Analysis and Strategy of Economic Instruments and of a Payment for Environmental Services System for Categories 1 & 2 in the Roundtable on Responsible Soy (RTRS) Mapping

Final Product

Prepared by: Marcelo Hercowitz
Roldan Muradian

October 2014
Contents

1. Introduction on RTRS, Mapping and Categories 1 & 2, and Task Goals ........................................ 5
2. Consultation Process ......................................................................................................................... 6
3. Environmental Policy Economic Instruments: Overview .............................................................. 8
4. Environmental Reserve Quotas (CRAs) - Brazilian Forestry Code ........................................... 10
   Introduction - Instrument Features ................................................................................................. 10
   Analysis of Existing Experiences .................................................................................................... 12
   Opportunities and Limitations for RTRS Properties ...................................................................... 14
5. Ecologic ICMS ................................................................................................................................. 14
   Introduction - Instrument Features ................................................................................................. 14
   Analysis of Existing Experiences .................................................................................................... 16
     Paraná ........................................................................................................................................... 16
     Mato Grosso ................................................................................................................................. 18
     Pará ............................................................................................................................................... 19
   Opportunities and Limitations for RTRS Properties ...................................................................... 20
6. REDD ........................................................................................................................................... 26
   Introduction - Instrument Features ................................................................................................. 26
   Analysis of Existing Experiences .................................................................................................... 28
     Locations where this has been applied (the Brazilian Experience) ............................................. 28
     Steps Towards a REDD Project ................................................................................................... 30
     Lessons Learnt During the Application of the Instrument .......................................................... 30
   Opportunities and Limitations for RTRS Properties ...................................................................... 31
7. Payment for Environmental Services (PES) ................................................................................... 32
   Introduction - Instrument Features ................................................................................................. 32
   Analysis of Existing Experiences .................................................................................................... 33
     Locations where this has been applied (the Brazilian Experience) ............................................. 33
     Lessons Learnt During the Application of the Instrument .......................................................... 34
   Opportunities and Limitations for RTRS Properties ...................................................................... 36
8. Conclusions on Economic Incentives for Conservation in Brazil ..................................................... 36
Actions that may be undertaken by RTRS to facilitate the access to conservation resources

CRA (Environmental Reserve Quotas) ........................................................................................................ 38

Outlining a Partnership between RTRS and BVRio in the Emerging Environmental Reserve Quota Market (CRA - Cotas de Reserva Ambiental) ............................................. 39

Background ................................................................................................................................................ 39

Cooperation Lines ..................................................................................................................................... 39

Roles ......................................................................................................................................................... 40

Bottlenecks .............................................................................................................................................. 40

Ecologic ICMS ........................................................................................................................................... 40

REDD + ...................................................................................................................................................... 41

Payment for Ecosystemic Services ........................................................................................................... 41

9. Proposal of a PES Model to RTRS ....................................................................................................... 42

Compensation Value for Biodiversity Protection ....................................................................................... 44

Implementing the System of Recognition for Biodiversity Protection ...................................................... 47

Next Steps ............................................................................................................................................... 47
List of Tables

Tabela 1 – Principais eventos do processo consultivo da consultoria

Tabela 2 – Critérios de distribuição do ICMS no estado do MT

Tabela 3 – Valores totais e por hectare repassados a título de ICMS ecológico para municípios selecionados e suas áreas protegidas (ano de 2011).

Tabela 4 – Valores totais e por hectare repassados por tipo de área protegida (ano 2011).


Tabela 6 – Áreas protegidas por município selecionado, extensão e valor recebido por hectare a título de ICMS ecológico.

Tabela 7 – Arrecadação de ICMS nos estados do Paraná e do Mato Grosso, 2008 a 2013, em milhões de reais.

Tabela 8 – Classificação dos PSA no Brasil, baseado nos arranjos institucionais

Tabela 9 – PROPRIEDADES RTRS COM ÁREAS DE VEGETAÇÃO ADICIONAIS - exemplo

List of Graphs

Figura 1 – Distribuição do ICMS entre estados e municípios, conforme determina a Constituição Federal, e potencial para o ICMS ecológico.
1. Introduction on RTRS, Mapping and Categories 1 & 2, and Task Goals

The Roundtable on Responsible Soy Association (RTRS), created in 2006, is an international initiative that fosters the growth of sustainable soy production through the commitment of key stakeholders of the soy value chain and a global standard for responsible production. The initiative is formed by stakeholders from the soy value chain or the civil society who work on related matters, that is, producers, industry, trade and the financial sector, and civil society organizations. In line with its goals, RTRS acknowledges the need for a mechanism for protecting vital ecosystems and areas critical for biodiversity and, thus, for defining which areas would be subject to restriction on soy expansion. At the beginning of 2012, RTRS began a mapping project on land use for guiding responsible soy expansion in two Brazilian biomes: the Amazon and the Cerrado. The resulting maps classify territories into four categories, defined as follows:

- Category I = areas critical for biodiversity (hotspots), where stakeholders agree that there must be no conversion whatsoever of native vegetation for soy production.
- Category II = areas highly important for biodiversity, where soy expansion may be implemented after performing an assessment of High Conservation Value Areas (HCVA) that identifies areas where expansion is possible.
- Category III = areas where the existing legislation is adequate for controlling responsible expansion (in general, areas relevant for agricultural purposes and less relevant for conservation purposes).
- Category IV = areas already used for agricultural purposes, where deforestation practices have been undertaken before 2009 and, consequently, with no remnants of native vegetation, except for Legal Reserves.

With mapping activities almost completed, RTRS is interested in developing a system of rewards to financially support producers having properties in categories with more stringent conservation requirements (I and II). The general purpose of the project this report forms part of is analyzing its feasibility, and developing a Payment for Environmental Services System (PES) for attaining such reward.

A key decision guiding this research is related to the distinction between Legally Protected Areas and Additional Areas, that is, areas preserved on a voluntary basis. This has brought about a heated discussion in the first meeting between consultants and the RTRS National Working Group, on March 2014, in São Paulo. Even though the group concluded on the importance of giving some kind of reward to producers having Category 1 & 2 areas within Legal Reserves and PPAs (Permanent Preservation Areas), it was decided that this initiative should focus mainly on Additional Areas, that is, areas that may be cleared, but that will not be cleared, in compliance with the RTRS guidelines.

---

This report systematizes the results of the research, which was divided into two main parts, as provided by the Term of Reference (ToR). The first part presents an overview of the economic instruments used in the Brazilian environmental policy and analyzes if they may be applied to properties complying with RTRS standards and how they may do so, specifically properties having forest assets in areas considered as critical for biodiversity or high conservation value areas (Product 1 in the ToR). Part 1 in the ToR is described in chapters 4, 5, 6, 7, and 8. Part 2 suggests developing a PES system for rewarding RTRS member properties having forest assets included in high conservation value categories, specifically Categories 1 and 2, and outside of Legal Reserves and PPAs (Product 2 in the ToR). This item is described in Chapter 9 herein.

An influential element in this report, highly important for its development and its final result, was the consultation process carried out among RTRS members, that had a decisive role in the format and final content of the research, as shown below.

2. Consultation Process

The development of Products 1 & 2 formed part of a consultation process that involved discussions with (a) the RTRS Secretariat, (b) the RTRS Task Force in Brazil, and (c) the International Advisory Group. The purpose of such consultations was to legitimize the history and assess, together with stakeholders, the applicability of preliminary ideas on alternative modalities of compensation schemes for biodiversity conservation focused on RTRS landowners having environmental, as described above.

The consultation process enabled making strategic decisions and redefining product goals and designs throughout the process. This explains why the results mentioned herein are not entirely consistent with the initial expectations, as described in the Terms of Reference. Yet, results tried to include stakeholders’ interests and visions so as to reach consensus.

After having presented the results of the first part of the task (economic incentive options for biodiversity conservation in Brazil), in the first meeting with the Brazil Task Force, on March 12, 2014, in São Paulo, the group decided that the possibility of creating a reward regime for biodiversity conservation within the soy value chain (and, more specifically, within the RTRS Certification system) should be explored further on. Identifying compensation options and a preliminary assessment of opportunities and limitations for implementing such options should be the focus of Product 2. On the other hand, the International Advisory Group suggested supplementing the analysis of existing economic instruments with some proposals on how RTRS could assist its members for having access to such instruments. This was complied with and is presented in Chapter 8 herein.

Thus, four possible options were expressed regarding "biodiversity credits" and, in order to illustrate how credits would be estimated, examples were made with data from anonymous RTRS property members (see Annex, at the end of this report). Preliminary results were presented during a second meeting with the Brazil Task Force, on July 23, 2014. The main output from this second meeting was that the creation of an additional credit system for biodiversity conservation (apart from the RTRS conventional credits) may probably be very premature at present. The Task Force considered that, firstly, it was necessary to solve current restrictions to the demand for RTRS credit system, before implementing any additional credit format. Yet, the Task Force also pointed out that, in the future, an internal system of credits
for biodiversity might work well once the current RTRS certification regime is mature and enables credit differentiation. The Task Force decided that the options based on the notions of "biodiversity content" and "production loss" (Modalities 2 & 3, in the Annex at the end of the document) are more promising for a future credit system for conservation of native vegetation additional areas. The Task Force asked the consultants to develop these two options. Besides, the Task Force suggested exploring possibilities of collaboration with BVRio and, specifically, options for enabling the participation of RTRS members as sales agents of Environmental Reserve Quotas (CRAs, according Brazilian acronym), as BVRio has partnered with RTRS and is setting up an online market for enabling CRA transactions. The General Manager of BVRio was present at the meeting and he confirmed the willingness of his organization to get involved in a strategic partnership with RTRS. Two additional meetings were held with BVRio personnel. Chapter 8 herein includes the outcome of such meetings, that is, a draft version of the Memorandum of Understanding, that outlines the possibilities of collaboration.

In a subsequent meeting with the International Advisory Group, on August 19, 2014, the main decisions taken in the second meeting with the Task Force in Brazil were presented. Then, the International Advisory Group suggested considering the possibility of merging both modalities of biodiversity credits considered as being the most promising ones by Brazil Task force into one single proposal. Hence, the resulting proposal (the Central Proposal of Product 2) is an attempt to combine the notions of production loss and of conservation efforts into one single "compensation index". Such index is explained in Product 9 herein.

The Final Report presented as follows echoes consultants’ work, and includes all the possible suggestions resulting from the consultations mentioned before. Table 1 below summarizes the main meetings held as part of the consultation process throughout this consultation.

Table 1 - Main Events of the Consultant Consultation Process

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.03.14</td>
<td>First meeting with Task Force Brazil, in São Paulo</td>
</tr>
<tr>
<td>17.03.14</td>
<td>Conference Call with the International Advisory Group</td>
</tr>
<tr>
<td>08.05.14</td>
<td>Meeting with the International Advisory Group in Foz do Iguaçu, during the 9th RTRS International Conference.</td>
</tr>
<tr>
<td>03.06.14</td>
<td>Conference Call with BVRio</td>
</tr>
<tr>
<td>03.06.14</td>
<td>Conference Call with the International Advisory Group</td>
</tr>
<tr>
<td>12.06.14</td>
<td>Meeting with the International Advisory Group in Amsterdam</td>
</tr>
<tr>
<td>23.07.14</td>
<td>Second meeting with Task Force Brazil, in São Paulo</td>
</tr>
<tr>
<td>19.08.14</td>
<td>Conference Call with the International Advisory Group</td>
</tr>
<tr>
<td>12.09.14</td>
<td>Conference Call with BVRio</td>
</tr>
<tr>
<td>07.09.14</td>
<td>Conference Call with the International Advisory Group</td>
</tr>
</tbody>
</table>
3. Environmental Policy Economic Instruments: Overview

The need to find market solutions for environmental issues has been underscored by the assumption that environmental issues are mainly ascribed to market failure. From this perspective, "environmental externalities" emerge when economic agents affect the welfare of other agents, through impacts on the environment, without the latter having the chance to participate in the decisions of the former and without any monetary transaction involved in such impacts.

Thus, for example, let's suppose that an industrial plan uses water in its production process for cooling down machinery and it pours back waste (lower quality) water to a river in a state different from that in which it was taken up. Then, let's suppose that the waste water poured back into the river affects an agricultural community downstream, and that, consequently, its production is put at risk. In this case, the industrial plant is causing a negative externality that is perceived by the farmers' community not taking part in the decision-making process. As there is no specific mandatory legislation requiring industrial plants to pour back water into rivers in the same conditions as it was taken up, decisions regarding water treatment will not form part of decision-making processes by the owners of the industrial plant mentioned above. This means that, for example, when assessing their productivity, profitability and decisions for expanding, keeping or decreasing production, waste water treatment costs do not enter into the equation. Waste water treatment costs will then be covered by the community living downstream, by investing in water treatment plants or by threatening their agricultural production or else, by endangering their own health.

Another example would be to think in global warming as an externality derived from consumption of fossil fuels. Anyone using cars, airplanes or consuming large quantities of fossil fuels cause an externality - global warming - that, in turn, boomerangs on them besides harming third parties not involved in the decision-making of those who drive cars or fly airplanes.

Neoclassical economics sees externalities as market failure precisely because they do not enter into the decision-making process and they result from economically inefficient situations and from socially and environmentally undesired situations. That is why it is thought that a way of minimizing environmental impacts is by turning externalities into internalities so that they are considered in the decision-making process that will eventually lead to decisions different from those that would be taken if externalities had not been included in such decision-making process (Hercowitz and Figueiredo, 2011).

Environmental externalities may be approached in at least two different ways: (i) through State intervention, or (ii) through a direct private negotiation between the affected parties. The first strategy was firstly proposed by Arthur Pigou, who suggested environmental taxes (Pigou, 1920). Nevertheless, since the 1960's, environmental economy has underscored that costs derived from externalities may also be resolved by means of direct and more flexible transactions between stakeholders, without any State involvement, as initially proposed by Ronal Coase, precisely as a reaction to Pigou's solutions, based on the inefficiencies they would bring about (Coase, 1960).
Initial theories were developed for negative externalities (such as pollution). Yet, later on, the theoretician also added "positive externalities", that is, non-rewarded economic benefits from the environment (Krutilla, 1967; Ridker and Henning, 1967), and that were subsequently called ecosystemic services (Engel et al, 2008; Kinzing et al., 2011). From the theoretical standpoint, the destruction of natural ecosystems is ascribed to the lack of recognition of positive externalities that ecosystems (and their users) develop. This leads to ignoring such benefits in economic decision-making and, hence, to social inefficiencies. Since the 1980's, the application of the so-called "market instruments" has increased as a way of including positive externalities in decision-making processes.

