

# Payments for Environmental Services: experiences from the globe

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## ABSTRACT

This paper tries to analyze the concept of Payments for Environmental Services (PES), to make a review on which countries have successful experiences and if there is any unsuccessful one. At the same time, analyses the lessons that can be learned and existent opportunities for other countries. To this extent, the research proceeds to documentary analysis, where there will be literature review and collection of statistics to support the theory.

Payments for Environmental Services are an emerging topic that has a potential to be extensively studied and developed, there are opportunities for more businesses to join these kinds of programs and contribute. The programs of PES have mostly been focused as a program of governments for promoting sustainability and generating profit and employment in certain rural territories, but there is a great chance of them to be adapted as part of the CSR strategies of different companies, even there are chances for SMEs to adapt similar initiatives and in general to involve the private sector on these programs.

It is known that PES schemes can impact positively not only the ecosystems and the environment overall, but they can also have a positive impact on communities that are seeking for opportunities of generating income by caring about the environment. This paper aims to be a guide for persons who are interested on getting involved with PES, whether it is for establishing as PES recipients or donors, also for academic people who are interested on environmental economics.

## 1. Introduction

In the current world and its climate conditions, it is becoming more and more important to search for sustainable options for production, ways of producing harmonized with the environment and where all the stakeholders can contribute in a certain way, to preserve what is

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more valuable for us. Certainly gold, oil and minerals are valuable, but also is the water, the oxygen, and the trees, without them, the world as we know it would not exist.

There is an interesting approach when it comes to compensating on the environment for the damage that production causes, it is the Payments for Environmental Services (PES) which on a simple explanation, they are “payments to farmers or landowners who have agreed to take certain actions to manage their land or watersheds to provide an ecological service” (IIED, 2023). The PES as it is possible to observe, are a way to generate economic activity within the conservation, because that is the main idea, that the farmers receive payments for taking care of the environment, so it has a goal for nature preservation.

The logic behind the PES says that the provisioners of environmental services should be “compensated directly while those who receive them must pay” (OAS, 2005, p.1). This represents a change on the previous paradigms because basically, through all of our existence as human beings, there has been people who protects the environment, and the nature generates some positive externalities from which we all benefit, we benefit from the scenery, air purifying, capture carbon and so on, but no one paid before for these services, hence the PES represent a trend for recognizing the hard work of taking care of the environment.

The theory that sustains this is based on the environmental economics, which is defined by the United States Environmental Protection Agency as the “application of the principles of economics to the study of how environmental and natural resources are developed and managed” (EPA, 2024). On this case, the discussion is basically focused by the neoclassical approach of economics, that pretends to assign a value to natural resources and at the same try to solve environmental issues, so it shows how the environmental policy is closely related to the economic policy.

On the other hand, there is another discipline that should not be confused with environmental economics, and it is the ecological economics, as defined by one of its main exponents, the ecological economics “addresses the relationships between ecosystems and economic systems in the broadest sense. These relationships are the focus of many of our most pressing current problems (i.e. sustainability. acid rain. global warming, species extinction. wealth distribution) but they are not well covered by any existing discipline” (Costanza, 1989, p.1). This makes clear that here there are two different currents presented that are not to be confused, both have made very important contributions, and both provide great tools for addressing environmental issues that will be experienced in the future, but certainly the topic of this document is more closely related to environmental economics.

It is important to clarify, that sometimes the literature addresses the PES for referring to the Payments for Ecosystem Services, which is a related term, but more recently developed, metaphorically, we could say that payments for ecosystem services is an evolution of the payments for environmental services approach, it is defined as a “variety of arrangements through which the beneficiaries of environmental services, from watershed protection and forest conservation to carbon sequestration and landscape beauty, reward those whose lands provide these services with subsidies or market payments” (WWF, 2024).

## **2. Payments for environmental services: Experiences from the globe.**

For this section, the purpose is to analyze different case studies on PES from different countries in the globe, the experiences will be presented in a way that we aim to present one case study by continent, trying to present some general information about the country where this case study happened, main features that make this case study very particular, and what lessons we can learn from it.

