Innovative mechanisms for financing biodiversity conservation

Experiences from Mexico

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Abbreviations and Acronyms

CIAD	Research Center of Food and Development (Centro de Investigación en Alimentación y Desarrollo)
CICES	Common International Classification of Ecosystem Services
CIRAD	French Agricultural Research Centre for International Development (Centre de coopération internationale en recherche agronomique pour le développement)
CONABIO	National Commission for the Knowledge and Use of Biodiversity (Comisión nacional para el conocimiento y uso de la biodiversidad)
CONAFOR	National Forestry Commission (Comisión Nacional Forestal)
CONAGUA	National Water Commission (Comisión Nacional del Agua)
CONANP	National Commission of Natural Protected Areas (Comisión Nacional de Áreas Naturales Protegidas)
DAKKS	National accreditation body for the Federal Republic of Germany (*Die Deutsche Akkreditierungsstelle GmbH*)
EVRI	Environmental Valuation Reference Inventory
FINDECA	Funding development of the countryside (*Financiando el Desarrollo del Campo*)
FMCN	Mexican Fund for the Conservation of Nature (*Fondo Mexicano para la Conservación de la Naturaleza*)
GIZ	German Corporation for International Cooperation GmbH (*Die Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH*)
ICDP	Integrated Conservation and Development Project
IEEP	Institute for European Environmental Policy
IFM	Innovative Financing Mechanisms
INAPESCA	National Institute of Fisheries (*Instituto Nacional de Pesca*)
INECC	National Institute of Ecology and Climate Change (*Instituto Nacional de Ecología y Cambio Climático*)
INMECAFE	National Institute of Coffee (Instituto Mexicano del Café)
NGO	Non-Governmental Organizations
OECD	Organisation for Economic Co-operation and Development
PACE Vaquita	Action Program for Conservation of the Species Vaquita (Programa de Acción para la Conservación de la Especie Vaquita)
PES	Payment for Environmental Services
PNA	Protected Natural Areas
PROAGRO	Program for the Promotion of Agriculture (*Programa de Fomento a la Agricultura*)
PSA-CABSA	Program for Development of Markets of Environmental Services, Carbon Sequestration and Biodiversity derivatives and to promote the establishment and improvement of Agroforestry Systems (*Programa para el Desarrollo de los Mercados de Servicios Ambientales de Captura de Carbono y los Derivados de la Biodiversidad y para Fomentar el Establecimiento y Mejoramiento de los Sistemas Agroforestales*)
PSAH	Payment for Hydrological Environmental Services (Pago por Servicios Ambientales Hidrológicos)
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SAGARPA	Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación)
SEMARNAP	Secretariat of Environment, Natural Resources and Fisheries (Secretaría de Medio Ambiente, Recursos Naturales y Pesca)
SEMARNAT	Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales)
SHCP	Mexican Secretariat of Finance and Public Credit (Secretaría de Hacienda y Crédito Público)
UMAS	Units of Management and Use of Wildlife (Unidades de Manejo y Uso de la Vida Silvestre)
USAID	United States Agency for International Development
USD	US dollars
USDA	US Department of Agriculture
WWF	World Wild Fund

Preface

This is a report on the "Innovative Financing Mechanisms for Biodiversity in Mexico" project financed by the EU Partnership Instrument (IP). The aim of the project was to support the implementation of the European Biodiversity Strategy to 2020, which emphasises the opportunities provided by innovative financing mechanisms for biodiversity conservation, both within and outside the EU. In particular, the project sought to promote the development and use of innovative financing mechanisms for biodiversity in Mexico through the review and exchange of experiences and collaboration between Mexican, European and other regional experts.

The final purpose of the project was to draw lessons from best practices across the Atlantic and provide recommendations on the ways forward for mobilizing resources to support the conservation of biodiversity and ecosystems services, with a particular focus on Mexico.

The project was coordinated by IBF International Consulting and undertaken by the French Agricultural Research Centre for International Development (CIRAD), the Institute for European Environmental Policy (IEEP) and the Universidad Iberoamericana. The project consisted of literature reviews carried out by the project team in both Mexico and Europe and the organization of workshops, bilateral meetings and a final conference, all designed to support dialogue on and the sharing of best practices.

Core events in the project included:
Kick-off seminar and bilateral meetings with key Mexican and Latin American stakeholders on innovative financing for biodiversity in Mexico City, April 19-20 2016;
Expert workshop with Mexican and European experts in Brussels, July 5 2016;
Final seminar with Mexican, European, Latin American and American experts in Mexico City, January 20 2017.

The main outcomes of the project culminated in identifying the most promising and mutually interesting areas of focus for the use of innovative financing mechanisms in Europe, Mexico and Latin America and establishing a community of practice between Europe and Latin America. This report summarises selected representative public and private examples of interesting innovative financing mechanisms found - it is by no means a fully comprehensive analysis or even an exhaustive listing in an area under rapid development.

The project resulted in three stand-alone outputs with complementary insights including two corresponding analytical reviews of innovative financing mechanisms (Mexico and Europe) and an executive synthesis reflecting and comparing insights from both sides of the Atlantic, with recommendations for future developments. See inside cover of this report for references to these outputs.

Executive summary

This report diagnoses the state of financing for biodiversity in Mexico, with an emphasis on identifying innovative elements in biodiversity financing mechanisms. Mexico is a megadiverse country, with enormous relevance in terms of biodiversity for the world. However, the trends in deforestation and ecosystem degradation in the country continue to cause severe biodiversity loss, in some cases at an alarming rate.

Our work presents the results of a systematic review on the instruments for financing biodiversity in Mexico. Based on this analysis, we found **162 cases related to biodiversity financing**, of which **two main categories can be distinguished: green markets** (64% of cases) and **payments for environmental services** (27%). In addition, the **source of funding** for these instruments (green markets and payments for environmental services) are **the production process itself** (56%) and **public environmental funds and civil society** in the majority of cases (21%). In terms of ecosystems, most of the cases (56%) **focus on forests** and secondly on arable land (17%).

An analysis of these cases yielded the following findings. First, although there is a scarcity of resources for biodiversity in some cases, one of the most pressing issues is to **reorient current (public) resources** to maximize benefits in terms of biodiversity conservation. Specifically, there is a sharp imbalance between the resources allocated to the environmental and the agricultural sector. For every dollar spent on the environment, more than two dollars are assigned to agricultural production policies. In addition, 72% of each dollar allotted to the environment is used for hydraulic infrastructure, which has a weak link with integral natural resource management. Furthermore, almost the entire budget for agricultural production is assigned to subsidizing private production inputs, which, as is well known, distort the market, putting greater pressure on deforestation and the degradation of ecosystems. In addition to the above, there are inefficiencies in the **quota system for access to Protected Natural Areas** (PNA). The amount obtained from access quotas to Mexico's PNAs barely accounts for 24% of the system's total operating costs. There is ample evidence that although the willingness to pay for access to natural areas is much higher than access quotas, the latter remain very low.

Second, there are many **successful cases of green markets in Mexico**, albeit on a very **small scale**. We found some interesting cases, such as the development of a green market in the Gulf of California, the habitat of a small cetacean on the verge of extinction (*Vaquita Marina*). The traditional fishing gear used by local shrimp fishermen causes the by-catch of this species. In response to this problem, the World Wide Fund for Nature promoted the replacement of fishing gear (supply) in exchange local businesses (demand) to buy shrimp at a premium price. This effort required the alignment of incentives of various actors in society and although it operates on a small scale, it could be replicated in other contexts. Another success story is the *Yomol A'tel* cooperative, a company that **produces and markets organic coffee and honey**. This company has managed to maintain standards of sustainability and fair trade, while running a profitable business. However, **the enabling conditions to unleash a larger investment of the private sector into biodiversity business viable ideas are still to be created.**

Our analysis also identified other features of specific projects worth highlighting. For example, in the case of the *Buen Socio* (a financial institution), a well-known social organization (e.g. the World Wide Fund for Nature-WWF- or *Comunidad y Biodiversidad* - COBI) provides support (non-monetary) to a community. In turn, the community becomes eligible for financing from the *Buen Socio.* This is a way of solving an obstacle constantly faced by entrepreneurs who have good projects but lack financing. *Reforestamos México* (a civil society organization) has managed to establish effective links with the private sector and bring together efforts to undertake projects that contribute to the conservation of biodiversity, which was not possible for some years, because companies wished to contribute to conservation but also wanted their name to appear, to show that they were the ones who were contributing. *Reforestamos México* managed to create economies of scale and organize companies of different sizes to achieve a common goal. Our analysis also enabled us to identify some main recommendations to foster successful private sector investments into IFMs for biodiversity conservation:

1. Inclusion of all stakeholders from the early stages of the project.
2. Have an indispensable minimum of social capital in the area where the project is to be developed.
3. Have the support of civil society and/or international organizations to provide technical assistance.
4. Have seed risk capital to allow the project to survive the early years of its operation.
5. In the medium and long term, move to a financial sustainability scheme that is not dependent on subsidies or favorable market conditions that are unsustainable.

On a larger scale, we recommend exploring working alternatives involving civil society and major firms. In Mexico there are a number of large companies with a correspondingly large market share. This constitutes an opportunity to create a high impact if one or more companies of this nature adopt processes or products whose use contributes to conserving biodiversity. There are two primary constraints: first, the procurement area is generally uncoupled from companies' area of sustainability as are their objectives. Second, the demand for sustainable products in Mexico, although increasing, is still not widespread. These two factors discourage companies from creating products and processes that contribute to the conservation of biodiversity. To cope with this problem, **the civil society should get involved on a pilot program with an interested company, and, in the early stages, the company could be temporarily compensated for the additional cost incurred by adopting these practices; this compensation will subsequently be withdrawn.**

We conclude our analysis with the following recommendations:

1. Reorient the resources currently reaching the rural sector. This not only involves transferring resources from the agricultural sector to the environment, but also designing mechanisms that are attractive to both actors (for example, result-based payment for agricultural environmental services, in a similar fashion to the ones presented in the European report).
2. When promoting projects for financing biodiversity, it is advisable to ensure that there are minimum conditions for its success (see above).
3. Continue the promotion of PES schemes, taking advantage of the flexibility of this instrument, which allows actors from different contexts and sectors to reach compensation agreements.
4. Take the opportunity to re-engineer the access quotas for Protected Natural Areas. The willingness to pay for access to these areas has been proved to exceed the fees charged for access. Wasting this opportunity could be very costly in the long run. In this regard, a legal analysis is suggested to identify legal constraints to make the system of access quotas for Protected Natural Areas more flexible and more efficient in order to achieve more resources for conservation while limiting degradation and biodiversity loss.
5. We recommend that civil society and the scientific community work together with one or more large companies in Mexico to undertake an environmentally friendly pilot project, oriented towards profit making. The effect of involving one or more large firms could have a large, positive effect in terms of biodiversity, as long as market shares are commonly concentrated in few firms in Mexico.
6. Support investments at the landscape level in order to consider broader social-ecological benefits and improve resilience and adaptation for climate change. Such an investment scale would need ongoing public-private partnerships to reduce the risk for private companies to invest at landscape level and, more importantly, make them understand the pertinence of it.

1 Introduction

The Innovative Financing Mechanisms for Biodiversity in Mexico Project sought to exchange experiences between Europe and Mexico regarding innovation in financing mechanisms for biodiversity. During the project, experts from Mexico and Europe performed a diagnosis of the state of financing mechanisms for biodiversity. In addition, three international meetings were held, one in Brussels and two in Mexico City, where experts from several countries shared their experiences.

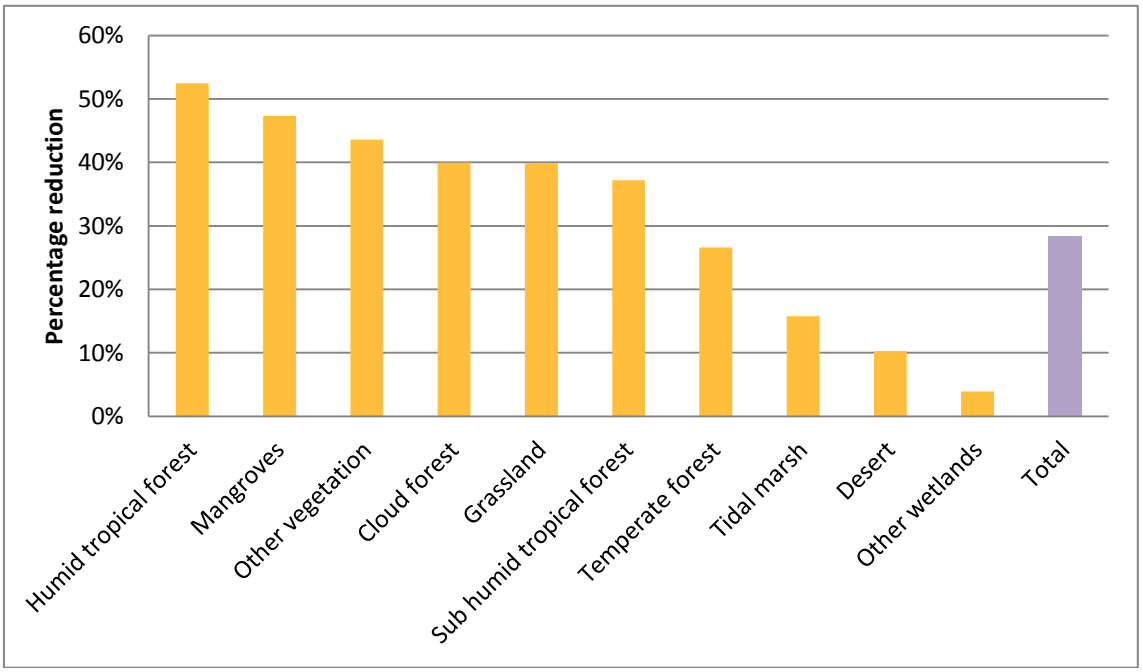
In this report, we present the results of a systematic review of financing mechanisms for biodiversity in Mexico. Our review focuses on six finance mechanisms: (i) Green Markets in combination with Impact Investments; (ii) Payments for Environmental Services; (iii) Conservation Easements; (iv) Conservation Funds; (v) Offsets and Carbon Markets and (v) Taxes and fiscal reforms. Some financial mechanisms being discussed at the international level such as the Green Bonds have not been included since their implementation is very recent and they only apply to clean power generation projects in the states of Puebla and Nayarit. Besides, we also present certain case studies in more detail with information obtained through semi-structured interviews with the implementers. Lastly, we present a set of recommendations derived from our analysis.

2 Biodiversity in Mexico

The 17 megadiverse countries are home to more than 70% of all known species of flora and fauna. Mexico is a member of this group and ranks fourth. It is home to 10-12% of the world's biodiversity, ranks second as regards reptile species and it is among the five countries with the most mammals, flowering plants and amphibians. Moreover,, many species in Mexico are endemic (2008). According to (CONABIO, 2012a) there are 19,150 endemic species in Mexico.

This enormous biodiversity is a result of the heterogeneity of Mexico's geo-physical environment. While it has a large northern terrestrial area with a maximum width of 2,000 kilometres, its southern territory is a narrow terrestrial area with a length of 200 kilometres. Mexico also has two peninsulas. The Yucatan Peninsula, located in the southern part of the country, is a vast plain with a maximum altitude of 200 meters above sea level. Conversely, the Baja California Peninsula is a long stretch of land located in the northern part of the country and dominated by mountains. The continental area of the country comprises five mountain systems, two large coastal plains and one central highland crossed by isolated mountain and volcano systems. These conditions contribute to a weather pattern so diverse that all climates are represented in the country (Espinosa et al., 2008).

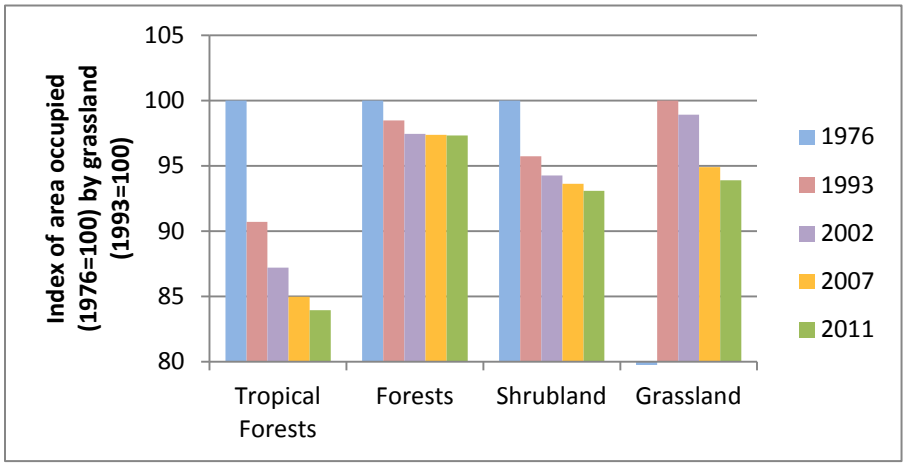
However, biodiversity is declining at an alarming rate. According to the Living Planet Index, biodiversity fell by 58% between 1970 and 2012 (WWF, ZLS, & GLOBAL Footprint Network, 2016). Mexico is no exception. In 2011, the remaining forested area accounted for 70% of the historical and potential distribution of forests, meaning that human activities have transformed 30% of the territory. The most deforested ecosystems are humid tropical forests and mangroves, with a net surface loss of 52% and 47%, respectively (Figure 1).



Source: (SNIARN, 2011a), (SNIARN, 2011b)

Figure 1 : Percent of reduction of terrestrial ecosystem areas compared to their historical area.

Another indicator of the loss of biodiversity in Mexico can be obtained from an area index developed from the first national satellite mapping in 1976. For tropical forests and shrublands, the index is based on the year 1976 whereas for grasslands, the index is based on the year 1993. This graph shows that from 1976 to 2011, tropical forests lost 16% of their surface, shrublands 7% and all other types of forests 3%. Between 1993 and 2011 grasslands lost 7% (SNIARN, 2015) (Figure 2).



Source: (SNIARN, 2015)

Figure 2 : Area occupied by main terrestrial ecosystems based on the 1976 index.

Nevertheless, the rate at which terrestrial ecosystems have been lost has systematically declined. The total loss of terrestrial ecosystems between 1976 and 1993 was approximately 372,000 hectares per year, as opposed to 275,000 hectares between 1993 and 2002, 239,000 hectares between 2002 and 2007, and 174,000 hectares annually between 2007 and 2011 (SNIARN, 2015).

International organizations such as FAO (2015) have also estimated that the deforestation rate from 2005 to 2007 was 155,000 hectares per year, halving the average deforestation rate between 1990 and 2000. Nine of the 155,000 hectares correspond to temperate forests and 146,000 to tropical forests, reflecting their drastic decline (of 16%). As for flora and fauna, 127 species have been recognised by the scientific community as being extinct in Mexico. Of this number, 57 were endemic to Mexico, 19 have disappeared in Mexico yet still exist in other countries and 43 still exist but not in the wild and have no possibility of being reintroduced as wild species. The main drivers of the extinction of these species are overexploitation, habitat destruction, introduction of exotic species, and water sources pollution and depletion (David Espinosa & Ocegueda, 2008; Soberón, Halffter, & Llorente-Bousquets, 2008).

According to (SEMARNAT, 2010) and (Llorente-Busquets & Ocegueda, 2008) 27.7% of vertebrate species in Mexico are now at risk of extinction together with 3.4% of vascular plants. See (Table 1)

Table 1 : Species at risk of extinction in Mexico.