"Economic instruments have a potential impact on the behaviour of individuals and, hence, when well designed, may encourage individuals to adopt environmentally desirable behaviours. For example, tax collection on ordinary residential waste and non-tax collection on recyclable waste, provided the latter is disposed of as determined by public policies, will encourage individuals to separate recyclable waste so as to avoid paying taxes on ordinary residential waste" (Hercowitz and Whately, 2008). In the case of the industrial plant that polluted the river (see above), these could be taxes on effluent disposal, that would make the plant review its decisions or even oblige it to implement tradable pollution restrictions. Environmental policy economic instruments are diverse, for instance:

- Taxes, such as taxes on water extraction
- Charging: charges on the use of water, on sewage and effluent emissions, on disposal of polluted water
- Subsidies
- Tradable Licenses
- Damage Liability = fines

Muradian and Rival (2012a) define three types of monetary transfers for ecosystem service management: rewards, incentives and markets. Rewards for landowners or owners of natural resources are destined to recognizing past performance, as a way of (1) offering social recognition, (2) encouraging good future performance; (3) inducing other landowners to follow similar practices, and, in some cases (4) offering economic benefits to vulnerable social groups (a contribution to rural economic development). On the opposite side of rewards, markets feature a high degree of "additionality" as owners will carry out activities being promoted only if mediated by payment. Besides, in the markets, the degree of mercantilization is high and the magnitude of payment must be proportional to conservation efforts (typically, payment must cover the costs of opportunity from supplying ecosystemic services). To a great extent, market operations depend on external motivations as agents would not adopt the desired practices without any payment. Finally, incentives as a combination of market and reward features. Incentives work well when there is a combination of extrinsic and intrinsic motivations for performing the activities being promoted (for example, the conservation of native forest). That is why the behaviour or practice being promoted could remain, even if the incentive is withdrawn.

Payment for Environmental Services programs may work well both as rewards and as incentives or markets, depending on the goals and on the institutional arrangement. The concept of Payment for Environmental Services results from, on one hand, acknowledging that
ecosystems effectively supply important services that must be preserved and, on the other hand, understanding that the supply of such services has a cost. If such costs are not covered, environmental services will not form part of decisions made by agents supplying such services and, consequently, such services will run the risk of being extinguished and replaced by other profitable activities. This happens for two main reasons. The first reason is that environmental services very frequently bring about a diffuse social benefit, while the burden of the costs for maintaining them are laid on some few private individuals. That is, it becomes clear that social costs and private costs are different, as well as the benefits derived from them. The second reason is that, typically, environmental goods and services are common goods and run the risk of being used up. This is what Garret Hardin (1968) has called the "tragedy of the commons (goods)" (Hercowitz and Figueiredo, 2011).

4. Environmental Reserve Quotas (CRAs) - Brazilian Forestry Code

Introduction - Instrument Features

The Environmental Reserve Quota - CRA - is a financial instrument foreseen in Brazilian environmental law ² whose main purpose is creating an economic asset for rural property owners having environmental assets and, as a spin off, flexibilizing and enabling environmental regulations for rural property owners having Legal Reserve liabilities in their properties. Even though the approval of this law was widely approved by those parties that considered the CRA introduced an element of progress to the new environmental law ³ –, this instrument already existed (under the name of Forestry Reserve Quota – CRF) within the old Forestry Code, since 2001, when Provisional Measure 2 166 was edited. Yet, the Forestry Reserve Quota was never regulated and, consequently, it was never implemented.

The CRA is implemented through Art. 44, Act 12 651, which defines it as a “registered deed (“título nominativo”) representing an area with native vegetation, existing or undergoing recovery...” . Article 46 provides that each CRA corresponds to 1 (one) hectare of “(i) an area with primary native vegetation or with secondary vegetation in any stage of regeneration or restoration, or (ii) restoration areas through reforestation with native species”.

Pursuant to the Law (art. 44), landowners with the features described as follows are entitled to apply for CRAs:

1. Under the environmental servitude regime ⁴, that is, areas whose use is limited to preserving or recovering existing environmental resources, except for Permanent Preservation Areas – PPAs – and minimum Legal Reserves required by law.
2. When a Legal Reserve is voluntarily implemented on a vegetation area exceeding percentages as required by law.
3. When protected as a Natural Heritage Private Reserve (RPPN - Reserva Particular do Patrimônio Natural).

² Law 12 651, May 25, 2012 (also known as new Brazilian Forestry Code).
³ See Valle (2013).
⁴ Implemented in the form of Art. 9 A, Law 6 938, August 31, 1981.
4. When on a rural property located within a public Unit of Conservation that has not been evicted yet.

Besides, emission of CRAs for native vegetation of Legal Reserve may be requested also by small owners or family rural squatters who, “according to the law, are all those properties having up to four fiscal modules, as well as land belonging to native Brazilians and other areas belonging to traditional peoples and communities that collectively use their land, e.g. quilombo lands” (Valle, 2013).

In order to request CRA emissions, owners must register in the Rural Environmental Registry (CAR - Cadastro Ambiental Rural) and submit a series of documents. CRAs have a control number, name of rural area owner cross-referenced with the ownership deed, location of area, biome and specifications on whether the area is an area of primary or secondary vegetation or under a process of regeneration. The link between the CRA and the area it represents will be recorded in the Property Identification Title. Besides, CRAs must be registered on merchandise packaging or in registration systems (Art. 47) and may be transferred to individual or legal entities through a term signed by CRA holders and by CRA recipients (Art. 48). Thus, CRAs have been designed as deeds that may be traded on the marketplace as they represent values identified by the parties.

Yet, for CRAs deeds to effectively have market value, a certain degree of demand is necessary and, above all, that there is a balance between supply and demand. It has already been specified who may apply for CRAs, as provided by the Forestry Code. The interest in acquiring CRAs developed by the demand may also be determined by the applicable law, apart from what is determined by market interests.

To date, there is no evidence of spontaneous interest in CRAs on behalf of the marketplace. Even if this instrument has not been implemented yet, that is, even if no CRAs have been issued yet, some degree of interest may have been already observed. For instance, as it happens with the voluntary carbon market where companies not legally bound to reduce carbon emissions may acquire carbon credits as part of their sustainability policy and their commitment with the planet, companies may also be interested in CRAs. As none of this has been verified so far, the main demand for CRAs that we may envisage, when it is operationalized, is the demand as determined by the law, for instance, compensation of liabilities of Legal Reserve. According to Art. 66 of the Forestry Code, "proprietors or owners of a rural property that, on July 22, 2008, had the status of Legal Reserve with an extension smaller than what is ruled by the law as provided by Art. 12, may update its situation, irrespective of adhering to the Environmental Regularization Program or not (PRA - Programa de Regularização Ambiental) by adopting the following alternatives, whether in isolation or as a whole:

---

6 As the CAR system is not operating yet, and that being registered in the CAR system is a mandatory condition for owners for requesting CRA emissions, it is concluded that CAR currently exists only as an instrument provided by law.
7 Other uses may be developed for CRAs, even with the purpose of stimulating the marketplace. For example, the State may accept CRA deeds for payment of environmental fines or other taxes. Yet, this will depend on different factors that cannot be foreseen and, consequently, that do not enter into the analysis in this report.
I - recomposing the Legal Reserve,
II - permitting the natural regeneration of vegetation in the Legal Reserve area;
III - rewarding the Legal Reserve”.

The reward, as dealt with in Section III above, may be made, among other ways, through the acquisition of CRAs. This will be an attractive mechanism depending on the market value of CRAs, on the cost of opportunity of liability holders or, in other words, on the level of profitability of the activity undertaken on a property, on the biome where it is located and on other variables such as the value of the land in the specific region. Research done by Hercowitz (2009), when the environmental law repealed in 2012 was still in force, but whose results would probably be the same should research be done today, shows that in properties in the Legal Amazon Region with Legal Reserve liability, it is financially more interesting for producers to regularize their situation by means of reward practices, than by means of vegetation recovery or regeneration.

Despite the different levels of attractiveness according to the context of each property, by allowing compensation of liabilities of Legal Reserve through CRA acquisition, the Forestry Code aims at stimulating demand by means of this economic instrument.

Analysis of Existing Experiences

As mentioned above, there is still no evidence of issuance and trading of CRAs. Nevertheless, considering the potential supply and demand of CRAs, some exercises and models may be done as a way of foreseeing the behaviour of such instrument and of the CRA market. More specifically, it is possible to make scenarios for verifying if this instrument may work (and how it may work) for RTRS purposes, if a way of financial compensation for owners of areas within Categories 1 and 2 is found, and if they voluntarily decide not to clear such areas.

During the first meeting with the National Working Group (NWG), within the framework of this work, held in São Paulo on March 12, 2014, there were lengthy discussions on whether compensation should be awarded only to owners of Category 1 and 2 areas voluntarily preserved, as per RTRS mapping, or if Legal Reserve areas and PPAs in these categories should also be awarded compensation.

Even though there is no clear answer and there are rationales supporting both positions, it is certain that, if implemented and if financially attractive, CRAs will only be used by properties within the RTRS scheme, having additional areas, besides Legal Reserve Areas and PPAs, considering they are mid-sized and large properties, and all of them having more than 4 fiscal modules.

According to conservative estimates de Valle (2013), in Brazil there are currently at least 129 million hectares of forest assets that may apply for CRAs – that is, 18.7 million hectares in

---

8 “Voluntarily” as provided by Law, even if it is a requisite for being certified by RTRS.
9 They are “conservative” because they do not take into account the “quilombo” areas, the forest asset areas that are voluntarily protected in private properties larger than 4 fiscal modules, RPPNs and forest areas in properties smaller than 4 fiscal modules that are not included in the INCRA as settlement projects.
family agricultural properties, and 110 additional millions of hectares in Native Brazilian-owned Lands- (TIs - Terras Indígenas).

On the other hand, the new Forestry Law reduces the obligation of preserving areas then considered as permanent protection areas (PPAs), as well as of recovering liabilities of Legal Reserve Areas and Permanent Protection Areas (PPAs)\(^\text{10}\). Thus, the potential demand for CRAs dramatically decreased, as less areas need to be regularized and, consequently, the Legal Reserve compensation mechanism will be less used. Soares-Filho (2013) estimates that the decrease in environmental liabilities for the national territory is around 58%, mainly in Legal Reserve areas, with a reduction in liabilities of around 17 million hectares. According to his estimates, Total liabilities (LR + PPAs), went down from 50 million to 21 million hectares. As PPAs’ liabilities account for approximately 5 million hectares (Valle, 2013, and Soares-Filho, 2013), it is concluded that Legal Reserve liabilities in the national territory account for around 16 million hectares.

Hence, according to the above mentioned research studies, the potential supply of CRAs accounts for, at least 129 million hectares\(^\text{11}\) and the potential demand accounts for a maximum of 16 million hectares. Hence, it is clear that there will be an imbalance between supply and demand of CRAs (this is one of the conclusions pointed out by the research by Valle (2013), and this suggests that the value of CRAs shall have a dramatic reduction. For private producers, who may voluntarily preserve forests, this instrument might not have a significant impact on their decisions as the value of CRAs will not be comparable to the costs of opportunity of any economic activity that might be set up in the area. It seems to be more feasible that low market value CRAs shall be offered by those (small) owners, family producers, who may issue a title in Legal Reserve areas, not only in the additional areas, on Native Brazilian-owned Lands (Quilombos) and, also, in areas within Conservation Units that may not have been duly evicted.

Obviously, such analyses are done on a national level as a forecast exercise for future scenarios. In real situations, results may differ as the Forestry Code considers that compensation, specifically through the acquisition of CRAs, should be developed in the same biome where the forestry liability is located and, preferably, in the same state. As most of the native Brazilian-owned land is located in the North and Mid-West areas of Brazil, as well as a large number of agricultural settlements under the Agrarian Reform, the Amazon and Cerrado biomes will probably have the highest degree of imbalance between LR assets and liabilities. Nevertheless, in the South and South-East areas in Brazil there are many small properties, not under mandatory recuperation and that may issue CRAs on the existing LR, besides agricultural reformation settlements, which fact also suggests that there may be imbalances between CRA supply and demand.

Within this context, it is interesting mentioning a survey done by the Instituto Centro de Vida (ICV) that performed a similar analysis exclusively for the state of Mato Grosso (ICV, 2013).

\(^{10}\) Legal Reserve Areas that have been irregularly cleared before July 2008 in properties smaller than 4 fiscal modules are released from the duty of area recovery. Likewise, PPAs next to hillsides with more than 45° in slope and hilltops cleared before such date are released from the duty of recovery.

\(^{11}\) Additionally, Soares-Filho (2013) estimates that there are around 100 million hectares in terms of forest assets in areas not included in the Legal Reserve, which include family-run agricultural production. This means that there is some degree of overlapping in the Graphs mentioned above.
According to this survey, if Ecologic Economic Zoning (ZEE - Zoneamento Econômico Ecológico) is implemented in the state, which enables the reduction of the Legal Reserve area to 50% of the size of the property under different circumstances and which is the most probable scenario, the potential supply of CRAs in the Amazon biome will be around 9.7 million hectares and the potential demand will be around 3.6 million hectares. In the Cerrado biome, the potential supply will be around 8.7 million hectares, and the potential demand will be around 1.9 million hectares. These are data that, per se, show an imbalance between supply and demand. Besides, it must be considered that Native Brazilian-owned Lands were not included here, which must increase even more the potential supply of CRAs.

**Opportunities and Limitations for RTRS Properties**

Theoretically, Environmental Reserve Quotas (CRAs) are interesting economic instruments for flexibilizing environmental laws and contributing with the effective implementation of the Forestry Code. Nevertheless, in practice, evidence suggests that CRAs may even be effective for enabling the environmental regularization of environmental liability holders, but will probably not work as an incentive for owners holding environmental assets (i.e. holding forest areas in percentages above legal requirements) to keep their areas preserved. As the purpose of RTRS is to develop an instrument capable of compensating owners who voluntarily preserve areas under Categories 1 and 2, that is, forestry asset areas as included in Categories 1 and 2, all this indicates that CRAs will not be the instrument that will supplying such compensation. Even if the exact value a CRA may be negotiated for may not be known in advance, it may be stated with a relative degree of certainty that such value should not come close to the cost of opportunity for soy production in these areas.

Besides the possible low value that CRAs must have, speculation is not possible when such instruments are in fact operating, as that would require the enforcement and full operation of the Rural Environmental Registry - CAR. This means that the State should take part, and this produces great uncertainty as to its future application.

It is not impossible that other uses of CRAs may foster demand, for example, by permitting the use of CRAs for paying fines and taxes. But, for this, more time is required as it first needs to be enforced, then the Rural Environmental Registry will be implemented and will enter into operation and, eventually, should its inefficiency for encouraging conservation be proved, other measures will be adopted. Yet, this is extremely uncertain as, on one hand, a possible increase in the CRA value may encourage conservation of additional forest areas, and, on the other, it will make environmental regularization more costly. Consequently, there will be a conflict of interests whose resolution, if any, is difficult to imagine but, what is for sure is that this will not cover a short time period.

Under such conditions, it seems clear that RTRS should not resort to CRAs as instruments for meeting the goal for compensating forest assets in areas within Categories 1 and 2 of the relevant properties.

**5. Ecologic ICMS**

*Introduction - Instrument Features*
The Tax on Circulation of Merchandise and Services (ICMS) is a State tax on circulation of merchandise, inter-state or inter-municipality transportation services, communications and on electric power. The ICMS has also an impact on the entry of imported merchandise and on services rendered abroad. The generating factor of ICMS taxes is the circulation of merchandise: when merchandise leaves taxpayers' premises, except for transportation between different branches, the tax is collected, irrespective of whether the transaction is completed or not.

