



1 sustainable forest management and natural forest protection. Almost 116,000 ha received  
2 financing through the old system.

3 By the time the PSA program was created, therefore, Costa Rica already had in place an  
4 elaborate system of payments for reforestation and forest management, and the institutions to  
5 manage it. The Forestry Law built on this base, with two major changes. First, it changed the  
6 justification for payments from support for the timber industry to the provision of environmental  
7 services. Second, it changed the source of financing from the government budget to an  
8 earmarked tax and payments from beneficiaries and created FONAFIFO to administer the  
9 program. In other respects, the PSA program was very similar to previous reforestation  
10 incentives. Until 2000, the types of activities financed under the PSA program closely paralleled  
11 those financed by previous instruments: reforestation, sustainable forest management, and  
12 natural forest management. Many of the details of implementation, such as the payment amounts  
13 and the scheduling of payments, were also carried over from the earlier programs. Indeed, CAF  
14 certificates were used to pay participants in the first year of the PSA program.

15 Over the years, the PSA program has evolved considerably. Initially completely  
16 untargeted, it is moving towards a greater degree of targeting. In 2000, the array of instruments  
17 was simplified to only two: forest plantation<sup>2</sup> and forest conservation. An agroforestry modality  
18 was introduced in 2004 [CHECK DATE], and a natural regeneration modality is being  
19 introduced. On the demand side, FONAFIFO has secured agreements with many water users to  
20 pay for watershed conservation, and developed streamlined instruments to facilitate this. It was  
21 an early entrant in the global carbon market with its Certifiable Tradeable Offset (CTO).

22 Costa Rica's PSA program is overseen by a governing board composed of three  
23 representatives of the public sector (one from the Ministry of Environment and Energy, one from  
24 the Ministry of Agriculture, and one from the National Banking System) and two representatives  
25 from the private sector (appointed by the board of directors of the National Forestry Office).

## 26 **Who pays for the PSA program?**

27 The PSA program is financed in a variety of ways. To date, the bulk of financing has  
28 been obtained by allocating 3.5 percent of the revenues from a fossil fuel sales tax to  
29 FONAFIFO {US\$ PER YEAR?}.<sup>3</sup> Since 2000, the PSA program has also been supported by a  
30 loan from the World Bank and a grant from the Global Environment Facility (GEF), through the  
31 Ecomarkets project (World Bank, 2000b).<sup>4</sup> It has also received a grant from KfW through Huetar  
32 Norte Forest Program.<sup>5</sup> Several efforts have also been made to charge various service users for

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<sup>2</sup> The forest plantation contract is called a 'reforestation' contract by FONAFIFO, but is intended to produce commercial timber plantations. To avoid confusion over its intent, it will be called the 'forest plantation' contract herein

<sup>3</sup> Initially, the PSA program was to receive 5 percent of the fuel tax revenues, but conflicts with the Ministry of Finance meant that only a small part of the earmarked funds were actually received by FONAFIFO (FONAFIFO, 2000). An agreement was later reached in which the PSA program receives a guaranteed 3.5 percent of the fuel tax revenues.

<sup>4</sup> The GEF grant represents additional resources for the PSA program, but the Bank loan does not. As discussed below, the GEF grant can be considered a payment from biodiversity users.

<sup>5</sup> The EUR10.2 million (US\$11.9 at the 2003 exchange rate) grant was received in 2003, but was made retroactive to 1999 by reimbursing FONAFIFO for earlier contracts it had entered into in anticipation of receiving the grant. This grant is essentially essentially a traditional aid/development grant, which happens to be

1 the services they are receiving. Ultimately, it is envisaged that all beneficiaries of environmental  
2 services would pay for the water services they receive. As discussed below, this objective has  
3 been met only partially to date, though progress is being made.

#### 4 *Water service payments*

5 The role of forests in providing hydrological services was explicitly recognized in  
6 Forestry Law No.7575, and payments from HEP generators and other water users were always  
7 envisaged to be one of the legs on which the PSA program would rest. Law No.7575 does not  
8 obligate beneficiaries to pay for services, however. Any payments must be negotiated with  
9 potential service buyers. Since its inception, FONAFIFO has dedicated substantial efforts to  
10 negotiating with water users for them to pay for the water services they receive.

11 A number of agreements have been reached with individual water users (Table 1). A first  
12 agreement, with private producer Energía Global, was reached in late 1997 with the assistance of  
13 FUNDECOR. Under this agreement, Energía Global reimburses FONAFIFO for part of the cost  
14 of payments made to participating land users in the watersheds above the two run-of-the-river  
15 hydroelectric plants operated by the company. A similar agreement was reached a year later with  
16 Platanar S.A. Perhaps more significant, a framework agreement was reached with state power  
17 producer CNFL. This has led to specific agreement to finance conservation in Río Aranjuez, Río  
18 Balsa, and Lago Cote watersheds.

19 After a slow start, the number of financing agreements with water users has risen sharply  
20 in recent years. Recent agreements include other HEP producers, but also a bottler, a municipal  
21 water supply system, irrigation water users, and hotels. The acceleration in the number of  
22 agreements signed was helped by FONAFIFO's development of a streamlined process based on  
23 environmental services certificates (*Certificados de Servicios Ambientales, CSA*) which are  
24 standardized instruments that pay for the conservation of one hectare of forest in a specified area.  
25 Thus rather than negotiating each individual agreement on an *ad hoc* basis, FONAFIFO can sell  
26 interested water users the appropriate number of certificates. The amounts paid by water users  
27 have also risen: early agreements saw water users paying for a quarter of the cost of conservation  
28 (based on the notion that water services were one of four services that the law said forests  
29 provide), while recent agreements involve water users paying the entire cost of conservation, as  
30 well as additional fees to cover FONAFIFO's administrative costs.<sup>6</sup>

31 The main hold-outs have been the country's main water utility (*Instituto Costarricense de*  
32 *Acueductos y Alcantarillados, AyA*) and the electric utility (*Instituto Costarricense de*  
33 *Electricidad, ICE*). These public agencies have traditionally been exempt from all water  
34 payments, including the nominal water concession fees.