	Species at risk	Total known species	Species at risk (%)
Vertebrates	1524	5488	27.77%
Birds	392	1096	35.77%
Mammals	291	535	54.39%
Reptiles	443	804	55.10%
Amphibians	194	361	53.74%
Fish	204	2692	7.58%

	Species at risk	Total known species	Species at risk (%)
Vascular plants	987	28937	3.41%

Source: (Llorente-Busquets & Ocegueda, 2008; SEMARNAT, 2010)

Economic importance of biodiversity

According to de Groot et al. (2012), "the total value of ecosystem services is considerable and ranges between 490 USD(2007)/year for the total bundle of ecosystem services that can potentially be provided by an 'average' hectare of open oceans to almost 350,000 USD(2007)/year for the potential services of an 'average' hectare of coral reefs." The authors find that an 'average' hectare of temperate forests provides an estimated value of 3,013 USD(2007)/year of ecosystem services while an 'average' hectare of tropical forests yields 5,264 USD(2007)/year. Table 2 shows the economic values estimated by the authors for ten types of ecosystem.

Table 2 : Economic value of different types of ecosystems (USD(2007)/year/hectare)

	Marine	Coral reefs	Coastal systems	Coastal wetlands	Inland wetlands
Economic value	$ 491.0	$ 352,249.0	$ 28,917.0	$ 193,845.0	$ 25,682.0
	Fresh water (rivers/lakes)	Tropical forest	Temperate forest	Woodlands	Grasslands
Economic value	$ 4,267.0	$ 5,264.0	$ 3,013.0	$ 1,588.0	$ 2,871.0

Source: (De Groot et al., 2012)

Lara-Pulido, et al. (2016) estimate the total value of the ecosystem services in Mexico provided by different ecosystems. They conclude that that the transformation of forests, mangroves, estuaries and tidal marshes to cultivated land is not cost effective because the value of the ecosystem services that cultivated land provides per hectare per year is lower than the value of the ecosystem services provided by these other ecosystems (See Box 1). Another study, by Bezaury-Creel (2009) estimates that the total value of ecosystem services that national protected areas in Mexico provide is over 4,800 million USD, of which over 760 million come from the conservation of biodiversity in these areas.

Furthermore, ecosystems and biodiversity play a key role as safety nets for poor rural households around the world. According to Angelsen and Wunder (2003) and Wunder et al. (2014), there is a vicious circle between poverty and deforestation. Deforestation frequently occurs as a result of the search for fertile soil for subsistence agriculture, which solves short-term needs, yet sacrifices the long-term net benefits of preserving forest ecosystems. Moreover, unless fertility is properly managed, mid-term traditional agriculture production may also be compromised. Moreover, deforestation harms current non-monetary income. An analysis of the income of approximately 8,000 rural households in 24 developing countries showed that approximately 28% of their total income is obtained from the environment, and even more so in poorer households (Angelsen et al., 2014). Environmental income is defined by the authors as "the extraction from non-cultivated sources including: natural forests, other non-forest wildlands such as grass-, bush- and wetlands, and fallows, as well

as wild plants and animals harvested from croplands." As one can see, this type of income relies heavily on the existence of forests. Deforesting eliminates a significant part of this income.

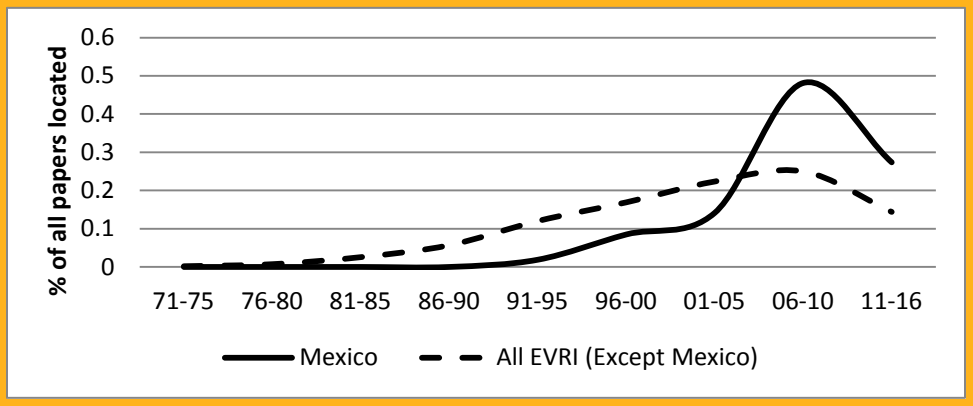
Deforestation and degradation directly affect 90% of the 1.2 billion people in extreme poverty in the world since they are completely dependent on the natural resources that surround them (Chao, 2012). In Mexico, many of these groups are indigenous communities that are disproportionally affected by biodiversity loss. Mexican forests cover 56.5 million hectares and are home to 14 million people, 28% of whom are indigenous. However this number only considers those that speak an indigenous language; if broader definitions of ethnic affiliation are considered, the proportion is much higher (Sarukhan & Merino, 2016). In addition, according to OECD (2013a), 10.9 million of the 14 million people inhabiting forests are regarded as living in extreme poverty. Deforestation and biodiversity loss must be reduced to achieve long-term reduction of rural poverty in Mexico. "The poor remain the most heavily affected by the loss of forest and soil fertility" (OECD, 2013a).

In order to stop this negative trend, innovative financial ways of increasing conservation resources must be implemented. For example, private incentives that lead to the degradation of ecosystems must be transformed to achieve biodiversity conservation to bring us closer to the social optimum.

Box 1 :"Visible Values of Invisible Values: the economics of ecosystem services"

In the study "Visible Values of Invisible Values: the economics of ecosystem services", Lara-Pulido, et al. (2016) estimate the value of ecosystem services in Mexico provided by different type of ecosystems. This estimation is drawn from a meta-analysis of economic valuation studies in Mexico. The analysis was based on 106 studies estimating an economic value for any given environmental good or service in the country. In total, 352 values were coded and classified in a matrix developed on the basis of the Common International Classification of Ecosystem Services (CICES) and the Economics of Ecosystems and Biodiversity (TEEB) ecosystem classification.

One of the qualitative findings they obtained is that ecosystem valuation literature is a relatively recent field of study in Mexico compared to the rest of the world. Twenty-seven per cent of the articles they analyzed were published between 2010 and 2016, another 48% between 2005 and 2009, and the remainder in previous years. When they analyzed the publication date of papers inside the Environmental Valuation Reference Inventory (EVRI) assessing environmental services in countries other than Mexico, very different scenarios emerged: only 14% of all the papers located were published in the period 2010 to 2015.



Among the quantitative conclusions, they find that land use change from forests, mangroves, estuaries and tidal marsh to cultivated land is not cost effective. This conclusion is based on the fact that the value of the ecosystem services provided by an average hectare of these four ecosystems is higher than the value of the services provided by an average hectare of cultivated land.

Ecosystem	Area (hectares)	USD per capita/year	USD/ha/year
Cultivated land	32,596,791.1	426.4	1,563.6
Forests	31,843,806.4	973.8	3,655.3
Mangroves	764,486	197.4	30,864.4
Estuaries	1,600,000	695.5	51,958.5
Tidal marsh	1,250,000	528.5	50,537.6

Source: (Lara-Pulido et al., 2016)

3 Financing Mechanisms for Biodiversity in Mexico

This section presents an analysis of the state of the art of the economic instruments and financial mechanisms for biodiversity in Mexico. The analysis was conducted using a two-stepwise procedure. We first conducted a systematic review on the Internet using web and academic search engines to identify financing initiatives that had been implemented and documented. This allowed us to identify expert-knowledge initiatives. During the second stage, we conducted a series of semi-structured interviews with key stakeholders who were conducting a pilot implementation of a particular financial mechanism for biodiversity in Mexico. This procedure allowed us to identify the most promising case studies for an in-depth study as well as current trends in the development and implementation of IFMs for biodiversity in Mexico.

General characteristics of IFMs in Mexico: Results of the Systematic Review

Methodology

For the systematic review, we used a list of 10 keywords we searched for on four different search engines: Google, Google Scholar, Jstor and Science Direct. Table 3 shows the list of keywords.

Table 3 : Keywords searched on the systematic review.

Keywords					
English	Financial Instruments	AND Biodiversity AND Mexico	Spanish	Mecanismos financieros	AND Biodiversidad AND México
	Financial Mechanisms			Instrumentos financieros	
	Economic Instruments			Instrumentos Económicos	
	Economic Mechanisms			Mecanismos económicos	
	Eco labelling			Etiquetado ecológico	
	Impact investment			Inversión AND Impacto	
	Green Market	AND Mexico		Pagos por servicios ecosistémicos	AND México
	Biodiversity offsets			Mercados Verdes	
	Payment for environmental services			Pagos por servicios ambientales	
	Payment for ecosystem services			Pagos por servicios ecosistémicos	

Source: Own elaboration

Each of the keywords was looked up in each of the four search engines in two different ways: first, as they are presented in (table 3) and then using quotation marks to find more specific references. Furthermore, in Jstor and Science Direct we conducted each of these two searches first on the full text and then only on the abstract, title and keywords of the articles in order not to miss important documents. Table 4 shows the specific methodology we used in each search engine with the total references we obtained from each.

Table 4 : Methodology used in the systematic review

Search Engines	Methodology	Total references (after dropping duplicates)	Cases (after interviews)
Google	**Subjects included**: All search terms with and without quotation marks **Evaluated results**: 50	653 (282)	155 (162)
Google Scholar	**Subjects included**: All search terms with and without quotation marks **Evaluated results**: 50	239 (60)	
Jstor	**Subjects included**: All search terms with and without quotation marks **Searched in**: Abstract And Full Text **Evaluated results**: 50	96 (5)	
Science Direct	**Database**: All sources **Subjects included**: All search terms with and without quotation marks **Searched in**: Abstract, Title, Keywords And Full Text **Evaluated results**: 50 (If 10 references were found in the last 25 results, we evaluated another 25 results)	138 (23)	

The selection mechanism we used in the search engines was based on a single criterion: the document or web page had to describe a case in which financial resources had funded the conservation or restoration of biodiversity in Mexico. The time frame for the cases did not matter in this first step. They could have been in the past, present, or planned for the future. In this first step, we obtained 1126 references, which were reduced to 370 after eliminating duplicates.

Using the 370 references, we built an initial list of 238 cases in Mexico. We then analysed this list to ensure that all the cases were actually financing mechanisms for biodiversity. During this process, we rejected 85 of the cases for any of the following reasons: They were not actually a case of financing biodiversity, they were cases that had already concluded and they were cases with more than one name but referred to the same case. The pre-final list we formed had 155 cases after which another seven cases were included with information gathered from the interviews with key stakeholders.

Results

This sub-section presents the general characteristics of the financial mechanisms, including their scale, the type of ecosystem where they operate and the main biodiversity-related problem they are attempting to solve. In the second part of this section, we discuss some of the examples we gathered from the interviews with stakeholders.

The majority of the 162 cases found are operational. Only seven mechanisms are still at the conception phase and two are transitioning from the concept stage to becoming a pilot program. In terms of scale, we grouped them in four categories: (I) local cases which only take place inside one state of Mexico. (II) Regional cases that take place in two or more states of Mexico but fewer than 10.. (III) National cases which occur in more than 10 states of Mexico and (IV) Cross-Border cases which occur in Mexico and other countries. The results based on this variable were as follows: The majority, 121 of the 162 mechanisms, are local cases, 18 mechanisms are cross border, 16 national and 7 regional. This first result shows that most of the biodiversity mechanisms in Mexico have been adapted to the social and ecological local context, which is reflected in the size of the area where local cases operate, ranging from 20 to 8,218 hectares. Cross border mechanisms are second in importance, partly because they include international certification standards of organic products that operate in Mexico.

As figure 3 shows, the three most common ecosystems are forests, accounting for 56% of all the cases, agricultural land for 17%, and coastal systems for 8%. Forests constitute the majority of cases because they constitute the largest ecosystem in terms of area and because they are the ecosystem that is home to most of the rural communities. Agricultural land is in second place since a large number of mechanisms involve organic production schemes.

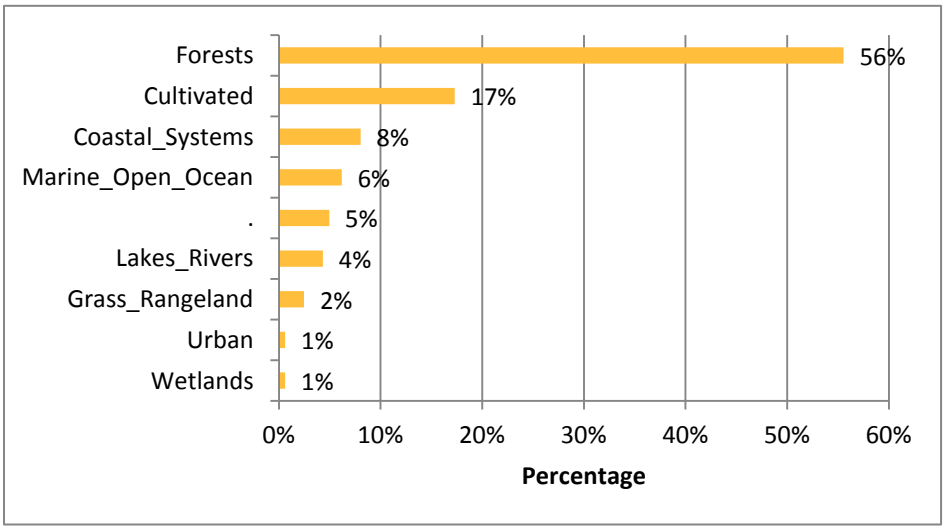
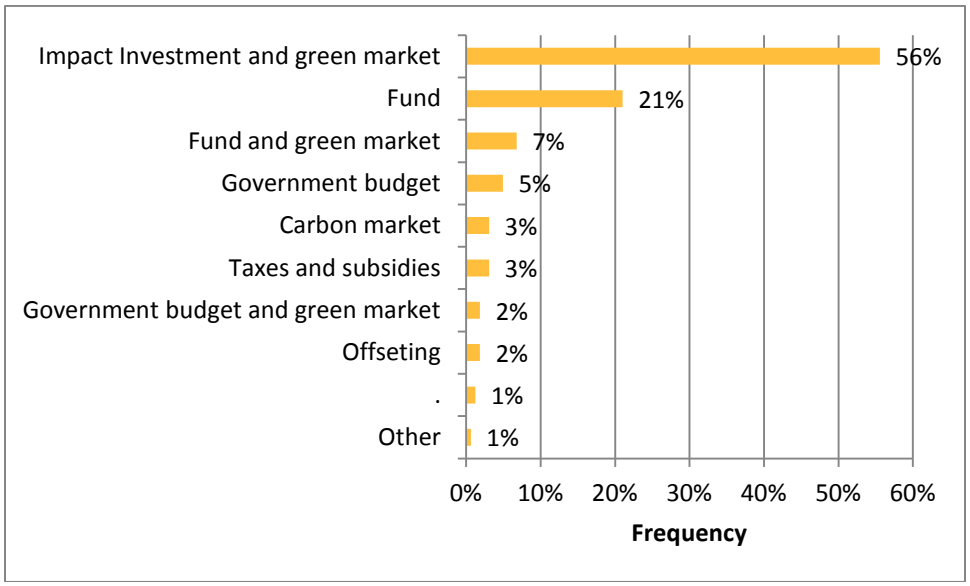


Figure 3 : Type of ecosystem where the identified mechanisms are working.
Source: Own elaboration.

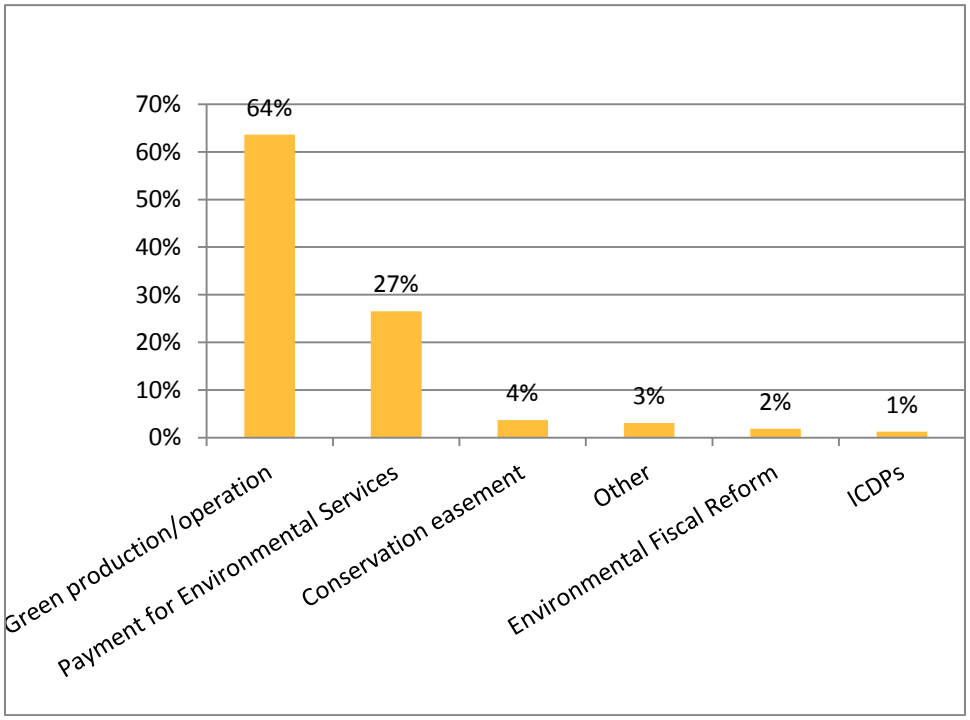
Even though all the cases should have a positive impact on biodiversity, as a result of the selection process, several only regard the conservation of biodiversity as a side objective. In 31% of cases, protection of biodiversity is considered as a side benefit. The most common objectives, in which biodiversity conservation is included as a side effect are watershed protection and preventing deforestation. Nevertheless, in the majority of the mechanisms reviewed -69%- the main objective was biodiversity protection.

For all the cases, we identified the underlying economic mechanism and financial mechanism. For the purpose of this report, “economic mechanism” refers to the specific governance mechanism used to foster environmental additionality and economic profitability, while “financial mechanism” refers to the specific architecture used for mobilizing and administering money. The distribution of financial mechanisms is shown in Figure 4, the distribution of economic mechanisms in Figure 5 and the matching of financial and economic mechanisms in Figure 6.



Source: Own elaboration.