The ICMS is the main source of financial resources in Brazilian states, that are free to adopt their own collection and distribution rules provided they comply with the Federal Constitution and the National Tax Code.

Brazil's Constitution (Art. 158, Section IV) provides that "twenty-five percent of the proceedings from state tax collection on operations linked with circulation of merchandise and with inter-state and inter-municipal transportation services and communication services" belongs to municipalities. Brazilian Constitution also sets forth that such percentages allotted to municipalities shall be credited as follows:

I – a minimum of three quarters, in the proportion of the added value on operations related with circulation of merchandise and services, performed in their territories,

II – up to one quarter, according to what the state law shall determine or what the federal law shall determine, in the case of territories.

Hence, the States are autonomous to decide how they will allot 25% of ICMS resources among municipalities. Graph 1 shows the distribution of ICMS among states and municipalities and the potential for the Ecologic ICMS.

Graph 1 – Distribution of the ICMS among states and municipalities, as determined by the Federal Constitution, and the potential for the Ecologic ICMS.
Analysis of Existing Experiences

Paraná

The first Brazilian state to implement the Ecologic ICMS was the state of Paraná, in 1991, when Complementary Law 59/91 was passed, defining environmental criteria for transferring the ICMS to municipalities. In 1990, the governor of Paraná passed Law 9 491, that defined the rules for transferring the ICMS. According to this law, 75% of what is transferred to municipalities must be based on the added value of operations performed in each municipality, and the remaining 25% must meet the following distribution scheme:

- 8% according to agri-livestock production in the territory of the municipality vis a vis the state production,
- 6% according to the number of inhabitants in the rural area of the municipality vis a vis the total number of rural inhabitants in that state,
- 2% according to the number of rural properties registered in the municipality vis a vis the total rural properties registered in the state,
- 2% according to the territorial area of the municipality vis a vis the state area,
- 2% as a fair distribution factor to all the municipalities,
- 5% according to environmental criteria, as determined in Art. 132 in the State Constitution. Complementary Law 59/91 of the state of Paraná determines that 5% of ICMS collection must be destined to municipalities having environmental units of conservation, or those that receive a direct impact from such units, and Sources of public Supply. From the total volume represented by this 5%, 50% shall be apportioned according to the existence of Units of Conservation (UCs), and the remaining 50%, following the criteria regarding sources, that is, 2.5% of total ICMS collection is destined to UCs, and 2.5% to sources.

"In the case of the Units of Conservation (UCs), in order to determine the amount to be transferred to each municipality, the Coefficient of Conservation of Biodiversity - CCB - should be used. The basic calculation is made up by the ratio between the surface of a Unit of Conservation and the surface of a municipality, adjusted by a parameter - the Factor of Conservation (FC) - a qualitative variable that is put into the calculation. In this calculation, "areas of environmental preservation, ecologic plants, parks, reserves, forests, hortos florestais (forest nurseries), native Brazilian reservations, areas of public or private property relevant for federal, state or municipal laws or decrees." 

For the purposes of this research, the case of Natural Heritage Private Reserves (RPPN - Reservas Particulares do Patrimônio Natural) should be specially underscored. Decree 1 529 (October 2, 2007) sets forth the support from municipalities to RPPN owners for rewarding them with resources derived from the Ecologic ICMS. Article 29 in such Decree defines the following:

"Municipal activities in support of biodiversity conservation in private reserves shall include the following procedures, among other:
I) arrangements between the Municipality and RPPN owner, directly or through proxies, with the participation of the IAP;
II) approval of Municipal Law setting up the bases for support to conservation of biodiversity in private reserves, namely, the RPPNs;
III) agreement between the Municipality and a non-profit organization, owner or proxy, as set forth by the Federal Court of Auditors;
IV) approval of specific Project with the relevant Plan of Application of the resources to be received, in kind or as material or human resources, with objective indicators of results and efficacy;
V) accountability of resources being received;
VI) Auditing."

---

12 Section 132. (...) Autonomous Paragraph. The State shall assure - by means of a law, that Municipalities forming part of its territory and making up environmental conservation units, or that are directly influenced by such units, or those with public supply sources - special treatment as regards the credit of the revenue mentioned in Art. 158, Autonomous Paragraph, II, in the Federal Constitution.
14 Environmental Institute of Paraná.
According to information in the Ecologic ICMS webpage, in order to implement Art. 29 and to assure the transfer of the Ecologic ICMS resources to RPPN owners, the RPPN Association of the State of Paraná signs an agreement with the municipality where the RPPN(s) is/are located for receiving the part of the resources received by the municipality of the Ecologic ICMS regarding the existence of the relevant RPPN(s) in the municipality. Subsequently, the RPPN Association should transfer the resource to the owner of the reserve, who should apply such resource exclusively for maintaining the existing natural heritage and pursuant to a pre-established annual plan. Nevertheless, participants of the first meeting of the National WG, held in São Paulo, on March 2014, pointed out that RPPN owners are currently not receiving such resources, with some rare exceptions. After the passing of the Ecologic ICMS law in the state of Parará, several other states followed the same model for defining ecologic criteria for distributing part of the resources collected from such tax. In 1993, the state of São Paulo created its own Ecologic ICMS, followed by the state of Minas Gerais in 1995, by Rondônia and Amapá in 1996, by Rio Grande do Sul in 1998, by Mato Grosso, by Mato Grosso do Sul and Pernambuco in 2001, and by Tocantins in 2002. At present, only the states of Amazonas, Roraima, Maranhão, Rio Grande do Norte, Alagoas, Sergipe, Bahia, Espírito Santo, and Santa Catarina need a specific law concerning the Ecologic ICMS. May et. al. (2003) and Mattos e Hercowitz (2011) display some of the limitations of the Ecologic ICMS in the state of Paraná. The limitation resulting from the percentage regarding the Ecologic ICMS as legally defined law should be pointed out here. For example, in the state of Paraná, 2.5% of the ICMS collected by the state follows the criteria on the existence of protected areas for transferring resources to municipalities. Thus, if there is an increase in the number of protected areas in municipalities in the state of Paraná, the amount to be transferred shall always be 2.5% of the collected ICMS and each protected area will then receive a lower amount.

**Mato Grosso**

Another example is the state of Mato Grosso, where the Ecologic ICMS was created by Complementary Law 73, December 7, 2000. Article 2 in this law determines de modality of distribution among municipalities in the state of Mato Grosso of 25% of the ICMS that the state may apply. Subsequently, this distribution was altered by Complementary Law 157, January 20, 2004, that sets forth the following:

---


16 See [http://www.icmsecologico.org.br/](http://www.icmsecologico.org.br/)
Article 8 in Complementary Law 73 sets forth that the Unit of Conservation/Native Brazilian-Owned Land criterion should be calculated by the percentage ratio between the Unit of Conservation Index of municipalities and the Addition of the Unit of Conservation Indexes of all the municipalities of the state. Originally, law in Mato Grosso did not make differentiation based on the degree of conservation of UC or of Native Brazilian Land, but only made a differentiation based on the type of protected area existing in the municipality, that is, on the restriction imposed by the protected area. For example, Biologic Reserves and Ecologic Plants are assigned an Index of 1, while Sustainable Development Reserves are assigned an Index of 0.5, and RPPN, an Index of 0.2\(^1\). This means that a municipality having a Biologic Reserve would receive, in terms of Ecologic ICMS, an amount twice as higher as what another municipality with a Sustainable Development Reserve of the same size would receive, and 5 times more resources than a municipality with RPPNs with the same size. Yet, Instruction 001 (May 5, 2010) also sets forth the analysis of the degree of conservation of the protected area.

### Pará

In the state of Pará, the Ecologic ICMS was defined by Law 7 632 (July 12, 2012) and was regulated by Decree 775 (June 26, 2013). In the state of Pará, the percentage of ICMS destined to municipalities based on ecologic criteria progressively increases until 2015 (calculated in 2016 and to be passed over in 2017). In 2012, this value was equal to 2%; in 2013, to 4%; in 2014, to 6%, and, finally, to 8% as of 2015.

From the foreseen percentage with ecologic criteria to be transferred, 25% is granted according to the percentage of municipal territory occupied by protected areas or special use areas; 25% is granted according to a minimum stock of vegetal coverage (20% of the native vegetation area of the municipality) and to the reduction in deforestation in the last year, vis a vis the average of years 2007/2008, 2008/2009, 2009/2010 and 2010/2011, considering that in 2011/2012, the municipality must have a 20% minimum decrease; in 2012/2013, a 30% minimum decrease, and in 2013/2014, a 40% minimum decrease. And, 50% of the transfer depends on the percentage of the area to be registered in the Rural Environmental Register (CAR) of Pará.

---

\(^{17}\) Annex II of Complementary Law 73.
Opportunities and Limitations for RTRS Properties

In order to foresee the potential impact of the ecologic ICMS on owners of forest assets on their decisions of whether to preserve an area or not, we did an exercise for estimating the transferred values in relation with the size of the areas, for the states in which such values were available.

Thus, an exercise was done with 10 municipalities in the state of Paraná, randomly selected. For this, it was verified that in 2011, nearly R$ 23.6 million were transferred as Ecologic ICMS for a total 570,119 hectares area, that accounts for an average value of R$ 41,46 per hectare (see Table 3, below).

Table 3 - Total values and values per hectare transferred as Ecologic ICMS to selected municipalities and their protected areas (2011).

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Transferred value of &quot;Ecologic ICMS&quot; for 2011</th>
<th>ICMS Value for Each Environmental Factor</th>
<th>Name of Protected Area</th>
<th>Area (hectare)</th>
<th>Value per Protected Area</th>
<th>R$/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrianópolis</td>
<td>2.053.599</td>
<td></td>
<td>Lauraceous Park (Adrianopolis)</td>
<td>23.613</td>
<td>2.053.599</td>
<td>R$ 86.</td>
</tr>
<tr>
<td>Alto Paraíso</td>
<td>3.011.708</td>
<td></td>
<td>Ilha Grande E.P. (Vila Alta)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parna Da Ilha Grande (Vila Alta)</td>
<td>22.052</td>
<td>2.599.500</td>
<td>R$ 117.</td>
</tr>
<tr>
<td>Altonia</td>
<td>2.051.805</td>
<td>9.016</td>
<td>Ilha Grande E.P. (Altonia)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parna De Ilha Grande (Altonia)</td>
<td>9.907</td>
<td>1.684.079</td>
<td>R$ 169.</td>
</tr>
<tr>
<td>Antonina</td>
<td>1.293.006</td>
<td></td>
<td>State Park Roberto Ribas Lance(Ant)</td>
<td>1.009</td>
<td>95.140</td>
<td>R$ 94.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Aet Do Marumbi (Antonina)</td>
<td>22.741</td>
<td>290.417</td>
<td>R$ 12.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>State Park of Pico Parana</td>
<td>2.253</td>
<td>225.439</td>
<td>R$ 100.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Balsa Nova Municipal Park</td>
<td>16</td>
<td>95.947</td>
<td>R$ 5915.</td>
</tr>
<tr>
<td>Céu Azul</td>
<td>3.236.891</td>
<td></td>
<td>Iguacu National Park</td>
<td>86.117</td>
<td>3.236.892</td>
<td>R$ 37.</td>
</tr>
<tr>
<td>Guaraquecaba</td>
<td>4.145.036</td>
<td></td>
<td>Guaraquecaba Ecologic Station</td>
<td>13.639</td>
<td>726.044</td>
<td>R$ 53.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Superagui National Park</td>
<td>34.362</td>
<td>1.837.268</td>
<td>R$ 53.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Federal RPPN Salto Do Morato</td>
<td>819</td>
<td>80.199</td>
<td>R$ 97.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Itaqui I RPPN State Reserve</td>
<td>392</td>
<td>42.097</td>
<td>R$ 107.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Itaqui RPPN State Reserve</td>
<td>1.913</td>
<td>237.997</td>
<td>R$ 124.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5306(Ex) Itaqui RPPN Reserve</td>
<td>1.614</td>
<td>262.576</td>
<td>R$ 162.</td>
</tr>
</tbody>
</table>

Pau Brasil - Economia Ecológica e Gestão Socioambiental
R. Hum, 122 - Jd. Alice - 11680-000 - Ubatuba / SP - Tel: (12) 3836-1842
paubrasil@paubrasilconsultoria.com.br
### Table 4: Analysis of Payments for Environmental Services in Selected Municipalities in 2011

<table>
<thead>
<tr>
<th>Protected Area</th>
<th>Area</th>
<th>Value 2011 (R$)</th>
<th>Average Value 2011 (R$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ilha do Mel Ecologic Station</td>
<td>2,241</td>
<td>389,076</td>
<td>R$ 173.</td>
</tr>
<tr>
<td>Guaraguacu Ecologic Station</td>
<td>1,145</td>
<td>200,501</td>
<td>R$ 175.</td>
</tr>
<tr>
<td>Guaratuba EPA (Paranagu)</td>
<td>5,657</td>
<td>112,469</td>
<td>R$ 20.</td>
</tr>
<tr>
<td>Federal EPA of Guaraquecaba (Paranagu)</td>
<td>26,253</td>
<td>500,570</td>
<td>R$ 19.</td>
</tr>
<tr>
<td>Palmito State Forest</td>
<td>525</td>
<td>80,673</td>
<td>R$ 153.66.</td>
</tr>
<tr>
<td>Ilha do Mel State Park</td>
<td>336</td>
<td>46,426</td>
<td>R$ 138.24.</td>
</tr>
<tr>
<td>Ilha Grande E. S. (Sao J.Do Patrocinio)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.00.</td>
</tr>
<tr>
<td>Municipal EPA of Sao Jorge Patrocinio</td>
<td>10,300</td>
<td>481,249</td>
<td>R$ 46.72.</td>
</tr>
<tr>
<td>Pama Da Ilha Grande (Sao Jorge P.)</td>
<td>12,600</td>
<td>3,767,099</td>
<td>R$ 298.98.</td>
</tr>
<tr>
<td>Turvo Marreca/Turvo Indigenous Reservation</td>
<td>16,120</td>
<td>1,217,810</td>
<td>R$ 75.55.</td>
</tr>
<tr>
<td><strong>TOTAL Selected Municipalities</strong></td>
<td><strong>570.119</strong></td>
<td><strong>R$ 23,637,050.</strong></td>
<td><strong>R$ 23,637,050.</strong></td>
</tr>
</tbody>
</table>

Source: Own elaboration, with data from the Environmental Institute of Paraná (IAP) and the Department of Taxation and Finance of Paraná.

If we arrange this information according to type of protected area, we will see a vast variety of values, even in areas with the same protection status (See Table 4). Yet, as shown in Graph 1, excluding the value transferred to Balsa Nova Municipal Park (apparently, there is an error here as the value is very different from values of the rest of the areas), State Forests are the ones that have received the highest average value in 2011 (R$ 153.66), followed by State Parks and Ecologic Stations, with R$ 135.58 and R$ 133.99, respectively.
Table 4 - Total values and values per hectare, transferred according to type of protected area (2011).