35 In mid-2005, Costa Rica is on the cusp of a major expansion of using water payments to  
36 finance its PSA program. In revising its water tariff (which currently charges water users near-  
37 zero nominal fees), it will introduce a conservation fee that will be dedicated to watershed  
38 conservation. Once fully implemented, this fee will generate an estimated US\$21 million

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implemented through the PSA program (an existing mechanism and a trustworthy institution up-and-running in the receiving country), rather than a conscious effort to pay for specific environmental services.

<sup>6</sup> In addition to the agreements under the PSA program, there has also been a bilateral agreement between a private HEP producer, La Manguera SA, and the NGO that owns the watershed from which the La Esperanza HEP plant draws its water (Rojas and Aylward, 2002). In October 1998, La Manguera agreed to pay the Monteverde Conservation League US\$10/ha/year to maintain the watershed under forest cover.

1 annually, of which about US\$7.5 million would be channelled through the PSA program.<sup>7</sup> This  
2 new tariff will initially be instituted by Presidential decree, and later embedded in a new Water  
3 Law which is under consideration in the National Assembly.

#### 4 *Biodiversity payments*

5 The Ecomarkets project includes a US\$8 million grant from GEF, which can be  
6 considered a payment from the global community for the biodiversity services provided by Costa  
7 Rica's biodiversity. The GEF grant contributes US\$10/ha/year towards conservation payments in  
8 biodiversity priority areas. Another GEF grant, for the Costa Rica component of the Regional  
9 Integrated Silvopastoral Ecosystem Management Project, is also being channeled through the  
10 PSA program (Pagiola and others, 2004). This project aims to generate both biodiversity  
11 conservation and carbon sequestration benefits by using a PES mechanism to encourage the  
12 conversion of extensive pastures to silvopastoral land uses. Conservation International (CI) is  
13 also paying for biodiversity conservation through the PSA Program. In the Osa and Amistad  
14 Pacifico conservation areas, it is providing US\$0.5 million to pay 50 percent of the cost of  
15 agroforestry contracts; likewise it is paying 50 percent of the costs of planting up to 80,000 trees  
16 under agroforestry contracts in the buffer zone of Chirripó National Park.

#### 17 *Carbon payments*

18 From the beginning, Costa Rica's PSA program has sought to obtain financing by selling  
19 carbon emission reduction credits to interested buyers. As with other aspects of the PSA  
20 program, this effort built on work already underway. Costa Rica had been very active in  
21 undertaking carbon emission reduction activities under the Joint Implementation (JI) program –  
22 including several land-use based projects, in which reductions in carbon emissions were  
23 achieved either by increasing carbon stocks through reforestation programs, or by conserving  
24 existing stocks by preventing deforestation. Costa Rica established a formal institutional  
25 framework to manage the program, including a dedicated Office on Joint Implementation  
26 (OCIC).

27 When the PSA program was initiated, Costa Rica attempted to move beyond the project-  
28 by-project approach of the JI program to commoditize carbon emissions (R. Castro and others,  
29 1997; LeBlanc, 1997; OCIC, 1999). It developed a standardized instrument, the Certifiable  
30 Tradeable Offset (CTO), which represented an externally certified 1-tonne net reduction in  
31 carbon emissions. These emissions reductions came from the estimated effects of the  
32 reforestation and forest conservation activities financed by the PSA program. Contracts with  
33 PSA program participants specify that the rights to any resulting emissions reductions belong to  
34 FONAFIFO. Measures taken to increase the instrument's credibility included auditing by SGS  
35 and the inclusion of a substantial margin in emissions. The principle of the approach was that  
36 investors seeking to acquire emission reduction credits need not develop a specific project to do  
37 so, but could simply purchase the desired amount of CTOs. Considerable effort was devoted to  
38 creating the CTO and ensuring it would be a credible instrument. The program got an early boost  
39 when a consortium of Norwegian power producers paid US\$2 million (including a contribution  
40 from the Norwegian Government) for 200,000 CTOs (Castro and others, 1997). This sale  
41 financed reforestation and forest conservation activities on about 52,000 ha, generating an  
42 estimated lifetime reduction in emissions of about 231,000 tonnes of carbon.

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<sup>7</sup> Of the balance, about US\$6 million would be allocated to the Ministry of Environment's Water Department, and US\$7.5 million would be used to support protected areas.

1 Despite the high expectations generated by the concept of emissions trading, results to  
2 date have been extremely modest and the short-term potential is extremely limited (Pagiola and  
3 Platais, 2001). Under the agreement reached in Bonn in July 2001, only reforestation and  
4 afforestation are considered eligible under the Kyoto Protocol's Clean Development Mechanism.  
5 As most of Costa Rica's emission reductions are generated by avoided deforestation rather than  
6 reforestation, no additional sales of CTOs were made.

7 With the Kyoto Protocol now ratified, Costa Rica is returning to the carbon market. It is  
8 proposing to sell about 54,000 tCO<sub>2</sub>e/year for 14 years to the World Bank's BioCarbon Fund.  
9 This would be achieved through a mix of planting trees in agroforestry systems, natural  
10 regeneration, and commercial plantations. FONAFIFO is also exploring the potential for sales to  
11 the 'retail' (non-Kyoto) market for emissions reduction. Already it has sold emission reductions  
12 from conservation of 100ha of forests in the Talamanca region to Italian firm Lifegate, in a deal  
13 arranged with the assistance of Italian NGO GEV-Modena. FONAFIFO is also working with  
14 Spanish NGO ECODES to arrange similar sales in Spain.