The section will start with the case of Costa Rica, since this country is acknowledged as the pioneer on establishing the PES, and its experience has been a role model for other countries of the world that have established similar systems.

### **1. Costa Rica: Payments for Environmental Services of forests**

Costa Rica is a Central American country, small (51 100 km<sup>2</sup>) but rich in natural resources, because of its location, the country has a tropical weather and has access to the Pacific Ocean and the Caribbean Sea, allowing it to host 5% of world biodiversity. The country shares borders with Panama and Nicaragua, among the environmental achievements of the country, is the fact that the country reached 99% of its energy production coming entirely from renewable energy sources, here is a summary of some indicators of Costa Rica:

**Table 1.** *Main introductory indicators on Costa Rica.*

<b>Indicator</b>	<b>Latest Value</b>
Population	5 M
Carbon dioxide emissions per capita (metric tons)	1,4
Nationally protected terrestrial and marine areas (% of territorial area)	28,8
Forest area (km <sup>2</sup> thousands)	31
ND-GAIN Index <sup>2</sup>	55

*Source:* Own preparation with data from World Bank.

Costa Rica has experienced a long journey on development which is reflected on its indicators, as stated before, it has an advantage on the wide variety of natural resources that the country has, so it made possible that the first program of PES was established in the country. This happened during the decade of 1990, certainly it was a period of transition for Costa Rica and the central American region in so many aspects, their preparation towards the new millennium was marked by the aims of having access to more development opportunities but at the same time, many obstacles for getting there. This time was marked by two main issues, persistence, and reproduction of the poverty, and at the same time high scale exploitation of natural resources, influenced by the idea that natural resources were unlimited, there was an intensive use of them, and this caused an important disappearance of the forest coverage.

On this context, the lack of incentives to protect the forest was noticeable, so there was an initiative to promote the conservation of forests through the international cooperation, considering that the country itself did not have enough resources to do it, this represented a change on the environmental policy of Costa Rica, considering that this measure was supported by a lot of international regulations like the Kyoto Protocol, Costa Rica decides to launch its PES program managed by the government.

This PES program is supported by the existing National Forestry Law and specifically for managing the PES, the government creates an institution named FONAFIFO, which in Spanish stand for the National Forest Financing Fund, on the Article 46 of the law it specifies that this institution will:

*“Finance, for the benefit of small and medium-sized producers, through credits or other mechanisms to promote forest management, whether intervened or not, the processes of afforestation, reforestation, forest nurseries, agroforestry systems, recovery of denuded*

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<sup>2</sup> ND-GAIN is the Notre Dame Global Adaptation index which “summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience” (ND, 2023). The lower the score, the more vulnerable a country is to climate change.

*areas and technological changes in exploitation and industrialization of forest resources. It will also raise financing for the payment of environmental services provided by forests, forest plantations and other activities necessary to strengthen the development of the natural resources sector, which will be established in the regulations of this law". (Forestry Law, 1996)*

Since its creation, FONAFIFO has served as a role model for other countries who are implementing PES schemes, as it comes to the services that the institution is recognizing, they mention the following ones:

- Mitigation of greenhouse gas emissions (fixation, reduction, sequestration, storage, and absorption).
- Protection of biodiversity for its conservation and sustainable use, scientific and pharmaceutical, research and genetic improvement, as well as for the protection of ecosystems and forms of life.
- Protection of water for urban, rural, or hydroelectric use.
- Natural scenic beauty for tourism and scientific purposes. (FONAFIFO, 2024).

To present a current panorama of the PES scheme, some statistics for the last decade can be mentioned.