<table>
<thead>
<tr>
<th>Name of Protected Area</th>
<th>Area (hectare)</th>
<th>Value per Protected Area</th>
<th>R$/ha.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEIT DO MARUMBI (ANTONINA)</td>
<td>22.741</td>
<td>290.417</td>
<td>R$ 12.77.</td>
</tr>
<tr>
<td>ESCARPA DEVONIANA/BALSA NOVA EPA</td>
<td>23.756</td>
<td>770.493</td>
<td>R$ 32.43.</td>
</tr>
<tr>
<td>GUARATUBA EPA (PARANAGUA)</td>
<td>5.657</td>
<td>112.469</td>
<td>R$ 19.88.</td>
</tr>
<tr>
<td>FEDERAL EPA of GUARAQUECABA (ANTONINA)</td>
<td>50.529</td>
<td>682.011</td>
<td>R$ 13.50.</td>
</tr>
<tr>
<td>FEDERAL EPA of GUARAQUECABA (GUARAQUECABA)</td>
<td>160.126</td>
<td>958.854</td>
<td>R$ 5.99.</td>
</tr>
<tr>
<td>MUNICIPAL EPA of SAO JORGE PATROCINIO</td>
<td>10.300</td>
<td>481.249</td>
<td>R$ 46.72.</td>
</tr>
<tr>
<td>ILHA GRANDE E. S. (ALTONIA)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.00.</td>
</tr>
<tr>
<td>ILHA GRANDE E.S. (SAO J.DO PATROCINIO)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.00.</td>
</tr>
<tr>
<td>ILHA GRANDE E.S. (VILA ALTA)</td>
<td>0</td>
<td>0</td>
<td>R$ 0.00.</td>
</tr>
<tr>
<td>ILHA DO MEL ECOLOGIC STATION</td>
<td>2.241</td>
<td>389.076</td>
<td>R$ 173.64.</td>
</tr>
<tr>
<td>GUARAQUECABA ECOLOGIC STATION</td>
<td>13.639</td>
<td>726.044</td>
<td>R$ 53.23.</td>
</tr>
<tr>
<td>GUARAGUACU ECOLOGIC STATION</td>
<td>1.145</td>
<td>200.501</td>
<td>R$ 175.11.</td>
</tr>
<tr>
<td>PALMITO STATE FOREST</td>
<td>525</td>
<td>80.673</td>
<td>R$ 153.66.</td>
</tr>
<tr>
<td>DAS LAURACEAS STATE PARK (ADRIANOPOLIS)</td>
<td>23.613</td>
<td>2.053.599</td>
<td>R$ 86.97.</td>
</tr>
<tr>
<td>ILHA DO MEL STATE PARK</td>
<td>336</td>
<td>46.426</td>
<td>R$ 138.24.</td>
</tr>
<tr>
<td>PICO PARANA STATE PARK</td>
<td>2.253</td>
<td>225.439</td>
<td>R$ 100.06.</td>
</tr>
<tr>
<td>ROBERTO RIBAS LANGE STATE PARK (ANT)</td>
<td>1.009</td>
<td>95.140</td>
<td>R$ 94.26.</td>
</tr>
<tr>
<td>BALSA NOVA MUNICIPAL PARK</td>
<td>16</td>
<td>95.947</td>
<td>R$ 5,915.34.</td>
</tr>
<tr>
<td>IGUAÇU NATIONAL PARK</td>
<td>86.117</td>
<td>3.236.892</td>
<td>R$ 37.59.</td>
</tr>
<tr>
<td>SUPERAGUI NATIONAL PARK</td>
<td>34.362</td>
<td>1.837.268</td>
<td>R$ 53.47.</td>
</tr>
<tr>
<td>ILHA GRANDE NATIONAL PARK (SAO JORGE P.)</td>
<td>12.600</td>
<td>3.767.099</td>
<td>R$ 298.98.</td>
</tr>
<tr>
<td>ILHA GRANDE NATIONAL PARK (VILA ALTA)</td>
<td>22.052</td>
<td>2.599.500</td>
<td>R$ 117.88.</td>
</tr>
<tr>
<td>ILHA GRANDE NATIONAL PARK (ALTONIA)</td>
<td>9.907</td>
<td>1.684.079</td>
<td>R$ 169.99.</td>
</tr>
<tr>
<td>MARRECAS/TURVO INDIGENOUS PEOPLE RESERVATION</td>
<td>16.120</td>
<td>1.217.810</td>
<td>R$ 75.55.</td>
</tr>
<tr>
<td>ILHA DA COTINGA INDIGENOUS PEOPLE RESERVATION</td>
<td>1.685</td>
<td>191.706</td>
<td>R$ 113.77.</td>
</tr>
<tr>
<td>RPPN 5306(EX) ITAQUI RESERVE</td>
<td>1.614</td>
<td>262.576</td>
<td>R$ 162.72.</td>
</tr>
<tr>
<td>ITAQUI STATE RESERVE RPPN</td>
<td>1.913</td>
<td>237.997</td>
<td>R$ 124.43.</td>
</tr>
<tr>
<td>ITAQUI I STATE RESERVE RPPN</td>
<td>392</td>
<td>42.097</td>
<td>R$ 107.29.</td>
</tr>
<tr>
<td>SALTO DO MORATO FEDERAL RPPN</td>
<td>819</td>
<td>80.199</td>
<td>R$ 97.90.</td>
</tr>
<tr>
<td>TOTAL</td>
<td>570.119</td>
<td>23,637,050</td>
<td>R$ 41.46.</td>
</tr>
</tbody>
</table>

Source: Own elaboration, with data from the Environmental Institute of Paraná (IAP) and the Department of Taxation and Finance of Paraná.
Graph 1 - Average Values Transferred to Protected Areas (2011), based on protection status.

Source: Own elaboration, with data from the Environmental Institute of Paraná (IAP) and the Department of Taxation and Finance of Paraná.

For the state of Mato Grosso, the year of transfer of protected area could not be determined as this information was not available. Yet, the transfer value per municipality and extent of protected areas per municipality could be verified and this permitted estimating the average transfer value per hectare for each municipality that was assessed. Five municipalities were analyzed, also randomly selected. In 2009, the value varied from R$ 1.86 per hectare in Chapada dos Guimarães, to R$ 6.74 per hectare in Santa Cruz do Xingu (See Table 5, below).
Table 5 - Value transferred to areas selected as Ecologic ICMS, per hectare - 2003-2009.

<table>
<thead>
<tr>
<th>Year</th>
<th>Água Boa</th>
<th>Cotriguaçu</th>
<th>Santa Cruz do Xingu</th>
<th>Chapada dos Guimarães</th>
<th>Alta Floresta</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>R$ 1.90</td>
<td>R$ 1.12</td>
<td>R$ 6.28</td>
<td>R$ 1.33</td>
<td>R$ 1.18</td>
</tr>
<tr>
<td>2004</td>
<td>R$ 2.38</td>
<td>R$ 1.41</td>
<td>R$ 6.19</td>
<td>R$ 1.49</td>
<td>R$ 1.51</td>
</tr>
<tr>
<td>2005</td>
<td>R$ 2.48</td>
<td>R$ 3.08</td>
<td>R$ 6.45</td>
<td>R$ 1.55</td>
<td>R$ 1.57</td>
</tr>
<tr>
<td>2006</td>
<td>R$ 3.88</td>
<td>R$ 3.21</td>
<td>R$ 5.16</td>
<td>R$ 1.43</td>
<td>R$ 1.59</td>
</tr>
<tr>
<td>2007</td>
<td>R$ 4.15</td>
<td>R$ 3.16</td>
<td>R$ 5.52</td>
<td>R$ 1.52</td>
<td>R$ 1.70</td>
</tr>
<tr>
<td>2008</td>
<td>R$ 4.88</td>
<td>R$ 3.40</td>
<td>R$ 6.49</td>
<td>R$ 1.79</td>
<td>R$ 2.84</td>
</tr>
<tr>
<td>2009</td>
<td>R$ 4.98</td>
<td>R$ 4.00</td>
<td>R$ 6.74</td>
<td>R$ 1.86</td>
<td>R$ 2.92</td>
</tr>
</tbody>
</table>

Source: Own elaboration, with data from SEMA/MT.

Table 6 shows the existing protected areas in the municipalities that were analyzed and that were the generating factor of Ecologic ICMS, as well as the municipality area and the value transferred per hectare of protected area in 2009.
### Table 6 - Protected Areas based on selected municipality, extension and amount received per hectare in Ecologic ICMS.

<table>
<thead>
<tr>
<th>UC</th>
<th>Municipality Surface (ha.)</th>
<th>R$/ha in 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Água Boa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ti Paraburé</td>
<td>570</td>
<td>748.421</td>
</tr>
<tr>
<td>Ti Areões</td>
<td>9.607</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10.177</td>
<td>1,36%</td>
</tr>
<tr>
<td>Cotriguaçu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Igarapés Do Juruenas STATE PARK (Overlapping)</td>
<td>168.938</td>
<td>912.358</td>
</tr>
<tr>
<td>Juruena National Park</td>
<td>126.904</td>
<td>129.243</td>
</tr>
<tr>
<td>Total</td>
<td>298.181</td>
<td>32.68%</td>
</tr>
<tr>
<td>Santa Cruz do Xingu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xingu State Park</td>
<td>95.025</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>154.565</td>
<td>27.5%</td>
</tr>
<tr>
<td>Chapada dos Guimarães</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Protection Area of Chapada dos Guimarães</td>
<td>143.224</td>
<td>620.657</td>
</tr>
<tr>
<td>Environmental Protection Area of Rio Da Casca</td>
<td>20.538</td>
<td>10</td>
</tr>
<tr>
<td>RPPN Mata Fria Ecologic Reserve</td>
<td>1.261</td>
<td>620.657</td>
</tr>
<tr>
<td>Cuiabá Park - Chapada Dos Guimarães Observation Point</td>
<td>3.535</td>
<td>6</td>
</tr>
<tr>
<td>Rio da Casca Ecologic Station</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Municipal Park of Cabeceira Do Coxipozinho</td>
<td>6.418</td>
<td></td>
</tr>
<tr>
<td>Chapada dos Guimarães National Park</td>
<td>6.418</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>174.992</td>
<td>28.2%</td>
</tr>
<tr>
<td>Alta Floresta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cristalino State Park</td>
<td>15.410</td>
<td>894.707</td>
</tr>
<tr>
<td>C/E Park - Sector C E E</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Ecologic Park - West - Sector E E G</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ecologic Park H E J - Sector J</td>
<td>8</td>
<td>894.707</td>
</tr>
<tr>
<td>Zoo Park</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>RPPN Cristalino</td>
<td>670</td>
<td></td>
</tr>
<tr>
<td>Ecologic Reserve - North</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16.162</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Source: Own elaboration, with data from SEMA/MT.

Assessments performed in the state of Paraná show that payments per hectare are significantly higher than in Mato Grosso. The amounts paid to each unit of protected area...
depends on the defined percentage to be transferred to municipalities as an Ecologic ICMS that, in these two examples, is the same – 5%\(^{18}\) – of the total ICMS collected by the state and of the quantity of protected areas. Consequently, in Paraná, the highest values paid per hectare are the result of a higher ICMS collection by the state and/or of the highest number of protected areas in the state of Mato Grosso. In fact, as shown in Table 7 below, ICMS collection in the state of Paraná is quite higher than tax collection in the state of Mato Grosso.

Table 7 - ICMS Collection in the states of Paraná and Mato Grosso - 2008 to 2013, in Millions of Reais.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paraná</td>
<td>11.767,0</td>
<td>12.335,6</td>
<td>13.870,4</td>
<td>15.961,8</td>
<td>17.859,7</td>
<td>20.758,2</td>
</tr>
<tr>
<td>Mato Grosso</td>
<td>4.736,3</td>
<td>5.016,1</td>
<td>5.336,9</td>
<td>5.814,7</td>
<td>6.708,8</td>
<td>7.454,7</td>
</tr>
</tbody>
</table>

Source: ICMS Newsletter, Ministry of Finance, **Conselho Nacional de Política Fazendária** (CONFAZ).

In any case, in both states it seems clear that the amounts paid are quite lower than the cost of opportunity of soy production.

In fact, any initiative interested in using the Ecologic ICMS scheme for remunerating private areas under conservation, not always protected by legal restrictions, will depend on important institutional arrangements. The creation of a RPPN (Natural Heritage Private Reserve) will always be a possible solution, especially in the states where there are plans for including this protected area category in the calculations for ICMS transfers and, specially, where there may be agreements with municipalities for resources to get to owners, even if lower than the costs of opportunity.

6. REDD

**Introduction - Instrument Features**

The global initiative known as "Reducing Emissions from Deforestation and Forest Degradation- REDD" is an emerging governance mechanism that forms part of the United Nations body dealing with Climate Change **UNFCCC**\(^{19}\), whose goal is to reduce the amount of greenhouse gas emissions from tropical forests (currently a large part of all global emissions). To meet this goal, the scheme will enable the transfer of financial resources from developed countries, which shall commit themselves to reduce greenhouse gas emissions, within the framework of the Kyoto Protocol, to developing countries, which shall not make such commitments.

Tropical forests are an important carbon reservoir as its biomass is largely made of carbon. As they are cleared, mainly due to burning practices, forests release a vast amount of greenhouse gases to the atmosphere. The idea supporting the REDD scheme is that if a project is capable

---

\(^{18}\) Even though, in the case of Paraná, only 2.5% is destined to protected areas (the remaining 2.5% goes to areas with water springs), while in the state of MT, 5% is shared by UC and Indigenous Lands.

\(^{19}\) United Nations Framework Convention on Climate Change.
of halting deforestation, then such project will automatically prevent a certain amount of greenhouse gases from being released to the atmosphere. That is, such project will bring about the reduction of greenhouse gas emissions which would occur if such project were not implemented. If the country where such emission reductions occur has not made any commitments with the UNFCCC, such reductions shall be transformed into credits that, in turn, may be acquired by other countries that, in fact, have made commitments to reduce greenhouse gas.

The general structure, the regulation and operation of this governance mechanism are still being negotiated within the UNFCCC framework, but there are already other experiences underway within the framework of the voluntary market, that is, between bodies that do not necessarily have commitments of reducing greenhouse gases and that do not abide by the UN regulations.

Brazil has a relevant role in this discussion, being the country with the largest forest area in the world and, potentially, one of the main beneficiaries from international transfers of resources. Besides, nearly two thirds of Brazilian greenhouse emissions are derived from deforestation, and this requires urgent action (Ministry of the Environment, 2012). REDD must resort to a diversified set of policies, tools and incentives with the general goal of creating synergies for reducing greenhouse gases derived from forests. In spite of the fact that the mechanism has not yet been entirely consolidated, many pilot projects and experimental initiatives have already been implemented around the world. The sources of resources for implementing such activities are manifold, but it is expected that most of them are derived from public funds from wealthy countries.