15 Need to develop new modalities for carbon. {...}

16 Carbon payments may be insufficient by themselves. {...}

#### 17 *Landscape payments*

18 The Forest Law mentions scenic beauty as one of the environmental services provided by  
19 forests. Negotiations were undertaken with several 'users', including hotels and a rafting  
20 company, to pay for this service, but they have not resulted in any agreements to date.

#### 21 *Summary*

22 Overall, the PSA program is only partly financed by direct payments from users. The  
23 bulk of its financing is from the fuel tax, which can only tenuously be regarded as a payment by  
24 service users. The proportion of the program financed by direct payments has been growing,  
25 however, and is set to increase dramatically as the new water tariff is implemented.

26 The program's own costs are financed from a levy of 5 percent of the flow of funds it  
27 handles, although specific agreements with some service users include a 7 percent contribution to  
28 administrative costs.

#### 29 **How are service providers paid?**

30 The PSA program targets private land users, with the aim of integrating environmental  
31 considerations in agricultural landscapes. A separate program is aimed at financing protected  
32 areas.

33 Under the PSA program, participants must present a sustainable forest management plan  
34 certified by a licensed forester ('*regente*').<sup>8</sup> In addition to the proposed land use, management  
35 plans include information on land tenure and physical access; a description of topography, soils,  
36 climate, drainage, actual land use, and carrying capacity with respect to land use; plans for  
37 preventing forest fires, illegal hunting, and illegal harvesting; and monitoring schedules. The task  
38 of contracting with farmers was initially undertaken by SINAC and by NGOs such as  
39 FUNDECOR. FONAFIFO took it over itself in 2003. It established eight regional offices to

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<sup>8</sup> *Regentes* are licensed forest engineers. They are the forest equivalent of notaries public, qualified to certify whether activities meet forest management standards.

1 handle applications, sign contracts, and monitor implementation. Once their plans have been  
2 approved, land users begin adopting the specified practices, and receive payments. Participants  
3 cede the rights to the greenhouse gas emissions reductions resulting from their activities to  
4 FONAFIFO.

5 Article 69 of Forestry Law No.7575 authorizes conservation easements to be contracted  
6 for periods of five or twenty years. Until 2000, FONAFIFO only contracted five year  
7 conservation easements, mainly because of the uncertainty of future funding. PSA contracts  
8 provide for payments spread over a five-year period. The specific schedule depends on the  
9 instrument. Forest conservation contracts provide for equal annual payments over the 5-year  
10 lifetime of the contract. In contrast, forest plantation contracts front-load a large part of the  
11 payment into the early years of the contract, with much smaller payments in later years.<sup>9</sup> Forest  
12 conservation contracts are for 5 years, and are renewable by mutual agreement. Reforestation  
13 contracts provide a 5-year payment but call for participants to continue with the agreed land use  
14 for 15 years, a restriction which is written into the land title, so that it transfers to the new buyer  
15 should the land be sold. Contracts undertaken under the Ecomarkets program and under the deals  
16 with the HEP producers have from the start tended to focus on longer duration contracts. The  
17 PSA contracts financed under the CNFL agreement, for example, are for 10-year periods rather  
18 than the PSA program's standard 5-year period. All GEF co-financed contacts under the  
19 Ecomarkets project have a contractual obligation of twenty years, in successive five-year periods  
20 that are automatically renewed when resources permit and landowners have met their contractual  
21 obligations.

22 The establishment of trustworthy contract monitoring and verification systems is an  
23 important part of any system of payments. Monitoring is undertaken primarily by the agencies  
24 responsible for contracting with farmers, including SINAC, FUNDECOR, and by *regentes*, with  
25 regular audits to verify the accuracy of monitoring. With the financial support of the Ecomarkets  
26 project, FONAFIFO has established a state-of-the-art database to track compliance.

### 27 **Impact of the PSA program**

28 The PSA program has been very popular with landowners, with requests to participate far  
29 outstripping available financing. Figure 1 shows the area contracted under each modality since  
30 the PSA program's inception. At the end of 2004, about 230,000ha were enrolled in the program,  
31 the vast majority (94 percent) under forest conservation contracts. Forest plantation contracts  
32 accounted for an additional 4 percent, and the now discontinued forest management contract for  
33 another 1 percent. The new agroforestry contract and the plantation with own resources contract  
34 accounted for negligible areas. Cumulatively, the PSA program has covered about 450,000ha.

35 In a separate paper, I identify various different types of inefficiency that a PES program  
36 might have:

- 37 • Offering payments that are insufficient to induce adoption of socially-desirable land uses,  
38 thus causing socially-undesirable land uses to remain in use.
- 39 • Inducing the adoption of socially-undesirable land uses (that supply environmental services,  
40 but at a cost higher than the value of the services).
- 41 • Paying for adoption of practices that would have been adopted anyway.

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<sup>9</sup> Under the forest plantation contract, 50 percent of the US\$538 payment is paid in the first year, 20 percent in the second year, 15 percent in the third, 10 percent in the fourth, and 5 percent in the fifth.

1 The first two are problems that result in social inefficiency: in either the failure to adopt practices  
2 whose social benefits exceed their costs, or in the adoption of practices whose benefits are  
3 smaller than their costs. The third problem is not one of social inefficiency: the practices adopted  
4 are in fact socially efficient. Rather, this problem is one of financial efficiency for the program,  
5 which is generating less environmental services per dollar spent than if the problem was avoided.

## 6 **Has the program affected forest cover?**

7 The forest area enrolled in the PSA program thus represented, at the end of 2004, about  
8 10 percent of the country's forest area. This high percentage, coupled with the country's success  
9 at reversing deforestation trends, makes it tempting to attribute the one to the other.

