DESIGNING INNOVATIVE SCHEMES FOR PAYMENTS FOR ENVIRONMENTAL SERVICES

FAS

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GLOSSARY

Accountability

An obligation or disposition to account for ones actions.

Additionality

The degree of success that the implementation of a scheme has in maintaining or increasing the provision of ecosystem services in comparison with a scenario "without the scheme" and with additional efforts to those foreseen by laws, regulations and direct financial return. Upon final analysis it is the impact observed from the proposed scheme.

Alternate state (AS)

Alternative state or scenario. The inverse of Business as Usual (BAU), and is due to several alternatives for interventions/environmental services.

Andragogic method

Method to facilitate the learning process for adults utilized by the PBF, primarily in the process of early information for adhesion of new providers to the scheme.

Areas adhering to the proposed solution

Areas in which the environmental service has the potential to positively impact the provision of ES, is viable from an operation standpoint, complimentary and additional to other conservation efforts.

Baseline

A reference to indicators prior to the PES scheme that will be used throughout the implementation of the scheme to weigh the increase (or avoided decrease) in the provision of an ecosystem service, based on PES activities.

Beneficiaries of ecosystem services

Beneficiaries of ecosystem services due to the scheme, which are not necessarily within the same territory of the PES scheme or directly involved in the PES scheme.

Business as Usual (BAU)

A neutral reference referring to future increases (or avoided reductions) in the provision of an ecosystem service, estimated based on projections of future levels of increase or decrease without any PES activity.

Catch-up innovation

Innovation strategy, namely the adoption and commercialization of existing products and technologies that are new in a certain region. These "imitation" catch-up activities are legitimately considered as innovations since their adoption involves adaptations to the local context.

Conditionality

The binding of payments for results according to conditions established in the scheme.

Critical areas

Areas at risk of not maintaining the provision of ecosystem services as a consequence of environmental degradation and the adoption of land use practices or from inadequate resources.

Crowd-out effect

Emptying of spaces for dialogue, participation and possibly of providers from the scheme.

Cultural services

Ecosystem services such as recreation opportunities and scenic beauty – the non-material (intangible) benefits obtained from ecosystems that support social well-being and are intimately tied to values of human behavior, as well as institutional and social standards.

Ecosystem functions

Some authors defend that support services be identified as ecosystem functions and not services themselves (i.e Haines-Young & Potschin, 2010).

Ecosystem services (ES)

Essential and highly complex natural processes for human well-being and are inherent in conserved ecosystems, affecting humanity in innumerable ways.

Endogeneity

Qualities arising from internal factors, that is, the role of causal variables in analysis of effects. Applied to ToC model, means that the variable that causes the effect is determined to lie within the context of the theory.

Environmental goods (or environmental benefits)

Are generated as a consequence of the ecosystem services (i.e water for consumption is a benefit – the regular flow of water and its purification are ecosystem services).

Environmental services (ENS)

The adoption, maintenance and improvement or expansion of land use and natural resource practices with positive impacts for the provision of ecosystem services.

Free, Prior and Informed Consent (FPIC)

A local and indigenous communities' right for bottom up participation and consultation prior to the beginning of a scheme or development using resources within their territory.

Free ride
Tendency of provider or group of providers to benefit from the scheme without committing to the terms of the conservation efforts like other providers.

Grassroots organization
Actions in conjunction with citizens of a specific region to achieve improvements for its population together with government and other social actors. Takes on a form of political activism, with the identification of necessities or deficiencies in a community, mobilization of resources and the formulation of a strategy for action. Central to the process of community adhesion.

Land use
Associated, in this publication, with the conversion of ecosystems bringing about a landscape change.

Leakage
Relocation of inadequate environmental activities to other locations in the areas surrounding the PES territory.

Metrics of success
Monitoring of the objectives of the scheme – the translation of the scheme reference in numbers, materialized through a combination of specific, measurable, attributable, realistic and temporal indicators. Indicators are divided in three categories: (i) effort; (ii) result and (iii) impact.

Nucleus for Conservation and Sustainability (NCS)
Infrastructures situated within Protected Areas in which FAS works and have the objective of supporting governments to deliver health and education services better adapted to the reality of riverine communities of the PBF.

Paraprofessional
A person to whom a specific aspect of a professional task is delegated, but who is not licensed/credentialed to execute as a completely qualified professional. In practice, these are the Community Health Agents, trained and empowered by the Secretary of Health of Amazonas and who act within the PBF scheme areas.

Payment for environmental services (PES)
Transfer of resources among social actors with the objective of creating compensation in order for land use and natural resource decisions – individual or collective – to align with social management interests and positively impact the provision of ecosystem services.

Permanence
The duration and irreversibility of the provisioning of ecosystem services. Non-permanence is a form of leakage.

PES-canvas
Modeling tool developed by this publication to support the process of designing PES schemes.

Positive leaders
Recognized leaders who are respected and considered trustworthy by a group of providers.

Positive leakage
Positive effect on the provisioning of ecosystem services influenced by the PES scheme and its activities in areas surrounding the PES territory.

Potential areas
Areas in which there are potential providers willing to accept the scheme.

Priority areas
In the context of this publication, areas that comprise the territory under the scheme defined from a process of prioritization based on attributes designed to increase the chances of success, the effectiveness of the scheme and the return on investment. In most cases are necessary due to budgetary limitations and variability in the attributes of areas and providers, but also should be understood as a permanent management instrument, even in light of increased availability of funding at a given time.

Providers
Potential providers are those who can be incentivized to improve practices in relation to the use of land and natural resources in order to positively impact one or more ecosystem services. Ultimately, providers are responsible for the adoption and implementation of changes in land use and natural resource practices detailed in the environmental service.

Provision services
Ecosystem services that generate products directly consumed by society, such as the production of food, fuel and fiber. The sustainability of these services is associated with the maintenance of current provisioning capacity at limits that do not compromise future provisioning conditions.

Regulatory services
Ecosystem services such as climatic regulation and control of pests and disease are benefits obtained by society from services that regulate environmental conditions. Evaluation is accomplished by analysis of the capacity of ecosystems to regulate certain environmental conditions.

Relevant areas
Areas that contribute to the provision of ecosystem services that are not objects of the scheme.

Rewards, incentives and payments
Compensation to providers – whose practices positively interfere in the provision of one or more ecosystem services promoting the maintenance or expansion of the same. The means for compensation for environmental services vary, from direct monetization, collective investments, equip-

ment and materials for collective or individual use, a combination of the above, among others, but does not have the sense of acquisition or appropriation.

Schemes for Payment for Environmental Services
Intentional interactions between social actors (providers, scheme investors, partners and beneficiaries) to implement an environmental service solution in order to achieve a clear objective to maintain or increase the provision of one or more ecosystem services.

Scheme investors
Scheme investors can have distinct expectations regarding the return over the PES scheme. Conceptually they are those who are beneficiaries of ecosystem services, or those that will gain from the environmental benefits due to the increase (or avoided reduction) in the provision of ecosystem services. It is therefore necessary to consider that in many cases scheme investors are not the de facto beneficiaries, who would be governmental and non-governmental organizations and international agencies acting in the interest of these beneficiaries and or/ exploring PES mechanisms for the private and public sectors to invest in conservation and sustainable development.

Scheme reference
The reference for a specific scheme is the common denominator that ties the efforts derived from the environmental service to the desired impact in the provisioning of the ecosystem service. This reference is a central component in the establishment of metrics of success in the description of the terms of the scheme.

Socio-environmental safeguards
The fulfillment of socio-environmental safeguards has the objective of respecting the rights of communities and the function of ecosystems, seeking to minimize negative social or environmental impacts.

Social learning
Incremental process of critical reflection – about the context, attitudes and practices – by which collective changes occur from social interactions.

Support services
Ecosystem services such as maintenance of biodiversity and nutrient cycling contribute to the provisioning of other ecosystem services. These are differentiated from other services in that their impacts on society are felt in an indirect manner and occur over the long term.

Sustainable Development Goals (SDGs)
Comprise the global agenda adopted during the United Nations Summit on Sustainable Development (September of 2015) and composed of 17 objectives and 169 goals to be achieved by 2030. Global actions are called for in this agenda in the areas of poverty eradication, food security, agriculture, health, education, gender equality, reduction of inequality, energy, water and sanitation, sustainability standards of production and consumption, climate change, sustainable cities, protection and sustainable use of oceans and terrestrial ecosystems, inclusive economic growth, infrastructure, industrialization, among others.

Territory
Associated with the geographic limits of the implementation scheme in the context of PES schemes, normally based on analysis of geographic boundaries related to the distribution of organisms, soil types, watersheds or depth of water bodies.

Theory of change (ToC)
An approach based on results that utilizes a process of critical reflection to design, implement and evaluate initiatives that intend to promote changes in the context in which they are inserted. It is essentially a clear explanation of how a group of actors intends to achieve a common objective over the long term.

Trade-offs
Choices that negatively impact the regulatory environmental services, normally treated as externalities.

Use of natural resources
In this publication, when not realized in a sustainable manner, is associated with a process of ecosystem degradation and not of landscape change.

Valuation of ecosystem services
Estimates of the economic value for the ecosystem service, which can be achieved by diverse valuation methods.

Willingness to accept (WTA)
In the context of PES schemes, means the disposition of the provider in the scheme to comply with the proposed terms of the scheme and provide the environmental services necessary to maintain or increase the provision of ecosystem services.

Willingness to pay (WTP)
In the context of PES schemes, means the disposition of the buyer in the scheme to pay for the ecosystem services.

TERMS AND ABBREVIATIONS

AMARU	Associação de Moradores da SDR Uacari (Residents Association of the Uacari SDR)
APA	Área de Proteção Ambiental (Environmental Protection Area)
AS	Alternate state
BAU	Business as Usual
CGIAR	Consultative Group for International Agricultural Research
CO_2	Carbon dioxide
EHP	Education and Health Program
ENS	Environmental services
ES	Ecosystem services
ex ante	Before the fact
FAS	Fundação Amazonas Sustentável (Sustainable Amazon Foundation)
FAPEAM	Foundation for Amazonas State Research
FLOREST	Floresta Estadual (State Forest)
FPIC	Free, Prior and Informed Consent
IDB	Inter-American Development Bank
IIED	International Institute for Environment and Development
INPE	National Institute of Space Research
ISP	Innovative Solutions Program
LEED	Leadership in Energy and Environmental Design
NCS	Nucleus for Conservation and Sustainability
PA	Protected Area
PBF	Bolsa Floresta Program
PES	Payment for Environmental Services
PPDUC	Programa de Monitoramento Participativo das Unidades de Conservação do PBF (Program for Participatory Monitoring in the Protect Areas of the PBF)
PRODES	Projeto de Monitoramento do Desflorestamento na Amazônia Legal (Deforestation Monitoring Project in the Legal Amazon)
PwC	PricewaterhouseCoopers
REDD	Reduced Emissions from Deforestation and Forest Degradation
REDD+	Reduced Emissions from Deforestation and Forest Degradation plus the role of forest conservation, sustainable management and the increase of forest carbon stocks
RESEX	Reserva Extrativista (Extractive Reserve)
SDGs	Sustainable Development Goals
SDR	Sustainable Development Reserve
SDSN	Sustainable Development Solutions Network
SEDUC	Secretaria de Estado de Educação do Amazonas (State Secretary of Education of Amazonas)
SEMA	Secretaria de Estado do Meio Ambiente do Amazonas (State Secretary for Environment of Amazonas)
SEUC	Sistema Estadual de Unidades de Conservação (State System for Protected Areas)

SUSAM	Secretaria de Estado de Saúde do Amazonas (State Secretary for Health of Amazonas)
tCO2e	Tons of Carbon Dioxide Equivalent
ToC	Theory of change
UN	United Nations
VCS	Verified Carbon Standard
WTA	Willingness to accept
WTP	Willingness to pay

FOREWORD

It is with great personal satisfaction that I see this Payment for Environmental Services (PES) toolkit come to fruition. As with any good toolkit, it is presented in a structured and useful way for institutional learning. The experiences obtained by the executors of the Bolsa Floresta Program (PBF) in 16 sustainable use protected areas all over Amazonas, Brazil in the decade that has passed since its initiation in 2007 are widely applicable to the context of many developing regions.

PES arose after many years of trial and error throughout the tropics in efforts to link forest and natural resource conservation with improvement in local livelihoods – an aspirational "win-win" approach. In Amazonas, like many tropical forest regions, forests are threatened by the advance of incompatible and often predatory economic activities. In many such contexts elsewhere in tropical forest regions, it had been difficult to show concrete improvement from the Integrated Conservation and Development projects (ICDP) design. These difficulties were due to incomplete measurement tools in evaluation which did not do justice to the long-term nature of these interventions, or to the difficulty of separating out what was the fruit of the ICDP strategy and what would have occurred anyway due to the nature of socio-ecological systems. The response to these measurement difficulties was a decision in many cases to leave such complex integrated approaches behind and to adopt direct conditional payment approaches, based on the ideas espoused by PES scheme developers.

The PBF adopted a different tactic. Here, instead of throwing out the baby with the bath water as had occurred in many "single bullet" exercises with direct PES payments, contingent on environmental performance, the executors of the PBF decided that there was merit in retaining some of the noteworthy aspects of ICDPs but combining them with direct household payments. The synergy between the two approaches has been noteworthy, even though it continues to be difficult to separate out which of the measures offers the best bang for the buck. One fundamental lesson from these experiences is that individual interventions on their own do not hold out much hope to join conservation with development within traditional forest communities. Rather, it is the combination of instruments, resources, tools and knowledge and how communities are empowered to learn and make use of them, while accessing other sources of support, that can make a difference.

The following core lessons derived from the PBF and the preparation of this toolkit will be readily apparent to those seeking to adopt PES as a fundamental contributor to an integrated development process engaging traditional peoples in forest regions:

1. Systematize what has been done so that ecosystem services and their interaction with livelihoods are recognized in value terms, and the environmental services that forest peoples provide are rewarded by local and global beneficiaries.