One of the key features of REDD is the need for creating assessment systems for determining if activities that are being carried out are really contributing with the reduction of GHGs (the ultimate goal) and for quantifying such contribution. This will enable stakeholders to claim for carbon credits as well as to exchange them. The issue of demonstrating “additionality” (that is, the extent to which activities or policies contribute with the reduction of emissions, compared with a scenario in which such activities and policies would not occur) is specially difficult due to the challenge of identifying a scenario of reference. The latter refers to forest resources and how their condition would have changed without such intervention. To obtain carbon credits, REDD initiative executors must estimate the level of deforestation or of forest degradation that would have resulted if such procedures had not been applied.

After the development of the idea of the REDD scheme, whose original idea was suggested by Brazilian researchers in 2003, at the COP-9 Climate Convention, Milan, Italy, the concept was expanded to become REDD+. The + signal after acronym REDD means that compensations for tropical forests within the framework of the climate convention should add the concept of forest conservation and sustainable management, besides that of reduction of deforestation and forest degradation. That is, compensation should not only be destined to endangered forests, but also to forests that are in good conditions and that develop ecosystemic services via sustainable management, an increase in carbon stocks and forest conservation activities.
Analysis of Existing Experiences

Locations where this has been applied (the Brazilian Experience)

In Brazil, most of the international resources linked with REDD+ were channelled through Fundo Amazônia, managed by the BNDES and operated mainly from Norwegian international cooperation resources. To date, Fundo Amazônia has supported the execution of 52 projects, accounting for approximately R$ 821 million, of which approximately R$ 227 million have already been paid. Such projects cover a wide range of matters and take on a series of approaches to reducing deforestation and promoting alternative production systems in the Amazon region. Two projects are shared with the Central Administration (one with the IBAMA; the other one, with the Forestry Service); 17 with the states; 8 with municipalities, 6 with universities, 18 with the third sector (e.g. NGOs), and 1 is an international project shared with the Organization of the Amazon Cooperation Treaty (OTCA - Organização do Tratado de Cooperação Amazônica). To date, there are no projects involving private owners or organizations of rural producers.

Most of the local and regional initiatives related with REDD in Brazil were undertaken in the Amazon region (May et al., 2011). The reason for such geographic concentration is the fact that the Amazon region accounts for the largest potential emissions caused by deforestation (a combination of high levels of carbon stock and high levels of threatened forests, namely in the agricultural border). Duchelle et al. (2013) estimate that there are 25 REDD initiatives in the Brazilian Amazon region. Such projects are very diverse, in terms of scope, approach, stakeholders and geographic scale. They are also diverse in terms of the political instruments they use (Lin et al., 2012).

Some REDD-related projects have applied (within a wider combination of instruments) direct payment to landowners, for improving production practices and encouraging forest conservation. Among the initiatives that have made direct payments, there is the "Incentive System for Environmental Services" (SISA - Sistema de Incentivos por Serviços Ambientais) in the state of Acre, executed by the state administration and supported by a state-specific law. The program aims at improving the supply of different types of ecosystemic services and not only carbon sequestration, although there is a specific chapter dealing with carbon sequestration (SISA - Carbon). According to Duchelle et al. (2013), certified producers (adopting several environmental responsibility practices, including not using fire) receive US$ 250-300 in terms of annual payment. Another program that has applied direct payment to landowners is the project for preventing deforestation in the "Reserve for Sustainable Development of the Juma", in the municipality of Novo Aripuanã, state of Amazonas, executed by Fundação Amazôna Sustentável. One of its main components is the Bolsa Floresta Program. Landowners benefitting from such Program receive R$ 50 in terms of monthly payment as an incentive for reducing pressure on forest resources. Another scheme, the PROAMBIENTE Program (Program for the Sustainable Development of Rural Family Production in the Amazon Area), was executed by the Federal Administration throughout different states having Amazon-type forests. Each family received approximately R$ 1,100 in terms of annual payment. The purpose was to promote the productive transformation and conservation of forests. Nevertheless, payments were discontinued.

Even though most of the existing REDD are based on public policies (most of them state policies), there are also projects that aim at capturing resources in national and international
private institutions and/or international governments in the form of donations. These are projects within the framework of the carbon voluntary market. Even though voluntary markets do not follow the rules as defined by the UNFCCC, that, in the case of REDD do not exist yet, this does not mean that they are not subject to a series of rules and criteria for their functioning. Donor institutions or institutions buying credits from the voluntary market wish to make sure if the project really exists and if it generates the amount of credits estimated and traded. For this reason, the need for having some sort of certification for carbon projects in the voluntary market is growing. At present, there are different types of certifications, each one with its own rules, costs and requirements. Yet, there are two certification seals that have become increasingly relevant in the international arena: the Verified Carbon Standard (VCS) and the CCB (Climate, Community and Biodiversity). The first one assesses projects, verifies if carbon estimates are consistent, validates projects and performs periodic verifications to check if carbon is kept stocked in forests (that is, if there is no deforestation or degradation), in the case of REDD projects. Finally, VCS issues the corresponding carbon credits. CCB does not issue carbon credits, but assesses projects to determine if they contribute with the wellbeing of communities and of biodiversity, besides climate benefit. Carbon projects frequently use these two certification seals and, obviously, this increases transaction costs.

The value of carbon credit trading is highly variable, depending on the type of project, the buyer, the type of certification, the type of project, among other variables. Yet, carbon value on the marketplace has recently decreased, especially after 2012, when the initial period of commitment between the parties as per the Protocol of Kyoto ended and a new agreement was not set forth. At present, there are no commitments for reducing GHG emissions within the framework of the UNFCCC and the future is uncertain as to a new international agreements.

According to a research study done by NGO Forest Trends, the average price of the ton of CO₂ in REDD projects around the world dropped from 12 US$ in 2011 to 7.4 US$ in 2012 (Peters-Stanley & Yin, 2013).

The amount of carbon existing in tropical forests is also very variable, but in the case of the Amazon region, it must have an approximate variation of 130 and 230 tons of Carbon per hectare, the equivalent of 570 and 850 tons of CO₂ per hectare. Considering the average price of 7.4 US$ per ton of CO₂, as pointed out by Peters-Stanley & Yin (op. cit.), the approximate value that is attained is between 4,200 US$ and 6,300 US$ per hectare. Yet, REDD projects must assure the permanence of forests for at least 30 years for this value to "get diluted" throughout that period. Thus, as a way of illustrating this exercise, an approximate value between 141 US$ and 210 US$ per hectare/year may be estimated.

Yet, such values must be seen as exceptions as they are gross values and all transaction costs should be deducted from them. In the case of projects such as forest carbon projects, specially the REDD project, such values are far from low, on the contrary, they are significant. Besides, a large part of the resources obtained from REDD projects must be applied to assure that carbon stocks are maintained, that is, to assure the existence of standing trees and of good quality vegetation. This may mean having, for example, management, surveillance and restoration costs.
Yet, the greatest obstacle for the execution of REDD projects, namely for the RTRS stakes, is finding parties willing to acquire carbon credits derived from deforestation prevention practices within a context of high level of uncertainty about the future of this market.

**Steps Towards a REDD Project**

To try to obtain resources from REDD projects, the first step is to develop a PDD or Project Definition Document. Such document must include a description of the project, the limits of the area to be offered, its current conservation status (baseline), future scenarios without a project, threats, carbon estimates (carbon released to the atmosphere in the absence of a project), methods adopted for estimates, relevant laws, title deeds, carbon monitoring plans, area supervision plans, and other information.

PDDs must be submitted to the Certification Body, that will assess their consistency and carry out a field audit. Should the CB approve the PDD, this will be considered appropriate for reaching the market and finding interested buyers.

If there are any buyers and if credits are sold, the commitment shall be a long-term commitment, usually a 30-year one. During such period, the CB will carry out periodical monitoring, every five years, and will issue a certificate with the amount of relevant credits. Such credits will be recorded in a Public Registration Office to avoid double selling of them.

**Lessons Learnt During the Application of the Instrument**

REDD initiatives are still going through pilot implementation phases, limited to the voluntary carbon market and frequently supported by some kind of public policy. Project benchmarking is difficult as there are still no clear national or international guidelines for the operation design. Yet, some lessons may be drawn from current practices. The following paragraphs summarize some of them.

a. Transaction costs are high and have a significant impact on the execution of the projects. The sources of transaction costs are manifold, including the need for processes with a vast diversity of social players, a weak governance in locations where the projects are implemented, uncertainty as to land tenure matters and a legal and governance framework for REDD+ that is still being developed.

b. Implementation requires a lengthy time period and State engagement. The type of process in REDD+ initiatives, with a variety of players, necessarily requires a long period for interaction, negotiations and execution. Besides, REDD+ -related activities financed with public resources depend on State timing and pacing.

c. REDD Initiatives will probably remain focused on the Amazon region because of the combination of high carbon stocks and great pressure levels on forests.

d. The main REDD initiatives involving direct payment to landowners have been, so far, the target of small producers (namely families), backside communities and traditional communities in the agricultural border, with low-productivity and low-income production systems. The next initiatives will probably target the same type of landowners due to the government's goal of using payments as a means for reducing
poverty, on one hand. On the other hand, they will focus on areas with high historical deforestation rates and low costs of opportunity, resulting in higher cost-efficacy levels, that is, better results with the same amount of invested resources.

**Opportunities and Limitations for RTRS Properties**

The REDD mechanism is probably not an adequate governance framework for offering compensation to RTRS landowners. To date, values paid for REDD projects to landowners have been very low, compared to the costs of opportunity of soy producers. Probably, government programs will not be able to cover the high costs of opportunity of forest conservation in soybean production areas. Besides, landowners members of RTRS do not have the specific qualifications for becoming special targets of REDD+ policies.

Anyone could suggest an internal REDD project to RTRS, in which forest asset holders in areas under Categories 1 and 2 would offer carbon credits and trades; the financial sector or even the retail sector would buy them as a voluntary neutralization policy of their emissions (or mandatory policy, if any). But, even in such cases, it is scarcely probable that any buyer would want to pay for values above market values, as is with carbon offered by areas where the cost of opportunity is lower, as discussed above. Besides, such lower costs must be present in the Amazon region, where most of the REDD projects would be present, by geographically limiting the use of the tool by the RTRS.

Another assumption is that focus areas mentioned in this report would be the object of a REDD project designed as a public policy for protecting priority conservation areas. Nevertheless, any issue related to State engagement would have a stake here, as mentioned above. The development of a public policy and of its corresponding budget would be necessary and, possibly, the carbon market itself will not be necessary for covering the costs of opportunity. The rationale of other ecosystemic services, specifically of biodiversity, will need to form part of the conception of the project.

In the case of projects between private individuals, it is also scarcely probable that values will be interesting for soy-producing farms, at least with the current state of the carbon market. Besides the fact that transaction values are lower than the cost of opportunity, other elements could currently discourage mid-sized and large private property owners, including: extremely high transaction costs, a very complex and bureaucratic process, long-term agreements (usually, 30-year agreements), the need for investing a large part of resources for the management of areas, risks inherent with standing forests (e.g. risk of fire) and difficulty in finding carbon buyers.

The long time lapse for the execution, and the high degree of dependence in the state of the REDD+ initiatives, are not very compatible with the expectations of RTRS stakeholders as regards landowner compensation regime for forest conservation (a high degree of autonomy and an expedite approach, with a low level of bureaucracy).

The need for demonstrating this “additionality” makes REDD+ projects extremely costly. Costs associated with follow-up and assessment activities (e.g. monitoring and certifications) probably make such initiatives not feasible, unless when there are very large forests at stake. This is probably not the case with the RTRS regime.
7. Payment for Environmental Services (PES)

Introduction - Instrument Features

Payment for Environmental Services may be defined as the transfer of resources between social players for creating incentives for aligning individual and/or collective decisions on the use of land, with social interests in natural resource management (Muradian et al., 2010). Direct payments for biodiversity conservation have been proposed as an explicit response for the relative failure in the most traditionally indirect approaches that have been adopted so far (Ferraro & Simpson 2002; Ferraro & Kiss, 2002). Historically, multilateral institutions and international donors, such as the World Bank and the PNUMA, the BID, international cooperation and private foundations, among others, have supported financial economic activities which might promote environmental conservation. Examples of such activities: ecotourism, bio prospection, exploitation of products not derived from wood, sustainable management of forests, etc. The introduction and dissemination of direct payments for conservation purposes are a shift in the environmental conservation paradigm. During the last decade, both research on PES and its implementation went through a strong expansion, especially in emerging countries (Pattanayak et al., 2010).

The fact that PES entered into the international agenda triggered off a legal framework for meeting the new requirements and safeguarding stakeholders, including traditional communities, that are frequently service suppliers and also the most fragile party in this relationship. Santos et al. (2012) gathered all the laws, decrees and bills on PES existing in Brazil, both at federal and at state level. They identified 8 legal framework initiatives on a federal level - concerning 5 programs or projects (occasionally, a program requires more than a law or decree to be in force), and 20 programs on a state level - concerning 9 programs. Among the initiatives mentioned above, there is a law that implements the SISA, a System of Incentives for Environmental Services, in Acre, and Bolsa Floresta, in the Amazon region (a complementary law, two laws and a decree), both mentioned herein. Organizers also describe two Bills - one from the Senate and another one from the House of Representatives - that refer to the REDD+ National System. Nevertheless, Bill 792 (2007) and its annexes should be mentioned here\(^2\), concerning the National Policy of Payment for Environmental Services.

A substitute for Bill 792/2007 is currently in the pipeline in the National Congress, setting forth concepts, goals and guidelines for the National Policy of Payment for Environmental Services (PNPSA); developing the Federal Program of Payment for Environmental Services (ProPSA), the Federal Fund of Payment for Environmental Services (FunPSA), and the National Register of Payment for Environmental Services. Such Bill defines all the institutional structure of the ProPSA, which enables having access to the Program and to mandatory clauses to be included in any agreement (including parties involved, purpose, timelines, and territorial borders, among others).

Bill 792/2007 created the FunPSA, whose purpose is to finance ProPSA activities with the following resource sources (Art. 11º):

I. up to 40% (forty per cent) of the resources mentioned in Section II, § 2 in Art. 50 in Law 9 478, August 06, 1997 ("Lei do Petróleo");

II. endowments contemplated in Annual Budget Law of the Central Administration, and in its additional credits;

III. resources resulting from agreements, adjustments, contracts and covenants signed with agencies and secretariats of the federal, state, Federal District or municipal Public Administration;

IV. donations from national and international agencies, whether public or private;

V. loans from national or international financial institutions;

VI. reversal of annual balance, not applied.

In the pipeline since 2007, this Bill is currently waiting to be voted by the Commission of Finance and Taxation of the House of Representatives. According to the rapporteur of this commission, financial and budget adjustments should be made to this Bill. In this context, it is impossible to foresee when this Bill shall in fact be approved and, most importantly, when there will be public funds available for financing PES on a federal level.

Institutional arrangements for such PES schemes frequently involve land users, parties requesting environmental services (State parties or private agents) and, very frequently, intermediate organizations. Whether PES programs should be considered as "markets" or not is a matter widely discussed in the relevant literature (Muradian and Gomez-Baggethun, 2013).