10 Of the various contracts that the PSA program offers, forest conservation contracts have  
11 been by far the most popular, accounting for 89 percent of the area covered since 1997.  
12 Sustainable forest management (now discontinued) accounts for 6 percent of total area, and  
13 forest plantation for 5 percent of area. The impact of the PSA program, therefore, is likely to  
14 have taken the form of preventing deforestation, rather than increasing current forest cover.

15 Even in terms of preventing deforestation, however, the question remains: how much of  
16 this gain is incremental – that is, how much less deforestation has occurred on land enrolled in  
17 the PSA program than would have occurred if the program had not existed?<sup>10</sup> There is some  
18 evidence that pasture was in any case becoming less profitable, particularly in marginal areas,  
19 and that some reversion to forest might have occurred anyway (White and others, 2001).  
20 Conversely, Aylward and others (1998) find that pasture can be quite profitable in some areas.  
21 Ortiz and others (2003) found that many PSA participants were well-off individuals claiming  
22 payments for forested land on holiday homes;<sup>11</sup> they would presumably have had little  
23 inclination to clear forest even in the absence of the PSA program. Miranda and others (2003)  
24 find a similar result in a smaller survey of PSA participants in the Río Virilla watershed. That  
25 FONAFIFO has a large waiting list of applicants willing to enroll at current prices suggests that  
26 clearing forest is not very profitable in many areas. At the very least, it suggests that FONAFIFO  
27 could, with the same budget, have enrolled a much larger area. As another piece of the puzzle,  
28 Robalino and Pfaff (2004) find that deforestation or forest conservation in one parcel increases  
29 the probability that neighboring parcels do the same. Actions that tend to encourage forest  
30 conservation, therefore, would tend to have that impact beyond the specific parcels covered by  
31 the action. A detailed assessment of whether the PSA program has resulted in incremental land  
32 use change will be conducted during the summer of 2005.

33 In assessing the incremental land use impact of the PSA program, two factors need to be  
34 borne in mind. First, FONAFIFO never set incrementality as an objective. Rather, their approach  
35 is to 'recognize' the environmental services of whoever is providing them. In principle, if their  
36 budget was sufficient they would pay any land user whose land use practices are thought to  
37 provide environmental services. Second, the PSA program was instituted at the same time as a

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<sup>10</sup> It should be noted that PSA participants do incur additional obligations compared to non-participants who also maintain forest. Although clearing forest is forbidden, up to 40 percent of standing timber above a certain diameter can be harvested. PSA participants give up this right. Again, however, it is unclear to what extent non-participants avail themselves of this option.

<sup>11</sup> Their survey had a serious selection bias problem, as it was conducted by telephone. While their results cannot be taken as representative of all participants, they do show that a sizeable group of participants consists of relatively well-off people – often urban professionals.

1 package of other measures, including a law banning the clearing of forest land. In a sense, the  
2 PSA program was a quid-pro-quo for legal restrictions on clearing. Without the PSA carrot,  
3 opposition to the legal restrictions might have been much higher.

#### 4 **Have environmental services been generated?**

5 It is unfortunately impossible to determine the extent to which the PSA program has been  
6 successful in generating environmental services. The PSA program has established, with the  
7 support of the Ecomarkets Project, a state-of-the-art system to monitor land user compliance with  
8 payment contracts. The program remains weak, however, in monitoring its effectiveness in  
9 generating the desired environmental services. We focus here on biodiversity and water services,  
10 the only two for which there has been significant sales.

##### 11 *Biodiversity conservation services*

12 A crude indicator of effectiveness at providing biodiversity services is provided by the  
13 percentage of enrolled area located in priority areas. A 1996 evaluation (the “GRUAS Report”)  
14 defined biodiversity conservation priorities on a countrywide basis. FONAFIFO data show that  
15 only 29 percent of the area enrolled during 1999-2001 was located within the GRUAS lands,  
16 representing about 5 percent of the GRUAS area. It thus seems quite likely that substantial  
17 resources were spent in areas where few biodiversity services were in fact being generated. In  
18 those early years of the program, however, payments were essentially untargeted, with applicants  
19 accepted on a first-come basis. Significant efforts have been made in recent years to enforce  
20 location in GRUAS lands as a condition of eligibility. [{FONAFIFO to provide updated figures  
21 on % land, % contracts located in GRUAS areas}](#)

22 With most contracts being for forest conservation, incremental impacts on biodiversity in  
23 enrolled areas depend largely on whether the program is achieving an incremental change in land  
24 cover. It is interesting to note, however, that almost 21 percent of the enrolled area located in  
25 GRUAS priority areas was for forest plantations – well above the program average. Thus the  
26 actual impact on land use may have been greater in these areas than elsewhere. The new  
27 agroforestry modality, though it only represents a small area to date, looks likely to have a  
28 significant impact on biodiversity in agricultural landscapes. The Silvopastoral Project has been  
29 documenting that land use practices with significant tree cover harbor higher levels of  
30 biodiversity than current tree-less pastures (Figure 2). The observed diversity of bird species  
31 (shown in the figure), as well as the number of individuals (not shown), is higher in land uses  
32 with trees, and higher yet when the tree density is higher. Similar results are being obtained for  
33 other indicators (vegetation, ants, and butterflies).