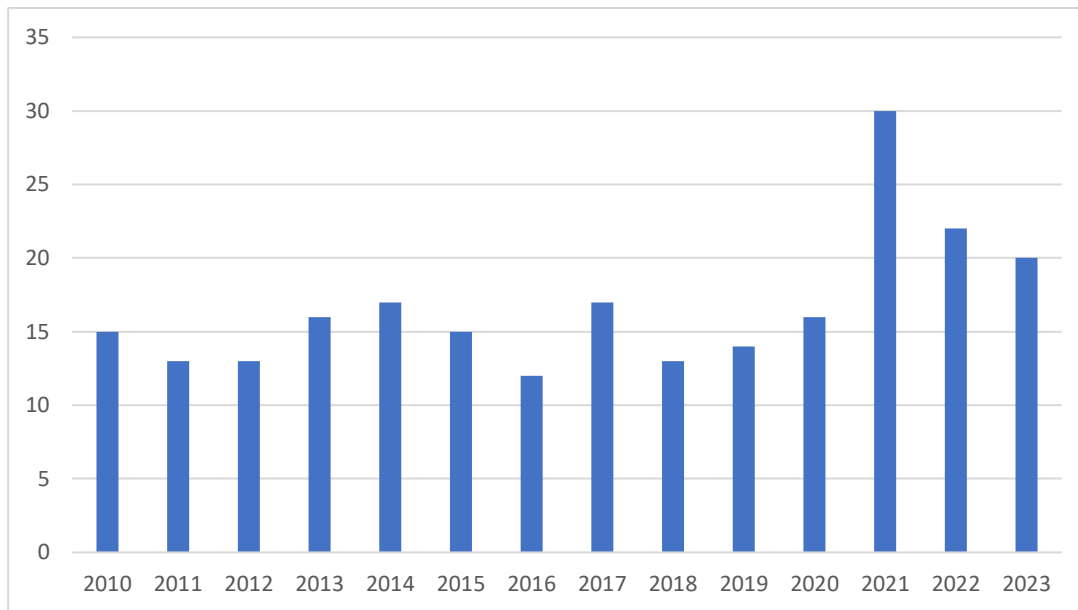
**Table 2.** *Statistics on PES schemes in Costa Rica for the period 2010-2023.*

<b>Indicator</b>	<b>Value</b>
New contracts	12.118
Total hectares on PES	748.338
Contracts on wild protected areas	1.626
Contracts on biological corridors	4.641

*Source:* Own preparation with data from FONAFIFO.

When it comes to the results, something very interesting is not only the fact that the PES scheme contributed to recover the forest coverage and promote the conservation of the environment, but it also enhanced different social aspects that promoted the development of the population, as it is possible to appreciate on their statistics.

**Figure 1.** *Yearly percentage of women managing PES contracts.*



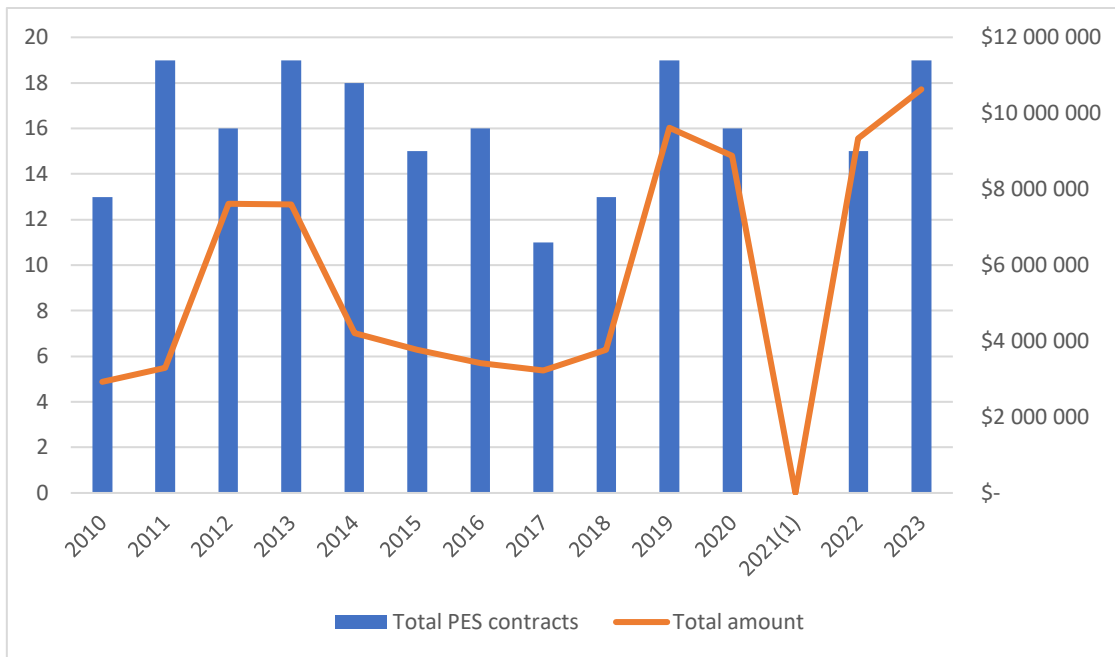
*Source:* Own preparation with data from FONAFIFO.