Analysis of Existing Experiences

Locations where this has been applied (the Brazilian Experience)

During the last decade, Brazil has probably been the country in Latin America where more Payment for Environmental Service initiatives have been initiated. As there is no universally accepted definition for configuration of PES, it is difficult to develop statistics on such tool. Yet, some attempts have been made to review the number of PES and other features already implemented or executed in Brazil as a whole (Pagiola et al., 2012; Vivian, 2012), and, specifically, in the Mata Atlântica biome (Guedes and Seehusen, 2011). By using a wide definition of PES, Vivian (2012) identified 116 PES cases in Brazil (excluding certification systems). Guedes e Seehusen (2011) counted 24 PES projects under implementation phase in the Mata Atlântica biome. Most of these cases have emerged in just a few years. The quick dissemination of PES in Brazil was enabled by some influential players, among them, the National Water Agency (ANA - Agência Nacional de Águas), that promoted the creation of PES on a municipal level and on river basins, through the Programa Produtor de Água, the World Bank and the Banco Interamericano de Desenvolvimento (BID), that have supplied financial and technical support for PES implementation, mainly on a state level. Civil society national and international organizations, such as The Nature Conservancy (TNC) or FUNBIO, have also promoted and financed (through international cooperation) the development and execution of PES initiatives.

A feature of Brazil is that many PES initiatives have been executed by state administrations. For example, PES programs have been applied in the states of Espírito Santo, Minas Gerais and
Santa Catarina. Each one of these cases has been associated with a state legal framework specifically developed for ecosystemic services. Unfortunately, there are still no systemic assessments of PES state-run programs.

**Lessons Learnt During the Application of the Instrument**

The scale is small: in spite of the relatively high number of projects, Pagiola et al. (2012) estimate that there are only almost 50,000 ha. involved in PES schemes in Brazil, a very small area compared to the almost 340,000 hectares receiving compensations in Costa Rica (a much smaller country than Brazil); 2.2 million hectares in Mexico, or almost 1 million hectares in Ecuador. This result has to do with several features of PES projects in Brazil:

a. Contrary to what has been done in Mexico, Costa Rica and Ecuador, in Brazil no national public policy or PES program have been executed on a federal level. Engagement is mainly from small and mid-sized land owners. Large scale areas and intensive agribusinesses have so far been excluded from PES programs.

b. Most of the Brazilian PES projects have been run on a pilot scale or as small projects ran by Civil Society Organizations, which leads to low value payments, not enough for covering high costs of opportunity.

Institutional Arrangements: most of the PES carbon-related schemes form part of voluntary international markets of carbon sequestration in forests, or of international cooperation projects. Yet, PES projects geared to improving water-related ecosystemic services tend to be included in public policies, on a municipal or state level. On one hand, such configuration accounts for international governance of climate change and mitigation of GHG emissions (and, specifically, for the new trend in private companies or in international cooperation of engaging in forest-derived carbon projects), and, on the other, it accounts for the public involvement in matters related to water resources, with serious restrictions on goals of private agents or on market arrangements. As to payment values, these may substantially vary. Comparing payments is a difficult task as forest activities and resources involved are very diverse. Yet, the price of voluntary carbon markets has collapsed in the last years, which has considerably reduced the perspectives of carbon absorption projects by using native forests.

Processes with diverse players: a distinctive feature of PES initiatives in Brazil is the involvement of multiple stakeholders, from different sectors. For example, in the institutional organization of a PES scheme, it is very common having different types of State agencies involved, as well as of civil society organizations, universities, different types of associations of rural communities, private companies and landowners. This complex configuration is closer to conventional conservation and development projects than the expectations from simple arrangements in market transactions.

High transaction costs: studies of PES schemes in Brazil mentioned above include, mainly, cases having reached the execution level. Yet, there is scarce information on initiatives that have failed. The proportion of cases that never reached the implementation phase is probably very high. Besides, one of the main conclusions drawn from recent experiences on PES conception and implementation are high transaction costs. Sources of such costs are manifold, including communications, development of knowledge, coordination between agents, bureaucracy, matters related to land ownership and the mistrust of landowners in the State.
management (a very relevant matter in Brazil) and in other players. The result of this is that, typically, the implementation of PES is a highly subsidized process that, very frequently depends on public resources or on international cooperation.

Uncertain Effects: Another distinctive feature of PES in Brazil is that strict assessments are very scarce, if not totally inexistent. This phenomenon not only occurs in Brazil. There is lack of assessments throughout the world, not only of PES projects, but also of conservation policy mechanisms, overall (Miterva et al. 2012). In the case of PES projects, the very few assessments in place have been implemented in Costa Rica and Mexico. Hence, there is a considerable gap between the pace of development of PES initiatives and the rate of knowledge development on its impacts, namely regarding alternative policies and mechanisms. Definitely, this implies some risks. The rapid spread of PES projects could lead to unexpected results if such instruments cannot meet the high expectations agents have in them. Consequently, it is urgent to invest in assessment studies on the impact of implementation of PES projects.

A focus on forest conservation: the studies mentioned above show that a high proportion of PES schemes in Brazil are basically geared to preserving remnants of forest areas. This is related to the fact that forest regeneration is much more costly than preservation. The risk related to this strategy is that projects based on forest preservation may have a very low additionality level or no additionality whatsoever. Additionality is more difficult to account for in the case of forest preservation as, from a methodological perspective, it is difficult to assess what would have happened if payments had not been made.

A focus on areas with relatively low costs of opportunity: even though there is still no thorough study on this matter, the current geographic distribution of PES in Brazil suggests that areas with the highest costs of opportunity (e.g. for sugar cane or soybean production) have not been included in PES regimes. This may also be due to the State or other stakeholders’ inability to contribute with resources for making up for these costs of opportunity. Besides, in many PES cases, payments are not made for covering costs of opportunity, but for supplying additional resources for encouraging landowners to engage in conservation activities or even for law compliance.

Table 8 proposes a possible classification of PES projects in Brazil, based on its institutional arrangements. PES projects are generally led by players who supply financial resources and who typically have considerable power for defining conditions and operational modalities. In Brazil, the main suppliers of such resources are the State (on municipal and state levels) and civil society organizations, very frequently receiving financial resources of international cooperation. In most of the PES schemes in Brazil, landowners are private owners who, nevertheless, not always strongly depend on their land for their subsistence. Even if this is not the rule, there are cases in which some landowners involved in PES live in urban areas and own a rural property as a second residential or leisure property (or for investment purposes). Besides, the State, as owner of protected areas, may also receive payments. Interaction between resource suppliers and landowners may be mediated by intermediate parties, typically civil society organizations in the case of Brazil. As mentioned above, apart from these three categories, typically, there are many other players involved in the development and implementation of PES schemes, including technical experts, donors, regulation agencies and associations representing specific social groups. We do not have enough complete information
for rigorously assessing the relative importance of the PES categories hereby proposed (e.g. in terms of covered surface).

Table 8 - PES Classification in Brazil, based on institutional arrangements.

<table>
<thead>
<tr>
<th>Financial Resource Supplier</th>
<th>Intermediate Party</th>
<th>Land Users</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Sector</td>
<td>CSO</td>
<td>Landowners</td>
<td>Carbon, Biodiversity and Community (Bahia)</td>
</tr>
<tr>
<td>Private Sector</td>
<td>CSO</td>
<td>Government</td>
<td>Carbon Park (Rio de Janeiro)</td>
</tr>
<tr>
<td>Municipality</td>
<td>-</td>
<td>Landowners</td>
<td>&quot;Conservador das Águas&quot; Project (Extrema, Minas Gerais)</td>
</tr>
<tr>
<td>State Administration</td>
<td>-</td>
<td>Landowners</td>
<td>&quot;Reforestar&quot; Project (Espírito Santo)</td>
</tr>
<tr>
<td>OSC</td>
<td>-</td>
<td>Landowners</td>
<td>Brasil Mata Viva (Goiás)</td>
</tr>
<tr>
<td>Private Sector</td>
<td>-</td>
<td>Landowners</td>
<td>Oasis Project</td>
</tr>
</tbody>
</table>

Opportunities and Limitations for RTRS Properties

The current collapse in carbon international market prices significantly decreases the opportunities for the implementation of PES projects based on carbon sequestration in forest areas. Even if this is not the case, values historically negotiated in carbon markets do not seem to be enough high for covering costs of opportunity for soy production and all the transaction costs inherent with related projects. The fact that, to date, such PES schemes have been focused on areas with low costs of opportunity, triggers off some doubts as to what extent they may be applied in RTRS properties.

Besides, it is scarcely probable that all RTRS properties qualify as priority areas for PES water-related regimes.

Besides, to date, there has been no national policy for PES, which makes it difficult for mid-sized and large producers to have access to compensations from the supply of environmental goods and services. Within this context, it is more feasible that projects be kept on a small-scale level in areas with a lower cost of opportunity, thus approaching them to income distribution projects rather than, exclusively, to environmental compensation.

8. Conclusions on Economic Incentives for Conservation in Brazil

In Brazil, there are several legal mechanisms and frameworks that enable farmers to receive economic compensation for preserving native vegetation. Of all these schemes, this document has discussed Environmental Reserve Quotas (CRAs), the Ecologic ICMS tax on circulation of goods and services, the global initiative for "Reducing Emissions from Deforestation and Forest Degradation (REDD) and the different Payment for Environmental Services (PES) arrangements, particularly on river basin and state levels. Such environmental policy instruments offer different opportunities, but also face important challenges, particularly for meeting the RTRS goal of having an expedite mechanism in place to offer landowners enough incentives for conservation of native vegetation, besides what is required by Brazilian law.
Following, we outline some of the most important limitations related to the practical use of the reviewed instruments:

- Most of the tools require State involvement, and this means having high transaction costs and lengthy execution periods. The voluntary market of forest-derived carbon is an exception because it requires less state involvement. Yet, this market is now in a downwards trend, with minimum historical prices.

- The values of PES or REDD+ projects already executed in Brazil are, overall, very small, compared to the costs of opportunity derived from the conservation of native vegetation in soybean production areas. Yet, this item requires a more thorough analysis. In the second phase of the project, we will try to get to some indicators of the disposition to accept compensation of soy producers for not changing the use of land in biodiversity conservation high priority areas. Yet, it would be logical for producers to expect a compensation value close to net potential revenues derived from soy production.

- In most of the instruments discussed in this document, transaction costs are high, not only due to State involvement, but also because these are complex processes, involving diverse players, monitoring and certification mechanisms, a legal framework development, etc.

- There are no specific features differentiating soy producers from other rural producers regarding the supply of environmental services (which would turn them into the target of specific public policies), which makes it difficult to use reviewed mechanisms for compensating exclusively RTRS rural properties.

All these limitations go against the PES scheme features expected by RTRS (fast and streamlined processes, high value remuneration and remuneration specific for RTRS certified soy producers), and this hinders the feasibility of using the existing mechanisms.

Consequently, as a result of the initial analysis, following conclusions are drawn:

- It is necessary to innovate in the development of compensation schemes. The possibilities of using existing tools are not very promising.

- An RTRS internal mechanism will very probably be the most feasible solution. The starting point should be the already existing certification mechanism. One of the possible options is creating differentiated RTRS credits that recognize the conservation efforts of native biodiversity (equivalent to credits already in place for best practices within the RTRS certification system).

Yet, RTRS may undertake actions to try to enable the access of RTRS soy producers to distributed resources through the instruments discussed herein. Following, we suggest some of these actions for each one of the instruments.

**Actions that may be undertaken by RTRS to facilitate the access to conservation resources**

Even though the economic tools analyzed herein seem to lack the necessary features for them to offer, in a general and institutionalized manner, incentives for biodiversity conservation in RTRS-member properties, some actions may be undertaken by RTRS for facilitating the access
of its membership to financial resources. Following, we present some suggestions for each one of the tools analyzed herein:

CRA (Environmental Reserve Quotas)

At present, the two major hindrances, that make CRAs unattractive, are regulatory processes (definition of standards, procedures, the functioning of the CAR, etc. - and the uncertainty about the future trade value that some parties estimate that may be reduced due to the possible over-supply of CRAs (Valle, 2013). Hence, these are the two items the RTRS can approach to try to develop economic incentives for biodiversity conservation in relevant properties.

It is expected that, as time passes, uncertainties on the CRA market functioning will fade away and that, then, RTRS will be able to support associated producers in the emission and trading of CRAs, be it directly, or through partnerships with specialized institutions (e.g. some NGOs partnering RTRS). As regards CRA emissions, they may enable producers to get the CAR registration, guidance for obtaining the necessary documents, guidance regarding eventual adjustments in the property, among other necessary activities. As to trading, RTRS may try to encourage differentiated markets among its associate producers, by encouraging both buyers and financial institutions and trading intermediaries (brokers) to adopt special conditions.

With financial institutions working in partnership with RTRS, RTRS could try to develop a credit line for financing the sale of CRAs of associate producers as a way of enticing more buyers. New producers interested in joining RTRS and having a Legal Reserve liability may be encouraged to settle their matters by acquiring CRAs from producers who are already RTRS members, thus benefiting from differentiated credit.

RTRS may try to encourage demand by requiring large soy buyers to commit themselves with the Forestry Code, by buying soybean only from 100% responsible properties. Besides, RTRS must also require from such buyers that they purchase the same quantity of RTRS credits as soybeans acquired because it encouraging demand for CRAs is as important as sharing conservation costs.

The larger the CRA market, the more efficient it will become and the easier it will be to trade CRAs. To enable trading and to encourage market practices, BVRio developed an incipient CRA negotiation platform where sellers offer CRAs, and buyers acquire them for suitable prices. BVRio is already an RTRS partner and associate, and both of them can jointly develop differentiated trading conditions for associate producers by even resorting to differentiated credits that may be created by financial institutions (See Chapter 4.1 herein, including the Memorandum of Understanding between BVRio and RTRS). Following, we present an initial outline of a possible partnership between RTRS and BVRio developed from discussions between both organizations.
Outlining a Partnership between RTRS and BVRio in the Emerging Environmental Reserve Quota Market (CRA - Cotas de Reserva Ambiental)

Background

The Round Table on Responsible Soy (RTRS) wishes to develop compensation mechanisms for soy-producing members having additional native vegetation conservation areas (areas that do not legally apply as Legal Reserves or Permanent Protection Areas - PPAs), specifically in locations considered as priority biodiversity conservation areas (and that have already been identified through mapping). To meet this objective, one of the options is resorting to flexibilization mechanisms, as expressed in the Código Florestal Brasileiro (Brazilian Forest Code) and, more specifically, to the Environmental Reserve Quotas system (CRA - Cotas de Reserva Ambiental). A CRA market would enable landowners with a surplus of Legal Reserve Areas or PPAs to receive a revenue from the sales of quotas.

BVRio is an environmental stock exchange system operating in different markets. This organization created an online platform for negotiating “forwards” of environmental quotas. CRA development agreements for future delivery are an effort for encouraging and starting up a CRA market. Participation in the BVRio CRA market is anonymous and not binding and, as such, landowners are not obliged to enter into negotiations. Landowners will view offers and decide whether to negotiate their CRAs or not, based on specific offers. Through such forwards agreements, landowners settle the terms of transactions even before securities are launched. Only after a sales contract is signed shall owners request the State’s agency to issue CRAs. Hence, landowners will only be responsible for the CRA issuance procedure, should the agreements they enter into meet their expectations.