##### 34 *Water services*

35 Expectations that the PSA program’s would improve water services are based on the  
36 view, well entrenched in Costa Rica as in most of Central America, that forests are always  
37 beneficial to water services (Pagiola, 2002; Kaimowitz, 2000). No monitoring has been  
38 undertaken to verify this assumption. The growing number of contracts with water users (Table  
39 1), indicates that many share this perception. In fact, most of these contracts are in watersheds  
40 that are providing satisfactory levels of water services and where forest cover is still substantially  
41 intact. Under these conditions, even if the precise link between forests and water services is  
42 unknown, a strong argument can be made from a precautionary principle to avoid changes that  
43 might threaten the situation. It is noteworthy that both the water service contracts that have come  
44 up for renewal have been renewed (see Table 1). That two private companies, after five years of

1 experience paying to protect the watershed from which they draw they water, have chosen to  
2 continue the arrangement indicates that they, at least, perceive the program as working. It is also  
3 significant that more recent contracts with water users have them paying the full cost of  
4 conservation in their watersheds, plus covering FONAFIFO’s administrative costs, as opposed to  
5 the much lower contribution that early contracts involved. {FONAFIFO to provide updated  
6 figures on % land, % contracts located in hydrological priority areas }

7 The water service agreements also indicate that the PSA program is often failing to  
8 conserve areas that could potentially generate environmental services. As can be seen in Table 1,  
9 relatively significant parts of each contract remain unfulfilled – even in areas that have now been  
10 targeted for over five years. Although at the national scale FONAFIFO has more applicants than  
11 it can pay for, in these watersheds it is unable to find enough applicants, at the current price, to  
12 spend the budget that water buyers provide. In the Río Segundo area, to overcome high local  
13 opportunity costs, the PSA program is offering a higher price (US\$67/ha, compared to the usual  
14 US\$45) by cumulating payments from two local water users, the municipal water supply  
15 company of the town of Heredia, and bottler Florida Ice & Farm.<sup>12</sup>

16 The pending implementation of a conservation fee in the water tariff is forcing a  
17 substantial increase in the attention paid to monitoring water impacts. Political support for the  
18 tariff could quickly evaporate if it comes to be perceived as a tax rather than a means to finance  
19 benefits to water users. To avoid this, FONAFIFO is requesting assistance from the World Bank  
20 (in a proposed new project) to develop operational guidelines for use of water tariff funds that  
21 seek to maximize their impact on water services, including identification of priority watersheds  
22 and critical areas within these watersheds, and specific interventions required to generate the  
23 needed services (which may differ depending on the nature of water use in the watershed). The  
24 project will also support the establishment of a monitoring system that will allow FONAFIFO to  
25 demonstrate to water users the benefits they are receiving, or to adjust responses in the  
26 watershed, in the event results fall short.

## 27 **How permanent are the benefits?**

28 The sustainability of land use changes promoted by the PSA program, and of any  
29 environmental services they generate, is hard to assess at present, because only the earliest  
30 contracts undertaken under the PSA have expired. In the case of forest conservation contracts –  
31 the vast majority of contracts agreed with landowners – there is no expectation of sustainability  
32 unless the contracts are renewed. Without continuing payments, landowners would clearly no  
33 longer have additional incentives to continue conserving forests.<sup>13</sup> FONAFIFO does intend to  
34 renew these contracts, to the extent that resources allow, except in cases where contracts were

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<sup>12</sup> This joint payment also demonstrates that it is possible to arrive at agreements for PES in watersheds with more than one water users. Securing payments from the beneficiaries of water services is particularly difficult in such cases, as, each individual water user has an incentive to free-ride. For another example of a case when multiple water users are sharing the cost of conservation in a PES program, see Echevarría (2002).

<sup>13</sup> It is important to stress that what matters is the duration of the payment, not the duration of the contract. A contract that last relatively few years before being renewed is in many ways attractive as it permits a periodic adjustment of the terms of the contract and a re-assessment of the usefulness of contracting in specific areas. It should also be noted that clearing forest is illegal.

1 outside priority areas.<sup>14</sup> In the case of reforestation contracts, the expectation is that landowners  
2 will continue with the agreed land use even after payments cease. Indeed, this is a legal  
3 requirement under the contract. The reasoning here is that the PSA payment helped landowners  
4 finance the initial investment of reforestation, converting what would have been an unprofitable  
5 investment into a profitable one. Reports from the field indicate that most landowners find it very  
6 difficult to maintain these practices because of the lack of cash flow in the interval between the  
7 end of the PES (in year 5) and the harvest of the timber (typically in year 20). FONAFIFO is  
8 studying possible approaches to helping fill this gap. One would involve essentially buying the  
9 timber up front, then making a constant flow of payments to participants until harvest. There are  
10 substantial incentive compatibility issues to be resolved, however.

11 The more important factor in the sustainability of the program is the sustainability of the  
12 income streams that FONAFIFO receives to make payments to land users. In this regard, it is  
13 worrying that the energy tax revenue is FONAFIFO's only substantial long-term income stream,  
14 as this may be threatened in the future if rising energy prices lead to pressure for reducing the  
15 tax. Individual agreements with water users are another sustainable income stream, and in this  
16 sense it is particularly encouraging that both contracts that came up for renewal to date have in  
17 fact been renewed. These payments, however, so far only represent a small portion of total  
18 funding.

19 The new water tariff to be implemented from late 2005 will substantially change this  
20 outlook, by providing a substantial additional income stream – an income stream that, moreover,  
21 will be highly sustainable over time as long as the PSA program can demonstrate that it is indeed  
22 generating water services. Carbon financing will also provide a reasonably long-term income  
23 stream for activities eligible under the Kyoto Protocol's Clean Development Mechanism.<sup>15</sup> As  
24 noted, an initial proposal is being developed for the sale of 4,000 tCO<sub>2</sub>e/year for 14 years to the  
25 World Bank's BioCarbon Fund. Initial estimates show, however, that carbon payments are likely  
26 to be insufficient by themselves to finance the payments to land users.