2. Think through and present a theory of change in an accessible, participatory and practical way, as a tool to identify pathways to intervene in an unsustainable scenario.

3. Recognize fully the oppositional interests and path dependencies that block efforts to try to "turn it around" toward a virtuous path, and learn how to bypass them.

4. Constantly and critically refer to concrete experiences with implementation such as those provided on the PBF throughout the toolkit, which represent gains both for other initiatives and for the PBF itself, which persistently seeks to improve and broaden its innovative features, in the expectation that in this way it will achieve greater success in the assumptions adopted.

5. Finally, show how important is the evaluation and feedback of these results to achieve improvements in processes while steering clear of the worst risks identified along the way.

New York, June 20, 2017
Peter H. May, PhD
Visiting Scholar, Columbia University Earth Institute
Professor Titular, DDAS/ICHS/UFRRJ
President, Brazilian Society for Ecological Economics

PREFACE

This toolkit was conceived with a focus on managers of conservation and sustainable development initiatives that intend to use Payment for Environmental Services (PES) schemes in their intervention strategies.

It proposes a way to design and implement a PES initiative by embracing the complexity of the social and environmental context in which the initiative will aims to foster change. The designing tool do not follow a step by step process and build up from the available knowledge in any of the designing blocks to foster a loop reflection that will lead to a sound PES strategy. The toolkit also includes a section dedicated to create the proper conditions to launch the initiative. In this section issues such as building trust among providers, foster positive leaderships, create sound participative processes and leverage social learning among others are discussed. Finally the toolkit also present some features that must be considered in PES operations such as adaptive management, monitoring and evaluation, innovation and effective communication.

This toolkit is the result of a partnership between the Inter-American Development Bank, (IDB) and the Sustainable Amazon Foundation (FAS), and was funded by the IDB's Biodiversity and Ecosystem Services Program (BIO).

The BIO program seeks to support sustainable development through the integration of biodiversity and ecosystem services in economic sectors in the Caribbean and Latin American region.

FAS is a Brazilian non-governmental organization (NGO) created in 2008 by the Bradesco bank in partnership with the Government of the State of Amazonas to implement the Bolsa Floresta Program (PBF), a PES scheme. It later came to count on the support of Coca-Cola Brazil (2009), the Amazon Fund (2010) and Samsung (2010), as well as other partnerships for the diverse work it develops.

An approach is proposed here, in the format of a toolkit, to understand and implement PES schemes that were defined in practice and have shown effectiveness for the Amazon region. This publication seeks to consolidate lessons learned by FAS throughout the process of implementing the PBF in the interior of the state of Amazonas in Brazil. From an operational perspective, this material seeks to contribute to the conceptual directives, implementation, monitoring and evaluation of PES schemes for the Amazon region.

In proposing this tested process of gradual design and implementation, this material hopes to incentivize the development of PES programs in Latin America and the Caribbean, within the Amazonian context of relatively low internal pressure for land use change and low to moderate external pressure for land use change. These pressures will likely increase due primarily to the development of infrastructure (particularly roads).

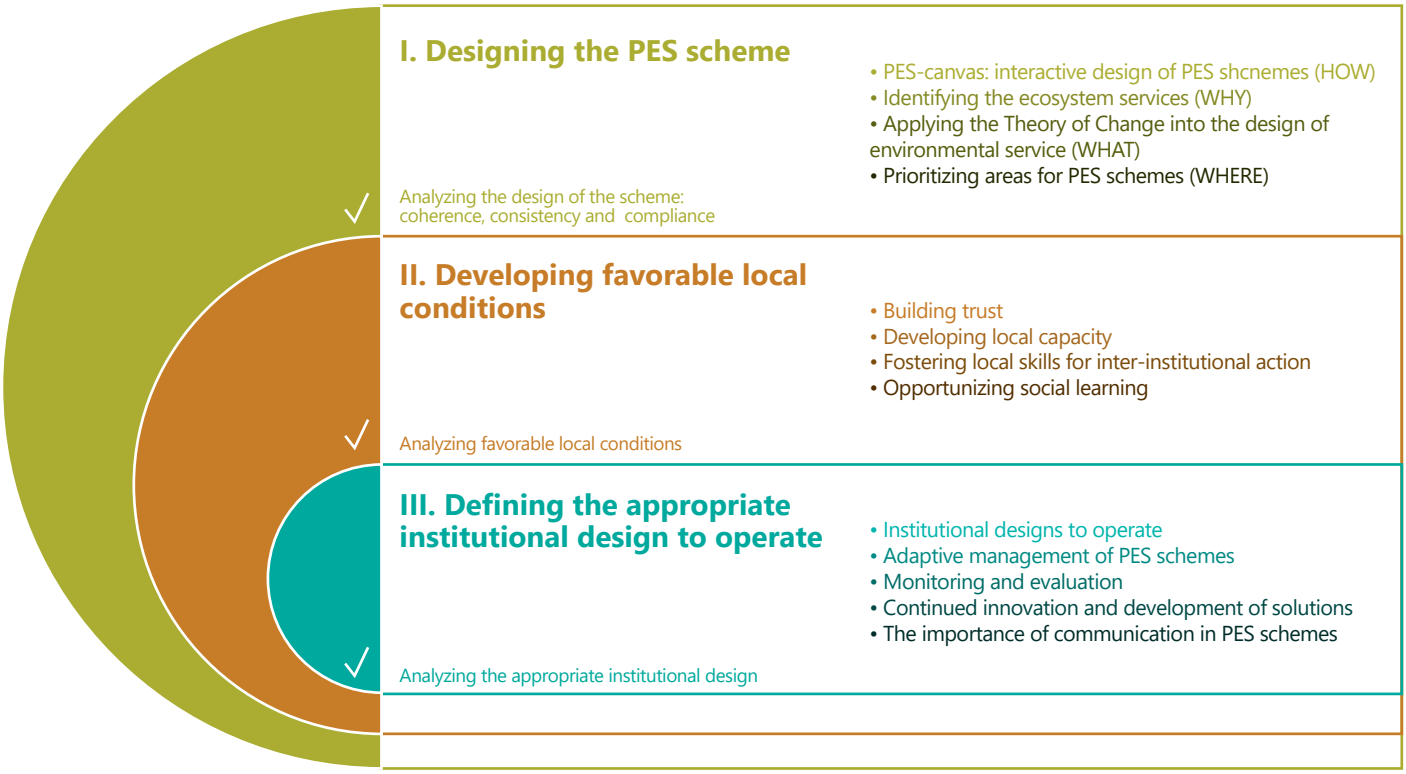
This toolkit, therefore, can contribute to the implementation of preventative measures in areas that will certainly be impacted in the near future by the agricultural frontier, which is the case in many places in the Amazon, allowing others to adapt and replicate these strategies to their context.

These guidelines and tools were developed through an inclusive collaborative process with ample public consultation related to the primary themes, involving PBF providers, FAS staff, specialists from diverse institutions (such as NGOs, governments and business), and revised by a scientific committee of renowned specialists.

READER'S GUIDE

This toolkit is divided into three sections, devoted to guide readers to (i) design PES schemes; (ii) develop favorable local conditions; and (iii) define appropriate institutional design to operate. In the beginning of each section, readers will find a checklist to be considered.

The tools proposed here are intended to support an interactive design process in which back-and-forth are expected and desired. They stem from the principle that the design and development process is non-linear and does not end when implementation begins. They also are grounded in the premise that the parameters are not constant and that adjustments and corrections are necessary to maintain the coherence and consistency of the scheme.



I Tools for the design of innovative PES schemes

Activity of the Riverine Early Childhood initiative (Rodrigo Thomzhinsky).

I Tools for the design of innovative PES schemes

CHECKLIST I. Analyzing the design of the scheme: coherence, consistency and adherence

As the collaborative creation process of the scheme progresses, an evaluation is needed to see if the options registered in each block create a scheme that is coherent, consistent and has local adherence. These three aspects can be considered predictors of efficiency of the scheme.

These moments of critical reflection on what was just collectively produced allows for adjustments to be made in the proposed scheme. In that context, this section is organized by a series of questions that the information included in the PES-canvas – or in supporting documents – should be able to answer. This exercise provides verification if the information is registered clearly in the PES-canvas and if there is common understanding about that aspect of the scheme.

Territory

- What is the legal classification of the territory?
- Is there a significant presence of people living in or using the territory?
- What are the vectors of environmental degradation in the territory?[1]
- Is the use of compensation in the form of a scheme for environmental services the best way to act on the vectors of degradation?
- What other conservation efforts are underway in the territory?
- Why should we consider the proposed scheme as complementary to the other conservation efforts?
- Is there a prevision or need to prioritize areas or providers in the territory? If yes, what are the criteria for prioritization of objectives?
- In the process of prioritization of areas, is the spatial distribution of areas or potential providers considered?

Ecosystem Services

- Is there clarity in the definition of the ecosystem service for the scheme?[2]
- Was there definition on how the ecosystem service will be measured over the long term?
- Is there an objective causal relationship between the reference for the scheme and the ecosystem service?
- Is there confidence that the environmental service proposed in the scheme is capable of delivering additional provision of the ecosystem service?

Ecosystem services – valuation

- Is there a need or expectation on the part of the actors in the scheme that the ecosystem service be valuated? If so, how did this expectation arise and how will this take place?
- Will the valuation of the ecosystem service be considered in the definition of values to be invested in the scheme or in the reimbursements and payments to providers?

Environmental services

- Is it easy to understand the relation between the intended impact from the environmental service and the ecosystem service object of the scheme?
- Does the reference for the scheme adequately translate the intended impact of the environmental service, allowing

[1] Based on "Natural-science principles and guidelines for PES interventions" (Naeem, et al., 2015).

[2] Based on "Making payments for ecosystem services work - efficiency score" (Arraigada & Perrings, 2009).

for the establishment of coherent metrics of success?

- Are there risks that the financial source of the scheme decrease (or are eliminated)? If so, is it probable that the providers return to practices before the scheme?
- Are the preconditions outside of the governance of the providers considered in the ToC in the form of complementary actions to be developed by partners?
- Is there evidence that the proposed environmental service is capable of being replicated in a similar context or territory? If not, is there a prevision to tier the implementation, including a pilot stage?
- Is there installed operational capacity to implement the proposed environmental service?
- Is there local expertise to implement the environmental service?
- Is there clarity on why providers should be paid?

Providers

- Are providers clearly identified?
- Do the identified providers see themselves as "providers"? If not, how will the scheme address this?
- What are the primary factors influencing the disposition of providers to accept the scheme?
- Is there local leadership involved in the design of the scheme?
- Does the level of organization of the providers allow for the implementation of the environmental service as proposed?
- Are there mechanisms foreseen to guarantee the participation of providers in decision-making processes of the scheme?
- Are the providers confident and taking on the proposed scheme?

Partners

- Is there a clear governance structure for the operationalization of the scheme?
- Does the proposed governance structure establish functions and powers that allow for an organic, equitable, balanced and just process?
- Do the partners have clear roles in the scope of the scheme?[3]
- Do partners have the governance needed to perform the functions under their responsibility?
- Are the governing institutions of the territory and its resources involved in the design of the scheme?

Scheme investors

- Are scheme investors well defined?
- Did the scheme investors from each canvas share common criteria for the definition of amount of investment?
- Was the need to create a complementary canvas for each segment of scheme investors assessed?

Reference for the scheme

- What is the reference for the scheme?
- Is the reference clear and does it contribute to the objective description of the metrics of success and the terms of the scheme?
- Does the reference help to establish the relation between the intended impact from the environmental service and an increase in the provision of the ecosystem service?

Metrics of success

- Why are the selected indicators necessary?
- Who developed the indicators? Was there participation by providers, scheme investors and partners?
- Do the indicators correctly translate the reference for the scheme?
- Do the indicators adequately translate the efforts, results and impacts?
- Are the indicators viable (technically and financially) to be monitored with the needed frequency?
- Do indicators influence other blocks of the PES-canvas?
- Are there established targets and verification sources for each indicator?
- Are the targets specific, measurable, attributable, realistic and temporal?
- What criteria are used to define the value to be invested by scheme investors? How is this criteria related to the metrics of success?
- What is the monitoring process needed to collect the relevant data for the metrics of success?
- Is it clearly established if the targets are individual or collective?
- Is there coherence between the targets established and the conditionality?
- Is there coherence between the targets established and the reimbursements and payments?
- Will the monitoring and tracking process take place with internationally recognized methodologies? If yes, which? If not, how was the methodology developed?

[3] Based on (Savy & Turpie, 2004).

Costs

- Is the adoption of proposed practices in the environmental service solution too onerous or require investments over long periods of time?
- Is there willingness by scheme investors to invest over the time necessary to effectively implement the environmental service?
- Is the financial willingness of the scheme investors sufficient to cover all the costs of the scheme?
- Is there loss of income on the part of providers because of the proposed scheme? If so, how to internalize that issue in the scheme?
- Are there resources that allow for real gains for providers?
- What fraction are the transaction costs of the total costs of the scheme?
- What fraction are the monitoring and tracking costs of the total costs of the scheme?

Rewards, incentives and payments

- What types of incentives for providers are promoted by the selected form of payment?
- Does the form of payment contribute to the disposition to accept the scheme on the part of the providers? In what way?
- What is the fraction of transaction costs compared to rewards?
- For how long will payments be realized?

Terms of the scheme

- Is the expected time-frame of the scheme coherent with the time needed to implement the environmental service?
- Does the scheme have a defined duration? If not, is there willingness on the part of scheme investors to pay continuously?
- Is the conditionality described clearly related to the reference in the scheme?
- Does the conditionality described establish minimum limits for the provider to be eligible to receive compensation and payment?
- Is there a baseline – or prevision of action - in the scope of the scheme?
- Is there a projection for the "business as usual" scenario – or prevision of action - in light of the standard vectors for degradation of the ecosystem service?
- Is there a control group that serves as a counterfactual in order to evaluate impacts?[4]
- How is the impact of the scheme going to be evaluated in terms of additionality?
- Are there clear rules for conformity and penalties associated with non-conformity? How did the providers, scheme investors and partners come to know of the rules and penalties?
- Are the groups of rules of the other block elements in the scheme the most simple, direct and objective possible?