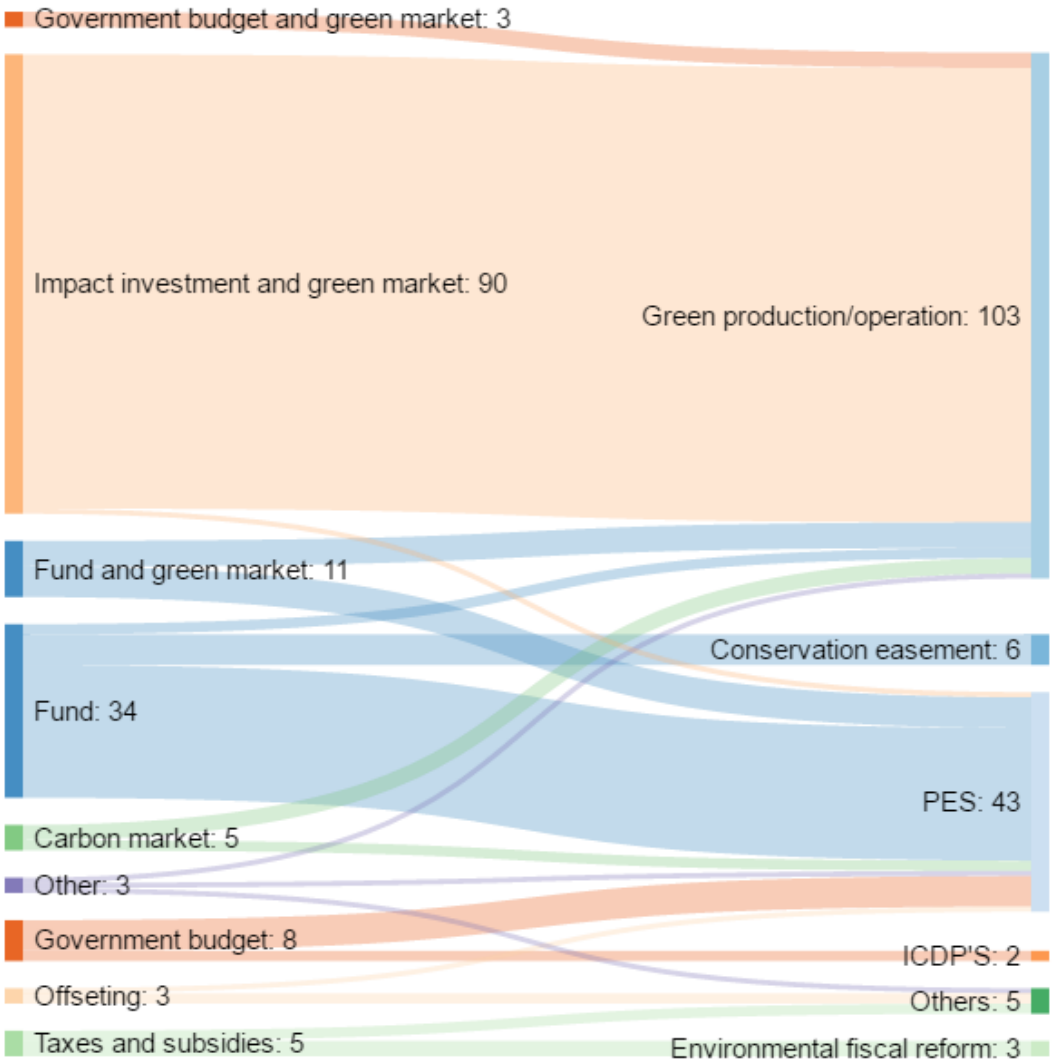
Figure 4 : Distribution of financial mechanisms



Source: Own elaboration.

Figure 5 : Distribution of economic mechanisms

Note: ICDP – Integrated Conservation and Development Project. Other –Offsetting financial instruments (4) and one proposal for green bonds.



Source: Own elaboration

Figure 6 : Matching financial and economic instruments

As one can see from Figure 6, the most frequent association between financial and economic mechanisms is impact investments with green markets. This is probably because green markets are attractive for private agents because they create profit but also generate positive environmental and social externalities. Another frequent association is between funds and payment for environmental services, which reflects the importance of public and private funds as a funding source for PES programs in Mexico. The next part of this section discusses each financial and economic mechanism. First, we describe the economic rationale behind each one of them and then we describe the status of the mechanism in the Mexican context.

Specific characteristics of IFMs in Mexico

Green Markets

As one can see from Figure 5, green production or operation is by far the most frequent economic instrument used for financing biodiversity – 64% of total cases. Green markets refer to the commercialization of goods and services produced through the sustainable use of biodiversity and ecosystems. Markets for green products emerge to satisfy the increasing demand for this type of goods and services. Common facilitators of these markets are green labels. Green labels indicate that a certain product or service was produced through sustainable use of nature which varies from label to label (OECD, 2013b).

The economic rationale behind markets for green products is that the sustainable use of natural resources maintains ecosystem services. Although these ecosystem services have not traditionally been in the market, there are people who value them and are prepared to pay for them.

As more information about the impact products have on nature conservation of nature is made available for consumers, more people are willing to pay extra money for goods and services that are sustainably produced. The concept that describes this behaviour in consumers is responsible consumption and is not limited to green products. There are also increasing numbers of consumers who value products made under fair conditions for their workers, which allow them to lead decent lives. Since production based on sustainable use of biodiversity usually costs more than traditional production techniques, and because certain consumers are willing to pay extra money for these sustainable practices, the market price of green products is normally higher than the market price of non-sustainable products. This premium can then be used to protect biodiversity.

On the side of government, the main attempt to create green markets was the creation of "Units of Management and Use of Wildlife" (UMAS) in 1997. UMAS are private or community areas where landowners commit to make sustainable use of biodiversity and receive economic support from the federal government and the right to commercially exploit their wildlife resources. There are three types of UMAS:

1. Extractive: Hunting, pet breeding, ornamental, inputs for industry and crafts, etc.
2. Non extractive: Ecotourism, research, education, photo, video, cinema.
3. Mixed.

(CONABIO, 2012b)

In 2014, there were 12,317 UMAS registered, covering 3.5 million hectares of land. The majority (86%) of them were for extractive-hunting use (GIZ, 2014). In these areas, local administrators sell a limited amount of hunting permits to visitors. The number of permits is designed to ensure that the birth rate of a hunted specie is not exceed by its death rate, which allows sustainable use of biodiversity. These UMAS are considered green markets because buyers of hunting permits are paying for the recreational service of biodiversity that is provided on a sustainable way. The most common species in UMAS are:

1. White-tailed deer.
2. Collared peccary.
3. Coyote.
4. White-winged dove.
5. Mourning dove.

And the most common flora species in UMAS are:

1. *Chamaedorea pochutlensis.*
2. *Beaucarena recuvata palm.*
3. Giant Spanish Dagger.
4. *Cryosophila nana.*

5. *Orbignya palm.*

(CONABIO, 2012b)

One of the most popular ways of fostering green production is eco-labelling or product certification. The Mexican government has also made efforts in this regard: In 2013 the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (Spanish acronym SAGARPA) created an organic label. From 2013 to 2015, 84,000 hectares were certified as organic by that institution (Martínez, 21 de febrero de 2017). Moreover, Mexico also approved a national law for organic production in 2006, which allowed other private national and international certifications to emerge in Mexico. So far, there are 23 certifications working in the country, some of the most famous examples are Forest Stewardship Council, Marine Stewardship Council, Certimex, and UTZ certified. (CONANP, 2009, 2016)

In Mexico, as elsewhere, organic production is on the rise. From 1996 to 2016, the area producing organic products increased from 2,000 hectares to more than 512,000 (Martínez, 21 de febrero de 2017), coffee being the most common organic product. Available data from 2008 indicate that approximately 185,000 hectares -equivalent to 50% of all the area cultivated organically in Mexico- was under organic shade grown coffee production. Shade-grown coffee benefits biodiversity because it requires the presence of more than 35 different species of trees, which help preserve local flora and fauna. Almost all organic coffee (91% of total hectares of organic coffee) is produced in the state of Chiapas (Gómez Cruz et al., 2009). In the final section of this report, we present a case study of shade grown coffee in Chiapas. There are also other important organic products in Mexico. These include vegetables, with 35,000 hectares planted, avocado with 31,000, herbs with 30,000, cocoa with 15,000, mango with 12,000, agave with 12,000 and coconut with 9,000 (Gómez Cruz et al., 2009).

One obstacle faced by private projects for green production is financial. It is extremely difficult to find financial resources to kick-start projects because profitability is obtained in the mid and long-term. Some of the reasons that prevent more green production schemes are:

- They are relatively new for the financial sector, meaning that there is a great deal of uncertainty about the risk of these projects. Besides, the expected profit is not a high as for example, in tech projects, which are also very new and risky.
- Many projects are undertaken by local communities, which often do not have the credit history or collateral assets required to obtain a loan.

To fill this gap, some financial institutions in Mexico are willing to facilitate the process and absorb initial investment costs. One of these financial entities is El Buen Socio, created with the objective of funding productive projects with positive environmental or social impacts in rural communities, but also with high initial financial risks. To give the funds, El Buen Socio establishes credit conditions such the frequency of payments to each project, (Box 2). Another risk-taking financial entity is Financiando el desarrollo del campo FINDECA ("Funding development of the countryside"), which also operates as a financial institution that funds productive projects in Chiapas and Oaxaca with environmental and biodiversity objectives. An important aspect of this financial organisation is that they have managed to make a profit, making them self-sustainable (Box 2).

Box 2 : El Buen Socio impact investment fund

Name of the program *El buen socio*
Year of birth 2007
Place where the program works Oaxaca and Chiapas
Supporting organization *El buen socio*

General description
El Buen Socio is a financial organization that funds productive projects with positive social or environmental impact in rural communities that own natural resources. The organization gives credits only to communities

that are really committed to their projects and that are already working with funds from other NGO's. Some examples of the projects that they have funded are: organic production of clam, honey, cacao, and coffee.

El buen socio tries to reach a financially unattended sector. Traditional banks do not lend money to this type of projects, microfinance organizations ask for weekly or monthly payments which are very hard to pay by many communities, since their projects need a maturing time to generate profits. Moreover, financial institutions ask for a credit history or collateral assets before lending money, which are very often inexistent among the rural poor. *El buen socio* suits the conditions of each credit to the specific necessities of each project, for example, by allowing them to pay after the whole production is sold or by accepting bees as collaterals in an apiculture project. The organization has made a very successful alliance with 6 NGO's and a somewhat successful with another 8. These 14 organizations play as *guarantees* of the community by recommending promising projects to *El Buen Socio.* In all success cases, there has been a mix of private, public and NGO resources and technical assistance, which is also key for success.

Innovation

1. They suit the credit conditions to every project, which has allowed them to reach a financially unattended sector.
2. They have summed strengths with NGO's technical assistance which has increased the probability of success.

Source: (Berceda, 2016)

Box 3 : *Financiando el desarrollo del campo*. Impact investment fund.

Name of the program FINDECA
Year of birth 2007
Place where the program works Oaxaca and Chiapas
Supporting organization *State Coordinator of Coffee Producers of the State of Oaxaca, A.C. (CEPCO)*

General description

FINDECA is a financial organization with the objective of funding productive and environmentally sustainable projects in the rural area of Oaxaca and Chiapas. Currently they fund projects that produce coffee, mango, papaya, sorghum, and forest products, among many other products, as well as controlled production projects (greenhouses), aquaculture and apiculture projects. They offer two types of loans: short-term accessory credits and fixed-assets credits.

FINDECA has not only funded many projects, they have achieved the financial profitability as a financial institution. One key aspect has been the technical accompaniment that they provide to their clients so the probability of success increases.

Innovation

1. They have achieved financial profitability which opens the door for the investment of more private resources on environmentally sustainable projects.
1. The technical accompaniment has been key for the success of the projects.

Source: (Martinez, 2016)

The importance of organic production schemes or biodiversity friendly production techniques should not be underrated. Production techniques have led to the extinction of many of the world's species. A case in point is

the shrimp fishery in the Peninsula of Baja California that is causing the extinction of the vaquita porpoise (Phocoena sinus). The vaquita is a small cetacean, endemic to Mexico that is accidentally caught by fishermen's nets. Today, the number of vaquita porpoises is estimated at fewer than 100 (WWF, 2016). WWF is leading a ground-breaking effort to catalyse a green market between local private fishing companies and fishermen to protect the remaining vaquita porpoise population. The innovative aspect of this example is developed as a case study in the next section.

Payments for Environmental Services

Payments for environmental services are the second most frequent financial mechanism we found, with 43 cases (27% of the total).These programs, also known as PES, are agreements between the beneficiary of a particular ecosystem service and the land owner or manager who provides the service, where the beneficiary pays the owner to continue providing the service. According to (S Wunder, 2015) PES are:

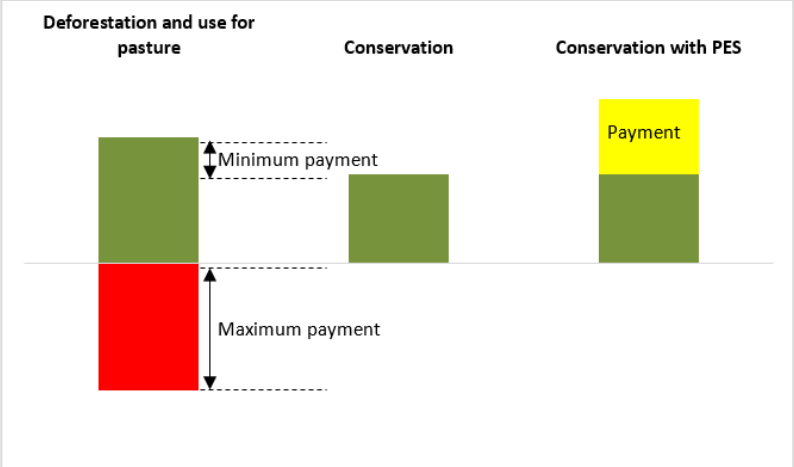
A. *voluntary transactions*
B. *between service users*
C. *and service providers*
D. *that are contingent on agreed rules of natural resource management*
E. *for generating offsite services*

One important feature of PES programs is that the payments are contingent on specific environmental objectives that must be met by land owners or managers. These objectives may be based on specific actions or specific environmental results. (Ezzine-de-Blas, Wunder, Ruiz-Pérez, & Moreno-Sanchez, 2016)

The economic rationale behind PES programs is that landowners or managers of ecosystems do not receive income for all the benefits the ecosystem provides. Normally, they only receive income for extractive uses, which encourage is them to deforest, meaning that other ecosystem services are lost. If landowners were paid for these other services by the beneficiaries of ecosystem services, extractive use would only continue in these ecosystems where this service is most valuable.

Figure 7 shows a hypothetical example of the benefits the owner of a forest in the upper part of a mountain would receive and the downstream costs the population would face with different forest uses. In the first scheme, the landowner would down cut all the trees and use the area for pasture. The income he would receive for his activity is represented by the green box, while the downstream costs that would arise due to the reduction of the hydrological services are represented by the red box. In the second scheme, the landowner would not deforest his land and would sell non-timber products. The green box shows the income he would obtain and one might conclude that a landowner would prefer the first scheme since it would give him more income. Nevertheless, if downstream population compensates him for hydrological services (yellow box), then conservation could become a more profitable activity as the third scheme shows.

It is important to note that the minimum payment a landowner would be willing to accept to conserve the forest is the difference between the first and the second scheme, in other words, the opportunity cost of conservation. On the other hand, the maximum payment downstream populations would be willing to pay is the total value of the hydrological services. Therefore, PES programs will work when beneficiaries' willingness is higher than the opportunity cost of conservation.



Source: Adapted from (Pagiola & Platais, 2007).
Figure 7 : Economic foundations of PES.

In 2003, the Mexican government created a national Program of Payment for Environmental Services. This program is among the 43 PES programs that we found in our systematic research, and covers the largest number of hectares in Mexico. Until August 2016, the program was compensating landowners for 2.7 million hectares of forests (Joaquín Saldaña, 2016).

Mexican PES was extremely innovative when it was created, since it was designed on the basis of an economic rationale (to pay for positive externalities provided by forest owners), which had rarely been seen in Mexico before. Initially, the Mexican PES was intended to compensate for any environmental service provided by forests (hydrological services, carbon sequestration and biodiversity). However, since the study that supported its creation was financed by Japanese funds allocated to water issues, this program focused mainly on hydrological services (it was called PSAH – Pago por Servicios Ambientales Hidrológicos, Payment for Hydrological Environmental Services) (Muñoz-Piña, Guevara, Torres, & Braña, 2008).

Since its inception, the program has undergone several modifications. In 2004, the Mexican PES broadened its objectives to pay for carbon and biodiversity services and also to promote agroforestry activities. Two PES programs now exist: the hydrological PSAH and the PSA-CABSA which stands for “Program for Development of Markets of Environmental Services, Carbon Sequestration and Biodiversity derivatives and to promote the establishment and improvement of Agroforestry Systems”. In 2006, after two years of effective operation, both programs were merged under the National Payment for Environmental Services scheme. In this new program, compensation for carbon services was eliminated, leaving only compensation for hydrological and biodiversity services. This program has continued to be managed by the National Forestry Commission (FAO, 2013).

The program operates with renewable five-year contracts, with payment depending on the service being compensated for and the type of forest. For hydrological services, annual payment per hectare is $280 pesos (13 USD) in arid lands, $380 pesos (18 USD) in coniferous forests, $550 pesos (26 USD) in evergreen tropical forests and $1,100 pesos (52 USD) in cloud forests. For biodiversity services, payment is $500 pesos (23 USD) and does not depend on the type of ecosystem. Moreover, all owners receive fixed annual financial support for technical assistance ranging from $16,000 pesos (762 USD) to $40,000 pesos (1,904 USD), depending on the number of hectares of the property. (CONAFOR, 2016)

Effectiveness of Mexican PES in deterring deforestation has been analysed by Alix-Garcia et al(2015), The author found a significant impact of the Program, in particular, that Mexican PES prevent between 40 and 51 percent of expected deforestation in the places where they operate.

At the same time, the National Forestry Commission developed a mechanism to incentivise the creation of PES programs at the local level by matching funds from different sources. These are PES programs where the federal government funds a maximum of 50% of the total costs of a local PES program with another private actor covering the other 50% (Saldaña, 2013). Matching funds emerged as a way of dealing with the criticism that the one-size-fits-all national program of PES was not aligned to the social-ecological local diversity and needs, or to the need to maximise public funds by attracting private investments. See Box 3 for one specific PES under matching funds that was initiated by local communities and Box 4 for one initiated by a private company. According to our systematic review, matching funds are the most common PES program in Mexico. Thirty-five of the 43 PES cases we found are matching funds and cover more than 133,000 hectares in Mexico (Saldaña, 2013).

There are other PES programs in Mexico that are not part of matching funds. These are: two carbon credit programs in which the organization with local communities is similar to a PES program, and another four programs created by non-governmental organizations in small areas. The average area covered by all the PES programs is 185,000 hectares; nevertheless, the programs are extremely heterogeneous: while there are 23 PES programs that cover less than 4,046 hectares, there are two current programs and one planned program that cover or will cover over 300,000 hectares, including the national PES program.

Box 4 : La Guasima matching fund for PES.

Name of the program *La Guasima Matching fund for PES*
Year of birth 2004
Place where the program works Sinaloa
Supporting organization *Conselva, Costas y Comunidades,* Mexican Fund for the Conservation of Nature (FMCN), and CONAFOR.

General description
La Guasima community in Sinaloa has a nuclear zone of almost 8 thousand hectares of forest that has not been altered since 1500. Since then it has developed a strong local organization between different communities that live in the area that has always looked for the conservation of their natural resources. Today *La Guasima* is about to be declared a federal Natural Protected Area, the biggest in Sinaloa, with 201 thousand hectares. In 2003, academics from the Research Center of Food and Development (CIAD by its acronym in Spanish) showed that *La Guasima* had both zones were very well conserved and other zones suffering from degradation due to farming practices and extensive cattle raising. The community decided to ask CONAFOR to be part of the national PES program and in 2004 they were accepted. From 2004 to 2008, 3 thousand hectares were protected under the national PES scheme.

After several failed attempts of renewing the contract with the Federal PES program, in 2012 they achieved the support of the organization *Conselva, Costas y Communidades* and the Mexican Fund for the Conservation of Nature for building a local PES program under the matching funds of CONAFOR for the next 10 years. Today the area under PES is of 2,200 hectares which are monitored monthly. The monitoring includes:

- 10 bird species, of which 8 are priority species for the government and 2 endemic.
- 7 fish species, all of them priority species.
- 2 flora species, both endemic.

