes a clear limit to the expansion of PES since public budgets are limited and, in the Brazilian case, suffering a relative stagnation for environmental functions.\(^2\)

Therefore, it is fundamental for the widespread dissemination of water-related PES systems in Brazil the effective implementation of water charging as considered by the Brazilian Federal Water Law (Law 9,433/2007). This could generate the required funding for a large-scale expansion of initiatives such as the Oasis Project. Other possible funding sources are:

- Royalties from hydropower generation
- Water resources funds

\(^2\) See Young (2005).
• Resources from fines and other non-compliance charges from companies that are not properly adjusted to the environmental legislation and standards

Thus, the identification of direct benefits of forest conservation (in this case, water supply and quality) is an important tool to convince companies associated to water resources (water supply, hydroelectricity, irrigation) to sponsor the Project and guarantee its financial sustainability. On the other hand, the risks of future funding problems where the sponsorship is made by donations or fiscal transfers dissociated from water services (for example, royalties from oil and gas exploitation).

3.2.3. Monitoring

The establishment of a monitoring system is a cornerstone for the success of a PES initiative. It requires a precise definition of parameters to be evaluated in all the dimensions that are considered (environmental, economic and social). These parameters should be defined ex-ante, in the planning stage of the program, in order to avoid conflicts due to changes in the evaluation criteria after the properties are enrolled.

The objective of these indicators is to provide the necessary information to verify the evolution of the program in terms of the desired targets. On the other hand, these data, when crossed with information from other watersheds or micro-regions with similar characteristics, can provide evidence (or not) about changes that the PES implementation brings to environmental quality and human welfare in the affected areas. These indicators can be divided in 5 groups: water, forest conservation, finance, social and agricultural practices.
Water indicators can be divided in two sub-groups: water quality and quantity. Forest conservation indicators include the proportion of the property area under conservation or restoration and whether privately established protected areas (RPPN) are present in the property. The agricultural quality index can be composed by the presence of best practices, such as certified organic agriculture, rotation of cultivations and contour plowing/farming. Financial indicators analyze the change in production costs due to the practices induced by the PES. Social indicators refer to changes in the quality of life within the families that are benefitted, including monetary income, consumption patterns, and indicators for health and housing conditions. Finally, there should be “satisfaction” indicators among the rural producers, based on their perception whether perceived changes related to the PES are positive and negative.

With these indicators, one can build up aggregate performance indices. The main problem is to establish weights in order to aggregate information. The international experience shows that synthesis indicators are not necessarily the best way to evaluate, and multi-variable comparisons can be employed, such as the Costa Rican experience of PES evaluation (Moreno, 2011). Figure presents a hypothetical example of a “radar” system on the evolution of different performance indicators.

Figure 1: Hypothetical example of a radar indicators

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3 RPPNs (Reservas Particulares do Patrimônio Natural) are conservation units established in privately owned land, and regulated by the Brazilian Law on Protected Areas (Law No. 985/2000).
4. Conclusions

Payment for environmental/ecosystem services (PES) are a possibility for improving the efficacy of environmental policy through the establishment of incentives to economic agents that assume a pro-conservation attitude, usually doing more than requested by the legal system. PES initiatives have a great potential as an alternative strategy for conservation activities in Brazil.

The Oasis Project is an example of how a PES system can be established through partnership between the public sector, public and private companies, and NGOs. The expansion of the program is an indication that the results are being perceived positively among the stakeholders (municipal governments, sponsors and rural landowners).

However, there were important criticisms to the problem in the procedures adopted to estimate how much each property should receive in monetary terms. The main objective of this paper is to present an improvement in the methodology used to
estimate the values to pay for the properties, in a way that the opportunity cost of land and the quality and quantity of conservation are adequately considered.

Nevertheless, there are important challenges that have not yet been fully addressed by the Project: the involvement of local authorities ("ownership") with the Project, how to obtain sustainable sources of the funding necessary for the payments, and how to monitor the performance of the properties and evaluate the program itself. These challenges are not specific to the Oasis Project, being a common issue with other PES programs. There remains a long way in the improvement of these initiatives, and the acknowledgment of the problems and gaps yet to be filled should be perceived as an incentive for further research and experimentation, rather than obstacles to deter their implementation.
Appendix 1

Variables and grades proposed to the Oasis Project

<table>
<thead>
<tr>
<th>Sub-groups</th>
<th>Parameters</th>
<th>Answers</th>
<th>Others Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPRINGS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1) Protected springs</td>
<td>0.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>1.2) Existence of rivers, streams or natural lakes protected</td>
<td>0.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>CONSERVATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1) Formation of corridors</td>
<td>0.25</td>
<td>Yes</td>
<td>Connectivity between internal natural areas (RL – APP –Surplus)</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>Yes</td>
<td>Connectivity between natural areas inside and outside (with neighbors)</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2.2) Existence of private reserves (RPPN)</td>
<td>0.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2.3) Natural area</td>
<td>1</td>
<td>Successional advanced/medium stage (x1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>early successional stage (x2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>degraded</td>
<td></td>
</tr>
<tr>
<td>2.4) % conserved area</td>
<td>0.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>AGRICULTURA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1) Certified organic agriculture</td>
<td>0.33</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3.2) Straw</td>
<td>0.33</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3.3) Contour plowing/farming</td>
<td>0.33</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3.4) Protective action of the natural area (supervision, information signs, etc)</td>
<td>0.5</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
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