Risks

- How are internal risks measured? And the external?
- Is there information about the trade-offs and synergies between ecosystems?
- How were the safeguards developed to minimize potential negative impacts in vulnerable populations?

General aspects

- Is there some way to simplify the scheme while maintaining its integrity?
- Are there elements included in the blocks that could be excluded or considered support, relating to secondary objectives?
- Are there risks of loss of focus relating to the primary objective of the scheme in light of the inclusion of secondary objectives?

This checklist should be reviewed several times during the design of a PES scheme. There will not be immediate responses to all the questions posed and the relevance of the same for each scheme should be considered. The questions proposed here probably require the need for consultation and other references for the design of PES schemes.

Register the responses to the questions in their entirety or partially, allowing for better understanding of decisions made during the design process of the scheme. However, this exercise can become excessively bureaucratic, impeding exchange and the creative process that the PES-canvas intends to incentivize. Revisit this checklist from time to time might be useful as a midterm evaluation of the canvas, creating an opportunity to adjust and update its content.

[4] Based on "A Four-tiered Rule for Evaluating Conservation Interventions" (Ferraro & Pattanayak, 2006).

1. Introduction

Ecosystem services are natural processes essential to human well-being (Daily, 1997). They are highly complex and inherent to conserved ecosystems, affecting humanity in innumerable forms (Huberman, 2008).

It is estimated that more than 60% of the world's ecosystems are being utilized in an unsustainable manner, in other words are being degraded more rapidly than their capacity for regeneration (Millennium Ecosystem Assessment, 2005). Following this trend, they will gradually cease to provide the ecosystem services essential for supporting life on the planet (Forest Trends, Katoomba Group & UNEP, 2008).

In this context, schemes for payment for environmental services (PES) have become more frequent in conservation efforts. In general terms, the appeal of these schemes is associated with an expectation of a simplification of the conservation strategy, which becomes centered on voluntary financial transactions conditional on the maintenance of one or more well-defined ecosystem services (Wunder, 2005).

However, processes of ecosystem degradation are complex problems. Complex problems are characterized by not having a technical solution that can be applied independently from the territory (Rittel & Webber, 1973). Solutions are difficult and highly interconnected with other problems (Conklin, 2005). These interconnections complicate the establishment of limits to activities and result in a demand for interactions with countless areas associated with other governance structures with independent decision-making processes (Kolko, 2012). Complex problems of environmental degradation demand an intervention strategy that may or may not include PES schemes (Engel, 2015).

Despite the concept of payment for environmental services being fairly straightforward, efforts to put them in practice have inevitably confronted institutional and governance questions (Pattanayak, et al., 2010) inherent in complex problems. As a result, the translation of this concept into practice has rarely been literal (Muradian, et al., 2010).

In reality, PES schemes have been used as a broad concept for a large variety of conservation initiatives in which financial incentives or payments are present as part of the strategy (Engel, et al., 2008).

These schemes – based or not on market mechanisms – are more adequately described as negotiation efforts (Hope, et al., 2007) and coordination initiatives (Peskett, 2011) whose development process is not linear, whose parameters are dynamic (de Groot & Hermans, 2009) and in which asymmetries can limit the expected impact (Pattanayak, et al., 2010).

This negotiation process requires adaptability and creativity befitting a broader definition in which a PES scheme is a transfer of resources between social actors with the objective of creating incentives in order for decisions about land use or natural resources[5] - individual or collective – to be aligned with societal management interests (Muradian, 2011) – positively impacting the provisioning of ecosystem services.

Evidence as to the effectiveness of PES schemes is mixed (Engel, 2015; Grima, et al., 2016). PES schemes, as with other conservation strategies, are not universally applicable and in order to perform depend on a solid design adhering to local realities.

The effectiveness of the process of change is related to the design of the incentive mechanism – including adequate performance metrics (Arraigada & Perrings, 2009) and appropriate monitoring intensity (Naeem, et al., 2015) – and not merely the incentive in itself. A scheme with an inadequate design can be more damaging than inaction (Kinzig, et al., 2011). "In the design of PES schemes, the devil is in the details" (Engel, 2015).

This toolkit was conceived with a focus on managers of conservation and sustainable development initiatives that intend to use PES schemes in their intervention strategies. The intent of this toolkit is to contribute to the design efforts of these schemes. It does not pretend to be exhaustive and it is highly recommended that it be utilized in an integrated manner with other available publications. This material is based on lessons learned by FAS through its efforts in designing and implementing the PBF in the Brazilian Amazon – one of the largest PES schemes in the world.

The design of PES schemes is a complex and often underestimated task (Engel, 2015). This section presents tools that, when incorporated, contribute to the design of innovative schemes for:

1. Identifying ecosystem services;
2. Designing the environmental service as a strategy to change land use and natural resource practices;
3. Design and validate, in an interactive manner, internal coherence among stakeholders of an environmental ser-

[5] In this publication the term **land use** is related to the conversion of ecosystems, changes in the landscape, while the use **of natural resources**, when not executed in a sustainable form, is associated with a process of ecosystem degradation and not changes in the landscape.

vices payment scheme;
4. Verify the coherence, consistency and adherence of the proposed scheme with the local reality;
5. Identify priority areas for the development of PES schemes, and;
6. Establish the institutional design most adequate for the operation of the proposed scheme.

The tools proposed here are intended to support an interactive design process in which back-and-forth are expected and desired. They stem from the principle that the design and development process is non-linear and does not end when implementation begins. They also are grounded in the premise that the parameters are not constant and that adjustments and corrections are necessary to maintain the coherence and consistency of the scheme.

PES schemes are not a universal solution. The application of the suggested tools is no guarantee for a viable scheme. This is because the viability of a scheme is limited, among other aspects, to the plasticity of the values relative to fundamental elements. The tools – if applied in a consistent manner – allow for analysis of coherence, consistency and adherence of a determined scheme.

The consistent application of the tools is directly related to an understanding of the territory, adoption of adequate data and the capacity to mobilize relevant stakeholders. Nevertheless, specific methodological approaches for the distinct ecosystem services must be considered to the proper the definition of metrics for those schemes.

1.1 The Bolsa Floresta Program

The Bolsa Floresta Program is an innovative scheme of payment for environmental services that seeks to compensate traditional populations of Amazonas for the environmental services they provide in conserving tropical forests.

The Program is a state public policy instituted by the Government of Amazonas in 2007, through Law 3135 on Climate Change, Environmental Conservation and Sustainable Development of Amazonas, and Supplementary Law 53 concerning the State System for Protected Areas (SEUC), both enacted on June 5th, 2007.

These laws were innovative and underpin a framework for statewide environmental legislation that initiated the development of an economy for forest-based environmental services and products and the reach of social justice to environmental conservation in the State.

The scheme was initiated in September of 2007 by the State Secretary of Environment (SEMA), at the time named the State Secretary for Environment and Sustainable Development (SDS), and came to be operated by the Sustainable Amazon Foundation in March, 2008.

2. PES-canvas: Interactive design of PES schemes

PES schemes are transfers of resources between social actors with the objective of creating incentives in order for land use and natural resource decisions – individual or collective – to align with societal management interests (Muradian, 2011) and positively impact the provision of ecosystem services.

PES schemes are negotiation efforts (Hope, et al., 2007) and may or may not be based on market mechanisms but regardless should be treated as enterprises to avoid unexpected impacts (e.g lack of clear cut break-even points or unforeseen costs carried by providers) and maximize potential benefits (Porras, et al., 2015).

Considering that parameters are dynamic (de Groot & Hermans, 2009) and that asymmetries can limit the desired impacts (Pattanayak, et al., 2010)[6], the development process will not occur in a linear or pre-determined form. The design of PES schemes requires concerted efforts that demand adaptability, creativity and interactivity.

Back-and-forth is expected and desired during the design process. Nonetheless, it is based on the principle that the process does not end when the implementation begins and that adjustments and corrections are necessary to maintain the viability of the scheme and its positive impact.

One constant challenge is to guarantee the coherence and consistency of the scheme's technical aspects (in terms of the environmental service solution and prioritization of areas) as well as the negotiated aspects (in terms of economic viability and sustainability over time).

Consequently, efforts have already been observed to apply business modeling tools to the design process for PES schemes. The business model canvas (Osterwalder & Pigneur, 2010) , for example, has been utilized by some authors, e.g. (Porras, et al., 2015) to evaluate and integrate the complementarity of PES schemes with small-scale farming businesses in several countries to identify opportunities and potential bottlenecks. The authors highlighted that the canvas "bite-size" approach of what, how, who, and how much? helps to compartmentalize issues and seek targeted solutions, while still maintaining the bigger picture.

The formats of the PES schemes are widely variable (Grieg-Gran & Bishop, 2004), reflecting differences in territories and socio-economic contexts, specificity of the ecosystem services involved and the methodological approaches adopted (Arraigada & Perrings, 2009).

Several aspects are fundamental in translating the concept of PES into practice. Essentially, the design of the PES scheme must demonstrate how it intends to create, deliver and capture value. PES-canvas was developed with specific elements of PES schemes inspired by the business model design proposed by Osterwalder and Pigneur (2010)[7], through exercises that reflected on the design of the Bolsa Floresta Program.

The PES schemes, when seen as enterprises, present some challenges relating to the creation of value: (i) ecosystem services, and their primary benefits are, in most cases, in the public domain; (ii) the beneficiaries of ecosystem services can be across the street or the other side of the planet; (iii) the services will continue to be provided over a significant period of time since the damage from inaction in preventing ecosystem´s functions deterioration is incremental and deferred.

In order to apply the PES-canvas, we began with the notion that a favorable business environment exists, in other words, one or more interested scheme investors, even if in prospecting stage, and resources (Forest Trends, Katoomba Group & UNEP, 2008) are available. The development of this favorable environment for a scheme occurs in most cases in two ways: (i) one of the actors recognizes a perceptible reduction in the provision of an environmental benefit or (ii) a market system is created to promote protection and enhance the management of specific natural resources associated with a strategic ecosystem service (Savy & Turpie, 2004).

Recognizing that ecosystem services are all, to a large or small degree, inter-related, when beginning the design of a PES scheme, it is natural that multiple ecosystem services associated with the territory, the providers, the scheme investors and the beneficiaries (direct or indirect) are identified.

Despite the fact that bundling environmental services may be a valid option, an initial analysis is recommended for each ecosystem service individually, prioritizing those with the highest demand and viability of establishing a scheme. This approach is adequate even if at a later moment a decision is made to opt for a scheme that considers multiple integrated ecosystem services.

[6] Detailed information about the **Business Model Canvas** is available at **Strategyzer.com**

[7] Organised in compartmentalized spaces, the Business Model Canvas is a global standard used by millions of people in companies of all sizes to describe, design, challenge, and pivot business models.

Besides contributing to the collaborative design of innovative schemes, PES-canvas hopes to (i) analyze if the payment for environmental services scheme is coherent and consistent, and able to add to the conservation strategy or management of an ecosystem or territory and (ii) sustain itself as an enterprise.

Figure 1 below shows the 12 primary blocks of the PES-canvas whose information is essential for the design of a PES scheme.

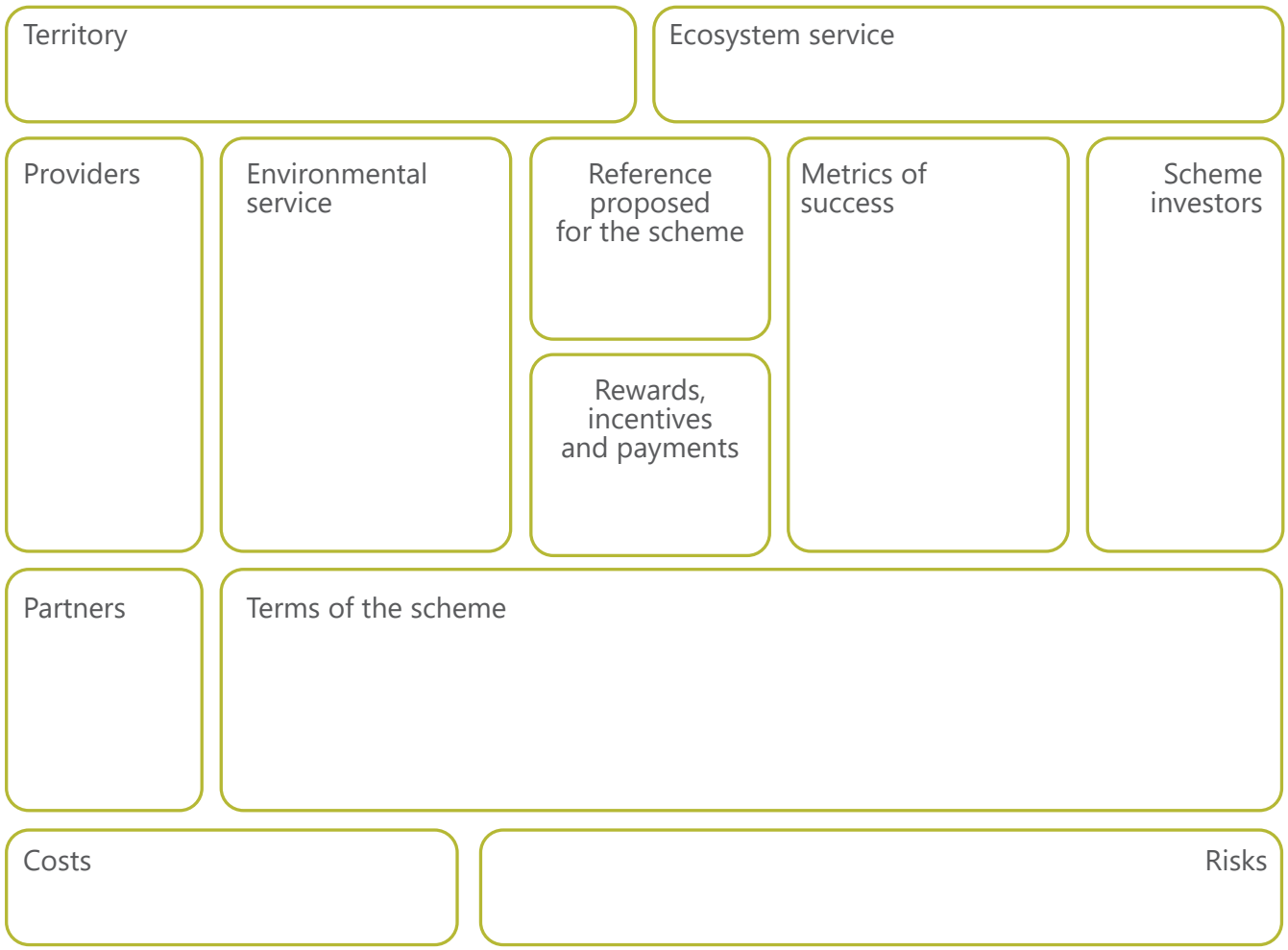


Figure 1. Primary blocks of a PES-canvas for the design of PES schemes[8]

[8] Based on (Osterwalder & Pigneur, 2010).