Innovation

1. The efforts of the local communities for conservation have resulted in the implementation of two PES programs and in the declaration of the zone as a federal Natural Protected Area.

Source: (Joaquin Saldaña, 2016).

Box 5 : Peña Colorada matching fund for PES.

Name of the program: Peña Colorada Payment for Ecosystem Services
Year of birth: 2014
Place where the program works: Colima and Jalisco
Supporting organization: Peña Colorada and CONAFOR

General description
Peña Colorada is a mining company dedicated to the extraction and commercialization of iron in the State of Colima. The mine is located in the municipality of Minatitlan and the processing plant is in the municipality of Manzanillo. The company produces 4.5 million tons of iron each year, equivalent to 30% of all the iron used in the Mexican industry.
In 2014, the company began a negotiation with CONAFOR to create a scheme of payment for environmental services in Minatitlan under the program of matching funds. The company wanted to maintain the ecosystem services provided by the deciduous forest in this area as a voluntarily way of compensating some of the environmental impact that its operations have. The negotiations resulted in a 5 year contract for the conservation of 510 hectares of forest with a total budget of 1.14 million pesos (52 thousand USD). Since the program is part of the matching funds initiative, 50% of the total budget is provided by *Peña Colorada* and the other 50% by CONAFOR. Unlike the majority of PES programs in Mexico that are focused on the water services, this program does not have one specific ecosystem service as objective: they pay for water, carbon and biodiversity services.
In 2016, a second PES program was agreed between *Peña Colorada* and CONAFOR under a five-year contract. This second scheme takes place in 770 hectares of the municipality of Manzanillo with a total budget of 2.15 million pesos (98 thousand USD). The rationale behind this second program is the same as that of the first one and the ecosystem services that want to be maintained are also the same because the predominant ecosystem is also deciduous forest. The two programs add together 1,280 hectares and a total budget of 3.3 million pesos (150 thousand USD).
Two key factors have facilitated the establishment of the program. The first one is that the expenses made by the company are tax deductible and the second one is that there is a good relationship between the company, CONAFOR and the local communities that facilitates the negotiations. According to *Peña Colorada*, to increase the PES schemes in Mexico that are funded by a private company, the government should promote more the matching funds with emphasis on the tax deductibility.

Innovation
1. Is a PES scheme initiated by a private company in Mexico, where the majority of PES programs have been funded by public agents and NGOs. It represents an example to foster this type of programs.

Source: (Betanzos, 2017)

Conservation easements

Conservation easements are restrictions placed on a piece of property to protect its associated resources. They are either voluntarily donated for conservation or sold by the landowner to an organization with an interest in conserving them (The Nature Conservancy, 2016). In our systematic research we identified six cases of conservation easements, all operated by two non-governmental organizations (NGO's): Naturalia and Pronatura.

Naturalia manages two projects in the State of Sonora. One of them, designed to conserve the jaguar, has an area of 20,234 hectares and was founded in 2003. The other is located in the basin of the San Pedro River, an

area of grassland where the deserts of Sonora and Chihuahua meet, considered one of the hotspots of biodiversity in Mexico. It is home to nearly 400 bird species, including the bald and golden eagle, as well as jaguars, black bears, beavers, amphibians and bats. It has an area of 3,800 hectares and was founded in 2005.

Pronatura administers the other four projects we identified. One of them, located in the State of Coahuila in the valley of Cuatrociénagas, was created in 2000 and has an area of 2,721 hectares. This valley has approximately 500 water bodies and "a biological endemism similar to that of the Galapagos Islands" (Souza, Siefert, Escalante, Elser, & Eguiarte, 2012). Another one, located in Yucatán, was created in 2002 and has an area of 2,358 hectares. In this area 21 species of mammals have been identified, of which seven are at risk of extinction such as the anteater, the black howler monkey, the spider monkey, wildcats and the jaguar (Faller-Menéndez, Urquiza-Haas, Chávez, Johnson, & Ceballos, 2005). The third, located in Baja California Sur in the San Ignacio Lagoon, was created in 2005 and has an area of 57,000 hectares. San Ignacio Lagoon is home to sea turtles, peregrine falcons, eagles and thousands of migratory and coastal birds. It is also the last undeveloped lagoon on the planet where grey whales are born. The last one, in Veracruz, has 3,870 hectares of cloud forest, and was created in 1998 with the aim of protecting the enormous diversity of species and the hydrological services provided by this type of forest.

Conservation Funds

Conservation funds are crucial to the conservation of biodiversity in Mexico. In the systematic review we identified 45 cases where financial resources are managed by an environmental fund. Funds may comprise public or private resources. In our database, 44% of funds use resources from non-government organizations, 31% of case funding comes from a mix of sources (private, public, NGOs),20% of cases are financed purely by public sources while only 5% of cases are funded solely by private resources.

Of the 45 cases of funds we identified, 31 are PES programs, six are conservation easements (all the conservation easements we identified) and five are green production/operation schemes. There is significant partnership between funds and Payment for Environmental Services Schemes and between funds and conservation easements.

The main reason why there is a large alliance between funds and PES programs is because of the existence of the Mexican Forest Fund (operated by CONAFOR). This fund was created in 2003 by the federal government to promote the conservation of forest resources, specifically by serving as an intermediary between the users of ecosystem services and the communities that own the forests. This fund may receive financial resources from national or international, and from public or private organizations. This fund is the financial architecture behind the national PES program and the matching funds program. By 2014, it had available resources of $8,445,810 thousand pesos ($402 million dollars). (Grupo Funcional Desarrollo Económico, 2014) Non-governmental funds are also very important for conservation in Mexico. A clear example of this is the Mexican Fund for the Conservation of Nature (Spanish acronym FMCN). Created in 1994, it now has approximately $120 million dollars in capital. This fund has supported more than 1,300 conservation projects in its 22 years of existence (FMCN, 2016b). See Box 5 for two selected initiatives of this fund.

Box 6 : The Mexican Fund for Nature Conservation.

Name of the program Film-minutes for the Golden Eagle and Avenger Blacksteel Chrono Watch.
Year of birth 2015
Place where the program works All of Mexico
Supporting organization Mexican Fund for the Conservation of Nature (FMCN)

General description
The Mexican Fund for the Conservation of Nature was born in 1992 with donations from the Mexican

government and the United States Agency for International Development (USAID). Its objective is the creation of a better future for Mexico through the mobilization of financial resources, the creation of alliances, the learning and the exploitation of opportunities for the conservation and use of the natural capital in Mexico.

One of the many programs they support has the specific objective of conserving the Golden Eagle, an endangered species in Mexico, which its population in the country has been reduced to only 120 couples. To conserve the eagle they have launched two innovative mechanisms:

1. Film-Minutes: The FMCN filmed and projected five filminutes about the state of conservation of the Golden Eagle in all the cinemas of one of the two biggest companies in Mexico (Cinepolis) and in all the offices of the Mexican bank Banamex. They estimated that 15 million people watched the films. Today they are among the most viewed videos of the history of Banamex and according to an extrapolation from psychologist's literature, they achieved a real impact in 2% of all the viewers. The funds raised with this campaign were not very high but increase awareness.
2. Avenger Blacksteel Chrono Watch: The watch company Brieitling launched a special edition watch called the Avenger Blacksteel Chrono. This edition has the Golden Eagle engraved in the back and a share of the price of each watch sold goes for the conservation of the specie to the FMCN. In total 250 watches were made.

Innovation

1. By selling the watches they created a green market for the conservation of the Golden Eagle. A question arises: what would generate more revenue, few watches of very high price, like this case, or selling a lot of watches with a lower price?

Source: (Ugarte, 2016).

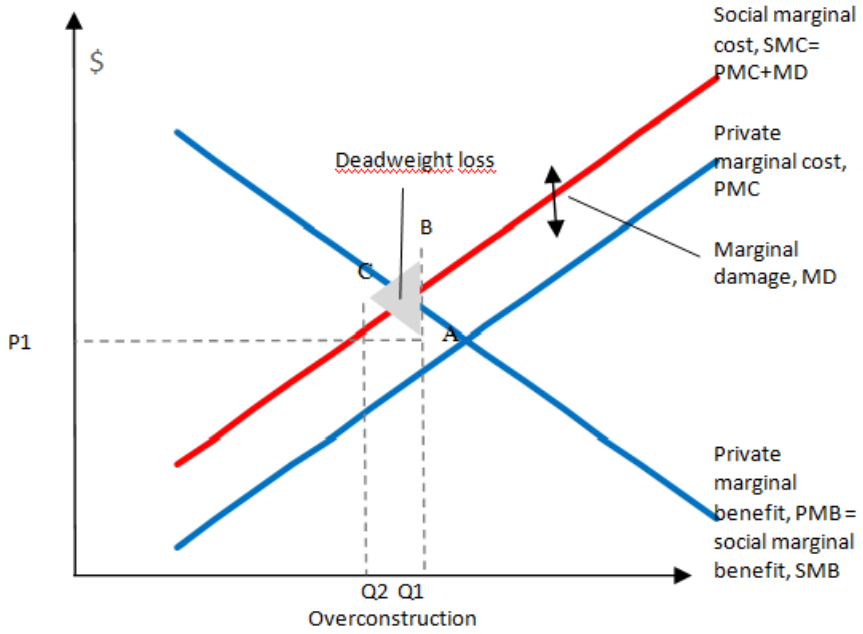
Offsets and Carbon Market

The next financial mechanism in importance in our database is biodiversity offsets and carbon offsets in which conservation of biodiversity is a side benefit. Biodiversity offsets are "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken" (BBOP, 2009). On offsetting programs, the developers of projects compensate the loss of biodiversity with actions that favour biodiversity conservation. The approach of these programs is similar to the polluter pays approach, because the project developers face an increase in their costs due to the environmental negative externalities they produce (OECD, 2013b).

The economic rationale behind biodiversity offsets is that project developers traditionally do not assume the environmental costs they produce. They produce a negative externality in society since their activities adversely affect the well-being of society but they do not compensate society for its loss. More specifically, the private marginal cost they face is lower than the social marginal cost of their activities, which without government intervention would result in higher than socially optimal biodiversity loss (Gruber, 2004). Since biodiversity offsets make project developers compensate for the loss of biodiversity, it forces them to assume the environmental costs and therefore to internalise the negative externality.

Figure 8 represents a situation in which a project developer wants to build a highway. The blue line with a negative slope shows the private benefit to society for every additional kilometre of road built. It has a negative slope assuming diminishing marginal utility for consumers. The blue line with positive slope represents the private cost for every additional kilometre of road built. It has a positive slope since increasing

marginal costs are assumed. Moreover, every kilometre of road is assumed to have a negative constant impact on biodiversity. The red line represents the private costs of the developer plus the negative impact on biodiversity that each kilometre generates. Without offsetting, equilibrium would be point A, where private marginal cost would equal private marginal benefit. With offsetting, the developer must internalise biodiversity costs and would therefore face the red line costs. The equilibrium would be point C, where these new marginal costs intersect with marginal benefits. This figure shows that biodiversity loss is compensated for but that the number of kilometres of highway built is also lower.



Source: Adapted from (Pagiola & Platais, 2007).
Figure 8 : Offsetting rationale.

In addition, to ensure that legal compensatory obligation is met, biodiversity offsets should provide three major economic incentives: (Calvet, Napoléone, & Salles, 2015)

- Since it represents significant costs for developers, it should encourage them to limit their impact on biodiversity.
- It also should encourage developers to meet the offsetting objective in the most efficient way, therefore seeking effective conservation projects.
- Due to the financial benefits provided by some biodiversity offsetting mechanisms, incentives should be provided for private or public stakeholders to invest in conservation actions for economic reasons.

We registered three cases of biodiversity offsets and five cases of carbon market offsets. Even though they are not very common, both are scaling up in Mexico. In the case of biodiversity offsets, although the first time they appeared in government plans was in 1998, it was not until 2003 that the federal government created a national offsets program for compensating for deforestation.

Today, this program forces developers of projects that involve deforestation to compensate for their impact with an additional project for natural conservation or asset building. The National Forestry Commission (CONAFOR) determines the compensation that must be provided by each developer depending on the negative effects on the environment and on the ecosystem where they are produced. Project developers have the option of paying a determined amount to the Commission instead of constructing and operating the offsetting project themselves. In these cases, the Commission also acts as the developer and administrator of the offsetting projects.

In order to determine the amount that needs to be paid to CONAFOR, project developers must submit information about the deforestation their project will produce, including the type of ecosystem, the environmental state of the ecosystem, flora and fauna species that will be damaged and the total area of the project. On the basis of this information, CONAFOR assigns a score from 6 to 24 to each case. Depending on the score, a payment ratio is established, which may range from 1:1.3 to 1:6. The payment ratio is then multiplied by the total area to be deforested and the price per hectare that has already been established for each type of ecosystem. Table 5 shows the offsetting price per hectare of each ecosystem. From 2005 to 2013, 342,008 hectares of forest entered the program, an average of 42,700 hectares each year, and 202,052 hectares have already been reforested (CONAFOR, 2015).

Table 5 : Compensation Costs per Hectare in National Offsetting program.

	Temperate forest	Tropical forest	Arid and semi-arid	Wetlands	
Offsetting Price per hectare	$26,508.95 (1,262 USD)	18,363.30 (874 USD)	14,002.49 (667 USD)	**Mangroves**	**Other wetlands**
				59,992.23 (2,866 USD)	188,556.75 (8,979 USD)

Source: (CONAFOR, 2014)

As for the carbon market, in three of the five cases we found, the carbon market supports a green production scheme, and in the other two it supports a Payment for Environmental Services program. We found successful cases in both schemes. A well-known example on the green market side is Scolel'Te in Chiapas, which has achieved Plan Vivo certification and manages 862 hectares for selling carbon credits in international markets (Ambio, 1997) Another less well-known yet successful case takes place in Oaxaca, where local indigenous communities organised to sell carbon credits to national and international companies. These companies include large Mexican companies such as Televisa, Gamesa and Chinoin. An interesting aspect of this case is that the government provided some initial funding, which later evolved into other hybrid public-private schemes.

As for PES programs funded by the carbon market, we found the Sierra Gorda Ecological Group in the States of Querétaro and San Luis Potosí where approximately 380 thousand hectares or forests are conserved for the carbon storage service and the Felipe Carrillo Puerto Ejido where they are trying to obtain Plan Vivo certification and in the meantime, they are selling carbon credits to hotels in the vicinity.

Furthermore, the Mexico REDD+ alliance is preparing the country for the REDD+ mechanism (see Box 7). The REDD+ mechanism is expected to incorporate several aspects of land management in Mexico. To date, the alliance has been managed by The Nature Conservancy and due to the complexity of the project, they have encountered difficulties as regards its implementation. The Mexican REDD+ strategy requires the involvement of many actors, including government, private organizations and local communities, which requires aligning the incentives of several stakeholders.

Box 7 : The Mexican REDD+ Alliance.

Name of the program Alliance Mexico REDD+
Year of birth 2011
Place where the program works Yucatán, Campeche, Oaxaca, Chiapas, Chihuahua, State of Mexico and Michoacán.
Supporting organization
The Nature Conservancy, Rainforest Alliance, *Espacios Naturales y Desarrollo Sustentable (ENDESU),* Woods Hole Research Center and USAID.

General description

The Alliance Mexico REDD+ works to strengthen rural and forestry development with low carbon emissions. The Alliance promotes and supports knowledge and empowerment capacities, especially in the rural and indigenous communities in Mexico, as well as in governmental organizations at regional, state and national level. All the previous work has intended to contribute to the preparation and start-up process of the National REDD + Strategy (ENAREDD+).

According to the National REDD+ Strategy, in 2020 Mexico will have a zero percent loss in the carbon stock of ecosystems, a significantly less forest degradation rate, an increase of the forest area with sustainable management, more conservation of biodiversity and a higher social capital in rural communities. Besides, the General Law on Climate Change has the objective of reducing by 30% the emissions of greenhouse gases for 2020 and by 50% for 2050.

It remains a long distance before REDD+ is put in practice in Mexico because it needs the joint effort between policies, programs, and actions by the three levels of government and by private economic agents that relate to forests. Still, there have been areas where the Alliance Mexico Redd+ has had a relative high success, one of them is the Yucatán Peninsula. A reason for this success is the commitment of State Secretary of Rural Development in funding projects for conservation.

For Alliance Mexico REDD+ political will is one key factor for success. If people in charge of the environmental policy are really committed to conservation, success comes easier, as it has happened in the Peninsula of Yucatán. On the other hand, in Chiapas the process has been slower because there is not much political will.

Innovation

1. The innovation of Alliance Mexico REDD+ is in the involvement of several stakeholders in the project. This characteristic makes that projects are harder to put in practice, but probably stronger and more replicable when they are already in practice.

Source: (Izaguirre, 2016).

Box 8 : Better alliances, better forests.

Name of the program: Better alliances, better forests (*Mejores alianzas, mejores bosques*)

Year of birth: 2011

Place where the program works: Mexico City, State of Mexico, Puebla, Queretaro, Guanajuato, Jalisco, Michoacán, Nuevo León, Yucatan and Tijuana

Supporting organization

Reforestamos Mexico, a non-governmental organization born in 2002 dedicated to the conservation of forests in Mexico.

General description

The program consists in the formation of alliances between government, local communities, private companies and young Mexicans in favor of reforestation. Through the program private companies adopt an area inside a Natural Protected Area in Mexico. The money for the adoption is used to reforest the area, to fund production schemes that are friendly with the environment and to look for the alignment of public subsidies that are harmful to biodiversity with conservation objectives.

The reforestation is made by young people that are hired by the organization. Local communities participate closely with the young ones in the reforestation process and with the organization looking for the formation of new projects that ensure the conservation of the new forests.

Innovation

The program has achieved two mayor innovations:

1. It has included middle sized companies that in the past were not able to participate in reforestation projects because they were only made by big companies with very high budgets.
2. It has triggered alliances between private companies. Traditionally, private companies that made reforestation programs wanted to be the only ones in the same area for marketing purposes. With Better alliances, better forests more than one company participate in the same national protected area which increases efficiency because there are scale economies in reforestation. "In reforestation 1+1 is not 2, it is 3, 4 or 5"

Source: (Herrera, 2016)

Taxes and Fiscal Reform

Lastly, we found three cases related to the Environmental Fiscal Reform category. Environmental fiscal reform refers to the use of taxes and subsidies by the government to achieve environmental goals that by are not being achieved by the market alone. This instrument also includes the modification of previously established taxes and subsidies by the government that produces negative environmental externalities.