Through the period of study, it is possible to observe that around 15% of the contracts of PES are managed by women, this represents a remarkable fact, considering that historically in Costa Rica, many agricultural tasks have been executed by the man, and now there is an emerging market of women that are working in the conservation. Not to mention that in general, women usually face more obstacles for finding a place for them in the labor market, so the PES represent a very important opportunity for them to generate their income out of sustainable projects by providing environmental services.

Another interesting fact concerning the PES scheme in Costa Rica is its impact on indigenous communities, when it comes to the situation of indigenous territories in Costa Rica this is a very particular situation because their levels of development have been affected by several aspects, during many years they were lacking essential services, so they had to move long distances for having access to education, health, or internet connection.

Indigenous communities have deep-rooted traditions that differ from the rest of the country and sometimes there are even different legislations or regulations applicable for them, however, in the territories where they live, the economic activities are very limited and new job opportunities for them are practically inexistent, but in the following graph, it is possible to appreciate the statistics related to the PES on indigenous territories.

**Figure 2.** *Total contracts of PES on indigenous territories and the hired amount of the contract.*



Source: Own preparation with data from FONAFIFO.

Given the previous conditions mentioned, it turns out great to observe the information that almost 20 contracts are generated every year on indigenous territories, meaning that this could represent incomes for millions of dollars, reaching a peak of over \$10 millions in 2023. It is important to mention that this not only represents an opportunity for preserving the environment and its services, but it also represents an opportunity of developments for indigenous families that are able to find ways of generating income and at the same time, staying at their territories and develop an economic activity that matches their principles of taking care of the nature and preserving their protected areas.

## 2. Kenya: PES scheme in the lake Naivasha.

The second country of study is Kenya, located in East Africa, Kenya is a big country with access to the Indian Ocean, Kenya has a considerable amount of land dedicated to wildlife, however, they are considerably vulnerable to climate change, and an aspect that is hazardous for them specially when it comes to the draughts. In the following table, the general introductory statistics of Kenya are presented.

**Table 3.** Main introductory indicators in Kenya.

Indicator	Latest Value
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Population	52,6 M
Carbon dioxide emissions per capita (metric tons)	0,4
Nationally protected terrestrial and marine areas (% of territorial area)	10,3
Forest area (km <sup>2</sup> thousands)	36
ND-GAIN Index	38

*Source:* Own preparation with data from World Bank.

In Kenya there are various PES projects identified, but for the purpose of this paper, the PES scheme in the Lake Naivasha was chosen because of some special features that make it interesting. First, we can mention the fact that this project is focused on payments for the watershed services and the restoration on the vegetation to reduce the deposit of sediments.

A key aspect is that besides the assessment of the environmental services, the stakeholders were clear that this lake has an economic importance when it comes to Kenyan GDP, because “floriculture investment contributes to over 35% of all flower sales in the European Union (EAC-EU 2015, p. 12), and 280MW of geothermal power generation is connected to the national grid” (ICRAF, 2018) and this certainly, facilitates the valuation and comparison.

Another important factor that meant a differentiating element in this project is the partnerships they developed with the stakeholders, on this case, there was of course involvement of the governmental institutions and civil society organizations, but key partners were also international organizations like WWF (World Wildlife Fund) and CARE (Cooperative for Assistance and Relief Everywhere) both on their Kenya chapters. These organizations were “providing funding and coordination as intermediary institutions to develop Payment for Ecosystem Services – PES (the ecosystem service in this case being water) – as a market-based scheme for delivery of sustainable natural resource management and improved livelihoods.” (Chiramba et al, 2011, p.2). With this initiative, there were many changes implemented in the communities and its inhabitants, among these, we can mention:

- “Rehabilitation and maintenance of riparian zones.
- Establishment of grass strips/terraces to reduce runoff and erosion on steep slopes.
- Reduced use of fertilizers and pesticides.
- Agroforestry/tree planting.
- Training for livelihoods enhancement” (Chiramba et all, 2011, p.4).