As shall be shown further, it is probable that for a single territory, multiple canvases will be developed to accommodate complementary proposals. These can address different scheme investors for the same ecosystem service but with distinct demands relative to the reference and conditions of the scheme. During the process of co-creation (Ramaswamy & Prahalad, 2004) the moment to split one canvas into two or more should be evaluated in order to guarantee that the diverse possibilities and scheme opportunities are not lost due to an unnecessary prerogative to design a single scheme.

The canvas does not need to be filled out sequentially. The level of detail of the information in each block is improved as the reflective process progresses. Thus the 12 initial blocks can be split into specific fields according the needs of the scheme design and as more detailed information becomes available (**Figure 2**).

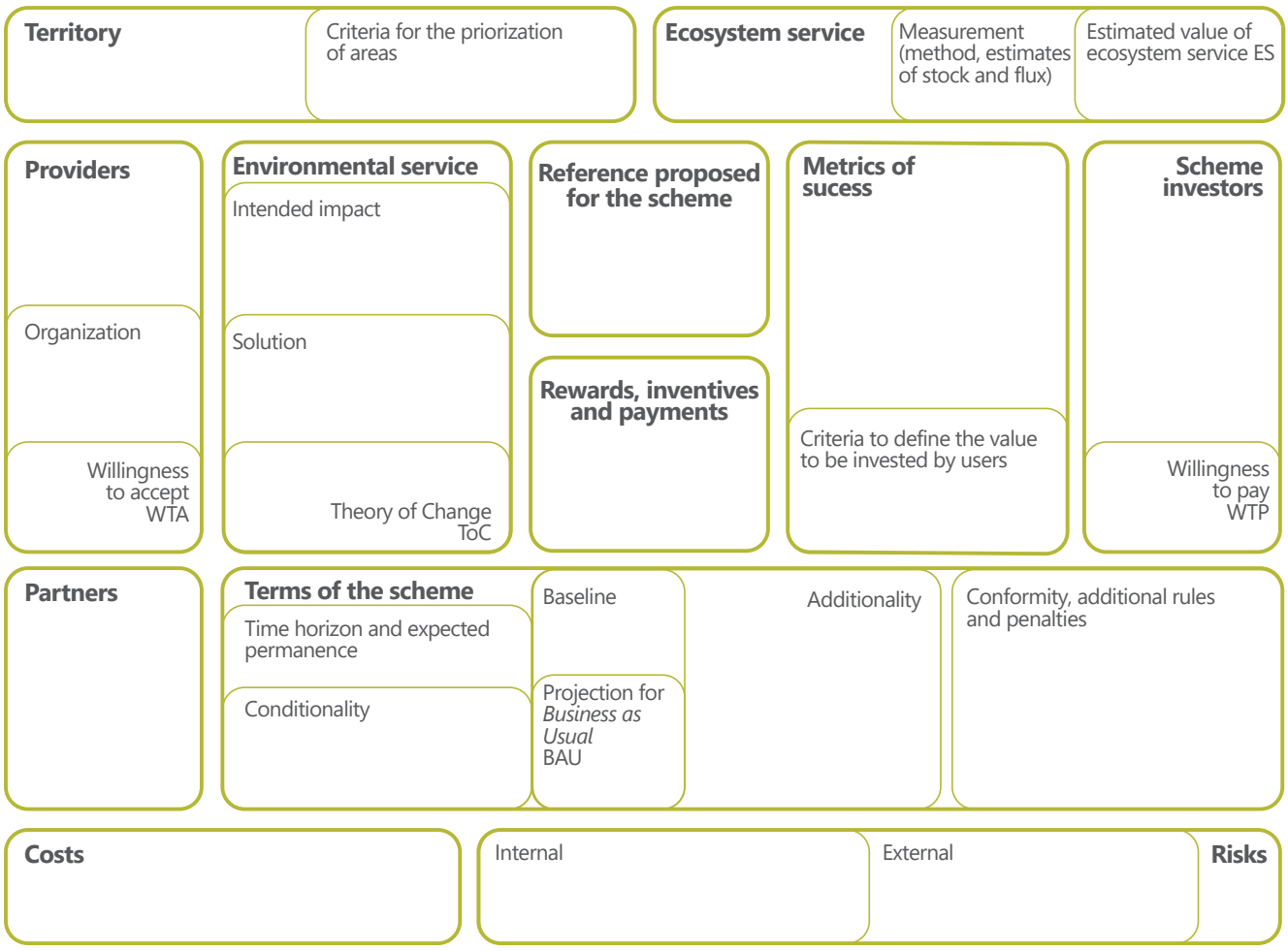


Figure 2. Specific fields suggested for the PES-canvas for the design of PES shcemes[9]

[9] Based on (Osterwalder & Pigneur, 2010).

It is important to consider that in practice the relation between land use and the provision of ecosystem services is not always readily understood (Kinzig, et al., 2011), as the level of understanding is distinct for each service (Naeem, et al., 2015), thus the potential to apply this approach varies significantly for each ecosystem service (Sekercioglu, 2010), which can generate bias in conservation efforts, i.e., the prioritization of "less complex" services or that allow for a greater impact on the system.

The PES canvas can help to make the different pieces of the puzzle of mounting a scheme visible, and their interactions and timing better understood. The PES canvas works better as a collaborative designing exercise. For each case a multi-stakeholder working group should be defined. Usually, it will start with a core group and increasingly engage other institutional actors as the designing evolves.

Therefore, an approach to conservation through payments for environmental services should not be considered a panacea for all environmental problems, but as a complementary strategy to resolve a defined set of problems in which the standard use of natural resources is inappropriate as a consequence of the erroneous perception that the provision of ecosystem services are externalities (Engel, et al., 2008; Pattanayak, et al., 2010).

2.1 Territory

PES schemes can be developed at various scales (Fripp, 2014). The approach proposed here is focused on the moment immediately before implementation leading up to the moment at which the ecosystem or territory for action has been established.

For the purpose of the PES canvas, the territory should be considered the area in wich the PES scheme intends to foster the implementation of the environmental services. The limits of the scheme´s territory might be the ecosystem itself, a fraction of it or even include fractions of multiple ecosystems. It also might be limited by political boundaries or other forms of land-use management units, like sustainable use PAs as in the PBF case.

PES schemes require the establishment of clear geographic limits (Fripp, 2014). The determination of ecosystem limits should be based on analysis of geographic discontinuities coinciding with the distribution of organisms, soil types, watersheds or depth of water bodies (Millennium Ecosystem Assessment, 2005). It is important to stress that relevant areas for conservation increasingly include landscapes inhabited or managed by man (Zimmerer, 2006; Eloy, et al., 2013).

The territory in which the PES scheme is intended to be developed should be described with detailed information about the ecosystem as well as facts about its territorial extent, and, when available, the number of areas.

In many cases it is necessary to prioritize areas within the territory due to budgetary limitations or to achieve cost-benefit targets of the scheme. The prioritization of areas is discussed in detail in the Chapter **4. Prioritization of areas for PES schemes** (pg63). The utilization of remote sensing tools and spatial analysis improves accuracy in definition of boundaries, thus adding value and is recommended.

2.2 Scheme investors

Conceptually scheme investors are the beneficiaries of ecosystem services, or those that will take advantage of the environmental benefits stemming from an increase (or avoided reduction) in the provision of the ecosystem services. It is necessary, therefore, to consider that in many cases scheme investors are not the de-facto beneficiaries, but are governmental and non-governmental organizations and international agencies acting in the interest of the beneficiaries and or/ exploring PES mechanisms for the private and public sectors to invest in conservation and sustainable development. There are three basic types of scheme investors:

1. Primary: organizations and individuals that directly benefit from the service and directly pay for it, according to the terms of the scheme;
2. Secondary: organizations or funds that acquire the environmental service in name of the specific beneficiary;
3. Tertiary: organizations or agencies that acquire the environmental service in name of the society.

Ecosystem services do not exist without an ecosystem. There is no environmental service without a provider and there is no scheme without a buyer willing to pay. Upon analysis of a scheme from the perspective of an enterprise, it is recommended to segment the scheme investors through a specific canvas, considering:

1. One or more scheme investors want to invest in different ecosystem services in the same territory;
2. One or more scheme investors want to invest in the provision of the same ecosystem service, but from distinct reference schemes;
3. Scheme investors have distinct characteristics and different forms of investment – for example, a foundation has a resource with low conditionality requirements and

a well-defined timeline versus a business with a high conditionality requirement and capacity to invest in a permanent manner;

4. The scheme investors propose very distinct criteria for the determination of investment values in the scheme;

5. The objectives of the scheme investors are different but complementary[10] and;

6. The choice[11] of the scheme investor to engage in a PES scheme.

Segmentation facilitates the negotiation process, advancing the design of the scheme. In these cases it is imperative to adopt measures to avoid double counting of services, duplication of financial or economic efforts or the shading of initiatives.

The participation of the service buyer in the scheme is initially limited by the willingness to pay (WTP). This willingness can be related to supply and demand[12] or to budget restrictions, appetite for risk, image and reputation, or other aspects.

In any given context, different levels of investment can result in distinct levels of provision (**Figure 3**), whether by the capacity of the scheme to involve more providers or expand the area, or by the variation in the potential impact of various alternatives for possible environmental services – which results in different future scenarios (AS - alternate states). Understanding the willingness to pay of the potential scheme investors is essential to make choices and improve the parameters of the scheme.

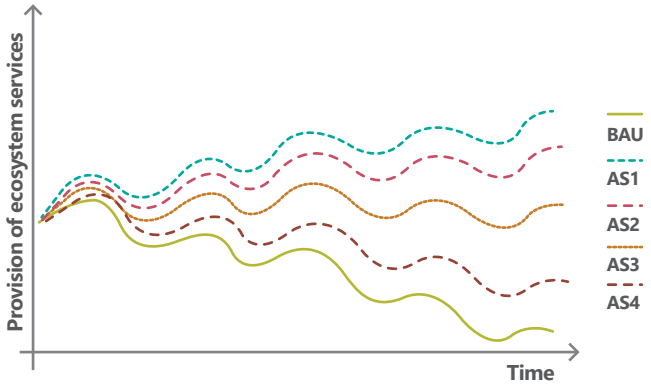


Figure 3. Different projections for provision of an ecosystem service in a degrading ecosystem as a result of various intervention strategies (**AS1**; **AS2**; **AS3**; **AS4**) (environmental services)

[10] For example: a certain scheme investor makes investments to contribute to the conservation of carbon in standing forests, which indirectly contributes to the conservation of and availability of water and biodiversity. Another scheme investor, with an exclusive focus on conservation and availability of water will benefit from the investments of the former.

[11] For example: a scheme investor can be led to a PES scheme to qualify for a certification in order to get social license to operate, as a result of a movement of the sector it´s business is part of, best practices standards change, social pressure and advocacy or strictly voluntary reasons.

[12] Restricted to schemes based on market mechanisms.

2.3 Identifying ecosystem services

As mentioned, ecosystem services are natural processes essential to human well-being (Daily, 1997). They are inherent to conserved ecosystems and highly complex, affecting humanity in innumerable ways (Huberman, 2008).

It is estimated that more than 60% of the world's ecosystems are being utilized in an unsustainable manner, in other words are being degraded more rapidly than their capacity to recover (Millennium Ecosystem Assessment, 2005). Recent studies indicate that current human demand is equivalent to the production capacity of 1.5 planets (McLellan ed., 2014). These trends will lead to a gradual decrease in the provision of essential ecosystem services that support life on earth (Forest Trends, Katoomba Group & UNEP, 2008) (**Figure 4**).

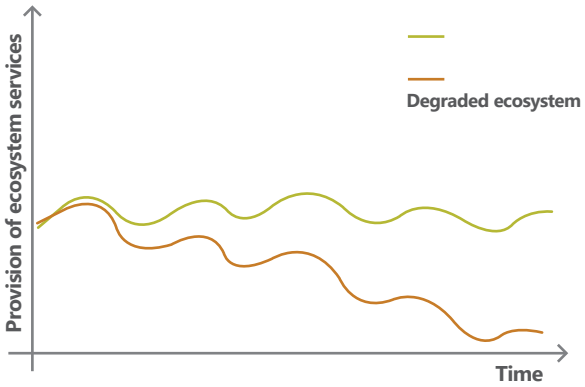


Figure 4. Projection for provision of an ecosystem service in a **conserved** and a **degraded** ecosystem

The most frequently adopted classification organizes ecosystem services into four categories: (i) provision, (ii) regulation, (iii) cultural, and (iv) support (Millennium Ecosystem Assessment, 2005). It is worth mention that some authors (e.g., Boyd & Banzhaf 2007; Fisher & Turner 2008) understand services are not benefits per se, but a change in the level of well-being. This distinction might seem unnecessary but it could be important when it comes to the need to measure an ecosystem output linked to human well-being (or welfare) as it may avoid double-counting (Haines-Young & Potschin, 2009).