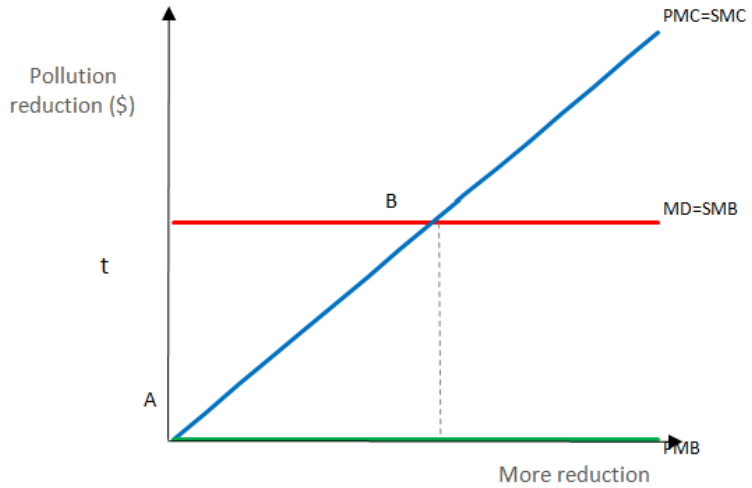
> "[Environmental fiscal reform] refer to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals (and with a view to analysing the incentives inherent in existing taxes and subsidies in order to optimise them). This includes taxes and charges on natural resource use, pollution, and resource rents, and the reform of subsidies harmful to the environment". (OECD, 2013b)

The economic rationale of environmental fiscal reform depends on the specific instrument used by the government. New taxes are very similar to offsetting: they are a mechanism for making producers assume the environmental costs associated with their production and therefore correct the negative production externality. New subsidies for environmental activities provide incentives to private companies to undertake activities that have positive externalities on society.

Figure 9 is a representation of the market of greenhouse gas mitigation. The x axis represents the level of mitigation. The blue line with positive slope represents the cost a hypothetical firm faces for mitigating an extra unit of greenhouse gases. It is positively sloped since increasing marginal costs are assumed. The red line is the benefit society gains from each unit of greenhouses gases that is mitigated. In this example, the benefit is considered constant for all units. The green line on the horizontal axis represents the benefit the firm obtains for every unit of greenhouse gases mitigated. In this example the assumption is that the firm receives no benefit at all.

Without intervention from the government, the equilibrium would be point A, where the firm mitigates no greenhouse gases because they obtain no private benefit for doing so. Nevertheless, the socially optimal level of mitigation is point B, where the social marginal cost (SMC) is equal to social marginal benefit (SMB). In order to achieve that level of mitigation, the government should implement a tax on pollution at the t level for each unit of greenhouse gases. With this tax firms would mitigate B units of greenhouse gases because for all the units before B, the cost mitigation (blue line) would be lower than the cost of polluting (tax).

The same outcome would be reached by implementing a subsidy on mitigation at t level for each unit of greenhouse gases. With this policy, firms would mitigate B units of greenhouse gases because for all the units before B, the cost of mitigation (blue line) would be lower than the benefits of mitigation (subsidy).



Source: Adapted from (Pagiola & Platais, 2007). PMC: Private Marginal Cost. PMB: Private Marginal Benefit. SMC: Social Marginal Cost. SMB: Social Marginal Benefit. MD: Marginal Damage.
Figure 9 : Environmental fiscal reform rationale.

In the case of modifying subsidies that harm biodiversity, the analysis is slightly different. "Subsidies that can be harmful to biodiversity are those that promote, without any environmental considerations, the intensification or geographic expansion of economic sectors such as agriculture, bio-energy, fishing, forestry and transport" (OECD, 2013b). These subsidies artificially increase the benefits of activities that harm biodiversity and therefore increase the total amount of production under these schemes, in the same way as the subsidy on mitigation increased the total amount of greenhouse gases mitigated. By eliminating or modifying these subsidies, pressures on biodiversity are reduced.

In our systematic review we identified five cases where taxes and subsidies work as the financial architecture. It is important to note that environmental policy in Mexico is relatively new compared to developed countries. It began in the 1990, with the creation of the Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP), now SEMARNAT (which excludes the Fisheries sector), and The National Commission for the Knowledge and Use of Biodiversity (Spanish acronym CONABIO). Prior to that, natural resource policy in Mexico was an agricultural policy designed to expand the agricultural area. Since then, although many harmful subsidies for biodiversity have been reformed, not all of them have been eliminated. (GIZ, 2014)

Today, most of the fiscal instruments in Mexico refer to subsidies for reengineering projects, where most projects belong to one of the following categories:

1. Infrastructure development and academic studies that promote sustainable water and soil use.
2. Expansion of water infrastructure to reactivate agricultural productivity in decertified areas.
3. Change from traditional agricultural production to organic production.
4. Transformation of traditional unsustainable fisheries into fisheries that do not threaten biodiversity by reducing fishing activities and improving technology.
5. Reforestation.

(GIZ, 2014)

Nevertheless, in the past ten years the federal government has also implemented a number of fees and taxes to change consumption patterns that cause negative externalities in natural resources. They include the following:

1. Tax on pesticides. It was implemented in 2013, and in 2017 the federal government estimates that it will raise 639.3 million pesos (30.4 USD million) through this tax. (Presidencia de la República, 2017)
2. Tax on fossil fuels. It was implemented in 2012, and in 2017 the federal government expects that it will raise 7,405 million pesos (352.6 USD million) through this tax. (Presidencia de la República, 2017)
3. Access fees for Natural Protected Areas. This mechanism was implemented in 2003 for both marine and terrestrial areas. In 2015, it raised 89 million pesos (4,240 USD million)

In this last mechanism, the financial resources raised are very low compared to the cost of maintaining Mexico's Natural Protected Areas. They accounted for a mere 24% of the budget assigned to the National Commission of Natural Protected Areas (Spanish acronym CONANP). The main reason for this situation is that only two access fees of $28 and $56 (1.3 and 2.7 USD) were established for all the Natural Protected Areas. According to Arceo et al. (2010), Green and Donnelly (2003), Rivera-Planter and Munoz-Piña (2005) in many of the areas, visitors' willingness to pay is much higher than the fee that is being charged, which has caused tourism saturation and degradation of the natural resources. Even though not all the cases have been documented, examples include the Cozumel and Veracruz Coral Reefs (CEMDA, 2015; Cossio, 2017).

One last case of fiscal reform is very recent and is a state-level initiative. In the State of Jalisco, the local Congress recently approved an initiative to earmark environmental-related taxes and fees for the Environmental Fund of Jalisco (See Box 9).

Box 9 : The Jalisco Environmental Fund.

Name of the program Jalisco Environmental Fund

Year of birth 2016

Place where the program works Jalisco

Supporting organization *Government of Jalisco*

General description

The Environmental Fund of Jalisco was recently formed with the objective of working in 5 fronts: climate change mitigation, restoration and conservation of ecosystems and environmental services, protection and conservation of biodiversity, sustainable management of territory and environmental education and culture. It was initially formed by a capital of 6.5 million pesos (325 thousand dollars) donated by the government of Jalisco. However, very recently, the local Congress approved to earmark financial resources that the government of Jalisco obtains through different taxes, compensations and fines related to environmental concepts. These will include compensations and fines for environmental damage made by private companies, the sale of the hologram that each car carries indicating the state of its emission of gases and fines on cars that do not comply on the emissions verification law. All these resources are estimated on more than 2,000 million pesos (over 100 million dollars).

Moreover, the fund is working with the federal government to obtain resources also from international funds. Today the official international aid goes generally to the federal government, not at state level. Recently, the Jalisco government sent the operating rules of the trust which manages the fund to the Mexican Secretariat of Finance and Public Credit (SHCP by its acronym in Spanish), which in turn, will present them to the World Bank in order to evaluate if there is a mechanism to channel foreign funds at State level.

Innovation

1. It will earmark resources generated through environmental regulations to environment protection.
2. Even though it is a fund made by the government of the state, its structure is independent from it.

For example, the period that each director of the fund will be in charge will be different from the period of the governor of the state.

3. They are trying to get official international aid for environments which have traditionally arrived only to the federal level, not at state level.

Source: (Reyes, 2016).

4 Concluding remarks

We identified a number of common topics in our interviews and in the systematic review, which we describe here as stylised facts. Due to the way we collected the information, they obviously cannot be taken as proven facts or as an accurate representation of the reality of biodiversity financing in Mexico; however, we think they give added value to the discussion of innovating in financing biodiversity in Mexico.

1. *There is an urgent need to reorient public spending in rural Mexico.* Some of the stakeholders we interviewed consider that more money for biodiversity is needed; however, more urgent issues are to:
    a. Efficiently managing existing funds, for example, by reducing inefficiencies in public resources (by aligning public subsidies that fund conflictive objectives, for example),
    b. building the capacities of local communities to attract funds, by developing online tools to access funds, for example, or by offering technical assistance at the local level,
    c. reducing information asymmetry and transaction costs between people or companies willing to finance biodiversity and those who own the land on which it is located, for example, by developing and improving mechanisms that reduce transaction costs (e.g. offset markets) or simply by increasing awareness of the threats of biodiversity (e.g. films).

2. *Replication is difficult.* Our analysis shows that a large proportion of projects are local, which is consistent with the conjecture that the wide diversity of ecosystems/land ownership schemes/socio-economic conditions/stakeholders in Mexico makes it difficult to have economies of scale in conservation projects. Moreover, some interviewees consider that local champions are key to the success of projects. This evidence suggests that replication is by no means simple.

3. *Yet some economies of scale exist.* Federal payment for ecosystem services has proved effective in deterring deforestation (Alix-Garcia, Shapiro-Garza, & Sims, 2012), in fact, Mexico is a pioneer in this kind of instrument. CONAFOR is a strong institution that has channelled important resources to protect ecosystems. Several matching funds that finance PES in Mexico might not exist if a national initiative had not existed. In this respect:

4. *Although the Government must take the first step, NGOs and the private sector must be be involved.* As noted earlier, the federal government has the resources and capabilities to generate economies of scale, and without its involvement, the state of biodiversity would probably be worse. Nevertheless, the participation of the private sector and NGOs is essential to adapting financing and economic instruments at the local level. The federal government does not have sufficient resources or time to adapt specific mechanisms to local conditions while NGOs do not have enough scope to transform the whole country. Moreover, since economic activity, undertaken by the private sector is the main source of degradation and depletion of ecosystems and ecosystems services, if this sector is unaware of its environmental impact and not involved in its compensation, no effort by the government and NGOs will suffice. The good news from our interviews is that some private companies are willing to do more to protect biodiversity, which is an opportunity NGOs and the government should leverage.

5. *Innovation is not only achieved through brilliant disruptive inventions; it is also achieved through marginal improvements.* Tweaking existing financial and economic instruments is also a form of

innovation. For example, earmarking environmental-related taxes and fines for environmental investment is not a new idea. However, in our interviews we realised that these minor changes in public policy are both extremely important (because they create a sustained source of money) and very difficult to achieve (no one wants or sometimes it is not possible to earmark taxes for a specific issue). As another example, there are opportunities to raise more money for biodiversity by simplifying the process of obtaining micro-donations (e.g. one-click to donate).

Funding biodiversity is an emerging issue in Mexico. In our analysis, we found interesting examples of how to cope with certain obstacles that involve generating more resources for the conservation of biodiversity. The first of these obstacles is clearly the lack of economic resources, which still prevails in some sectors.

To illustrate this, we can compare the public budget assigned for the environment and natural resources with the public budget allocated for primary production. In 2017, the public budget for the environment and natural resources amounts to 36 billion pesos (1.8 billion USD), whereas for agriculture, livestock, rural development, fishing and food it is 62 billion pesos (3.1 billion USD) (Gobernación, 2017). When the budget for the environment and natural resources is disaggregated, one can see that 26 billion pesos (1.3 billion USD), accounting for 72% of the total environmental budget, is destined for the National Water Commission (Spanish acronym CONAGUA), which is mainly assigned to hydraulic infrastructure activities, with little effective emphasis on integrated water management (CONEVAL, 2016). In contrast, the budget for the National Commission for Natural Protected Areas (Spanish acronym CONANP) or the Federal Attorney for Environmental Protection (Spanish acronym PROFEPA) is barely one billion pesos (50 million USD), respectively (Government, 2017). Furthermore, if we examine the budget for the promotion of agriculture, we see that in 2017, 15 billion pesos (USD 750 million) will be allocated to the Program for the Promotion of Agriculture (PROAGRO) (Gobernación, 2017), a program that mainly involves subsidizing private inputs for use in agriculture.

In addition, we find that the quotas to access Natural Protected Areas of Mexico are very low. Although there is a willingness to pay that exceeds their access quota, this has not been leveraged. Inefficiency persists in this system, which is detrimental to Mexico's biodiversity.

These figures reflect the acute imbalance that exists between public financing that can contribute to the conservation of biodiversity and financing that has potentially negative effects on it. In this sense, as we pointed out before, more resources to biodiversity are needed, but to reorient current subsidies is urgent.

A second obstacle is the difficulty in replicating small-scale projects. In our analysis we identified some interesting cases in which actors from different sectors have found innovative ways to generate projects with positive effects on biodiversity conservation. Several examples of this type of project were presented throughout the text. However, most of these projects have a limited scale. Here the challenge is to identify how to replicate good practices and innovative elements. On the basis of our analysis we consider that the elements that contribute to successful projects of this nature are:

1. Inclusion of all stakeholders from early stages of the project.

2. Having an indispensable minimum of social capital in the area where the project is developed.

3. Having the support of civil society and/or international organizations that provide technical assistance.

4. Having seed risk capital that allows the project to survive the first years of operation.

5. In the medium and long term, shifting to a financial sustainability scheme that is not dependent on subsidies or favourable market conditions that are unsustainable.

6. Foster private-public partnerships to support training and capacity building of biodiversity business brokers from the local to the national levels, so to create of a chain of actors from project level to the financial institutions.

One type of project that has been attractive to different actors is the payment for environmental services. As shown throughout the document, these mechanisms have evolved since 2003, when the national PES program was created. Matching funds, in which the private, social and public sectors participate, are an example of this evolution. The PES mechanism has shown itself to be flexible enough to align the interests of various actors. In this context, there is an opportunity to involve the agricultural sector in this type of mechanisms. Given that, as discussed previously, there is a misalignment and imbalance between environmental and agricultural policy, payment for agricultural environmental services can provide a window of opportunity to align the interests of both actors, while creating benefits in terms of conservation of biodiversity.

From a broader perspective, there is the possibility of launching larger projects, for example, by promoting more environmentally friendly production in major companies. In Mexico, there are large companies, with an equally large market share. There is therefore potentially the opportunity to work with a few major companies to adopt biodiversity-friendly production methods that will have an enormous impact on the market However, for this to happen there are two limiting factors that can pose a major challenge.

First, although these companies usually have a sustainability area that genuinely carries out activities for the benefit of the environment, it is common for these areas to be unrelated to the procurement area, which frequently has the sole objective of minimizing production costs. In the absence of an effective link between these two areas, it is very difficult to adopt internal rules for the purchase of products that come from environmentally friendly sources. Second, while the demand for environmentally friendly products is on the rise, in Mexico this type of consumption is still incipient, meaning that it is difficult for large firms to provide products for which demand is still not generalised.

We consider that a possible alternative to encourage the use of environmentally friendly goods is to carry out a pilot program with a large company to promote the production of a good that has production standards that favour the conservation of biodiversity. In the early stages of the product, the higher cost of producing it can be offset by external resources (for example from civil society organizations) and subsequently, once the demand for the product has sufficient scale, compensation for the additional cost will be removed.

There are still considerable challenges for financing biodiversity in Mexico. As we have seen, although there are several financing mechanisms and instruments with innovative elements, their replicability and generalization is still a major challenge. Despite the above, there are some recommendations that emerge from this report:

1. Reorient the resources currently reaching the rural sector. This means not only transferring resources from the agricultural sector to the environment, but also designing mechanisms that are attractive to both actors (for example, payment for agricultural environmental services).

2. When promoting projects for financing biodiversity, it is essential to ensure that there are minimum conditions for its success (see above).

3. Continue the promotion of PES schemes, taking advantage of the flexibility of this instrument, which allows for actors from different contexts and sectors to reach compensation agreements.

4. Take the opportunity to re-engineer the quotas for access to Protected Natural Areas. The availability to pay for access to these areas has been confirmed to exceed the fees charged for access. Failure to leverage this opportunity could be very costly in the long run. In this regard, a legal analysis is suggested to identify legal constraints to make the system of quotas for access to Protected Natural Areas more flexible and more efficient so as to generate more resources for conservation while limiting degradation and loss of biodiversity.

5. We recommend that civil society to work with (a) large companie(s) in Mexico to implement an environmentally friendly consumer pilot project. The effect this might have on one or a few large firms could achieve a large, positive effect in terms of biodiversity.

6. Support investments at the landscape level in order to consider broader social-ecological benefits and improve resilience and adaptation for climate change. Such an investment scale would need ongoing public-private partnerships to reduce the risk for private companies to invest at landscape level and, more importantly, make them understand the pertinence of it.

5 Case Studies

Transforming traditional community based conservation into impact investment: The Experience of WWF to save the Vaquita Porpoise

Summary

The *Vaquita Porpoise* is an endemic cetacean living in the upper part of the Gulf of California with the dubious honour of being the world's most endangered sea mammal.. In 2015, the National Institute of Ecology and Climate Change (Spanish acronym INECC) estimated that there were only 50 *vaquitas* still alive, equivalent only to 8.8% of the estimated population in 1997. The main cause driving the extinction of the *Vaquita* are gillnets used by fishermen to fish shrimp and *totoaba*, which accidentally catch them. (FMCN, 2016a)

The effort that WWF is making to save the *vaquita* is on the market side. They have created the *San Felipe pescados y mariscos* company in association with 25 fishermen that produces *vaquita*-friendly shrimp. Shrimp are caught using a different technique that avoids unintentionally catching the *vaquita* and has achieved Marine Stewardship Council certification. The products are sold to high-end restaurants and chefs in Baja California, Mexico and in California, United States, where consumers are increasingly willing to pay for environmentally responsible products.

Fishermen are the owners of the company and WWF, with Credit Suisse and RaboBank will fund the company in order to make it financially sustainable. Part of the funds will be used to cover costs that arise from switching from normal shrimp to *Vaquita*-friendly shrimp. The funds will cover equity up to a certain amount after which they will be considered as loans. These institutions will only be repaid in the event of success, combining social responsibility with impact investment. One of the mid-term objectives is to enable fishermen to ensure loans from financial institutions in a traditional way.

Fishermen using the *Chango Ecologico*. Source: (Sanjurjo, 2016)

Introduction

The *vaquita* porpoise is the world's most endangered sea mammal. In 2015 the National Institute of Ecology and Climate Change (Spanish acronym INECC) estimated that there were only 50 *vaquitas* still alive, equivalent only to 8.8% of the estimated population in 1997.

Even though there are many factors that may have driven the reduction in the *vaquita* population, the main reason behind this problem are the gillnets used by fishermen to catch shrimp and *totoaba*, in the upper Gulf of California, which accidentally them. Although efforts have been made by the Mexican government to reduce the amount of fishing boats that catch *totoaba* and shrimp with these gillnets, these have not been enough to stop the decline in the vaquita population.

This case study describes the efforts by WWF to conserve the *vaquita* porpoise. These efforts have focused on the market side by producing and selling shrimp and other fish that were caught using techniques that do not threaten the *vaquita*. One of the many aspects to learn from this case is that there are possibilities of investing resources in projects that have positive social impacts and have private economic returns, also known as impact investment.

(FMCN, 2016a)

Description of the instrument/initiative and the related process

Description and key design features

Shrimp fisheries that affects the *vaquita* porpoise are mainly located in three places: San Felipe in Baja California, and the Gulf of Santa Clara and Puerto Peñasco in Sonora. The first two communities, San Felipe and the Gulf of Santa Clara are heavily dependent on fishing and all the complementary activities surrounding fisheries. In Puerto Peñasco the situation is different because tourism has become the most important economic activity. Of these three communities, WWF focuses on San Felipe, which is also the place where the first sightings of the *vaquita* porpoise were made in 1958.