In summary, we can mention that the project developed in Kenya brought very satisfactory results for the communities, not only they found more sustainable ways of using their resources and preserving them, but also this project brought many lessons for them and improved their livelihood.

3. Indonesia: Experiences from PES schemes.

The third case of study is Indonesia, for this case the journey of the research is moving towards the southeast Asia, known for being the world's largest archipelagic state, which makes it quite interesting for this study also because of the large access of natural resources, the country is having access to Indian and Pacific Oceans. Some introductory data can be observed in the following table:

**Table 4.** *Main introductory indicators on Indonesia.*

<b>Indicator</b>	<b>Latest Value</b>
Population	270,6 M
Carbon dioxide emissions per capita (metric tons)	2,1
Nationally protected terrestrial and marine areas (% of territorial area)	5,3
Forest area (km <sup>2</sup> thousands)	915
ND-GAIN Index	50

*Source:* Own preparation with data from World Bank.

As the table details, Indonesia has a huge population and it is important to consider the effects that this has on the environment, also there is a considerable vulnerability to climate change, not really surprising keeping in mind their geographical conditions, which also gives them important advantages when it comes to biodiversity, in fact, Indonesia holds the second place in the world when it comes to total endemic species, together with their tropical climate makes them to have a wide range of resources that are able to provide all kinds of ecosystem services, starting from the scenic beauty of their beaches up to carbon capture.

Indonesia fulfills very interesting conditions for establishing PES schemes, because it has the world’s third largest tropical forest, but also has one of the fastest deforestation rates, “third largest emitter of greenhouse gasses” (Sloan et al, 2012). Due to the previously mentioned details, they had previous experiences with REDD+ activities in the country, so this represents a positive aspect because it sets a baseline for establishing PES schemes.

The evidence suggests that there have been PES projects in Indonesia since the early decade of 2000s, but not always the best evidence considering that some of them just stayed in pilot projects. A study carried out by Suich et al (2017) gathered information on existing PES projects or programs, they were able to identify 87 projects in total, this is an impressive number considering the challenges that are still ahead.

From this extensive list of projects, they purged the list according to some criteria that made these projects suitable for comparison and for the evaluation of their effectiveness to reflect on them and formulate some lessons learned out of their execution, the list was shortened to 9 existing projects.

Within the list of projects selected for the study they were divided in 2 main groups according to the focus of the scheme whether is water or carbon, some interesting facts to mention is that the buyers tend to differ when it comes to their constitution, some of them are state-owned enterprises, others are donors, companies from the private sectors and for one of them the buyer was a water association and its members. All of them worked with intermediaries (mainly NGOs) and when it comes to the activities carried out, they identified tree planting, agroforestry, reforestation, avoiding planned deforestation, forest rehabilitation among others.

When assessing the projects, the authors (2017) of the research found some common challenges, the first one was to make the stakeholders understand the value and the importance of the ecosystem services, this is a similar case to what happened in other countries, people just assume that the ecosystem services are free because they are provided by the environment so they do not see the logic on paying for them.

Another constraint for them was to work with the governments, especially “demonstrated by the persistence of overlapping and conflicting regulations and the apparently ineffective regulatory development processes” (Suich et al, 2017, p.493), they even mention the Costa Rican scheme and highlight how the fact that its supported by a law helps to have clarity, avoid uncertainty and have the arm of the government helping with the collection from taxes.

#### 4. France: The PES scheme on Vittel waters.

Finally, the last case study that is analyzed comes from France, is the case of Vittel waters, France is a developed country with a large territorial extension, diverse landscapes and a big population that develop a lot of economic activities within their territory, the following table provides the introductory data.

**Table 5.** *Main introductory indicators for France.*

Indicator	Latest Value
Population	67 M
Carbon dioxide emissions per capita (metric tons)	4,0
Nationally protected terrestrial and marine areas (% of territorial area)	36,6
Forest area (km <sup>2</sup> thousands)	173
ND-GAIN Index	67,5

*Source:* Own preparation with data from World Bank.