In the PES-canvas designing process proposed by this toolkit this classification serves the sole purpose of clearly identifying the intentionality of the conservation effort of the PES scheme in terms of ecosystem services provision. It also can contribute to engage other stakeholders, specially the ones distant from the conservation agenda into such efforts by making evident how such issues impact their life in many aspects. It is not by any means an indication that

all ecosystem services - and goods – can and should be quantified, priced and traded as commodities.

Provision services – such as the production of food, fuel and fiber – generates products consumed directly by society (**Table 1**). The sustainability of these services is associated with the maintenance of current capacity to supply within limits that do not compromise future supply conditions.

Table 1. Provision of ecosystem services

Provision services	Provision of food Provision of food and fiber Provision of genetic and biochemical resources Provision of medicinal substances (phytopharmaceuticals) Provision of potable water Provision of renewable fuels (firewood, ethanol)

Reasonable estimates of value are available for a large part of provision services, primarily in the cases of well-developed markets. The same does not occur with regulatory or cultural services (Carpenter, 2006).

Regulatory Services – such as climatic regulation and control of pests and disease – are benefits obtained by society through services that regulate environmental conditions (**Table 2**). Their evaluation comes from analysis of the capacity of ecosystems to regulate specific environmental conditions.

Due to the growing and unsustainable demand for the products of provision services, trade-offs occur that negatively impact regulatory ecosystem services (Arraigada & Perrings, 2009), normally treated as externalities.

Table 2. Regulatory ecosystem services

Regulatory services	Regulation of air quality Regulation of climate (including CO2 sequestration) Regulation of water discharge (floods/droughts) Water purification Maintenance of soil fertility Prevention of erosion Biological control (pests/disease) Pollination Disaster prevention Waste processing

Cultural services – such as opportunities for leisure and scenic beauty (**Table 3**) – are non-material (intangible) benefits obtained from ecosystems, which support social well-being and are intimately connected to values of human behavior, as well as institutions and social standards.

Table 3. Cultural ecosystem services

Cultural services	Provision of aesthetic values and scenic beauty Provision of conditions for leisure, recreation and tourism Provision of elements associated with spiritual and religious values Provision of educational references

Support services – maintenance of biodiversity and nutrient cycling – contribute to the provisioning of the other ecosystem services (**Table 4**). These are differentiated from the other services as their impacts on society occur in an indirect manner and over the long term.

Table 4. Support ecosystem services

Support services	Maintenance of biodiversity Maintenance of life cycle (cycling of nutrients and water/photosynthesis) Soil formation

In order to define ecosystem services more objectively, some authors claim support services should be identified as ecosystem functions and not services in themselves (Haines-Young & Potschin, 2010). In this way, double-counting of ecosystem services can be avoided during the valuation process (Boyd & Banzhaf, 2007).

It is also important to distinguish ecosystem services (intermediate or final) from so-called **environmental benefits or goods** generated as a consequence of these services (**Figure 5**), which normally combine other inputs (such as labor) (Haines-Young & Potschin, 2010). Water for consumption is a benefit. The regular flow of water and its purification are ecosystem services.

Figure 5. Relationship between functions, services and environmental benefits[13]

Naming the services that a specific ecosystem provides is a more objective way to approach the challenges of conservation. This enables the establishment of financial mechanisms that contribute to sustaining the conservation efforts of that ecosystem (Wunder, 2005), based on an estimated economic value of the services and identification of their beneficiaries.

[13] Adapted from Raffaelli & Frids (eds.) Ecosystem ecology: a new synthesis. Cambridge UK. Cambridge University Press.

It is important to define which ecosystem service will be subject to the scheme including estimates of provision as well as the chosen methods for measurement and valuation.

Clarity in the definition of the ecosystem services to be considered in efforts for conservation, restoration, development, zoning or management of a given territory or ecosystem is one of the central aspects of the effective design of PES schemes (Arraigada & Perrings, 2009).

To the extent that this approach is widely adopted, it is recommended that ecosystem services be identified, and if possible measured and valued from a socio-ecological perspective (Reyers, et al., 2013). The valuation of ecosystem services can be included afterwards as the design of the scheme advances and information becomes available. Nevertheless, objective definition of ecosystem service values can serve as a reference to build up a more equitable allocation of costs and benefits for a PES scheme among the providers and scheme investors. PES schemes have nonetheless been implemented without any service valuation, because there was agreement among scheme investors that the services are worth maintaining.

The initial unavailability of this information does not impede the continued application of the PES-canvas. Once the ecosystem services are identified, the next step is to define which environmental services will be needed, as well as the potential providers and costs associated with conservation, restoration, development, zoning and management of a given territory or ecosystem.

As will be shown below, in practice many PES schemes are referenced to intermediary results and objective measures of environmental services are used as proxies for ecosystem services (Arraigada & Perrings, 2009; Speranza & Sand, 2010).

2.4 Measurement and valuation of ecosystem services

Over the last years diverse methods have been developed for valuing some ecosystem services. The objective of valuation is to estimate the economic value of the ecosystem service. However, and unfortunately, there is no uniformity in the measurement of ecosystem services: the same ecosystem service can have diverse valuation methods with distinct levels of precision, effort, complexity and investment.

The challenge of measuring and valuing ecosystem services is worth highlighting. A transdisciplinary approach is necessary (Liu, et al., 2010) that takes into consideration ecosystem complexity and the existence of ecological and social values (May, 2010), as well as the economic value. This is a quite dynamic field of research. New methods and approaches, and reviews of the current ones are constantly being published. It is highly recommended to seek the latest literature on valuation of the ecosystem services the scheme is targeting and select what is feasible and best suits the scheme. It is important to consider that any attempt of valuation is a modeling effort, which requires a simplification of reality and must be taken into consideration along with awareness of it limitations. **Table 5** below presents some references for valuation methods for different ecosystem services.

Table 5. Non-exhaustive references for valuation methods for different ecosystem services

Ecosystem Service	Ecosystem Function	Valuation References
Carbon capture or sequestration	Tons of CO2 sequestered or not emitted to the atmosphere	1. Guitart, A. Bussoni, and LC Estraviz Rodriguez. "Private valuation of carbon sequestration in forest plantations." Ecological Economics 69.3 (2010): 451-458. 2. Valatin, Gregory. Forests and carbon: valuation, discounting and risk management. Forestry Commission, 2011. 3. May, Peter H. "Local sustainable development effects of forest carbon projects in Brazil and Bolivia: a view from the field." (2004). 4. Watkiss, Paul, and Thomas Downing. "The social cost of carbon: Valuation estimates and their use in UK policy." Integrated Assessment 8.1 (2008). 5. Peters, Charles, Alwyn Gentry, and Robert Mendelsohn. "Valua tion of an Amazonian rainforest." (1989): 655-656.
Water conservation	Maintenance or increase in the quantity and quality of water	1. Young, Robert A., and John B. Loomis. Determining the economic value of water: concepts and methods. Routledge, 2014. 2. Dumas, Christopher F., Peter W. Schuhmann, and John C. Whitehead. "Measuring the economic benefits of water quality improvement with benefit transfer: an introduction for noneco nomists." American fisheries society symposium. Vol. 47. 2005. 3. Briscoe, John, et al. "Toward Equitable and Sustainable Rural Water Supplies: A Contingent Valuation Study in Brazil." The World Bank Economic Review 4.2 (1990): 115-134. 4. Canadian Council of Ministers of the Environment. Water Valuation Guidance Document. 2010.
Conservation of biodiversity	Species or hectares of habitat protected	1. Pearce, David, Dominic Moran, and Dan Biller. "The Handbook of Biodiversity Valuation." (2002): 1-156. 2. Nunes, Paulo ALD, and Jeroen CJM van den Bergh. "Economic valuation of biodiversity: sense or nonsense?" Ecological economics 39.2 (2001): 203-222. 3. Atkinson, Giles, Ian Bateman, and Susana Mourato. "Recent advances in the valuation of ecosystem services and biodiversi ty." Oxford Review of Economic Policy 28.1 (2012): 22-47. 4. May, Peter H., Fernando C. Veiga Neto, and Osmar V. Chévez Pozo. "Valoração econômica da biodiversidade: estudos de caso no Brazil." (2000).
Conservation of scenic beauty	Tourism services and photography permissions	1. Bienabe, Estelle, and Robert R. Hearne. "Public preferences for biodiversity conservation and scenic beauty within a framework of environmental services payments." Forest Policy and Econo mics 9.4 (2006): 335-348.

For some ecosystem services, for example carbon sequestration by forests, there are widely accepted methods and reference data that reduce the effort needed to valuate. Other services, such as those related to biodiversity, control of pests and disease, pollination and cultural aspects of ecosystems, do not have widely accepted references and as a consequence tend to demand a larger effort for valuation.

Relevant information to be included in the block of ecosystem services: the value of ecosystem services (ES) per unit and the actual and (or) projected value of the services derived from a specific delimited territory. It is always important to indicate the methodological reference used and include the calculations used to demonstrate how the value was estimated.

2.5 Environmental services

Beyond the ecosystem services and their beneficiaries, another component should be considered in the equation: local communities whose practices positively or negatively interfere with conservation and the provision of ecosystem services. These can be individuals, collectives with different structure types and composition, as well as organizations, nations or societies.

The adoption, maintenance, improvement or amplification of land use and natural resource practices with positive impacts on the provision of ecosystem services are environmental services (ENS).

While not all authors make the distinction[14, 15], the idea that ecosystem services are "benefits provided by nature and productive systems to living beings" and environmental services are "human activities for conservation and restoration of natural environments" (**Figure 6**) has been presented in the literature for its practical contribution, beyond semantics, to the design and implementation of PES schemes (FAO, 2007; Lugo, 2007; Peixoto, 2011; Derissen & Latacz-Lohmann, 2013; Eloy, et al., 2013; WWF, 2014; Porras & Nhantumbo, 2015; Swinton, et al., 2007).

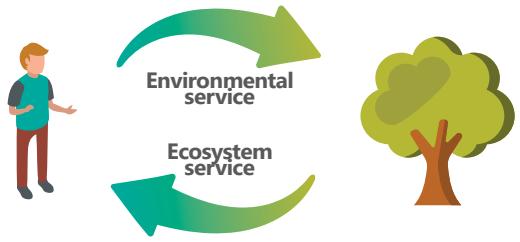


Figure 6. Causal relationship between environmental service and ecosystem service

This publication considers ecosystem services as the inherent services of a conserved ecosystem, while environmental services are services provided by individuals, collectives, businesses or governments in the form of restoration, conservation or ecosystem management actions with positive and measurable impacts in the provision of one or more ecosystem services (**Figure 7 and Figure 8**).

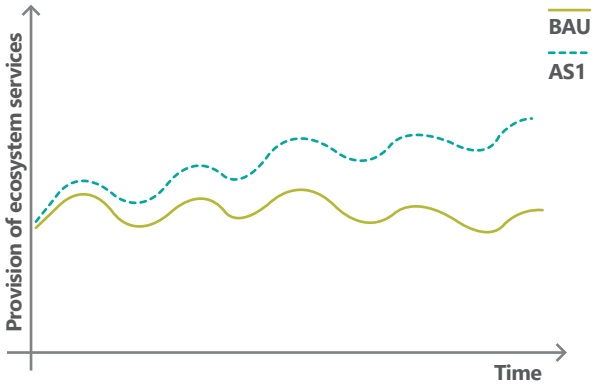


Figure 7. Projection for provision of an ecosystem service in a **conserved** ecosystem vs **increase** in the provision resulting from the environmental service (**AS1**)

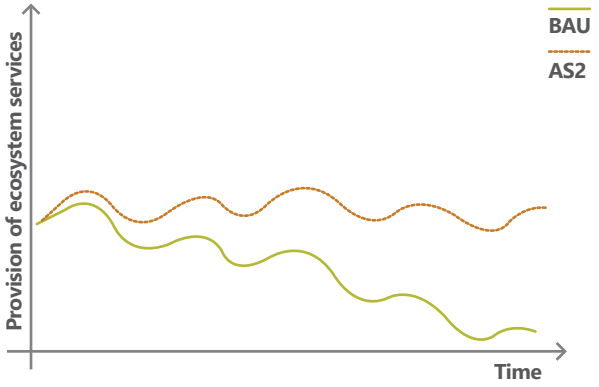


Figure 8. Projection for provision of an ecosystem service in a **degrading** ecosystem vs **maintaining** provision resulting from an environmental service (**AS2**)

Environmental services can be grouped by: (i) services with use and practice restrictions; (ii) restoration services; (iii) services to maintain traditional practices; (iv) services for transition to technologies with positive ecosystem impacts (Eloy, et al., 2013).

1. **Environmental services with restricted use or practices:** compensate provider for limiting their interference in the ecosystem.
2. **Environmental services for restoration:** compensate restoration efforts and the restoration of the ecosystem.
3. **Environmental services to maintain traditional practices:** compensate for sustainable practices in the use of

[14] In many publications, ecosystem services and environmental services are treated as synonyms, while this guide finds validity in making the distinction.

[15] This differentiation is not adopted in many cases because the definitions are less clear when discussing environmental services in comparison to ecosystem services (Derissen & Latacz-Lohmann, 2013).

natural resources or low-impact agro-extractivist practices already in use by traditional populations or indigenous communities.

4. Environmental services for transition: incentivizes the adoption of sustainable agricultural practices and diversification of production with positive impacts on the provision of ecosystem services.

The payment for environmental services is, in a simple analysis, a financial transaction whose objective is to influence and structure the standards for the use of natural resources. In essence these rewards, whether financial or not, should incentivize actions for the restoration, maintenance and conservation of natural resources (Sommerville, et al., 2009). This setup thus demands the establishment of an objective causal relationship – as in a theory of change (vide **Chapter 3. Applying the theory of change to environmental service design**, pg36) - linking the environmental and ecosystem services (Fripp, 2014).