San Felipe is located 120 miles south of the Mexican border with California. It is very close to the southern border of the Biosphere Reserve of the Upper Gulf of California and it has a bay almost 20 kilometres long. The Port of San Felipe covers 37 hectares of water with approximately 380 small fishing boats. (DIGAOHM)

The population of San Felipe was approximately 15,000 in 2010 (INEGI, 2010). Most of them depend economically on fishing activities. Fishing is the main economic activity, followed by an incipient tourist industry that is only active during vacations.

The social actors present in San Felipe and related to this case study are:

Organised fishermen.

The National Commission of Natural Protected Areas (CONANP).

Non-governmental organizations such as WWF and PRONATURA.

International organizations such as the Marine Mammal Commission, the International Union for Conservation of Nature and the International Whale Commission.

Illegal fishermen of *totoaba* fish

Chefs at selected restaurants in California and Tijuana.

San Felipe pescados y mariscos is owned by 25 fishermen who have changed their fishing techniques. They have adopted a new fishing net developed by the National Fishing Institute and WWF that does not catch the

vaquita porpoise accidentally. The payment fishermen receive is the revenue they obtain from selling the shrimp to the restaurants in United Stated and Mexico because they are the owners of the company. WWF, together with Credit Suisse and RaboBank will work as funders. Their funds will buy equity until the amount represents 10% of the estimated investment and the extra resources needed will work as a loan that must only be repaid with 10% interest rate if the company makes a profit. WWF has estimated that an inversion of 70,000 USD is required to achieve the company's economic sustainability.

(DIGAOHM; FMCN, 2016a; Sanjurjo, 2016)

History

The *vaquita* was first described by Norris and McFarland in 1958 based on bone remains, with efforts to conserve it beginning in the mid 70's. In 1970, the risk that the *vaquita* Porpoise faces due to fishing activities was first recognised and in 1975 the fishing of *totoaba* was banned, and remains an illegal activity. In 1993, the Biosphere Reserve of the Upper Gulf of California and the Delta of Colorado River was created to protect the *vaquita* and the *totoaba*. In 1997, the first estimation of the number of *vaquitas* was carried out, yielding 567 individuals.

After the creation of various organizations for the protection of the *vaquita* and the creation of a sanctuary in 2005, in 2008 the federal government established the "PACE-*Vaquita*" conservation program. This program offered to buy back shrimp fishing boats and permits from fisherman, incentivised the change of technology to *vaquita*-friendly nets and suspended fishing activities in the *vaquita* sanctuary.

The *vaquita* population continued to decline and in 2015 commercial fishing in the *vaquita*'s habitat suspended by the government. Some months later, in 2016, measures were adopted to eradicate the commercialization of *totoaba* in international markets, especially in China.

Parallel to these events, WWF and the National Fishing Institute began to develop alternative fishing nets. They concluded and proved their effectiveness in 2012, the year of the founding of the *San Felipe pescados y mariscos* company. In 2015, the certification process began with the Marine Stewardship Council.

(FMCN, 2016a; Sanjurjo, 2016)

Key actors

The main social actors present in San Felipe and related to this case study are the organised fishermen. Since 1980, fishing activities have been owned by cooperatives that are part of the *Regional Federation of Cooperative Societies of the Fishing Industry in the Port of San Felipe*. Within this federation, conflicts are solved and decisions made to ensure the fishermen's protection.

Other key actors are the National Commission of Natural Protected Areas (CONANP), non-governmental organizations that seek the conservation of the *vaquita* such as the WWF and PRONATURA, international conservation organizations such as the Marine Mammal Commission, the International Union for Conservation of Nature and the International Whale Commission, and the illegal fishermen of *totoaba* fish, who are motivated by the Chinese market, where the bladder of this fish is sold at 3,000dollars.

Outside San Felipe, major social actors include RaboBank and Credit Suisse, which fund the company's operations, and the chefs of gourmet restaurants in Tijuana and California who wish to include *vaquita*-

friendly shrimp on their menus.

(FMCN, 2016a; Sanjurjo, 2016)

Role of public policies and public bodies

The government, through the National Institute of Fisheries (Spanish acronym INAPESCA) worked with WWF to develop a fishing net that does not harm the *vaquita*. Both institutions were present from the initial development to the final approval of the new technology called s "RS-INP-MX" or *Chango ecológico* (ecological monkey). In 2013 this same institute changed the official norm to replace traditional gillnets with this new technology.

(Sanjurjo, 2016)

Monitoring/sanctioning mechanisms

Traceability systems are at the pilot stage with 10 small-scale vessels and the criteria for creating a *vaquita*-friendly regulatory council are under development.

(Sanjurjo, 2016)

Measures to ensure long term sustainability

An essential characteristic of this mechanism that may ensure long term sustainability is that the company is owned by the fishermen. Accordingly , long term sustainability does not depend on decisions made by public actors or external institutions but will depend largely on the economic profits the company makes. Today the company has a promise of letters of purchase of several buyers fOr up to 20,000 kg with a premium of 6% over the list prices published by Urner Barry.

On the other side, WWF is just a few bureaucratic steps away from receiving the 70,000 USD needed as initial investment to achieve the economic sustainability of the company. By working with Credit Suisse and Rabobank, they are also helping to increase impact investment in Mexico. In the mid-term, the aim is to ensure that financial institutions give loans to environmental projects as a matter of course. This does not happen today because these are relatively new projects and there are many doubts about risk management. As funds for impact investment grow, long term sustainability will be easily achieved because there will be more funds available to cope with normal needs as happens with traditional projects.

(Sanjurjo, 2016)

Analysis of the instrument/initiative[1]

Ecological / conservation effectiveness

The direct benefit of this initiative is the reduction in the death rate of *vaquitas*. It has been proved that the fishing technique used by the fishermen in *San Felipe pescados y mariscos* does not accidentally trap this species. Nevertheless, the initiative is still at very early stage to measure the real effects that it has had.

Due to the enormous pressures the *vaquita* faces, which include all the remaining fishermen who have not changed their fishing technology and the illegal fishing of the *totoaba*, this project will only achieve real measurable effects in the conservation of the *vaquita* if it remains in the long term and if more fishermen are included. Still, these efforts provide an opportunity to save the world's most endangered marine mammal species under a profitable economic project.

(Aguilar-Ramirez & Rodríguez-Valencia, 2012)

Cost-effectiveness

Since this initiative is at an initial stage it is therefore difficult to assess its cost effectiveness. The investment is estimated at 70,000 USD and the benefits are not yet measurable. But, in the event success and growth over time this project could be very cost-effective. As mentioned, traceability systems are being set up , which will guarantee that the products sold are *vaquita*-friendly, and therefore, that the resources generated are for the conservation of the *vaquita*. Moreover, one important feature is that the company will eliminate many intermediaries that today exist on the fish market because they are selling the products directly to restaurants and chefs. This helps to channelize more resources into conservation and reduce the money wasted on intermediaries.

Social impacts, perceptions and legitimacy

The social impact of this project could be very positive. It has given local fishermen the opportunity to own an innovative company that offers sustainable projects with a premium of approximately 6%. The distribution of benefits is mostly for the fishermen, with 90% for fishermen and 10% for WWF because they will buy 10% equity of the company. It has also provided them with growth opportunities that did not exist the past.. If the project continues and the market grows over time, their income may increase. Finally, as mentioned in the past section, the company is eliminating many intermediaries, which means better income for the families involved.

Still, in the short run, the social impact may not be as positive. This fishing technique does not catch as many

[1] The assessment framework of this chapter is adapted from the one developed and applied in the context of the study "Integration approach to financing of biodiversity: evaluation of results and analysis of options for the future", financed by the European Commission, and carried out by Kettunen, M., Illes, A. and Baldock, D. (IEEP)

Rayment, M., Ebrahim, N. and Verstraeten, Y. (ICF), Primmer, E., Rantala, S. and Rekola, A. (SYKE), Ring, I. and Droste, N. (UFZ), Santos, R. (2Eco). This framework draws from the existing literature and assessments (e.g. EU FP7 POLICYMIX project and the EU nature directives fitness check).

jumbo shrimps as the traditional one, which are the ones that fetch the highest market price. This has turned some fishermen against the technology change.

(NOTIMEX, 2012; Sanjurjo, 2016)

Broader institutional context and role of instrument in the policy mix

Efforts to preserve the *Vaquita* have also been on the government's agenda. The Federal Government, through the National Commission for the Natural Protected Areas created the Biosphere Reserve in 1993. In 2007 financial resources of the Regional Sustainable Development Programs were used for activities with fishermen to protect the *vaquita*. In 2008, "PACE *Vaquita*" was established with the objective of reducing the number of fishing boats that use nets that are dangerous to the species, in 2015, fishing activities in the *vaquita* area were temporarily suspended and in 2016 measures were adopted to ban the commercialization of the *totoaba*.

This initiative has achieved in the policy mix to replace traditional gillnets with the *Chango ecologico* in the fishing norm Moreover, this is the only effort for the conservation of the *vaquita* that is being made on the market side, which complements the other regulatory efforts made by the government. The government's efforts have helped this initiative because the vaquita topic was already on the agenda when *San Felipe pescados y mariscos* was created, which facilitated negotiations with fishermen. The threat the *vaquita* faces is so urgent that it is necessary to fight for its conservation from various angles, and the actions of the government serve to complement this initiative.

(FMCN, 2016a; Sanjurjo, 2016)

Conclusions and potential for replicability

To save the *vaquita* from extinction, this type of efforts must increase. The current situation is critical for the species, and a broad mix of policies is required to eliminate the illegal fishing of *totoaba* and completely change fishing technology to *Chango ecológico.* Efforts must also be made to diversify production in the area, and investment in information campaigns about the danger faced by the *vaquita*.

Some of the conclusions of this case study are given below:

The interaction of different actors such as local communities, international organizations, and the federal government may result in positive initiatives that contribute to the conservation of the environment and the protection of biodiversity. In this case local producers, WWF, financial institutions and the National Fishing Commission managed to change the fishing technology, which may save the *vaquita* from extinction. It is important to mention that social cohesion is key to success. In this case, the fishermen were well organised under the federation, which made it easier to set up the company.

Financial resources exist for impact investment. As concluded in the report, there are financial resources available for impact investment. Information failures exist but they can be solved to increase and strength the profitable projects that produce positive externalities on biodiversity. In this case, Rabobank and Credit Suisse provided the funds under a special agreement that combines social responsibility with profitability, which may be helpful for other similar initiatives.

There is a growing market for green products in the world and these initiatives will experience growing demand for their products. There are therefore very important opportunities for financing biodiversity

through the commercialization of green products, which, in conjunction with other policies, may reduce the loss of biodiversity worldwide.

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Yomol A' Tel

Summary

Yomol A'tel is a group of solidarity economy companies dedicated to the production of organic coffee, honey and honey-based soap. It is made up of over 350 families from 64 Tzeltal indigenous communities in Chiapas and collaborators who, together, work for social justice and the defense of their territory, generating social property and business efficiency. It was created is 2002 by a Jesuit mission working in the region of Chiapas with the objective of improving the economic situation of local communities that had been very affected by the drop in coffee prices that occurred after the government liberated its price in 1989.

Coffee, which is their most important product, is grown under the shade of trees in a diversified ecosystem that helps maintain biodiversity levels. The group is responsible for the entire process: they plant, harvest, roast, pack and sell it to international companies or to the final consumer by cups at five specialty coffee bars located in Mexico which generates a higher income for producers who previously sold the coffee to intermediaries that gave them very low prices for their product. It is considered a project with triple benefits because it is profitable, has positive economic impacts on the local communities and helps conserve forest coverage.

On the conservation side of biodiversity, *Yomol A'Tel* represents an opportunity to stop the intensification through deforestation trend that is affecting the world's coffee plantations. In Latin America, between 1970 and 1990, nearly 50% of shade coffee farms were converted to low-shade systems (Perfecto, Rice, Greenberg, & Van der Voort, 1996). From 1990 to 2010, the percentage of coffee production area under shade management kept declining but at a lower rate. (Jha et al., 2014)

Introduction

Yomol A'tel is a group of solidarity economy companies dedicated to the production of organic coffee, honey and honey-based soap. It is made up of over 350 families from 64 Tzeltal indigenous communities in Chiapas and collaborators who, together, work for social justice and the defence of their territory, generating social property and business efficiency. (Yomol A'Tel)

The group comprises three cooperatives, three companies and one microfinance company that commercialise organic products. This process ranges from cultivation in Chiapas, to sale to the final consumer by cup in Mexico at five specialty coffee bars or as roasted coffee in Japan, United States and Europe.

Organic coffee is the most important product of the three they sell. It was the first product they commercialised and the one that accounts for most of the revenue. In addition to not using chemical pesticides or fertilisers, the coffee is shade grown, meaning that the crops require the shade of more than 35 tree species. This means that most of the flora where the coffee is produced is maintained and the fauna is not losing its habitat.

Description of the instrument/initiative and the related process

Description and key design features

Yomol A'Tel has a complex coordinated operation where each of the three cooperatives and the three companies plays a role in the commercialization of the organic coffee, honey and soap. The first part of the process takes place in the *Ts'umbal Xitalha* cooperative where green organic coffee and honey are produced by more than 250 people in 198 hectares in Chiapas. After this first stage, the companies involved in the production of coffee and honey are different.

The second stage of the coffee process takes place in the *Batsil Maya* cooperative. Here the product is

classified, roasted, ground and packed at a roasting plant and sold to clients in United States, Japan and Europe and specialty coffee bars in Mexico, named *Capeltic*, another company in the group. The second stage for the honey takes place in the *Chabnichim* cooperative, where the honey is packed for commercialization. The honey-based soap is produced in the *Xapontic* cooperative. These two products are sold to different stores on the national market, one of them is also the *Capeltic* specialty coffee bars.

The final stage takes place in *Capeltic* where the products are sold to the final consumer in five locations, three inside private universities in Mexico City, Puebla and Guadalajara, and two outside universities in Chiapas and Mexico City. The coffee is sold by cup, the format where it obtains the highest price. Compared to unroasted coffee, the price by cup is 40 times higher. Moreover, , the premium for being organic products certified by Certimex and USDA Organic is between 7% and 12%.

In 2015, total coffee production was 95 tons, 55% of which was sold internationally. This production generated an annual revenue for *Ts'umbal Xitalha* of 53,490 USD, for *Batsil Maya* of 968,520 USD and for *Capeltic* of 821,689 USD. The group has seen real economic success; since 2007, revenue has increased at an average growth rate of 79%. In the same year, local coffee producers received 25% more than the local price. (Arlberto Irezabal, 2016)

(Fuentes, 2016; Alberto Irezabal, 2017)

History

The late 19th century saw the beginning of coffee production in the northern region of Chiapas. First, production was carried out on plantations owned by Europeans, and it was not until 1942 that the government, under rural reform, expropriated rural land in Mexico and gave most of it to the local communities in the form of communal lands. By 1970, coffee crops in Chiapas occupied approximately 81,000 hectares of land, and as a consequence of a national public policy that incentivised the production of coffee through the establishment of minimum prices, this area increased to approximately 165,000 hectares by 1989. Mexico became the world's fourth largest coffee producer , with coffee exports accounting for 2.6% of total exports between 1985 and 1991.

In 1989 the government liberalised the price of coffee as part of the neoliberal changes in public administration. Since then, the price of coffee in Mexico has been aligned with prices established in the New York Stock Exchange. This new form of price determination made the price susceptible to world changes in supply and demand and the exchange rate. Coffee production in Brazil and Vietnam had increased during this period and the Mexican peso had been devalued which made coffee prices fall by approximately 70% between 1989 and 2003, causing a major crisis. Local producers were selling their product to intermediaries who then sold it to major world companies. Without negotiating power, the price these local communities received for the coffee was insufficient for the basic necessities and poverty increased. (Rodríguez Moreno, 2014)

In this context in 2002 a Jesuit mission in Chiapas called Mission of the Bachajon created the *Ts'umbal Xitalha* cooperative for the production of organic coffee and honey with 22 Tzeltal producers. The aim was to improve the economic situation of local communities and to incorporate local cultural and religious elements into their production techniques. A cooperative situated in Palenque, a nearby municipality, was producing organic certified coffee and had seen favourable economic results. This encouraged the new cooperative to opt for the organic method of production, which involved a different relationship with the land and the natural resources that was in line with their cultural beliefs.

In 1993, *Batsil Maya* had also been created by the Mission of the Bachajon. This project had the aim of empowering indigenous women in the region through the ownership of a cooperative for the packing and

roasting of coffee. In the beginning, the entire process was done by hand meaning that they could only process small amounts of coffee. In 2001 the mission acquired a roasting machine and built a plant in Chilon which increased the capacity and the quality of the cooperative and brought non-solidarity clients to the company.

At the same time, the producers in *Ts'umbal Xitalha* were increasing. All of them produced organic certified coffee or honey and *Batsil Maya* experienced growing demand for its products. In 2005, a new roasting plant was built with a greater capacity with funds from the Universidad Iberoamericana in Mexico City, the National Bank of Mexico and the Loyola Foundation. Between 2006 and 2007, *Batsil Maya* signed contracts with Zensho, a Japanese food company that today has 112 thousand employees, to export organic coffee to Japan, and with Dolphy, a Mexican ice-cream company that wished to see the coffee at their stores in Mexico City. Since then, , all the coffee produced by *Ts'umbal Xitalha* has been sold to *Batsil Maya*

Parallel to these events, the Universidad Iberoamericana proposed to open a specialty coffee bar inside the university where the organic coffee produced by *Ts'umbal Xitalha* is sold by cup. This coffee bar was born under the name *Capeltic* and represents a channel through which the profits generated by selling coffee by cup are return to the indigenous producers in Chiapas. The project was successful and *Capeltic* now has five coffee bars in the country. In addition, the *Yomol A'Tel* group began working to diversify its products, and in 2010, created *Xapontic* for the commercialization of honey based soap. (Mena, 2013)

Relevant actors

The main actors involved in Yomol A' Tel are listed below: (Mena, 2013):

1. Local producers: Around 220 coffee producers and 30 honey producers that own *Ts'umbal Xitalha.* They are all part of the Tzeltal indigenous group and this is their main economic activity. They are well organised, which has allowed the group of companies to grow.
2. Mission of the Bachajon: This Jesuit mission accompanies the *Yomol A' Tel* to improve its organization and professionalization. The main interest of this actor is to improve the quality of life of local communities.
3. Universities: National universities belonging to the Jesuit University System are home to the *Capeltic* specialty coffee bars, provide volunteers for the organization and generate knowledge for its improvement. The Universidad Iberoamericana has also provided funds for the construction of the last roasting plant. International universities such as Mondragon Universitea in Spain have also been involved in the generation of knowledge and the international expansion of the group.
4. Foundations: National and international organizations are also involved also in knowledge generation and have provided funds for special projects such as the construction of the last roasting plant.
5. Private companies: National and international companies such as Zensho, Jade, Fides Ecosol, Dolphy, Cesmach and Mayavinic are the main clients of the organization. Zensho is the company that buys the majority of the production (70%) and plays a very important role in the economy of the group.