27 The missing element in the long-term funding picture is biodiversity-specific funding.  
28 Both water fee revenues and carbon funding sources have restrictions (water fees can only be  
29 used in the watersheds where they are generated, carbon funding can only be used for  
30 reforestation), which would leave many areas that are important for biodiversity conservation  
31 with insufficient financing. The GEF grant under the Ecomarkets Project and smaller contracts  
32 with CI are providing biodiversity-specific funding at present, but both these sources are finite in  
33 time. To help assure sustainable, long-term financing of its activities in areas where water and  
34 carbon payments will be insufficient, FONAFIFO is establishing a Biodiversity Conservation  
35 Trust Fund with the assistance of the Ecomarkets Project. This fund would receive initial  
36 capitalization from a GEF grant, and also serve as the repository of other grants, and of income  
37 from sales of conservation certificates in the voluntary market.<sup>16</sup>

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<sup>14</sup> The process of contract renewal, therefore, will help to gradually increase the efficiency of service provision. The US Conservation Reserve Program (CRP) has also seen significant changes in the distribution of contracts over time, as prioritization criteria were revised ([REF](#)).

<sup>15</sup> That is, for reforestation and afforestation in areas deforested prior to 1990. Costa Rica has identified about 1.1 million ha of 'Kyoto Lands' in the country.

<sup>16</sup> There is a small but growing market for voluntary contributions to conservation. This market does not depend on either legal obligation (as in the case of firms needing to buy carbon emissions to comply with obligations, or water users being obligated to pay the new water fees) nor self-interest (as in the case of the water users that have signed contracts with FONAFIFO to finance the conservation of the watersheds from which they draw

## 1 Does the PSA program benefit the poor?

2 Although PES programs like Costa Rica’s PSA are not designed to be a poverty reduction  
3 program, the frequently high spatial correlation between areas that supply environmental services  
4 and poor areas create opportunities for PES to contribute to this objective (Pagiola and others,  
5 2005). Studies of the biological corridors targeted for GEF-financed payments under the  
6 Ecomarkets program—some of which overlap with watersheds targeted by water service  
7 payments—found them to be among the poorest areas in Costa Rica (World Bank, 2000).  
8 Frequently, however, the poor find it difficult to participate, thus barring them from receiving  
9 any benefits. Several studies (Ortiz and others, 2003; Miranda and others, 2003; Zbinden and  
10 Lee, 2005) have found that the bulk of program benefits tend to go to larger and relatively better-  
11 off farmers.

12 A specific problem that affected the participation of the poor early in the PSA program  
13 was lack of titles. Generally, titles may not be necessary for participation in a PES program as  
14 long as tenure is secure (Pagiola and Platais, forthcoming). Titles did emerge as an issue in the  
15 PSA program, however, as national law forbade using public funds to pay landowners who  
16 lacked formal title. This not only prevented many of the poor from participating—as they were  
17 more likely to lack titles than better-off farmers—but it also impeded the effective functioning of  
18 the program by restricting participation in several important areas (Pagiola, 2002). When  
19 FONAFIFO is administering private funds, however, the legal restrictions do not apply. The  
20 solution, therefore, was to create a parallel contract, similar in all respects to the PSA contract,  
21 but financed entirely with funds provided by the service buyers, as was done in the Río Platanar  
22 case (see Table 1). More recently, the law was changed to allow participation of landowners that  
23 lack titles.

24 Transaction costs are often an important impediment to participation of the poor, as  
25 working with many small, dispersed farmers imposes high transaction costs. Initially, the PSA  
26 program imposed very high transaction costs on participants, requiring applicants to fulfill  
27 eleven separate requirements, many of which—such as providing proof of payment of local taxes  
28 and that they do not owe anything to national health system—had nothing to do with their ability  
29 to provide environmental services (Miranda and others, 2003). These requirements have since  
30 been substantially reduced, by linking FONAFIFO’s databases to those of other government  
31 agencies. Being current on social security payments is still a requirement, but this is not checked  
32 automatically. The PSA program also developed mechanisms to overcome the obstacles that  
33 transaction costs can create to participation by the poor. A system of collective contracting  
34 (“contratos globales”) was developed through which groups of small farmers can join the PSA  
35 program collectively rather than individually, thus spreading transaction costs over a large group  
36 (FONAFIFO, 2000).

37 Some have argued that by making land more valuable, PES could result in politically  
38 powerful groups muscling out poorer land users who lack secure tenure (Landell-Mills and

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their water). Rather, this market depends largely on the personal ethical/moral choices or individual tastes, or on the desire for favorable publicity. Thus, many individuals and firms seek to offset the impact of their own carbon emissions even when they are under no obligation to do so. See Tipper (2002) for an example of a conservation project financed by sales of carbon emissions reductions to the ‘retail’ (non-Kyoto) market. This is not a huge market, but neither is it negligible. Costa Rica’s strong ‘brand name’ in environmental conservation and FONAFIFO’s track record mean that FONAFIFO is well positioned to tap into this market. As noted, FONAFIFO has already made some forays into selling carbon emission reductions to the ‘retail’ market. It is also exploring options for selling ‘biodiversity conservation’ in this market.

1 Porras, 2002). There is anecdotal evidence that this has happened in Colombia's Cauca Valley,  
2 for example. Conversely, Costa Rica's PSA program has been said to improve tenure security by  
3 preventing land kept under forest being considered 'idle' and providing protection against land  
4 invasions (Miranda and others, 2003).

## 5 **Conclusions**

6 Costa Rica's PSA program has been one of the conservation success stories of the last  
7 decade. It's approach has been widely studied, and to an increasing degree imitated. FONAFIFO  
8 has hosted dozens of official delegations from countries throughout the world who have come to  
9 study the PSA program. El Salvador and Mexico have both established formal PSA programs  
10 inspired, in part, by Costa Rica's example. As this paper has noted, however, the PSA program  
11 has many weaknesses, and it is as important to learn from its mistakes as it is to learn from its  
12 successes.