Borner, and collaborators (2015) describe a number of factors for which assumptions are made in a PES theory of change that affects its effectiveness. Assumptions related to property rights regime, intrinsic motivations, and pre-existing inequalities and conflicts in accessing resources, among many others end up defining which interventions are expected to be more effective to foster change.

The assumptions embedded in PES theories of change can also be described as an effort to predict how interventions on context factors, design factors and implementation factors will result in changes and, in turn, how these changes in (causal) chain will impact the ecosystem services provisions. This requires assumptions to be explicit whenever possible and be backed by sound scientific evidence (Naeem, et al., 2015).

3. Applying the theory of change to environmental service design

PES schemes are associated with change on several levels. Conceptually they intend to change the perception that ecosystem services are externalities and their perceived value. The central objective is that changes related to decisions about land use and natural resource practices maintain or increase the provision of ecosystem services. These plans normally require changes in flows of governance, the organization of providers, choices of scheme investors and behaviors in society.

As stated above, **environmental services** are the services provided by people, collectives, businesses and governments in the form of additional actions for restoration, conservation and ecosystem management with positive and measurable impacts on the provision of one or more ecosystem services. In other words, a proposed solution to promote the needed changes for the provision of an ecosystem service to the desired level (**Figure 9**).

The theory of change (ToC) is a results-based approach utilizing a process of critical reflection to design, implement and evaluate initiatives intended to promote changes in the context in which they are inserted (Vogel, 2012a; Stein & Valters, 2012). According to Anderson (2005) the ToC is essentially a clear explanation for why a group of actors intends to achieve a long-term common objective.

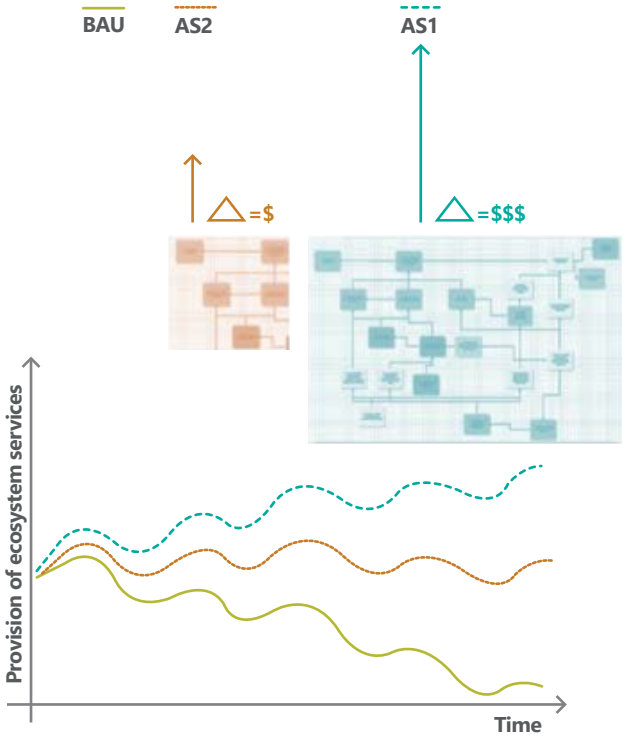


Figure 9. Impact on the provision of ecosystem services by different intervention strategies (environmental services) with different costs

The ToC approach is particularly beneficial in contexts in which the expected changes are related to complex problems (Bours, et al., 2004). Complex problems are characterized by not having a simple technical solution that can be applied independently of the territory (Rittel & Webber, 1973). They are difficult to resolve and highly interconnected with other problems (Conklin, 2005). These interconnections problematize the establishment of limits to the scope and end up requiring numerous interactions with areas tied to governance structures with independent decision-making (Kolko, 2012).

The approach is based on the creation of a change model, or a map of how one intends to get out of a given current condition and achieve their vision of success, i.e., primary objective. It begins with a reflection on what actions (or interventions) and intermediate results are required to achieve the primary objective and what are the measures for evaluation for each of these intermediate results (INSP, 2005).

The consistency of a ToC is directly related to the establishment of coherent causal relations between the interventions and the intermediate results and how these are connected in order to generate the needed changes to achieve the primary objective (White, 2009; Gertler, et al., 2011). The causal relations are established in the model from basic logic or explicit suppositions that should be tested for possible adjustments that guarantee the effectiveness of the proposed theory of change (Vogel, 2012b). Many factors can influence the causal relations in a ToC one can say that these causality is never linear and is subject to a number of variables (i.e. institutional arrangements; individual/ collective values) that should be considered based on the best knowledge and updated whenever new information is available .

During the process of implementation these suppositions should be tested using proper evaluation approaches to determine if the original assumptions are sound and seek evidence of the contribution of the interventions to the observed results and support corrections and adjustments to the ToC as initially proposed (Le Velly & Dutilly, 2016). There is a vast literature on how to develop indicators for monitoring performance, impacts and desired outcomes and the difficulties of really attributing results to actions. In **Chapter 11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientific research** (pg123) some evaluation strategies adopted by Bolsa Floresta Program are presented.

The result of this approach is a visual[16] diagram providing a detailed image of how one intends to apply a series of interventions and rewards to unlock a series of changes directed at the primary objective (Vogel, 2012b). The ToC should converge on a primary objective, called the intended impact (Carttar, et al., 2015).

In the design of a scheme for payment for environmental services, provisions of ecosystem services are the reference for **what** intends to be delivered: the intended impact. The environmental services indicate **how** it will be delivered: the associated ToC.

[Intended impact]

The intended impact of an environmental service in a scheme should be explained in relation to the ecosystem service to be positively impacted and have an objective causal relation with the proposed reference for the scheme. For such, the scheme must determine which ecosystem service it will address and which methodological approach is more adequate to measure and if possible value the same.

[Intermediary results] > [Intended impact]

Frequently, conditional payments are based on intermediary results, i.e. indirect levels of effort or environmental indicators (Arraigada & Perrings, 2009). The ToC makes explicit how these intermediary results are organized and converge on the intended impact.

With the intended change as a reference, the causal chains are designed together with providers of environmental services to incentivize and promote the necessary changes. The causal chains are described as the step-by-step of how the changes lead to the primary objective (Anderson, 2005).

The intermediary results are important to achieving the primary objective, by proving that specific changes by providers, in practices and living conditions, which together impact the provision of ecosystem services. It is also important to clearly establish the desired causal relation between changes in practices, the living condition of providers, and the intermediary results, with each being measured. In the ToC, each link in the causal chain should explain its logic and respective desired result – as well as its performance indicators.

[Changes in practice] > [Intermediary results] > [Intended impact]

[16] The ToC diagrams are normally accompanied by an executive narrative and a list of connectors, descriptors, indicators and suppositions considered in the model.

Among the examples of complementary support activities for provider groups are the development of local capacity, trainings related to practices that the scheme intends to incentivize, qualification of providers and the simplification of bureaucratic processes. Actions like these are increasingly essential to create conditions that unlock the desired changes (Pattanayak, et al., 2010).

It is essential that other essential intermediary results that are outside the governance of the scheme by registered as pre-conditions. These pre-conditions should be resolved, always if possible, from inter-institutional dialogue and additional actions of the scheme.

[Preconditions + Complementary actions + Rewards] > [Change in practices] > [Intermediate results] > [Intended impact]

The ToC contributes to making explicit the relationship between pre-conditions, complementary actions, changes in practices (incentivized), intermediary results and the intended impact. For example, the relationship between investing in a program for adult literacy – complimentary action – contributes to creating conditions in which the small-scale agricultural producer can read simple instructions on the use of pesticides - intermediate result – which then contributes to a reduction in problems of soil and water contamination - intended impact.

In the same way, the installation of water sources for cattle – *change in practice* – contributes to the recovery of riparian forests – *intermediate result* – reducing sedimentation of water bodies and turbidity in the water captured for consumption nearby – *intended impact*.

However not all the relationships to which the ToC is applied are obvious and intuitive. A well thought ToC contributes to a consistent scheme design, and facilitates the implementation, monitoring, evaluation and communication.
The process of developing a ToC requires a good level of understanding of the context in order to match the proposed solution to the local reality. Participation is indispensable for the development of a consistent solution with a high rate of adoption by providers who, ultimately, will be responsible for the implementation of the primary causal chains.

Still, it is preferable that the participation process occurs incrementally and tiered: beginning with a smaller group to conceive a first draft of the theory, which will be completed gradually, always with the primary objective in mind. The result of this process is a detailed roadmap of the necessary steps for the change desired by the actors directly involved.

This map, then, will rarely be implemented in the exact same way in different locations, even if under the same scheme. The operationalization of the ToC requires adaptive management[17] in which opportunities, barriers, local dynamic conditions, available resources and other specifics are regularly evaluated prior to the prioritization of actions. It should be expected that the implementation of the theory will occur at different rhythms in the different groups of providers and should occur in a modular and tiered way. In this dynamic implementation context, the theory also contributes to avoiding losing sight of the larger vision.

3.1 Beginning the development of a theory of change[18]

1. Start from the primary objective and build the theory from back to front, or the first interventions to be realized will be the last to be included in the ToC;
2. What are the pre-requisites for this primary objective to be achieved? What is necessary for this primary objective to be achieved? The causal relationships can be easily identified with a series of reflections described as "if X then Y", i.e., if the vaccination coverage is increased then infant mortality is reduced;
3. Each X and Y are intermediate results needed to continue in the direction of the primary objective. In the diagram of the ToC the interventions should be tied to the theory's desired results. At this point, include only the anticipated results and in the next step detail the interventions;
4. Some pre-requisites may be out of scope or governance of the actors involved in the scheme. If they influence the primary objective it is important that they be included in this model, thereby indicating the need for institutional dialogue;
5. What is the basic logic that justifies the expectation that the achievement of X will result in Y? The ToC is more consistent when the assumptions are explicit and based on evidence and best practices;
6. Identify indicators and minimum necessary limits for each result;
7. Develop one causal chain at a time and then work on integrations among them, and;
8. Look to keep what is essential in the model, use other documents to detail specific operational and methodological aspects when needed.

[17] Strategies for adaptive management will be discussed **in Section III. Important management aspects for the effectiveness of innovative PES schemes.**

[18] Based on Anderson (2005).

There are several references available to orient the development of ToC models. Particularly recommended are Anderson (2005); Vogel (2012a); Vogel (2012b); van Es, et al. (2015); Bours, et al. (2004); Center for Theory of Change (n.d.).

3.2 Cautions in the development of a theory of change

- The ToC model is not a map of actors. The determination of who is responsible for each of the required interventions is a later step. During the development of the model it is important to focus initially on what needs to be done and what results need to be reached – and not on who will pursue these objectives;
- The ToC is not an institutional representation in the form of an organogram with departments or sectors. Resist the tendency to mirror the organization or partners map in the theory of change. The organizational structure should be adapted to deliver the primary objective and not the inverse;
- The ToC is not a programmatic representation with projects and initiatives. The incorporation of completed or ongoing initiatives should be done through the expected results of the initiatives and not by the initiatives themselves. In this vein, an initiative can have various expected results but only part of them contribute to the primary objective in question;
- The ToC is, like any model, a simplification. A common tendency during the process is to try to establish all the possible connections among the elements of the causal chain. Keep the model comprehensible, including only the connections that are indispensable for understanding of the causal chains of change, and;
- The ToC should be primarily a management tool and not an instrument for institutional communication. However, increasingly, development agencies and private funding are demanding the inclusion of a ToC in project proposals.

3.2.1 Theory of Change for the Bolsa Floresta Program

The following diagram shows the current ToC for the PBF. The PBF has two primary objectives or intended impacts: the conservation of the ecosystem(1) and the eradication of extreme poverty(2) (of riverine communities). These declared impacts are the result of 28 intermediary results or preconditions interconnected by various causal chains.

Both the intended impacts are interconnected in various moments in the ToC, indicating an understanding that they are interdependent, in other words the performance of efforts to achieve one interfere with the other and vice-versa.

In the ToC proposed in the PBF (**Figure 10**) there are basically four categories:

(i) Intermediate results that should be achieved by the providers in terms of changes in practices (in blue), such as "Adoption of sustainable management of natural resources";
(ii) Direct results anticipated from rewards foreseen in the scheme (in green), such as "Supplies, equipment and technical support for sustainable production chains made available";
(iii) Complementary actions to be realized by the leader of the scheme or partners (in light green), such as "Development and/or dissemination of standard best practices for natural resources management"; and
(iv) Complementary actions outside the governability of the scheme (in yellow), such as "Community management projects for approved resources".