Role of public policies and public bodies

Description of the role of public policies in the establishment of the instrument (e.g. legal requirements for water quality). Analysis of the role of public bodies in supporting the instrument (e.g. role as intermediary, guarantee of long-term sustainability, financial support)

(Fuentes, 2016; Alberto Irezabal, 2017)

Monitoring/sanctioning mechanisms

The organic certification of the *Yomol A'Tel* products is carried out by Certimex, an independent Mexican company dedicated to the certification of organic processes. Their inspection processes are conducted on a yearly basis on the land to verify that the requirements for being certified organic are men. This certification has been approved by the Secretariat of Agriculture, Livestock, Rural Development, Fishing and Food, the German accreditation organisation DAKKS, USDA Organic and the Ministry of Agriculture, Fisheries and Forestry of Japan. (Certimex, 2008)

Measures to ensure long term sustainability

The long-term sustainability of *Yomol A'Tel* in terms of biodiversity depends on the maintenance of the organic production of shade grown coffee and honey as their production technique. In the present scenario, there are no important threats that might lead the organization to opt for a different production technique. Fifteen years have elapsed the creation of *Ts'umbal Xitalha* and since then, the principles of conserving the natural capital have not only been maintained but been strengthened in the organization. The main reasons driving the long term sustainability are that this view of respecting nature is in line with the Tzeltal beliefs of the local communities and that this production has substantially improved their economic situation. The organization has even overcome problems that could have led them to use chemical pesticides, most of which took place four years ago when the disease known as "Rust " reduced their production by 90% yet the group maintained its organic production.

Still, the group faces a number of small threats to sustainability on their working agenda. One of them is the vulnerability to the exchange rate due to the fact that they export most of their products and the other one is their dependence on specific clients such as Zensho. To cope with these threats *Yomol A' Tel* has been taking measures to diversify its international clients and increase the proportion of products sold on the national market Still, the national market only accounts for ___% and their main client buys them ___%, meaning that more needs to be done in the following years.

(Fuentes, 2016; Alberto Irezabal, 2017)

Analysis of the instrument/initiative2

Ecological / conservation effectiveness

The traditional technique for producing coffee involved growing it in the shade of a diverse canopy of native forests, where shade covered from 60% to 90% of the coffee plants. Over time, coffee production and agricultural intensification have increased, encouraging producers ise to reduce the amount of trees, increase the number of coffee plants by unit of area and use more agrochemicals. This has resulted in coffee grown in less diversified lands with less forest coverage. (Jha et al., 2014)

The reduction of shade grown coffee has harmed biodiversity because it reduces the habitat of various species. Many authors have demonstrated the importance of shade systems for biodiversity, such as http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2010.01939.x/full who states that "Shade trees in agroforestry enhance functional biodiversity, carbon sequestration, soil fertility, drought resistance as well as weed and biological pest control"

The ecological effects of *Yomol A'Tel* basically involve the increase in forest coverage and the ban of agrochemicals in their production areas. To produce shade grown coffee, producers first had to restore the forest in many areas that had been used to plant sun coffee or for livestock. They also learned about biological pest control, organic fertilization and other ecological practices to produce high quality organic coffee.

Cost-effectiveness

In the history of *Yomol A'Tel,* there have been many financial donations have been received to pay for necessary additions such as the two roasting plants that have existed, to achieve organic certification, which includes the cost of the certification as well as the costs of restoring the forests, and building the specialty coffee bars. These donations have been made by various institutions such as the Ford Foundation, Banamex Social Support, the Meneses Foundation and the Loyola Foundation, among many others. Nevertheless, in the operation, the group has achieved economic profitability with revenues of approximately one million dollars per year and does not need the financial assistance of other organizations.

In other words, to achieve the positive conservation outcome, *Yomol A'Tel* only needed external resources for the initial investment but not for its everyday operation. This situation, with the guarantee of the certifying agency *Certimex* that the financial resources are correctly allocated for the conservation of biodiversity,makes this initiative highly cost-effective in the long run.

[2] The assessment framework of this chapter is adapted from the one developed and applied in the context of the study "Integration approach to financing of biodiversity: evaluation of results and analysis of options for the future", financed by the European Commission, and carried out by Kettunen, M., Illes, A. and Baldock, D. (IEEP)

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Social impacts, perceptions and legitimacy

The social impacts of *Yomol A' Tel* have been very positive because it has provided a higher and more stable income to the coffee producers of coffee involved. Before the organization was created, the price they received was very variable because it was determined by the New York market and it was very low because they sold it to intermediaries who took advantage of their negotiating position to buy the coffee at very low prices. Now they have integrated the production chain and sell the product directly to the consumer in Mexico or to international companies, which generates economic profits that are returned to producers. In 2015 the price that the organization paid local producers was 25% higher than the price at local markets (Arlberto Irezabal, 2016), and proof of this social effectiveness is that the number of producers belonging to the organization has increased significantly. In the beginning, there were 22 producers and now there are approximately 250.

Broader institutional context and role of instrument in the policy mix

In Mexico, the traditional public policy for the rural development has indirectly encouraged deforestation and the use of agrochemicals to increase productivity. Coffee has not been the exception: since the creation of the National Institute of Coffee (INMECAFE) in 1957, the federal government subsidised agrochemicals, had a minimum price policy and incentivised the reduction of shade in coffee plantations to increase the productivity by hectare. Since the last decade of the XX century some subsidies have been reformed for environmental reasons and the use of pesticides has been taxed, yet there are still many subsidies that indirectly encourage deforestation and the loss of biodiversity. (Giovannucci & Juárez Cruz, 2006)

In the history of *Yomol A'Tel* the relationship with public policy has been minimal. The initiative has not operated with public funds nor has it been part of any public initiative. The only significant positive action taken by the government related to this initiative, it was the publication in 2006 of the law of organic products and the publication in 2010 of the legal requirements for being classified as organic (Maldonado, Trujillo, & Rivas, 2013). Even though the group's production was already certified, these norms provided legality for the certification they had.

Conclusions and potential for replicability (half a page)

The positive experience of *Yomol A'Tel* illustrates key aspects of the success of a conservation initiative and its replicability potential. As mentioned in the case study, the group may be considered a triple dividend initiative because it generates positive social and environmental impacts as well as economic profits. One of the most important characteristics of this group that has helped achieve these results is that is based on interdisciplinary work. The local communities in Chilon, other communities in Chiapas that also produce organic shade grown coffee, academics from various universities, the Jesuit mission and experts on organic coffee production have worked together since the group's inception to achieve the long term sustainability that has resulted in innovative aspects such the creation of their own specialty coffee bars and the elimination of intermediaries.

Other important aspect of this group is that the conservation of biodiversity has been aligned with the cultural beliefs of the local communities that produce the honey and coffee. This suggests that the cultural beliefs of certain indigenous communities in Mexico are in line with the conservation of biodiversity, which

will facilitate the process of implementing organic production schemes in many of the country's rural areas.

Third, the vertical integration of the group is a characteristic that could be implemented in other similar production schemes. By eliminating intermediaries, the price local producers obtains is higher, which increases the economic profitability of organic production schemes and at the same time the available funds for investing in organic production techniques or certifications. One important aspect of the vertical integration of *Yomol A'Tel* is the market that they have created within private universities in Mexico. They have targeted conscious consumers willing to pay for biodiversity conservation and fair trade.

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Annex – Systematic Review

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
1	Servicios Ambientales de Oaxaca	Green production/operation	Carbon market	Region Sierra Norte, Mixe, Chinantea and Sierra Sur, Oaxaca	Local	2526.2	Mixed	Operational	Forests	Climate change mitigation	2004
2	Captura de carbono en Ejido Felipe Carrillo Puerto	Payment for Environmental Services	Carbon market	Ejido Felipe Carrillo Puerto, Quintana Roo	Local	11230	Public	Pilot	Forests	Prevent Prevent deforestation	2006
3	Scolel'Te	Green production/operation	Carbon market	Chiapas	Local	862	Private	Operational	Cultivated	Prevent Prevent deforestation	1997
4	Captura de carbono en comunidades de extrema pobreza en la Sierra Gorda de México	Payment for Environmental Services	Carbon market	Sierra Gorda, Queretaro and San Luis Potosi	Local	383000	NGO	Operational	Forests	Climate change mitigation	1997

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
5	Alianza México para la Reducción de Emisiones de carbono por Deforestación y Degradación	Green production/operation	Carbon market	Yucatán, Quintana Roo, Campeche, Jalisco, Chiapas and Oaxaca	National	-	Mixed	Concept/Pilot	Forests	Prevent Prevent deforestation	2017
6	Bonos Verdes	Other	Other	All of Mexico	National	.	Private	Concept/Pilot	Forests	Climate change mitigation	2016
7	Compensación Ambiental CONAFOR	Other	Offseting	All of Mexico	National	342008	Private	Operational	Forests	Prevent Prevent deforestation	2003
8	Cobro de derechos por el uso y aprovechamiento de las Áreas Naturales Protegidas	Environmental Fiscal Reform	Taxes and subsidies	All of Mexico	National	25,394,779	Public	Operational	.	Biodiversity protection	2001

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
9	Impuesto Especial sobre Producción y Servicios, Carbono	Environmental Fiscal Reform	Taxes and subsidies	All of Mexico	National	.	Public	Operational	Urban	Climate change mitigation	2014
10	Fondo Patrimonial Biodiversidad	Payment for Environmental Services	Fund	All of Mexico	National	17400	Mixed	Operational	Forests	Biodiversity protection	2009
11	Biosphere Responsible Tourism	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Private	Operational	.	Biodiversity protection	2016
12	Shrimp vaquita free	Green production/operation	Fund	Gulf of California	Cross-border	.	NGO	Operational	Marine_Open_Ocean	Biodiversity protection	2015
13	Certimex	Green production/operation	Impact Investment and green market	All of Mexico	National	.	Private	Operational	Cultivated	Biodiversity protection	1997
14	Ceres	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	.
15	Ecocert	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Private	Concept	Cultivated	Biodiversity protection	2015

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
16	IMOCERT	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	2015
17	Mayacert	Green production/operation	Impact Investment and green market	Oaxaca, Chiapas	Cross-border	9443	Private	Operational	Cultivated	Biodiversity protection	2015
18	Naturland	Green production/operation	Impact Investment and green market	Oaxaca	Cross-border	.	Private	Operational	Forests	Biodiversity protection	2015
19	OCIA international	Green production/operation	Impact Investment and green market	Chiapas, Puebla, Veracruz, Guanajuato	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	.
20	Oregon Tilth	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	1987
21	QAI Inc	Green production/operation	Impact Investment and green market	.	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	.
22	Best aquaculture practices certified	Green production/operation	Impact Investment and green market	Sonora, Sinaloa, Chiapas	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	.

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
23	Bird Friendly Coffee	Green production/operation	Impact Investment and green market	Chiapas and Jalisco	Cross-border	2253	Private	Operational	Cultivated	Biodiversity protection	2007
24	Comercio Justo Mexico	Green production/operation	Impact Investment and green market	Oaxaca, Chiapas, Puebla, Tlaxcala	National	.	Private	Operational	Cultivated	Biodiversity protection	1999
25	Mexico GAP	Green production/operation	Impact Investment and green market	All of Mexico	Cross-border	.	Mixed	Operational	Cultivated	Biodiversity protection	2015
26	Marine Stewardship Council	Green production/operation	Impact Investment and green market	Baja California Sur, Baja California Norte, Sonora and Quintana Roo	Cross-border	.	Mixed	Operational	Marine_Open_Ocean	Biodiversity protection	2004
27	UTZ Certified	Green production/operation	Fund and green market	Chiapas, Oaxaca, Veracruz, Puebla, Colima Tabasco and Guerrero	Cross-border	.	Mixed	Operational	Cultivated	Biodiversity protection	1997

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
28	FSC	Green production/operation	Impact Investment and green market	Chiahuahua, Durango, Jalisco, Michoacán, State of Mexico, Puebla, Oaxaca, Chiapas, Campeche, Quintana Roo	Cross-border	900388.69	NGO	Operational	Forests	Prevent deforestation	1995
29	Orgánico Sagarpa México	Green production/operation	Impact Investment and green market	All of Mexico	National	84278	Public	Operational	Cultivated	Biodiversity protection	2013
30	Chakay	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.	Private	Operational	Marine_Open_Ocean	Biodiversity protection	2009
31	Ecoturismo certificado	Green production/operation	Impact Investment and green market		National	.	Public	Operational	.	Biodiversity protection	2006
32	Tequila Bat Friendly	Green production/operation	Impact Investment and green market	Jalisco, Guerrero, Oaxaca, Hidalgo, Michoacán and State of MexicoState of Mexico	Regional	.	Private	Concept	Cultivated	Biodiversity protection	2016

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
33	Corredor Ecoturístico Ocho Venado	Green production/operation	Impact Investment and green market	Tututepec, Oaxaca	Local	14187	Mixed	Operational	Forests	Prevent deforestation	2009
34	Playa Viva Guerrero ecoturismo	Green production/operation	Fund and green market	Guerrero	Local	.	NGO	Operational	Coastal_Systems	Biodiversity protection	2011
35	Rancho ecoturístico Goeturismo La Bocana	Green production/operation	Impact Investment and green market	Baja California Norte	Local	3500	Private	Operational	Forests	Biodiversity protection	2007
36	Casa Mexicana de la Ballena Gris	Green production/operation	Impact Investment and green market	Baja California Sur	Local	.	Private	Operational	Marine_Open_Ocean	Biodiversity protection	1990
37	Deportes Ecoturísticos Laguna S.P.R de R.I	Green production/operation	Impact Investment and green market	Baja California Sur	Local	.		Operational	Lakes_Rivers	Biodiversity protection	
38	Ecoturismo Kuyina	Green production/operation	Impact Investment and green market	Baja California Sur	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	1990
39	Centro Ecoturístico Valentín Natural	Green production/operation	Impact Investment and green market	Baja California Sur	Local	723185	Private	Operational	Forests	Biodiversity protection	2012

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
40	EL porvenir Eugenio Echeverría Castellot	Green production/operation	Impact Investment and green market	Campeche	Local	1000	Private	Operational	Forests	Biodiversity protection	.
41	Grupo Ecoturístico Robles	Green production/operation	Impact Investment and green market	Campeche	Local	.		Operational	Forests	Biodiversity protection	
42	La Raíz del Futuro de la Comunidad Veinte de Junio	Green production/operation	Impact Investment and green market	Campeche	Local	.	Private	Operational	Forests	Biodiversity protection	1997
43	Campamento Servicios Turísticos Lacandones	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	
44	Campamento Ya Toch Barum	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	2006
45	Centro Ecoturístico Cueva del Tejón	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	2006

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
46	Centro Ecoturístico Las Guacamayas	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	2006
47	Centro Ecoturístico Naha Canan K'ax	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	2006
48	Centro Ecoturístico Tres Lagunas	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Public	Operational	Forests	Biodiversity protection	2006
49	Ecolodge Top Che	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Private	Operational	Forests	Biodiversity protection	.
50	Siyaj Chan, SC Turismo Bioarqueológico	Green production/operation	Impact Investment and green market	Chiapas	Local	.	Private	Operational	Forests	Biodiversity protection	2014
51	Ecoturismo La Florida SC de RL de Cv	Green production/operation	Impact Investment and green market	Hidalgo	Local	.	Private	Operational	Lakes_Rivers	Biodiversity protection	.
52	Grutas de Xoxafi El Palmar SPR de R.L.	Green production/operation	Impact Investment and green market	Hidalgo	Local	.	Private	Operational	Grass_Rangeland	Biodiversity protection	.

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
53	Centro Ecoturístico Benito Juárez	Green production/operation	Impact Investment and green market	Oaxaca	Local	10000	Private	Operational	Forests	Biodiversity protection	1998
54	Centro Ecoturístico La Ventanilla	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	,
55	Cuajimoloyas Yaa Cuetzi	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Forests	Biodiversity protection	.
56	Ecoturismo Capulálpam	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Forests	Biodiversity protection	.
57	Ecoturismo Lagunas de Chacagua	Green production/operation	Impact Investment and green market	Oaxaca	Local	14187	Private	Operational	Coastal_Systems	Biodiversity protection	.
58	Ecoturismo Shia Rua Vía	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Forests	Biodiversity protection	2010
59	Latuvi	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Forests	Biodiversity protection	.

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
60	Llano Grande	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Lakes_Rivers	Biodiversity protection	.
61	Nevería Latzi Belli	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Forests	Biodiversity protection	2002
62	Proyecto Ecoturístico Barra de Navidad Colotepec	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	.
63	Proyecto Ecoturístico Cascadas Llano Grande	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Lakes_Rivers	Biodiversity protection	
64	Proyecto Ecoturístico Los arrecifes de Chipehua	Green production/operation	Fund and green market	Oaxaca	Local	.	Public	Operational	Marine_Open_Ocean	Biodiversity protection	2011
65	Proyecto Ecoturístico Playa Tilapia	Green production/operation	Impact Investment and green market	Oaxaca	Local	.		Operational	Coastal_Systems	Biodiversity protection	

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
66	Sociedad Cooperativa Santuario de la Tortuga La Escobilla	Green production/operation	Impact Investment and green market	Oaxaca	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	.
67	A´aktun Jaaleb	Green production/operation	Government budget and green market	Quintana Roo	Local	.	Public	Operational	Forests	Biodiversity protection	2002
68	Centro Ecoturístico Beej Kax Ha	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.		Operational	Forests	Biodiversity protection	
69	Sijil Noh Ha	Green production/operation	Impact Investment and green market	Felipe Carrillo Puerto, Quintana Roo	Local	1230	Private	Operational	Forests	Prevent deforestation	.
70	Community Tours Sian Kaan	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.		Operational	Forests	Biodiversity protection	
71	Kìichpam K'àax Uk'aax manati sc de RL	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.		Operational	Forests	Biodiversity protection	

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
72	Laab Oob Kaak – El Corchal	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.	Private	Operational	Forests	Biodiversity protection	
73	Servicios Turísticos Bahía Blanca	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	1999
74	Ubelilek Kaxtik Kuxtal S.C. de R.L. de C.V	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.	Private	Operational	Forests	Biodiversity protection	.
75	Uyo ochel Maya	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	1986
76	Xyaat-Palma Camedoria ” SC de RL de CV	Green production/operation	Impact Investment and green market	Quintana Roo	Local	.		Operational	Forests	Biodiversity protection	
77	Centro Ecoturístico Cascadas Encantadas Sociedad Cooperativa de R.L. de C. V.	Green production/operation	Impact Investment and green market	Veracruz	Local	25	private	Operational	Lakes_Rivers	Biodiversity protection	.