13 By building on the basis of previous forest subsidy schemes, Costa Rica was able to  
14 develop an elaborate, nationwide system of payments for environmental services relatively  
15 rapidly. As discussed, however, this was not without drawbacks. Many of the details of the  
16 previous schemes which were carried over into the PSA program were sub-optimal from the  
17 perspective of generating water services – notably the lack of targeting and the use of  
18 undifferentiated payments. With experience, many of these weaknesses are being gradually  
19 corrected. The PSA program is evolving towards a much more targeted program, a trend that will  
20 be accelerated by the introduction of the new water tariff and by efforts to secure carbon  
21 financing. These same trends are also forcing the development of new approaches and the use of  
22 more differentiated payments, to allow for differences in both the level of service provision and  
23 the opportunity cost of providing services. This is, of course, not a purely technical issue. The  
24 trend towards targeting has been pushed by the demands of service buyers, but it has been  
25 resisted by country's reforestation lobby, which prefers untargeted – and, therefore, more easily  
26 accessible – payments.

27 The other major weakness in the PSA program is its lack of data on the extent to which  
28 its activities are, in fact, generating environmental services. Only in the case of biodiversity has  
29 this been monitored at all, and even then only for the silvopastoral practices promoted under the  
30 GEF-supported silvopastoral project. It is certainly encouraging that several individual water  
31 users, after participating in the program for 5 years, have renewed their contracts to pay for  
32 watershed conservation through FONAFIFO. Nevertheless, the efficiency and long-term  
33 sustainability of the program demand that understanding of how different land use practices  
34 contribute to generating environmental services be substantially improved. In particular,  
35 demonstrating carbon sequestration is a sine qua non of participation in the emerging global  
36 carbon market. Work is currently underway in this area, including one-time studies of the impact  
37 of different land uses on services and the establishment of long-term monitoring systems.

38 As the first effort to develop a large-scale PES program in a developed country,<sup>17</sup> it was  
39 inevitable that there would be mistakes in Costa Rica's PSA program. There was no instruction  
40 manual, and many of the issues involved were only dimly perceived. Even today, with much  
41 more experience in this area, there remains much to learn before we can confidently make  
42 recommendations on how such programs should be designed. We do not yet have all the

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<sup>17</sup> There are earlier examples of PES approaches, notably in Colombia's Cauca Valley (Pagiola and Platais, forthcoming; Echevarría, 2002) but they are on a much smaller scale.

1 answers, but we believe we have most of the questions (Pagiola and Platais, forthcoming).  
2 Perhaps the most important lesson that might be learned from the Costa Rica experience is the  
3 need to be flexible and to adapt to lessons learned and to changing circumstances.

4 In addition to continuing the transition to a more targeted and differentiated payment  
5 program, the most important challenge for the PSA program in the next few years is to secure  
6 sustainable long-term funding sources. A new World Bank project is being developed, with  
7 support of the GEF, to achieve this.

8

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{These have not been cleaned up, prob several are missing}

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**Table 1: Contracts for provision of water services in Costa Rica's PSA program**

<i>Company</i>	<i>Type of user</i>	<i>Watershed / Area</i>	<i>Area covered by contract (ha)</i>	<i>Actual area enrolled as of end 2004 (ha)</i>	<i>Contribution to payment to participating land users<sup>a,b</sup> (US\$/ha/yr)</i>	<i>Contribution to FONAFIFO administrative costs</i>	<i>Comments</i>
Energía Global	Hydropower producer	Río Volcán and Río San Fernando	2,000	1,493	12	0	Signed 1997, renewed 2002
Platanar S.A.	Hydropower producer	Río Platanar	750	396 354	15 30 <sup>c</sup>	5% of payment	Signed 1999, renewed 2004; addendum on non-titled land users signed 2000 for 10 yrs
CNFL	Hydropower producer	Río Aranjuez Río Balsa Río Laguna Cote	4,000 6,000 900	2,424 4,567 501	40 40 40	\$13/ha yr 1 \$7/ha yrs 2-5	Umbrella agreement signed 2000, with addendums covering specific watersheds
Florida Ice & Farm	Bottler	Río Segundo	1,000	440	45 <sup>d</sup>	\$29/ha yr 1	Signed 2001, later modified to use CSA
Heredia ESPH	Municipal water supply	Río Segundo			22 <sup>d</sup>	\$4/ha yr 1	Signed 2002 using CSA
Azucarera El Viejo	Agribusiness (irrigated)	Acuífero El Tempisque	550	0	45	7%	Signed 2004 using CSA
La Costeña SA	Agribusiness (irrigated)	Acuífero de Guanacaste	100	0	45	7%	Signed 2004 using CSA
Olefinas	Agricultural supplies	Acuífero de Guanacaste	40	40	45	7%	Signed 2004 using CSA
Exporpac	Agribusiness (irrigated)	Acuífero de Guanacaste	100	0	45	7%	Signed 2005 using CSA
Hidroeléctrica Aguas Zarcas	Hydropower producer	Río Aguas Zarcas	1,666	0	30	7%	Signed 2005 using CSA
Desarrollos Hoteleros Guanacaste	Tourism	Acuífero de Guanacaste	925	0	45	7%	Signed 2005 using CSA

Notes: a. In cases where contracts have been renewed, information shown on area covered and payment is that under the latest contract.  
b. Participating land users receive the standard PSA contract payments (currently US\$42/ha/yr) except in Río Segundo (see below)  
c. Platanar pays US\$15/ha/yr for contracts with landowners with land titles (285ha at end 2004), with FONAFIFO paying the rest; It pays US\$30/ha/yr for contracts with landowners without land titles (385ha at end 2004), who are not otherwise eligible for PSA contracts  
d. To overcome high local opportunity costs, payments by Florida Ice & Farm and Heredia ESPH are cumulated, so that land users are paid US\$67/ha/yr