Each category and the causal chains are presented in **Figure 10.**

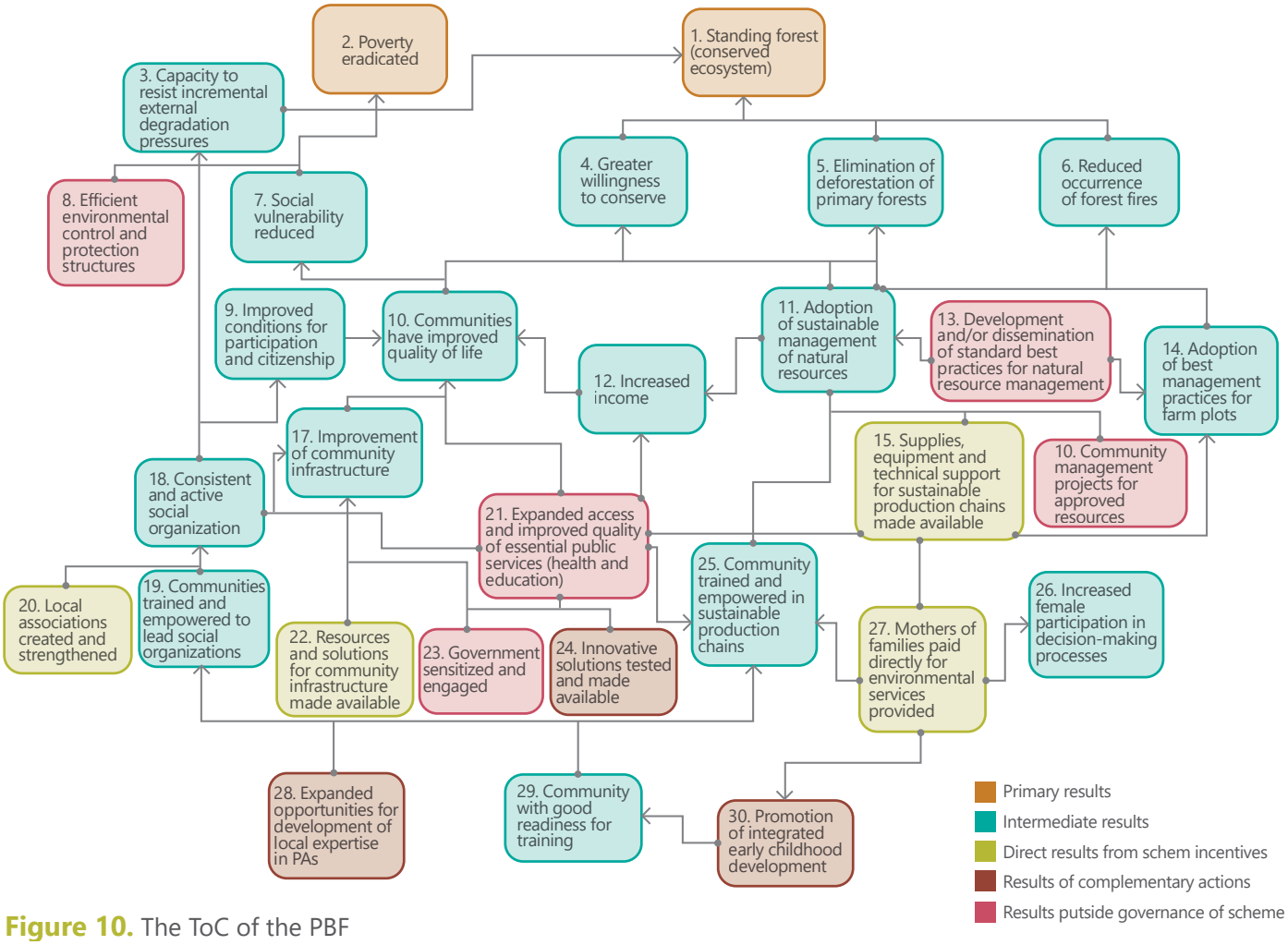


Figure 10. The ToC of the PBF

From these two primary objectives or intended impacts for riverine communities: *the conservation of the ecosystem*(1) and the *eradication of extreme poverty*(2) 28 intermediary results or interconnected preconditions were mapped through various causal chains, described below.

The proposed theory assumes that the *conservation of the ecosystem*(1) is the result of three intermediary outputs: *greater willingness to conserve*(4) on the part of local people; *deforestation of primary forest ceases*(5) and the *incidence of forest fires decreases*(6).

Greater willingness to conserve(4), is the result of two primary elements: *communities with a higher quality of life*(10) and *the adoption of sustainable natural resource management*(11), in the form of sustainable economic alternatives.

The adoption of *sustainable natural resource management*(11) is the result of *developed and disseminated standards for best practices*(13); availability of *supplies, equipment and technical assistance*(15) (rewards); *environmental permitting for management projects*(16) to be realized by competent entities; and from *communities trained to undertake sustainable production chains*(25).

The *sustainable management of natural resources*(11) also generates an *increase in income*(12) for local populations and contributes to the *elimination of deforestation in primary forests*(5), to the extent that the standing forest comes to have value and contributes to the generation of income.

The *adoption of best practices for farm plots*(14), is incentivized by *dissemination of information*(13) and from *incentive of direct transfers of resources to families*(27) – also an integral part of the rewards in the scheme – both essential to the *elimination of deforestation of primary forests*(5) and for the *reduction in the occurrence of forest fires*(6).

As the strategy for the scheme, the *direct transfer of resources to the families*(27) is paid preferentially to the mothers of the family, which beyond the obvious consequence of *increased income*(12), increases *feminine participation in decision-making processes*(27); increases money destined to *integrated early childhood development*(30) and works to cover families' emergency needs, allowing its members to *participate in opportunities to develop expertise*(28) and are *trained to engage in sustainable production chains*(25), whose economic return often times has a longer cycle.

Over the medium term, a new generation of communities trained to *undertake sustainable production chains*(25) is the consequence of *opportunities to develop expertise*(28), but also to *access to public services and quality education*(21), and from *readiness to learn*(29), which is in turn a consequence of stimulus provided by *integrated early childhood development*(30) (**Box 1. Riverine Early Childhood initiative: strategic long-term action to promote sustainable development**, pg42).

The *eradication of extreme poverty*(2) (of riverine communities) is the result of *reduction of social vulnerability*(7) and the *increase in quality of life*(10), which can stem from *increased income*(12); from *updating community infrastructure(17); from access to quality public services*(21) and; from *improved conditions for participation and citizenship*(9).

Improved community infrastructure(17) is a consequence of the availability of *innovative solutions adopted*(24) and from resources for the implementation of these solutions and *community infrastructure made available*(27) – another form of incentive foreseen for the scheme – associated with a *sensitized and engaged public sector*(23) in relation to the demands of the riverine communities and from a *consistent and active grassroots organization*(18).

Consistent and active grassroots organizations(18) are central to *engaging the public sector*(23); for demanding *increased access to quality public services*(21), for the operation and maintenance of *existing community infrastructure*(27) and to *improve conditions for participation and citizenship*(09). This intermediate result influences the *capacity to resist external degradation pressures*(3) with impacts on *the conservation of the ecosystem*(1).

It is worth considering that the *capacity to resist external degradation pressures*(3) through the mobilization of local population and condemnation of processes of environmental degradation is limited by the *effectiveness of command and control structures for environmental protection*(8) in the territory.

Preconditions for *consistent and active grassroots organizations*(18) are that *communities be trained and empowered to lead these organizations*(19) through the *opportunities for development of expertise*(28), together with investments to *structure and strengthen these organizations*(20). In this vein, the scheme also seeks to invest in local associations among its rewards.

This systemic approach, through the rewards called for in the scheme, seeks to unlock a series of changes that culminate in the *conservation of ecosystems*(1) and *eradication of extreme poverty*(2) (of the riverine communities in the purview of the scheme). The theory demonstrates that each of these intermediary results relates to the conservation objectives and if successful, have the potential to maintain or enhance the provision of ecosystem services, and are therefore considered an environmental service.

Further, the environmental service solution proposed is merely a part of the design of the PES scheme. The other elements to be considered are described in the blocks of the PES-canvas, described in the following section.

BOX 1. Riverine Early Childhood initiative: strategic long-term action to promote sustainable development

The Riverine Early Childhood initiative is a service model for the promotion of integrated development for early childhood in communities within the PBF scheme. The delivery of service is realized by family visits accomplished by a paraprofessional in health (Community Health Agents) acting in the areas of the scheme.

The model is based on scientific findings from various parts of the world that a comprehensive program – that offers healthcare, good nutrition and a secure and stimulating environment at the beginning of life has lasting impacts on communities, contributing to their development and sustainability in multiple aspects.

PES schemes strive for changes in standards for the use of land and resources, which in many cases involves the substitution of current productive activities by alternatives with lower impact on ecosystems. In many cases these alternatives are more complex from the management perspective, requiring the capacity to learn new skills, adapt existing understanding and access new markets. The science of early childhood has demonstrated that development of these abilities and executive competencies are related to the architecture of the brain, whose most important phase is between 0 and 6 years.

In this sense, as explained in the PBF ToC, investing in early childhood contributes significantly to the development of healthier, independent communities with the capacity to learn and develop solutions to their problems.

The PES schemes are strategies for sustainable development guided by a principle of ethics between generations. They should, therefore, look as much to the environment that will be left for future generations as to the future generations that we will leave to manage the resources of the environment in more efficient and sustainable forms, and an understanding of interdependence of both.

Objectives

1. *Develop a model for early childhood care in the Amazon;*
2. *Work on childhood development with a focus on pregnant women and children 0 to 6 year in riverine communities;*
3. *Strengthen expertise of families for protection and stimulation;*
4. *Train and empower Community Health Agents;*
5. *Contribute to the formulation of public policy, and;*
6. *Create conditions for the improvement of social indices, with effects on sustainable development.*

Strategy for action

1. *Workshops for state and municipal health agents;*
2. *Baseline (study) of public served;*
3. *Initial training of Community Health Agents;*
4. *Evaluation of the dimensions of development of children aged 0 to 6 years;*
5. *Supervision of family visits by Community Health Agents;*
6. *Strengthening of project in the municipalities;*
7. *Development of Visitation Model;*
8. *Continued training for Community Health Agents and;*
9. *Supervision and monitoring for follow-up.*

Activity of the Riverine Early Childhood initiative (Bruno Kelly).

Activity of the Riverine Early Childhood initiative (Rodrigo Thomzhinsky).

3.3 Providers

Potential providers are those that can be incentivized to improve their practices in relation to the use of land and natural resources in order to positively impact the provision of one or more ecosystem services (Porras, et al., 2015).

Providers, at the end of the day, are those responsible for the adoption and implementation of different practices that use the land and natural resources described in the environmental service. Clarity in the identification of participating providers is crucial in the design of the scheme and influences its effectiveness (Arraigada & Perrings, 2009).

An understanding of the social context in which they exist is needed to understand the providers, as is an understanding of the formal and informal rules and norms related to social organization in the territory. These norms influence the rights and access to land and natural resources, determine relations of power, social and political networks and mirror the values that determine the existing management practices (Vatn, 2010).

Even with well-established metrics of success established individually for each provider, the objective of the PES scheme is the result of collective efforts. Various skills and social expertise are required for success in the process of change desired in the PES schemes. Skills such as working collaboratively, reflecting on practices, learning from mistakes (own and by others), correcting and adapting actions, requesting support from partners, among others, are determinants of success and should, upon reflection, be analyzed by the providers under the PES scheme.

Groups of providers with different levels of social organization and expertise will probably deliver different levels of results. Between the existing level of social organization and the ideal level to operationalize the scheme, there are various intermediate stages that can be enhanced through complementary actions that should integrate with the environmental service.

As will be discussed in the **Item 3.8 Rewards, incentives and payments** (pg47) the willingness to accept is related to relevance of the proposed rewards to the deficits and needs of providers. Besides covering the costs of providing the service or its opportunity cost, other aspects, such as social costs, and criteria should integrate the analysis of the participant's willingness to accept the scheme.

The adoption of the scheme by providers is essential to its success (Eloy, et al., 2013). Kosoy and collaborators (2008) warn that despite being considered key actors, few schemes favor the participation of providers in decisions regarding its management and the use of natural resources.

3.4 Partners

While, conceptually, the flow of resources in PES schemes occurs from the buyer to the provider, in practice diverse actors are needed to appropriately and efficiently implement and operate a PES scheme. There is no one ideal configuration for a scheme as the contexts in which they are inserted are extremely diverse and specific (Greiber, 2009).

Appropriate attention to the conditions surrounding implementation determines the success of a PES scheme. This attention begins with the identification of an adequate institutional design to operate. Many actors have a role in the design and operationalization of schemes, particularly in the integration between providers and scheme investors, developing local expertise, confidence, credibility and legitimacy, certification, and risk management, among others (Porras, et al., 2015).

It is important to define the alliances and connections needed to operationalize the scheme, identify which intervention – foreseen in the environmental services – are outside the governance of the institutional actors involved and who will realize which required function to operationalize the scheme.

A compilation of primary functions described in the literature, as well as thoughts on the centralization or decentralization of processes is presented in **Chapter 9. Institutional designs for operationalization** (pg108).

The institutional designs and their structures should be created assuring the quality of the implementation of the PES schemes. In **Chapter 9**, positive structures and the advantages and disadvantages of different organizations to act as lead institutions in a PES scheme framework are discussed.

3.5 Reference for the scheme

The reference for a given scheme is the common denominator that links the efforts of an environmental service to the desired impact in the provisioning of an ecosystem service. This reference is a central element to the establishment of metrics of success and in describing the terms of the scheme.

The reference upon which the scheme is established ultimately defines its entire design, as the other blocks all converge on the adopted reference.

The reference for a given scheme is the common denominator that links the efforts of an environmental service to the desired impact in the provisioning of an ecosystem service. This reference is a central element to the establishment of metrics of success and in describing the terms of the scheme.

Schemes can be based on results- directly related to the provisioning of an ecosystem service – or based on activities – conditional on the development of activities clearly related to the provisioning of an ecosystem service (Engel, 2015). Schemes whose reference is the provision of an ecosystem service can be more attractive or advantageous when there are low costs related to the monitoring utilized, for example, only remote sensing (ibid.).

In a majority of cases, however, the provider of the environmental service does not have control over governance, but merely influences the factors that determine the provisioning of ecosystem services. Rural landowners that adopt adequate protection of headwaters (environmental service) in a determined watershed cannot guarantee a specific flow of water (ecosystem service) in the face of a prolonged drought, for example. In other cases, the desired impacts from the provisioning of ecosystem services are deferred over time, making a design whose incentive is conditional on proof of impact unviable on its own.

As a result, in practice many schemes are referenced to intermediary results and objective measures of environmental services as proxies for ecosystem services (Arraigada & Perrings, 2009; Speranza & Sand, 2010).

A scheme can have as a reference:

1. The additional quantity of an **environmental benefit** from an ecosystem service;
2. The increase in **provision of an ecosystem service**;
3. Measures of effort and **intermediary results** derived from the **environmental service**;
4. **Total area** in which a given **practice** of land or natural resource use is adopted or increased (measure of effort) and;
5. A **number of providers** engaged in the scheme that adopt **best practices**.