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
78	Cielo, Tierra y Selva Ejido López Mateos "Selva del Marinero"	Green production/operation	Fund and green market	Veracruz	Local	358	NGO	Operational	Forests	Biodiversity protection	2002
79	Ecodesarrollo Je am Taákxi	Green production/operation	Impact Investment and green market	Veracruz	Local	22	Private	Operational	Forests	Biodiversity protection	.
80	Ecoturismo el Apompal	Green production/operation	Impact Investment and green market	Veracruz	Local	.		Operational	Forests	Biodiversity protection	
81	Sociedad Cooperativa Naturaleza y Cultura Jomxuk	Green production/operation	Impact Investment and green market	Veracruz	Local	.		Operational	Forests	Biodiversity protection	
82	Tortuga Carey S.C. de R.L. de C.V.	Green production/operation	Impact Investment and green market	Veracruz	Local	.	Private	Operational	Coastal_Systems	Biodiversity protection	.
83	Amigos del Delfín	Green production/operation	Impact Investment and green market	Yucatán	Local	.		Operational	Marine_Open_Ocean	Biodiversity protection	

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
84	Cabañas Ecológicas U´najil Ek Balam	Green production/operation	Impact Investment and green market	Yucatán	Local	.	Private	Operational	Forests	Biodiversity protection	.
85	Cenote X' Canché	Green production/operation	Impact Investment and green market	Yucatán	Local	.		Operational	Coastal_Systems	Biodiversity protection	
86	Grupo Jaltun de Celestún	Green production/operation	Impact Investment and green market	Yucatán	Local	.	Private	Operational	forests	Biodiversity protection	.
87	Senderos Eco-Arqueológicos Oxwatz	Green production/operation	Impact Investment and green market	Yucatán	Local	.	Private	Operational	forests	Biodiversity protection	.
88	Café de sombra	Green production/operation	Impact Investment and green market	Chiapas, Oaxaca, Veracruz, Puebla, Colima and Guerrero	Local	185193	Mixed	Operational	Cultivated	Biodiversity protection	1988

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
89	Vegetables	Green production/operation	Impact Investment and green market	Baja California, Baja California Sur, Sinaloa, Sonora, Chiapas, Guanajuato, Colima, Veracruz, Nuevo León, Puebla, Jalisco, Coahuila, Mexico City, Guerrero, State of MexicoState of Mexico, San Luis Potosí, Morelos, Tlaxcala, Oaxaca	Local	35414	Mixed	Operational	Cultivated	Biodiversity protection	1985
90	Avocado	Green production/operation	Impact Investment and green market	Michoacán, Colima, Nayarit, Sonora, Nuevo León, Baja California Sur, Jalisco, State of Mexico	Local	31572	Mixed	Operational	Cultivated	Biodiversity protection	1985

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
91	Herbs	Green production/operation	Impact Investment and green market	Querétaro, Baja California, Chihuahua, Puebla, Morelos and Oaxaca	Local	30199	Mixed	Operational	Cultivated	Biodiversity protection	1985
92	Cocoa	Green production/operation	Impact Investment and green market	Tabasco and Chiapas	Local	14796	Mixed	Operational	Cultivated	Biodiversity protection	1985
93	Mango	Green production/operation	Impact Investment and green market	Nayarit, Michoacán, Colima, Sinaloa, Oaxaca, Veracruz, Jalisco, Chiapas, Tabasco	Local	12465	Mixed	Operational	Cultivated	Biodiversity protection	1985
94	Grape	Green production/operation	Impact Investment and green market	Guerrero, Baja California, Sonora	Local	12032	Mixed	Operational	Cultivated	Biodiversity protection	1985
95	Agave	Green production/operation	Impact Investment and green market	Jalisco, Guerrero, Oaxaca, Hidalgo, Michoacán and State of Mexico	Local	11566	Mixed	Operational	Cultivated	Biodiversity protection	1985

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
96	Coco	Green production/operation	Impact Investment and green market	Michoacán, Guerrero and Chiapas	Local	9031	Mixed	Operational	Cultivated	Biodiversity protection	1985
97	Lobsters	Green production/operation	Impact Investment and green market	Baja California and Quintana Roo	Local	.	Private	Operational	Marine_Open_Ocean	Biodiversity protection	2000
98	Restauración Delta del Río ColorDO	Green production/operation	Fund	Baja California Norte	Cross-border	400000	NGO	Operational	Lakes_Rivers	Watershed protection	2012
99	Mazunte	Green production/operation	Impact Investment and green market	Oaxaca	Local	14000	Private	Operational	Coastal_Systems	Biodiversity protection	1992
100	Loca community in Oaxaca sells water	Green production/operation	.	Oaxaca	Local	.	Private	Operational	.	Watershed protection	.
101	Smartfish	Green production/operation	Impact Investment and green market	Baja California Sur	Local	.	.	Operational	Marine_Open_Ocean	Biodiversity protection	2013

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
102	Unidades de Manejo para la Conservación de la Vida Silvestre	Green production/operation	Government budget and green market	All of Mexico	National	34480000	Public	Operational	Forests	Biodiversity protection	1997
103	Ecoturismo en la Reserva de la Biósfera de la Mariposa Monarca	Green production/operation	Fund and green market	Monarch Butterfly Biosphere Reserve , Michoacán and State of Mexico	Local	2385	Private	Operational	Forests	Biodiversity protection	1986
104	Mercados Verdes Herbolarios	Green production/operation	Impact Investment and green market	Puebla and Tlaxcala	Local	.	Private	Operational	Cultivated	Biodiversity protection	2000
105	NATURLAND	Green production/operation	Impact Investment and green market	Oaxaca	Cross-border	.	Private	Operational	Cultivated	Biodiversity protection	2015
106	OMESP in Sierra de Petatlán	Green production/operation	Impact Investment and green market	Sierra Petatlán, Guerrero	Local	.	Private	Operational	Forests	Prevent deforestation	2001
107	Agreement in Mexico to conserve the Parrot	Payment for Environmental Services	Fund	Chiahuahua	Local	2400	NGO	.	Forests	Biodiversity protection	.

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
108	Derechos de Desarrollo Transferibles	Green production/operation	Impact Investment and green market	Quintana Roo	Local	1917	Private	Operational	Coastal_Systems	Biodiversity protection	1996
109	Programa de Fondos de Apoyo para la Conservación y Restauración de los Ecosistemas a través de la participación social	Other	Taxes and subsidies	Mexico City	Local	87294	Public	Operational	Forests	Prevent deforestation	2008
110	Red Indígena de Turismo en México	Green production/operation	Government budget and green market	All of Mexico	National	.	Mixed	Operational	.	Biodiversity protection	2002
111	Fondo Monarca	Payment for Environmental Services	Fund	Monarch Butterfly Biosphere Reserve , State of Mexico and Michoacán	Local	9928.34	Mixed	Operational	Forests	Biodiversity protection	2000
112	Shrimp vaquita free	ICDPs	Government budget	Gulf of California	Regional	.	Public	Operational	Marine_Open_Ocean	Biodiversity protection	2012

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
113	Programa para el Pago por Servicios Ambientales Hidrológicos	Payment for Environmental Services	Fund	State of Mexico	Regional	.	Public	Operational	Forests	Watershed protection	2007
114	Programa Nacional de Pago por Servicios Ambientales	Payment for Environmental Services	Fund	All of Mexico	National	2484225	Public	Operational	Forests	Watershed protection	2003
115	Programa Estatal para la Compensación por Servicios Ecosistémicos	Payment for Environmental Services	.	Chiapas	Regional	3992476	Mixed	Concept	Forests	Biodiversity protection	.
116	PSAL Valle de Bravo	Payment for Environmental Services	Fund	Valle de Bravo, State of Mexico	Local	7898	NGO	Concept	Forests	Watershed protection	.
117	Adopta un manantial	Payment for Environmental Services	Impact Investment and green market	El Guayabal and Los Bajos, Guerrero	Local	.	Private	Operational	Forests	Watershed protection	2007

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
118	Componente Disminución del Esfuerzo Pesquero Retiro Voluntario de Embarcaciones Mayores	ICDPs	Government budget	Entire Mexican coastline	National	.	Public	Operational	Marine_Open_Ocean	Biodiversity protection	2005
119	Northern Jaguar Project	Conservation easement	Fund	Sonora	Local	20234	NGO	Operational	Forests	Biodiversity protection	2003
120	Viviendo con felinos	Payment for Environmental Services	Fund	Sonora	Local	20234	NGO	Operational	Forests	Biodiversity protection	2007
121	Conservación de tierras privadas	Conservation easement	Fund	Baja California Sur	Local	57000	NGO	Operational	Lakes_Rivers	Biodiversity protection	2005
122	Conservación de tierras privadas	Conservation easement	Fund	Coahuila	Local	2721	NGO	Operational	Wetlands	Biodiversity protection	2000
123	Conservación de tierras privadas	Conservation easement	Fund	Yucatán	Local	2358	NGO	Operational	Forests	Biodiversity protection	2002

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
124	Conservación de tierras privadas	Conservation easement	Fund	Veracruz	Local	306	NGO	Operational	Forests	Biodiversity protection	1998
125	Protege los pastizales y arroyos silvestres del noroeste de México	Conservation easement	Fund	Sonora	Local	3875	NGO	Operational	Grass_Rangeland	Biodiversity protection	2005
126	Impuesto Especial sobre Producción y Servicios, Plaguicidas	Environmental Fiscal Reform	Taxes and subsidies	All of Mexico	National	.	Public	Operational	Cultivated	Biodiversity protection	2014
127	Sociedad de Historia Natural Niparjá A.C.	Payment for Environmental Services	Fund	Sierra Las Trincheras and El Novillo, Baja California Sur	Local	200	NGO	Operational	Forests	Watershed protection	2011
128	Secretaría de Medio Ambiente y Aprovechamiento Sustentable (Gob. Estatal de Campeche)	Payment for Environmental Services	Government budget	Xbonil, Conhuas and Heribero Jara ejidos, Campeche	Local	1040	Public	Operational	Forests	Biodiversity protection	2011

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
129	The Nature Conservancy, Yucatán	Payment for Environmental Services	Fund	San Marcos, Santa Elena and NCPA San Agustín ejidos, Yucatán	Local	3300	Mixed	Operational	Forests	Watershed protection	.
130	Conselva, Costas y Comunidades	Payment for Environmental Services	Fund	La Guasima, Sinaloa	Local	223.85	Mixed	Operational	Forests	Watershed protection	2004
131	Instituto Forestal del Estado de Quintana Roo	Payment for Environmental Services	Fund	Lic Isisdro Favela, Nuevo Hoctun, Caobas, Tres Garantías and Chacchoben ejidos, Quintana Roo	Local	8218.88	Public	Operational	Forests	Climate change mitigation	2012
132	Secretarìa de Desarrollo Rural, Gobierno del Estado de Querétaro	Payment for Environmental Services	Government budget	Guerrero	Local	14000	Public	Operational	Forests	Watershed protection	.
133	Amigos de Calakmul	Payment for Environmental Services	Fund	Calakmyul, Campeche	Local	1993.61	NGO	Operational	Forests	Biodiversity protection	2004
134	Niños y crias A.C.	Payment for Environmental Services	Fund	Yucatán	Local	3854	Mixed	Operational	Forests	Watershed protection	2010

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
135	Amigos de Sian Ka'an	Payment for Environmental Services	Fund and green market	Sian Ka'an, Quintana Roo	Local	410	Mixed	Operational	Forests	Watershed protection	2011
136	Sendas	Payment for Environmental Services	Fund	Sub-basin river Pixiac, Veracruz	Local	1098.1	Mixed	Operational	Forests	Watershed protection	2010
137	Dirección de Medio Ambiente, H. Ayuntamiento de Tulancingo	Payment for Environmental Services	Government budget	Tulancingo, Hidalgo	Local	215.17	Public	Operational	Forests	Watershed protection	2011
138	FIDECOAGUA	Payment for Environmental Services	Fund	Coatepec, Veracruz	Local	1472.78	Mixed	Operational	Forests	Watershed protection	2008
139	Fábricas de Agua del Centro de Sinaloa IAP	Payment for Environmental Services	Fund and green market	Ejido Imala, Sinaloa	Local	2580	Private	Operational	Forests	Watershed protection	2009
140	Unión Internacional para la Conservación de la Naturaleza	Payment for Environmental Services	Fund	Volcán Tacaná, Chiapas	Local	3010.77	NGO	Operational	Forests	Watershed protection	2012
141	Desarrollo comunitario los Tuxtlas	Payment for Environmental Services	Fund	Coatzacoalcos, Veracruz	Local	2807	NGO	Operational	Forests	Watershed protection	2011

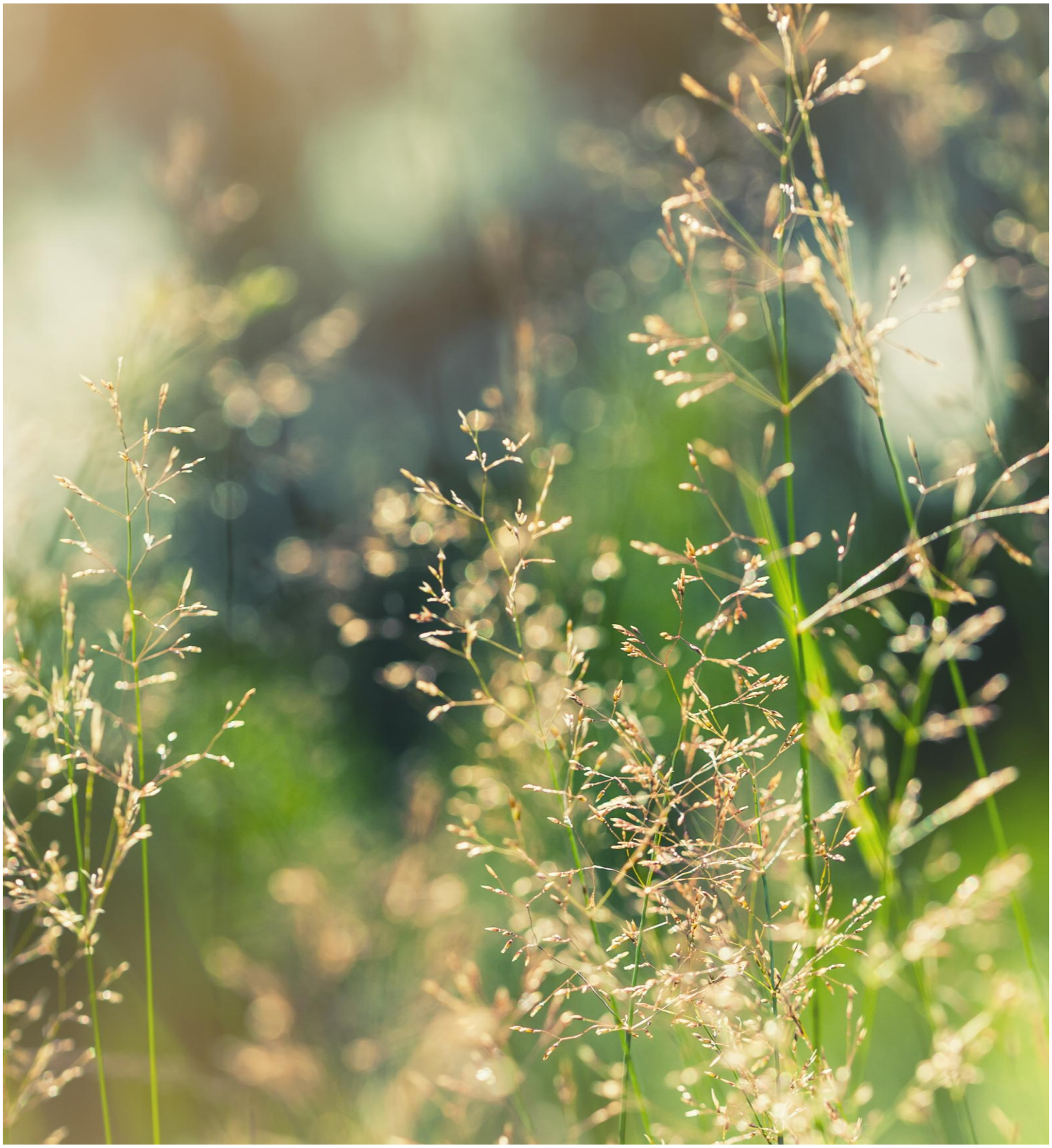
#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
142	Indayu	Payment for Environmental Services	Fund	Jalapa del Valle and Putla Villa de Gerrero ejidos, Oaxaca	Local	3800	NGO	Operational	Forests	Watershed protection	2012
143	Geoconservación	Payment for Environmental Services	Fund and green market	Santa Cruz Tepetotutla, San Antonio del Barrio, San Pedro Tlapusco, Santiago Tlatepusco, San Antonio Analco and Nopalera de Rosario, Oaxaca	Local	11444.66	Public	Operational	Forests	Watershed protection	2009
144	Guardianes de los Volcanes	Payment for Environmental Services	Fund	State of Mexico	Local	.	Public	Concept	Forests	Watershed protection	.
145	Comisión de Agua Potable, Alcantarillado y Saneamiento de Uruapan	Payment for Environmental Services	Government budget	Uruapan, Michoacán	Local	2550	Public	Operational	Forests	Watershed protection	2010

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
146	Parque ecológico Chipinque	Payment for Environmental Services	Fund and green market	Parque Chipinque, Nuevo León	Local	1675.2	Mixed	Operational	Forests	Watershed protection	2008
147	Pronatura Noreste	Payment for Environmental Services	Fund and green market	Cumbres de Monterrey, Nuevo León	Local	750	Mixed	Operational	Forests	Watershed protection	2011
148	Secretaría de Desarrollo Rural del Estado de Jalisco	Payment for Environmental Services	Government budget	Alta Montaña de Puerto Vallarta, Jalisco	Local	3294.85	Public	Operational	Forests	Watershed protection	2011
149	Fundación Manantlán para la Biodiversidad de Occidente	Payment for Environmental Services	Fund	Manantlán Biosphere Reserve, Colima and Jalisco	Local	14906.46	NGO	Operational	Forests	Watershed protection	2011
150	Agricultores Unidos de Poncitlán	Payment for Environmental Services	Fund	Poncitlán, Jalisco	Local	200	Mixed	Operational	Grass_Rangeland	Biodiversity protection	2011
151	Secretaría de Medio Ambiente. Aguascalientes	Payment for Environmental Services	Fund	Barranca de las Cabras and Mezquitera del Llano, Aguascalientes	Local	3100	Public	Operational	Grass_Rangeland	Watershed protection	2012

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
152	Fondo Ambiental Regional de la Chinantla A.C. Oaxaca	Payment for Environmental Services	Fund	Chinantla, Oaxaca	Local	3690.9	Public	Operational	Forests	Watershed protection	2010
153	Dirección de Desarrollo Forestal, Secretaría de Desarrollo Rural, Gob del Edo. De Chihuahua	Payment for Environmental Services	Government budget	Cuenca Río Conchos, Chihuahua	Local	19000	Public	Operational	Forests	Watershed protection	2011
154	Comisión de Cuenca Alto Nazas	Payment for Environmental Services	Fund	River Nazas central basins, Durango	Local	8622	Public	Operational	Forests	Watershed protection	2011
155	Protección de la Fauna Mexicana A.C.	Payment for Environmental Services	Fund	Zipalanimé, Coahuila	Local	479	Mixed	Operational	Forests	Watershed protection	2001
156	Bienes Comunales de San Pedro y San Felipe Chichila	Payment for Environmental Services	Fund and green market	Taxco, Guerrero	Local	1315	Mixed	Operational	Forests	Watershed protection	2009

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
157	Fondo de conservación El Triunfo	Payment for Environmental Services	Fund	El Triunfo, Chiapas	Local	4451	NGO	Operational	Forests	Watershed protection	2011
158	Yomol A'Tel	Green production/operation	Impact Investment and green market	Chiapas	Local	198	Private	Operational	Forests	Biodiversity protection	2002
159	Offset initiative FMCN	Other	Offseting	Veracruz	Regional	.	Private	Concept	.	Prevent deforestation	.
160	Jalisco Environmental Fund	Other	Taxes and subsidies	Jalisco	Regional	.	Public	Concept	.	Climate change mitigation	.
161	Better alliances, Better forests	Payment for Environmental Services	Offseting	Mexico City, State of Mexico, Puebla, Queretaro,Guanajuato, Jalisco, Michoacan, Nuevo León, Yucatan and Tijuana	National	.	Private	Operational	Forests	Prevent deforestation	2011

#	Name	Economic Instrument	Financial Mechanism	Sub region	Scale	Scale (hectares)	Funding	Developing stage	Ecosystem	Problem addressed	Start year
162	Avenger Blacksteel Chrono Watch	Green production/operation	Impact Investment and green market	Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, Tamaulipas, Sinaloa, Durango, Jalisco, Aguascalientes, Zacatecas, San Luis Potosí, Guanajuato, Queretaro and Oaxaca	Regional	.	Private	Operational	.	Biodiversity protection	2015



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