Cooperation Lines

After several discussions with the RTRS and BVRio staff, some possibilities of strategic cooperation were identified, summarized as follows:

1. BVRio considers that RTRS Certified Producers would have a comparative edge in the CRA forwards emerging marketplace. The main source of advantages would be quota "quality", in terms of formal requirements necessary for quantifying and registering quotas (even forwards quotas), such as the Rural Environmental Register (CAR - Cadastro Ambiental Rural), the existence of a registered Legal Reserve, a clear land ownership structure, a statement proving the absence of land disputes and information on whether the property is located in priority areas for conservation. Such requirements are highly relevant in the forwards emerging market as they have an impact on the level of risk, a key factor in markets not entirely developed. Or else, they may even make a difference between being able or unable to make transactions with such quotas. BVRio expects that RTRS Certified Producers who may sell environmental reserve quotas have previously met most of the requirements and, thus, may harness the benefits from being "early birds" in this market. Another possible comparative edge in this emerging CRA market would be the possibility of offering preferential financing. An option under discussion was to come to an agreement with financial institutions that are RTRS members (e.g. Santander and Rabobank) for enabling the financing of CRA purchase / sale (or of forwards quotas) from RTRS Certified landowners. This idea still needs to be further developed, but the initial proposal is to study the options of offering CRAs with preferential financial.
support (to make transactions feasible). This would create a difference between Landowners who are RTRS members and other quota suppliers.

3. A third competitive edge would be identifying priority areas for conservation. RTRS has already made progress in this regard by mapping properties and classifying vegetation coverage into different categories, as well as priority areas for conservation. Besides, the emergence of an environmental reserve quota secondary market (with the engagement of environmental NGOs, for instance) could develop a specific demand for quotas in areas considered as high priority conservation areas.

Roles

4. The main roles of the RTRS Secretariat would be: (1) spreading information on BVRio and on possibilities for its members to engage in the CRA markets; (2) giving support for adapting and complying with legal requirements; (3) enabling negotiations with financial stakeholders; and (4) coordinating the implementation of a strategic partnership with BVRio.

5. BVRio could enable the differentiated participation of RTRS members through the information offered on its selling platform, be it information on the possibilities of financing transactions, or information on the "quality" of the supply of quotas derived from RTRS-certified landowners. It could also offer differentiated intermediation conditions.

Bottlenecks

The current market of forwards quotas is only in its initial stage. At present, a forecast of the CRA price evolution cannot be made, considering a series of variables, including regulatory variables, that may have an impact on the supply and the demand.

Ecologic ICMS

The Ecologic ICMS is the mechanism under assessment that has proved to be best consolidated and with the longest record as regards functioning. Yet, experience has shown that the values transferred to municipalities are not very high. In the average of municipalities analyzed in the state of Paraná, the transferred value was R$ 41.46 per hectare of protected area. In the state of Mato Grosso, this value was much lower, oscillating between R$ 1.86 and R$ 6.74 per protected hectare in the selected municipalities.

The transfer of the Ecologic ICMS depends on a specific law enforcing it (already in force in a large portion of Brazilian states) and is geared to municipalities having protected areas in their territory. For resources to get to private landowners who preserve native vegetation areas in their property, it is firstly necessary to verify if there is any type of legal/formal protection on the additional native vegetation area, and this is more feasible by means of a Private Reserve of Natural Heritage (RPPN - Reserva Privada do Patrimônio Natural). RTRS may guide landowners who wish to create RPPNs in their properties by giving technical and law support in the preparation of the area and documents. This can be done by means of partnerships with NGOs specialized in such matters.
Subsequently, a specific municipal law should be created for determining if a municipality must transfer the value received as Ecologic ICMS to private landowners having RPPNs, in terms of the protected areas present in the municipality. RTRS could hire experts or partner other institutions for supporting municipalities in defining the legal framework that may enable Ecologic ICMS resources to get to private landowners who preserve additional native vegetation areas.

For example, in the state of Paraná, a state decree provides that municipalities must support RPPN owners by compensating them with Ecologic ICMS resources; and that they must approve municipal laws for that purpose. Besides, a decree sets forth that the transfer must not be made directly to landowners, but to non-profit organizations. In these cases, RTRS could take up this role, even though this is not its role, properly speaking.

**REDD +**

The main bottlenecks for using the opportunities offered by REDD+ among RTRS members are as follows:

- REDD+ projects tend to focus on highly endangered areas in terms of deforestation and with high contents of carbon caused by the local vegetation.
- REDD+ projects frequently have high transaction costs. This is due, among other things, to the need for verifying and proving additional carbon sequestration.
- Implementing REDD+ requires having specific knowledge, not only on carbon-related international governance, but also on matters of coordination with farmers and of long term project execution.

In order to explore possibilities for carrying out REDD+ projects, the RTRS Secretariat could do the following:

- Mapping areas with the highest chances of engaging in REDD+ projects (a combination of highly endangered areas and high carbon contents in local vegetation).
- Setting up strategic partnerships with non-government organizations with expertise in implementation of REDD+ projects (The Nature Conservancy, WWF-Brasil, Conservation International, etc.). Such partnerships not only must enable the assessment of potential areas for REDD+ projects, but also the search for additional external resources (for co-funding transaction costs), the development of necessary documents, and the implementation of onsite projects. Due to high transaction costs and to the need for specific knowledge, we think that it is more reasonable for RTRS to "outsource" services for assessing REDD+ project feasibility and implementation than to do such tasks itself. The same applies to developing the project design document and other activities necessary for implementing a carbon project.

**Payment for Ecosystemic Services**

As mentioned above, most PES schemes in Brazil are relatively small, they depend on public funds and are implemented in areas with low costs of opportunity for the conservation of
native vegetation. We consider that implementing several PES projects on a small scale among RTRS members (based on local or regional ecosystemic service delivery) would be very costly. Besides, getting such public (regional) resources for compensating RTRS producers would involve a long coordination and negotiation process. Hence, as is the case with REDD+ projects, for them to be attractive for RTRS, PES schemes must have a sufficiently high scale, that is, a minimum scale economy is necessary to make them feasible. Attaining such scale requires that most RTRS landowners be eligible for participating. A possible common feature of all RTRS producers are additional areas (besides what is required by law) reserved for native vegetation conservation. Such environmental asset could become a key element in a regular PES scheme. In line with the overall recommendations in this report, we think that such scheme has more chances to be successful if developed within the current RTRS credit system. Such scheme could be entirely managed within RTRS. Yet, the verification and facilitation of conservation requirement compliance could be outsourced (as it is in the RTRS current credit system). The assessment of the potential supply of additional conservation areas and the demand for biodiversity-related credits are the main tasks to be performed in a stage prior to the design of the PES scheme, so as to verify feasibility.

9. Proposal of a PES Model to RTRS

As mentioned at the beginning of this report, after discussions with the international advisory group, four models of PES mechanisms were developed and presented for meeting RTRS' request. The first model proposed issuing biodiversity credits according to the additional conserved (absolute) area in Categories 1 and 2. Model 2 suggested credits based on the idea of "biodiversity contents in soy". Model 3 was based on the principle of credits based on (opportunity of) "lost" production in additional conservation areas, and Model 4 was based on the principle of acknowledging conservation efforts by multiplying the rights to sell RTRS conventional credits. These Four Modalities are introduced in the Annex.

In the second meeting of the National Working Group (RTRS Task Force in Brazil), in São Paulo, on July 23, 2014, it was suggested that Models 2 & 3 were the most interesting modalities for RTRS, and it was recommended that these two modalities should be described in depth. On the other hand, the International Advisory Group recommended developing a fifth modality, a mix of the two modalities suggested by the National Group. As to Model 2, based on the "biodiversity content in soy", indicated by the size of the additional conservation area vis a vis the onsite productive area, such model had a positive effect: encouraging the conservation of wider areas. As to Model 3, based on the idea of missed or lost production, such model had a positive effect: encouragement of productivity earnings. Hence, in Model 5, both positive effects would be combined into one, as described below:
Modality 5 proposes a compensation index, calculated through the following equation:

\[ CI = ACA \times P \times CE \]

Where,

- CI = Conservation Index
- ACA = Additional Conservation Area (conservation area in Categories 1 & 2, outside the Legal Reserve and the PPA)
- P = Soy Productivity (onsite productivity in the previous year)
- CE = Conservation Effort (defined as the proportion of ACA vis a vis the property productive area)

With this format, the Conservation Index aims at encouraging property efficiency, measured in terms of productivity, and, at the same time, aims at being equitable, recognizing conservation efforts done by a landowner as regards its productive area. This means that two landowners having same size conservation areas (e.g. 200 hectares), but with different productive areas, will receive different compensation. The landowner having a larger productive area will receive a smaller compensation as its conservation effort is lower, with an impact on a smaller productive area on their property.

The proposal is that such Index be used for estimating the value of the compensation to be received by a producer and that the resource not be directly derived from the buyer, but from a Biodiversity Fund to be created by RTRS. Such fund should be fed by a small percentage to be collected from all the transactions of RTRS credits, assuming that it is operating appropriately and on a large scale.

Even though some members were reluctant to create a biodiversity fund, its creation seems to make sense for the following reasons:

1. A Biodiversity Fund will avoid competitiveness between a possible biodiversity credit and the existing RTRS credit,
2. Creating a fund for supplying resources may solve the biodiversity conservation issue in the mid an long-term as this would be a permanent fund,
3. Biodiversity conservation costs, represented by the conservation of additional vegetation areas in areas defined as priority conservation areas, are shared by all the chain soy parties,
4. If there is enough scale for existing RTRS credits, the percentage to be collected from transactions for feeding the fund may be very small,
5. It is not clear whether there would be demand for an additional "biodiversity credit" besides the existing RTRS credit,
6. There is no clear and direct relation between the Compensation Index (CI) and the amount of soy purchased by the industry, as it exists in the current RTRS credit.

7. The index value could be defined by RTRS members, not by the market, depending on the volume of resources available and on the disposition to accept this from producers with additional areas.

As mentioned above, one of the main advantages of the Index is that it encourages both productivity and conservation efforts. Its limitation is that the Index does not have a "unit", that is, it is not expressed in terms of hectares, kilos, etc., and, consequently, it may be difficult to report to buyers. Nevertheless, such limitation must be decreased if the fund institution decides to do so.

The equation that calculates the index, \( CI = ACA \times P \times CE \), may be reformulated as follows:

\[
CI = ACA \times P \times CE = ACA \times \frac{P}{AP} \times \frac{CE}{AP} = ACA^2 \times \frac{P \times CE}{AP^2}
\]

That is,

\[
CI = \frac{ACA^2}{AP^2} \times \text{Production}
\]

Where,

\( PA = \text{Productive Area} \)
\( \text{Production} = \text{total production of the property} \)

Thus, according to this equation, if the additional conservation area (ACA) is kept constant and the productive area (PA) is kept constant too, and if production increases, the conservation index shall increase, thus encouraging productivity gains. Hence, increasing production with the same productive area indicates an increase in productivity. By the same token, an increase in ACA will bring about an increase in CI. Or else, an increase in the productive area (PA) with the other constant variables will result in a lower CI as it is the result of a loss in productivity. The decrease in productive area (PA) with the same production volume also means a gain in productivity and will lead to an increase in the CI.

In Table 9, below, examples are displayed of how the Compensation Index (CI) applied to eight RTRS member properties (in Mato Grosso) would operate.

**Compensation Value for Biodiversity Protection**

Our suggestion is that RTRS use the CI (Conservation Index) for assigning "recognitions for biodiversity protection" among Biodiversity Protection Fund beneficiaries. RTRS must decide on the relation between the CI and the remuneration value. Even if there is no *a priori*
"appropriate" relation between the index and the compensation value, it is recommended assigning a fixed monetary value per index unit, as an annual recognition for protecting biodiversity. For instance, if the assigned value were US$ 8 per index unit, then, a landowner with a 1,230 index would be simply entitled to receive US$ 9,840 per year, while another landowner with a 230 index would be entitled to receive US$ 1,840 per year. We recommend assigning a fixed value per index unit because the index already recognizes the conservation efforts (proportional to the size of the productive area) and, hence, there is no need to determine a decreasing monetary value as the index increases (as a way of being equitable).

The value of recognition (per index unit) will depend on the size of the Fund (which will depend on - if our suggestion of charging a small percentage from RTRS credit transactions - the volume of RTRS traded credits and on the taxation percentage) and on the number of additional areas of biodiversity conservation available among RTRS members. RTRS must decide on the term of the agreements with the beneficiaries. Yet, initially, agreements should be signed for relatively long terms (5 to 10 years) to assure long term biodiversity protection.

The value of recognition could be reviewed on a periodical basis, considering inflation, shifts in the costs of opportunities or variations in the amount of the fund or in the supply of biodiversity protection areas. Yet, a minimum value per CI unit should be assured to landowners to reduce the degree of uncertainty and to engage them in commitments with long term biodiversity protection. To make such important decisions, a governance body for the Fund must be set up. Such body should be responsible for taking strategic as well as operational decisions. Initially, the fund governance body must be formed by representatives from different RTRS constituencies.
Table 9 - RTRS PROPERTIES WITH ADDITIONAL VEGETATION AREAS - Example

<table>
<thead>
<tr>
<th>Property</th>
<th>Municipalit y</th>
<th>Total Property Area (hectare)</th>
<th>Productive Area (hectare)</th>
<th>Total Vegetation Area (hectare)</th>
<th>PPA (hectare)</th>
<th>Required Legal Reserve (hectare) (35%)</th>
<th>Additional Conservation Area (hectare) (E = B-C-D)</th>
<th>Productivity (ton / hectare)</th>
<th>Product Loss (ton)</th>
<th>Conservation Effort</th>
<th>Conservation Index (I = G * H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Campo Novo do Parecis</td>
<td>3.619</td>
<td>2.169</td>
<td>1.450</td>
<td>68</td>
<td>1.267</td>
<td>115</td>
<td>3.7</td>
<td>427</td>
<td>0.05</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>Vera</td>
<td>5.324</td>
<td>1.475</td>
<td>3.849</td>
<td>130</td>
<td>1.864</td>
<td>1.856</td>
<td>2.9</td>
<td>5.382</td>
<td>1.26</td>
<td>6.772</td>
</tr>
<tr>
<td>3</td>
<td>Santa Carmem</td>
<td>1.646</td>
<td>849</td>
<td>797</td>
<td>54</td>
<td>576</td>
<td>167</td>
<td>3.2</td>
<td>535</td>
<td>0.20</td>
<td>106</td>
</tr>
<tr>
<td>4</td>
<td>Itaúba</td>
<td>14.025</td>
<td>6.920</td>
<td>7.105</td>
<td>423</td>
<td>4.909</td>
<td>1.773</td>
<td>3.0</td>
<td>5.319</td>
<td>0.26</td>
<td>1.363</td>
</tr>
<tr>
<td>5</td>
<td>Campo Novo do Parecis</td>
<td>2.635</td>
<td>1.566</td>
<td>1.069</td>
<td>68</td>
<td>922</td>
<td>79</td>
<td>2.8</td>
<td>222</td>
<td>0.05</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Sapezal</td>
<td>24.924</td>
<td>14.861</td>
<td>10.063</td>
<td>553</td>
<td>8.723</td>
<td>787</td>
<td>3.0</td>
<td>2.360</td>
<td>0.05</td>
<td>125</td>
</tr>
<tr>
<td>7</td>
<td>Sorriso</td>
<td>10.768</td>
<td>4.900</td>
<td>5.868</td>
<td>591</td>
<td>3.769</td>
<td>1.508</td>
<td>3.1</td>
<td>4.674</td>
<td>0.31</td>
<td>1.438</td>
</tr>
<tr>
<td>8</td>
<td>Nova Ubiratã</td>
<td>2.548</td>
<td>1.329</td>
<td>1.219</td>
<td>32</td>
<td>892</td>
<td>295</td>
<td>3.0</td>
<td>886</td>
<td>0.22</td>
<td>197</td>
</tr>
</tbody>
</table>
Implementing the System of Recognition for Biodiversity Protection

As mentioned above, feasibility levels of the Biodiversity Protection Fund would be higher when the current RTRS certification regime reached maturity, and when a higher amount of RTRS credits were sold in the marketplace (to attain a volume that would enable attaining a minimum operational Fund size). Yet, we consider that implementing the system of recognition for biodiversity protection would be better done through a progressive expansion of the number of beneficiaries. The system of recognition could begin in a delimited area considered as a high priority area for biodiversity conservation and for strategic interests for RTRS. For example, areas identified by the Ministry of the Environment as high priority areas for biodiversity conservation (there are already maps with different categories based on areas) could be used for outlining a pilot program for creating a Fund and allocating recognitions among RTRS members located in such areas. Or, otherwise, priority areas identified by the Ministry of the Environment could be selected as priority areas for RTRS.