Source: FONAFIFO data

**Table 2: FONAFIFO budget, 1998-2004**  
(million colones)

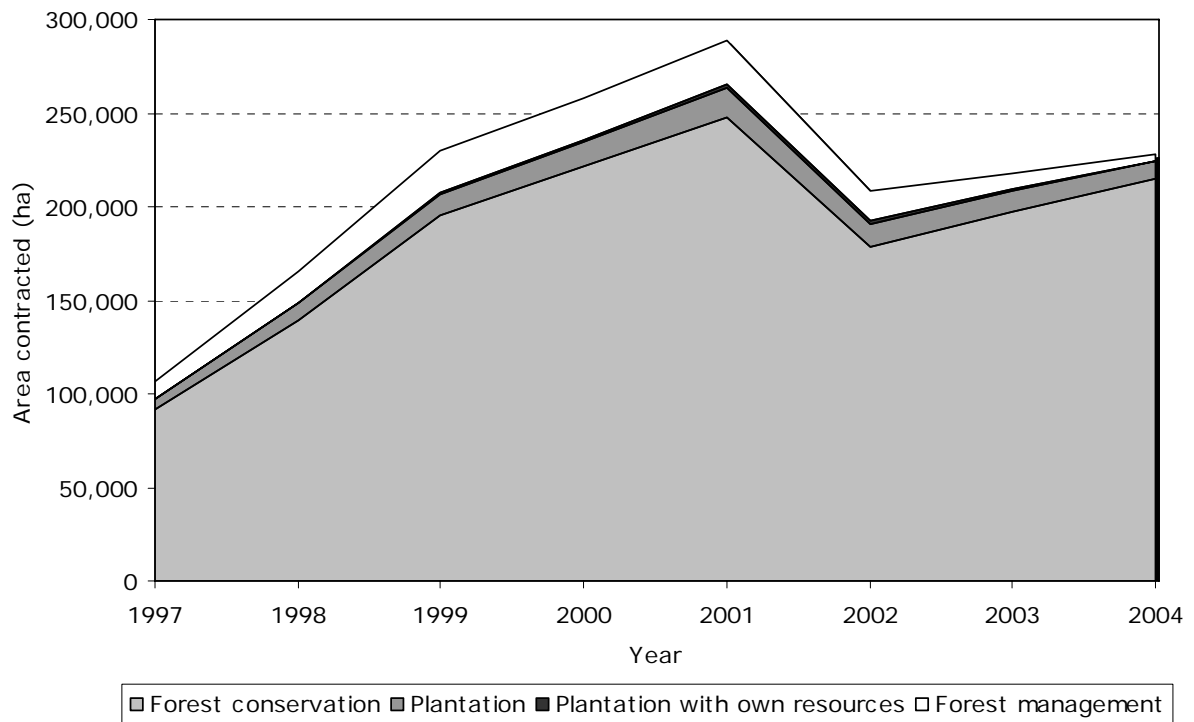
<i>Year</i>	<i>Fuel tax</i>	<i>Water payments</i>	<i>Biodiversity payments</i>		<i>Carbon payments</i>	<i>KfW grant</i>	<i>Total</i>
			<i>GEF</i>	<i>Other</i>			
1998	1,269	2					1,269
1999	2,406	2					2,406
2000	2,098						2,098
2001	2,345	86					3,000
2002	3,067	102					6,013
2003	1,399	173				1,715	6,075
2004	1,511	2				811	5,858

*Notes:* Does not include budget dedicated to paying for residual CAF contracts

*Source:* FONAFIFO data

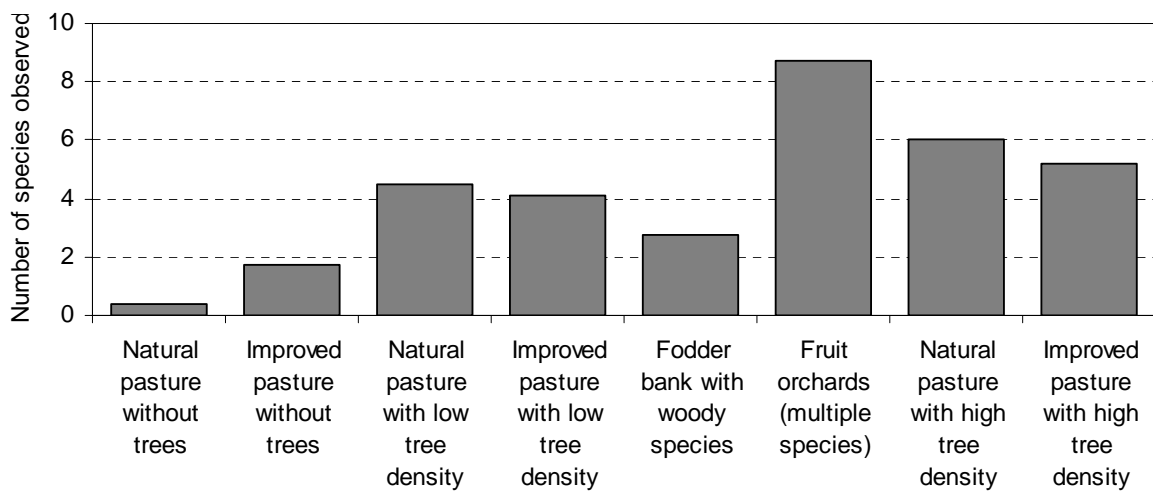
{ Awaiting additional data from FONAFIFO; then convert to US\$ }

**Figure 1. Area contracted in the PSA program, by modality**



Source: FONAFIFO data

**Figure 2: Biodiversity impact of adopting silvopastoral systems in Esparza, Costa Rica**



Source: Silvopastoral Project data