France is a wealthy country not only when it comes to natural resources, but also with its economic factors, the interesting part of this scheme that will be presented is precisely that is not widely used at a country level, in fact, it started by a private company in a small scale that served as a model for further expansion of PES schemes.

Vittel is a French brand of bottled water, who is owned by Nestlé, since 1993 they have developed a PES scheme on their 5100 hectares catchment at the foot of the Vosges Mountains to keep the high quality of aquifer water, they pay to “all 27 farmers in the ‘Grande Source’ watershed to adopt best practices in dairy farming. It is implemented through Agrivair, a buyer-created agricultural extension agency, which has a solid local base and is trusted by farmers” (Prokofieva et al, 2012, p.6).

The challenge that they wanted to address was to reduce the nitrate contamination in the aquifer caused by the agricultural activities of the farmers, in order to manage the PES scheme, Nestlé created an institution who will act as an intermediary named “Agrivair”, they will carry out the negotiation and the execution of the programme.

At first farmers were opposed to it, a series of conditions and compensations were presented to them and this implied that they had to transform a conflictive situation into something positive, to ensure the compliance, there was a monitoring and evaluation role where Agrivair “monitors the farming practices, the livestock stocking rate, the good use of new building facilities (...) and reviews all farm accounts, a specific right explicitly stated in the PES contract” (FAO, 2013, p.3).

The program combined a complex structure where they combined conditional cash payments with technical assistance and a recognition of variable costs paid through reimbursement, and this in fact is a key aspect that every PES scheme should consider, the constant monitoring and evaluation of the services and its correspondent payment once the intermediary assures that they are complying with the promised services. The scheme was so successful that eventually the total number of hectares covered doubled compared to the year when they initiated (so it

expanded to 10.000 hectares). To finalize, experts have summarized 6 lessons learned from this scheme that seem very valuable:

1. Target threat / leverage zones.
2. Target high-service zones.
3. Pay customized rates.
4. Strengthen conditionally.
5. Ensure institutional coordination of policies.
6. Limit transaction costs” (Prokofieva et al, 2012, p.6).

These lessons pretty much summarize the overall lessons learnt from the different case studies in the paper, but further discussion of them will be addressed in the following section.

### **3. Conclusions**

The payments for ecosystem services have always been a controversial topic, they carry a huge debate on whether the stakeholders are simply paying to justify the pollution or other negative externalities, this has always been a typical argument against the tools provided by the environmental economics thoughts. On a personal thought, environmental economics and ecological economics should not be seen as rivals, on the contrary they must be allies that work together to ensure sustainability and development.

The negative externalities on the environment probably will exist forever, it is very difficult to think of a production in the current globalization conditions that do not harm the environment in a certain way, but at least there are some tools to compensate for the damage caused. However, it is obvious that these tools are not enough, they should be combined with more sustainable strategies of production, re-utilization and enlarging the product life cycle and other strategies provided by the circular economics.

When it comes to the PES schemes, the lessons learnt during this research showed that the activities on PES can bring positive results, not only for the environment but also for the communities that work with them, however, for meeting this success, some requisites are essential, that will be summarized:

1. Coordination with governments and the institutional environment; preferably they should be supported by the law.

2. The schemes are usually not perfect, not only because of their effects, but also during their execution, there is a chance for many mistakes, the lack of documentation and information on the execution of this projects should not be acceptable, since we are “doing business” with these projects, there should also be continuous improvement as if we were dealing with any other project or company.
3. Monitoring and evaluation are essential, as any other project where there is money involved, there will be many interested parts, some of them might not come with the best intentions, so the intermediaries should grant compliance with the objectives of the project and ensure that all of them are met and none is left behind.
4. Stakeholders and its involvement are essential, it is important to choose the right ones, organizations that have experience, that have political skills and that are interested on the correct execution of the scheme.

This aims to be an initial statement on the lessons learned from the different PES schemes in different continental locations through the world, but as stated before, it is a process of constant learning that can keep growing through the years.

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