Initially, allocation of recognitions may be applied in any soy-producing country. Yet, the definition of "additional area for biodiversity protection" will vary, depending on local legislation.

Next Steps

If the RTRS Board considers that it is worthwhile further exploring the idea of a "Fund for Biodiversity Protection", the following tasks would need to be undertaken for assessing its level of feasibility and projecting its operation:

- Assessment of possibilities for the supply of additional areas of biodiversity protection among RTRS members.
- An estimate of the appropriate rate on RTRS credit transactions that must be charged for feeding the Fund. Development of scenarios regarding size of Fund, assuming different RTRS credit market trends.
- Assessment of soy industry availability for contributing with Fund creation.
- Designing a possible governance body for the Fund, and assessing perceptions of different stakeholders on how the Fund should be managed.
Analysis and Strategy of Economic Instruments and of a Payment for Environmental Services system for Categories 1 & 2 in the Round Table on Responsible Soy (RTRS) Mapping

Bibliography


ANNEX - Modalities of Suggested Payment for Environmental Services (PES)

Modality 1: Biodiversity credits depending on the (absolute) additional preserved area in Categories 1 and 2.

Definition of credit: In this scenario, a credit is developed depending on the amount of additional conservation area existing in the property, where:

Additional Conservation Area = vegetation preserved in Category 1 and 2 areas as defined by RTRS mapping, apart from mandatory conservation areas (Legal Reserve and PPAs).

Credit = Additional conservation area

Unit: Hectares

Verification: Verification is done remotely, with remote sensing devices. For this, it will be necessary to have the following information: geographic borders of properties, RTRS mapping of prioritary areas for conservation and satellite images.

Type of Agreement: The Agreement may be on a short-term, a mid-term or a long-term basis. Mid and long-term agreements should be preferred as this would foster producers' commitment with maintaining preserved areas. Payment may be made on an annual basis:

Advantages:

- Simple. No need to use complex indicators and calculations. Each additional conservation area hectare is equivalent to one credit and any interested party may verify the existence of such credit through satellite images. The largest the additional conservation area, the higher the incentive that is received, and this encourages conservation of larger areas.

Limitations:

- No relation with soy production. Buyers may buy biodiversity credits, but this is not related with the amount of purchased soy.

- Communications become more difficult: 100% of acquired soy is compensated with biodiversity credits.

- Does not encourage soy productivity yields.

- Conservation efforts of producers are not taken into account. For example, producers having 100 hectares of additional conservation area in 500 hectare-properties. (20% of the property) makes an effort and suffers a higher impact than producers with 200
hectares of additional conservation areas in a 5,000-hectare property. (4% of the property), but, in this scenario, it would be receive half of the incentive.

<table>
<thead>
<tr>
<th>Farm</th>
<th>Municipality</th>
<th>Total Farm Area (ha)</th>
<th>Productive Area</th>
<th>Vegetation Area - excluding APP</th>
<th>Legal Reserve required (ha.)</th>
<th>Forest surplus (ha.)</th>
<th>Productividade (supostas/ton/ha.)</th>
<th>Créditos de Biodiversidade modalidade 1</th>
<th>Créditos convencionais RTRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Campo Novo do Parecis</td>
<td>3.519</td>
<td>2.269</td>
<td>1.350</td>
<td>1.232</td>
<td>18</td>
<td>3.7</td>
<td>18</td>
<td>8.482</td>
</tr>
<tr>
<td>2</td>
<td>Vera</td>
<td>5.125</td>
<td>1.475</td>
<td>3.949</td>
<td>1.854</td>
<td>2.3</td>
<td>1.986</td>
<td>4.278</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Santa Carmem</td>
<td>1.005</td>
<td>649</td>
<td>7.99</td>
<td>579</td>
<td>218</td>
<td>5.2</td>
<td>228</td>
<td>2.717</td>
</tr>
<tr>
<td>5</td>
<td>Campo Novo do Parecis</td>
<td>2.634</td>
<td>1.566</td>
<td>1.069</td>
<td>922</td>
<td>147</td>
<td>2.8</td>
<td>147</td>
<td>4.335</td>
</tr>
<tr>
<td>6</td>
<td>Safidel</td>
<td>25.001</td>
<td>14.861</td>
<td>10.063</td>
<td>8.753</td>
<td>1.310</td>
<td>3.0</td>
<td>1.310</td>
<td>44.583</td>
</tr>
<tr>
<td>7</td>
<td>Sorriso</td>
<td>9.400</td>
<td>4.900</td>
<td>5.368</td>
<td>3.290</td>
<td>2.578</td>
<td>3.1</td>
<td>2.578</td>
<td>15.190</td>
</tr>
<tr>
<td>8</td>
<td>Nova Ubiratã</td>
<td>2.549</td>
<td>1.329</td>
<td>1.219</td>
<td>892</td>
<td>327</td>
<td>3.0</td>
<td>327</td>
<td>3.987</td>
</tr>
</tbody>
</table>

==

Modality 2: Credit based on the idea of "biodiversity content in soy"

Definition of credit: Credit is based on the idea of "biodiversity content in soy" That is, the credit is calculated according to the relation between the additional conservation area existing in the property and the productive area in the same property, and by using the amount of soybean produced as a basis for calculation.

Credit = Multiplier x amount of soybean produced in the property, where:

The Multiplier is defined in terms of categories according to biodiversity content.

Content of biodiversity = area of conservation in Categories 1 & 2 - legally protected areas in Categories 1 & 2 (Legal Reserve and PPAs) / property productive area (area in the property - LR - PPA - additional areas in Categories 1 & 2).

Three categories of Multipliers are defined according to the content of biodiversity.

For example:

<table>
<thead>
<tr>
<th>Content of Biodiversity</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 0 to 25%</td>
<td>0,25</td>
</tr>
<tr>
<td>Between 25% and 50%</td>
<td>0,5</td>
</tr>
<tr>
<td>Between 50% and 75%</td>
<td>0,75</td>
</tr>
<tr>
<td>Above 75%</td>
<td>1</td>
</tr>
</tbody>
</table>

Unit: Tons of soybean
Verification: Verification is performed based on property information and on satellite images. As regards properties, it will be necessary to know the amount of soybean produced (as with RTRS Credit verification) as well as the property and Legal Reserve boundaries. For the analysis of additional areas, it will be necessary to have RTRS mapping and updated images.

Type of Agreement: Agreements must be signed on an annual basis as productivity varies on an annual basis.

Advantages:

- The RTRS Credit Trading platform may be used for negotiations concerning biodiversity credits.
- Credits are identified in tons of soybean, this allows buyers "to neutralize" all their purchases with biodiversity credits.
- Conservation efforts on behalf of producers are taken into account.

Limitations:

- The definition of amount of credits is not straightforward, and depends on the calculation of multipliers.
- Competition with RTRS credits on the platform
- Large producers are favored
### Modality 3: Biodiversity Credits based on the idea of "lost" production in additional conservation areas

Definition of credit: This type of credit is based on the idea of "lost or missed production" in additional conservation areas of local vegetation. Credits are calculated with the following equation:

\[
\text{Credit} = \text{Productivity} \times \text{Additional Conservation Area}
\]

Where, 
\[\text{Productivity} = \frac{\text{Previous Year Production}}{\text{Area of Production}}\]

and the Additional Conservation Area = conservation area within Categories 1 and 2, besides mandatory conservation areas (Legal Reserve and PPAs).

Unit: tons of soy

Verification: Verification systems would be the same as the current RTRS credit system. External auditors would need to verify the following key variables: (a) Productivity, and (b) Additional Conservation Area. For this, the following information on the property would be necessary: production, property map including productive areas and conservation areas, as identified, as well as map of RTRS priority areas for conservation.

Credit Trading Structure: This type of credits would carry a label different from the one used for current RTRS credits. They would be sold as biodiversity *differentiated* credits (even with the same unit as conventional credits). They would resort to the same trading structure (RTRS Platform) as conventional credits, but would be "a different product", and their price would be negotiated in a differentiated manner.
Pricing Mechanism: The pricing mechanism would be the same as that with RTRS conventional credits (supply and demand in the Trading Platform), but applied to this type of differentiated credits (biodiversity credits). For them to be sufficiently attractive for Producers, biodiversity credits would need to obtain a price higher than that of current conventional credits.

Type of Agreement: annual (as productivity varies on an annual basis)

Advantages:

- Credits would be easily calculated and based on an easy idea of communication (lost production).
- They may use the same platform as with conventional credits, and it would only be necessary to add biodiversity differentiated credits to the system.
- They have a potential for encouraging increase in productivity as the higher the productivity rate, the more biodiversity credits will be developed.

Limitations:

- Creating a "virtual" soy credit system (where producers "no longer" produce) may bring about legitimacy issues on the grounds that it is a "speculative" system (not much to do with reality).
- A one-year agreement may not be enough for creating lasting incentives for conservation of local vegetation.
Modality 4: Recognition of Conservation Efforts by Multiplying the Rights to Selling RTRS Conventional Credits.

Definition of credit: This alternative does not consist in differentiated credits, but in the opportunity for producers to multiply their RTRS conventional credits, depending on their conservation efforts.

Multiplier = (Additional conservation area / productive area) x 3

Calculation of rights on sales of credits = #conventional credits + (#conventional credits x Multiplier)

Additional conservation area = conservation area within Categories 1 and 2, besides mandatory conservation areas (Legal Reserve and PPAs).

Productive Area = soy production area

Unit: tons of soybean (conventional credit)

Verification: Verification systems would be the same as the current RTRS credit system. External auditors would need to verify the following key variables: (a) Productive Area, and (b) Additional Conservation Area. For this, the following information on the property would be necessary: production, property map including productive areas and conservation areas, as identified, as well as map of RTRS priority areas for conservation.

Credit Trading Structure: same as conventional system of RTRS credits (unchanged)

Pricing Mechanism: same as conventional system of RTRS credits (unchanged)

Type of Agreement: annual (as productive areas may vary on an annual basis)

Advantages:

- Only a few changes are necessary in the current RTRS credit system; no need for creating differentiated credits (uncertain demand)
- Easy communication (right to multiply conventional credits, depending on conservation efforts)

Limitations:

- The problem of the current credit system seems to be the excessive supply. Creating the possibility of multiplying credits (for acknowledging conservation efforts) may
worsen this situation. The success of this alternative will depend on the considerable increase in demand for conventional credits.

<table>
<thead>
<tr>
<th>Farm</th>
<th>Municipality</th>
<th>Total Farm Area (ha)</th>
<th>Productive Area</th>
<th>Vegetation Area - excluding APP</th>
<th>Legal Reserve required (ha.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Campo Novo do Parecis</td>
<td>3.519</td>
<td>2.269</td>
<td>1.250</td>
<td>1.232</td>
</tr>
<tr>
<td>2</td>
<td>Vera</td>
<td>5.325</td>
<td>1.475</td>
<td>3.849</td>
<td>1.864</td>
</tr>
<tr>
<td>3</td>
<td>Santa Carmem</td>
<td>1.655</td>
<td>849</td>
<td>797</td>
<td>579</td>
</tr>
<tr>
<td>5</td>
<td>Campo Novo do Parecis</td>
<td>2.634</td>
<td>1.566</td>
<td>1.069</td>
<td>922</td>
</tr>
<tr>
<td>6</td>
<td>Sapezal</td>
<td>25.008</td>
<td>14.861</td>
<td>10.063</td>
<td>8.753</td>
</tr>
<tr>
<td>7</td>
<td>Sorriso</td>
<td>9.400</td>
<td>4.900</td>
<td>5.868</td>
<td>3.290</td>
</tr>
<tr>
<td>8</td>
<td>Nova Ubiratã</td>
<td>2.549</td>
<td>1.329</td>
<td>1.219</td>
<td>892</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forest surplus (ha)</th>
<th>Produtividade (suposta)</th>
<th>Multiplicador</th>
<th>Créditos convencionais RTRS</th>
<th>Direitos a créditos adicionais RTRS</th>
<th>Total créditos</th>
<th>% Aumento</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>3,7</td>
<td>0,02</td>
<td>8.482</td>
<td>206</td>
<td>8.687</td>
<td>2</td>
</tr>
<tr>
<td>1.986</td>
<td>2,9</td>
<td>4,04</td>
<td>4.278</td>
<td>17.275</td>
<td>21.553</td>
<td>404</td>
</tr>
<tr>
<td>218</td>
<td>3,2</td>
<td>0,77</td>
<td>2.717</td>
<td>2.090</td>
<td>4.807</td>
<td>77</td>
</tr>
<tr>
<td>2.146</td>
<td>3,0</td>
<td>0,93</td>
<td>20.760</td>
<td>19.316</td>
<td>40.076</td>
<td>93</td>
</tr>
<tr>
<td>147</td>
<td>2,8</td>
<td>0,28</td>
<td>4.385</td>
<td>1.236</td>
<td>5.620</td>
<td>28</td>
</tr>
<tr>
<td>1.310</td>
<td>3,0</td>
<td>0,26</td>
<td>44.583</td>
<td>11.794</td>
<td>56.377</td>
<td>26</td>
</tr>
<tr>
<td>2.578</td>
<td>3,1</td>
<td>1,58</td>
<td>15.190</td>
<td>23.972</td>
<td>39.162</td>
<td>158</td>
</tr>
<tr>
<td>327</td>
<td>3,0</td>
<td>0,74</td>
<td>3.987</td>
<td>2.945</td>
<td>6.932</td>
<td>74</td>
</tr>
</tbody>
</table>