As an example, beginning with the same ecosystem service, schemes can have as reference:

1. Environmental benefit from the ecosystem service (e.g., m3 of water consumed per buyer downstream);
2. Ecosystem service (e.g., flow of water measured a given water body);
3. Environmental service based on the premise that the adoption of those practices will have a positive impact on the ecosystem and the provision of ecosystem services (e.g., hectares of riparian forest recovered or number of tributaries protected) and;
4. Providers (e.g., number of landowners who adopt a drip system of irrigation).

3.6 Metrics of success

Once the reference for the scheme is defined, metrics of success should be established. For such, a suite of indicators needs to be defined that best translate the reference established for the scheme. Indicators are divided into three categories: (i) efforts; (ii) results and (iii) impacts (Sandhu-Rojon, n.a.).

Indicators of effort – or of process – are related to inputs and indicate, for example, the amount of equipment made available, trainings offered, providers contacted or fraction of resources applied. These indicators are important for management. But they don't indicate the performance and efficacy of the PES scheme.

Results – or outcomes - indicators, on the other hand, test if each desired indicator achieved its objective. Results indicators, for example, indicate the number of hectares reforested, providers who effectively adopted the proposed best practices, or the incidents of forest fires, among others. By crossing the metrics - specially outcomes-related - with the costs a set of cost-effectiveness indicators can be integrated to this block.

Indicators of impact should determine directly or indirectly – through proxies – the provision of the ecosystem service in the medium and long term. For measurement of ecosystem services, consult **Item 2.4 Measurement and valuation of ecosystem services** (pg33) and **Chapter 11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientific research** (pg123).

Additionally, indicators of perception can be established through the use of opinion surveys. These qualitative indicators can contribute to an understanding of preferences or to anticipate changes by providers. These integrate a series of intangible aspects for context relating to adherence to the scheme. The use of qualitative data is discussed in **Chapter 11** (pg123).

It is recommended that indicators and methods be established utilizing the criteria proposed by (Doran, 1981) and be: (i) specific; (ii) measurable; (iii) attributable; (iv) realistic and (v) temporal. Upon establishing indicators and targets, it is important to have clarity in how monitoring will be realized, at what frequency and what cost.

It is necessary to translate the reference for the scheme into numbers, defining the indicators and establishing methods.

The indicators and methods are in most cases measured for each provider, supporting the process of payments or incentives. However, there are several cases in which other units of control are more adequate or necessary such as in collective ownership of land by communities (Vatn, 2010).

In the same scheme individual and/or collective goals can be established. These contribute to increasing internal controls over the scheme on the part of the providers, avoids that environmentally inadequate activities are relocated or outsourced and allows for better evaluation of the success of the scheme in locations where the use of land and resources is collective (Engel, 2015).

The metrics of success can be established based on relative performance in cases where external risks to the scheme are significant (Engel, 2015 in Zabel & Roe, 2009).

One of the more sensitive aspects of a scheme is the translation of metrics into investments. The viability of a scheme is conditional on the scenario in which a potential amount of resources directed to these metrics exceeds the minimum required investment.

It is worth noting is the need to limit indicators to the essential, prioritizing those with a direct relation to the objective of the scheme. A large collection of indicators can make effective project monitoring impossible and increase the costs of the scheme.

Additionally, it is important not to confuse indicators with management controls. Management controls allow for monitoring and implementation of processes associated with the scheme and the efficient application of resources, but they cannot be considered measures of results or impacts.

3.7 Costs

The total costs of a scheme consist of (i) costs for implementing the environmental service, (ii) opportunity costs, (iii) cost of payments, incentives and rewards, and (iv) transaction costs of the scheme.

The estimated cost of implementing the environmental service should include all investments necessary: (i) complementary actions; (ii) changes in practice and; (iii) general costs associated with the implementation, supervision and monitoring, including structure, team and processes.

The definition of the cost of the environmental service is similar to a project's budget. This cost, however, does not represent the total cost of the scheme because it does not include rewards to providers, for example. In cases of lost rents for the adoption of new practices, opportunity costs should be included in calculations of the total cost. The cost of provision is obtained by the sum of costs of implementation plus opportunity costs.

This cost is an important reference to establish a minimum investment level required to make the scheme viable, for it indicates the total need to implement the new proposed practices for the environmental services solution. In many cases, a significant part of these values need to be spent ahead-of-time, at the very beginning of operationalizing the scheme.

In cases in which the (i) changes in practices do not lead to losses in rents or; (ii) opportunity costs are negligible or are not considered in the scheme, the cost of implementation should be considered as the minimum cost of provision.

The attractiveness of the scheme, it should be considered, is related to the expectation of real gains. Payments that merely compensate for costs of provision do not generate real gains to the providers. Payments maintained at minimum values very close to the cost of provision tend to generate few results over the medium term (Muradian, et al., 2010; Engel, 2015).

In order to obtain the total cost of the scheme, in addition to the costs considered above that may incur on providers, it is necessary to include all the transaction costs associated with the administrative functions and management of the scheme, such as fundraising or negotiations, development and implementation of socio-environmental safeguards, monitoring efforts, validation and verification, contracting of outside verification and financial audits, among others (for a comprehensive list see **Chapter 9. Institutional designs for operationalization**, pg108).

3.8 Rewards, incentives and payments

The financial incentive of a scheme should at minimum cover the costs of adopting land use and natural resource practices, and, where they exist, loss of income from the adoption of these alternative uses of land and resources related to the practices previously employed (Engel, et al., 2008).

Ultimately, the expectation around a specific scheme is that the reward be sufficient to make the change of land use and natural resource practices attractive at a scale and intensity sufficient to guarantee the properly functioning ecosystem, thus increasing the provisioning of one or more ecosystem services (Pagiola, et al., 2005).

The incentives should compensate users whose practices interfere positively on the provision of one or more ecosystem services, promoting the maintenance or increase of the same. The adoption of incentives that focus exclusively on users whose practices have a negative impact can create adverse impacts on other users, diminishing the propensity toward conservation (Engel, et al., 2008). Beyond semantics, positive, diverse and recognized incentives are more appropriate than payments that are easily associated with a process of acquisition or appropriation of something.

The methods for payment for environmental services – or incentives – vary. Defining how to pay is a critical aspect (Kinzig, et al., 2011). While in most schemes payments or incentives are realized through direct monetary transfers, it is not rare to find cases of payments made entirely or partially in other forms (Engel, 2015). Payments can be monetary as well as non-monetary. Many times an investment in improvements to education or in access to potable water can be more relevant than monetary transfers.

Payment for environmental services is not limited necessarily to direct financial incentives. The introduction of payments for services can be perceived in different ways in terms of their social and cultural costs (Vatn, 2010). The distinction between payment as incentive and reward is also necessary. A payment presupposes an active posture on the part of the provider in relation to the environmental service and the conservation objectives. Reward is normally associated with a restriction or limitation that stimulate or inhibit a certain social behavior or practice. Exclusively financial incentives have limited impacts and, if they are substantially reduced, can even be a disincentive to providers, if seen as an offense (Muradian, et al., 2010).

The use of the term reward also contributes to building bridges between segments of the society that are resistant to the idea of attributing monetary value to environmental services and making payments in for them. It can be said that is a large convergence in terms of the need to economically value environmental services and create conditions in which those responsible for conservation and restoration of ecosystems are compensated for such.

Rewards, beyond monetary transfers, can be related to individual or collective needs of the providers, which can be met by providing supplies, services or equipment, for example. The success of a PES scheme is directly related to defining the correct incentives (Naeem, et al., 2015). Regardless of the format of the chosen incentive, it is imperative there be clear rules that are communicated effectively to potential providers.

The forms of rewards can include, among others:

1. Fixed monetary by provider;
2. Variable monetary based on results;
3. In collective investments;
4. In equipment and materials for collective or individual use and;
5. A combination of the above.

The relevance of the incentives and rewards to the realities, demands and motivations of the providers improves the chances of success for a potential PES scheme. As long as the maintenance of incentives is conditioned on the continued delivery of the environmental service according to the established metrics, there is no need to restrict the incentive to direct monetary transfers (Wunder, 2005).

Diverse attributes should be analyzed when developing the incentives and compensation: (i) Expected payments; (ii) flexibility in definition of restrictions; (iii) duration of contract; (iv) demand for registration or maintenance of controls by the providers, and (v) predictability of payments, among others (Cranford, 2014).

It is important to explain that the providers win with the scheme. The value of the incentive per unit of reference, the types of reward, payment cycles and duration of contracts and, if they exist, criteria for differentiation.

The concept of quality of income can be useful in evaluating the impact of the scheme on the income of providers and helps to define the format of the incentive. The quality of income considers aspects such as (i) the periodicity and distribution of income, (ii) security, (iii) the predictability of payments and, (iv) diversification that minimizes impacts on family income from oscillation of prices for products or seasonality of demand. It also considers if the activity is sustainable over the long term, and respects questions of gender (vide **Box 2. Gender equity in PES schemes**, pg49) and culture, if there are health risks, or if individuals are placed in difficult situations. Additionally, the quality of income can also be associated with the legality of production, payment of taxes, among others.

For ease of operation, schemes tend to opt for uniform payments per unit of reference. A uniform payment limits the effective gains by providers with larger costs of provision and restricts the supply of potential providers for a given scheme. Evidence from diverse sources compiled by (Engel, 2015) indicates that the differentiation of payments increases the effectiveness of the schemes.

However, efforts to collect data and the monitoring needed to process the **differentiation** should not be underestimated. The adoption of criteria for the differentiation of payments should be carefully evaluated in terms of technical and operational viability compared to the potential gains in the scheme's effectiveness and the increase in potential providers.

Responses to incentives and compensation can vary due to distinct degrees of (i) aversion to loss; (ii) perception of justice and altruism and; (iii) temporal variation in preferences (as in Anderson, 2006 cited by Pattanayak, et al., (2010)). It is important to stress that maximizing the willingness of providers to accept is not the same as having an effective scheme (Engel, 2015).

BOX 2. Gender equity in PES schemes

Gender equity and quality of participation in PES schemes contributes to the creation of bonds and the building of an environment of trust essential for the success of the scheme. Promoting widespread participation in community decision processes that define the development models should consider the need to act on diverse aspects of the social context in which the scheme is being inserted such as gender inequality and violence against women. The model adopted by the PBF scheme incorporated a series of strategies to create more space for women participation in decisive processes of the scheme.

Objectives

1. *Increase the role of women in decisions on the use of family resources;*
2. *Empower women in the decision-making processes of communities;*
3. *Increase the spaces for participation by women in associations and other organizations;*
4. *Train female leaders to generate income and in entrepreneurship;*
5. *Enhance the understanding by women of the Maria da Penha Law and other mechanisms to defend rights and reduce violence and;*
6. *Reduce gender inequality.*

Strategies for action

1. *Control of PBF resources by women;*
2. *Incentive for participation of women in participative planning workshops, leadership meetings and other pocesses of participatory management;*
3. *Incentivize leadership of women in projects that generate income and enterprise;*
4. *Educational actions on the rights of women, with emphasis on the Maria da Penha Law;*[19]
5. *Support for the creation and strengthening of clubs and associations of women and;*
6. *Support to women in leadership positions with associations.*

Lessons learned

1. *Monitoring of indicators on the participation of women is essential;*
2. *Monitoring allows for constant improvement in the practices utilized to build gender equity;*
3. *The control of payments by women within the bounds of the PBF scheme is a winning strategy for the efficient allocation of resources to family priorities;*
4. *Participation by women in all processes of participatory management should be actively supported;*
5. *The participation of women in programs and projects that generate income and specific enterprises contributes to the reduction of economic inequality associated with gender;*
6. *International actions related to gender contribute to the reduction of violence against women and in creases participation in spaces for dialogue;*
7. *Women's associations should be supported to enhance processes for knowledge exchange, establish ment of support networks and empowerment of women and;*
8. *The participation of women in positions of leadership in associations should be incentivized and con tributes to the diversity of views and perspectives in the PES schemes and its adherence to local realities.*

[19] Brazilian Law 11340, of August 7 2006 which creates a mechanism to prevent domestic violence and violence against women as well as other measures.

Group of female entrepreneurs from Rio Negro APA (Bruno Fijii).

Sumimi restaurant at 3 Unidos community (Bruno Fijii).

3.9 Terms of the scheme

3.9.1 Time horizon and expectation of permanence

Schemes can be designed with established or undefined timeframes. Timeframes relate to the duration of the scheme, the contracts with providers, the reimbursements and payments and primarily the expectation of permanence of the gains from the provision of ecosystem services.

The duration of payments can be continuous while still associated with sequential short and medium-term contracts (Engel, 2015). This allows for conditions to be adjusted to the degree that lessons are learned in the operation of the scheme. Independent of the choices, reflecting on the cycle of the scheme and establishing moments for adjustment is positive, for it reduces the risk that the scheme loses efficacy due to alterations in the context in which it is inserted.

3.9.2 Conditionality

Conditionality is often described as one of the key aspects that distinguish a PES project from integrated conservation and development projects (ICDP) (Kinzig, et al., 2011; Wunder, et al., 2008; Arraigada & Perrings, 2009; Engel, 2015).

Conditionality is the transfer of payment for a result according to conditions established in the scheme.

Conditionality should be clearly associated with the reference in the scheme and defines the criteria under which a producer, or group of producers, is apt to receive the rewards or payments stated in the scheme. Conditionalities are directly related to monitoring results and consequent application of sanctions for non-compliance. This step also should be taken into consideration in the design of the scheme. It is important to notice that the strength of sanctions and compliance is strongly related to local governance and empowerment. In other words, it is not effective to define conditionalities that providers and other stakeholders can´t understand or grasp.

Even in the case that payments are made ahead of schedule, to support the adoption of the proposed practices, penalties or rules for reimbursement can be defined for cases when agreed results are not delivered (Wunder, et al., 2008). Still, while understandable, rules of this kind are difficult to apply and compromise the conditionality of the schemes when those with the lowest levels of conditionality have higher levels of early payments (Engel, 2015).

Conditionality implies that, in many cases, reimbursements and payments are variable due to results observed from monitoring (**Figure 11**).

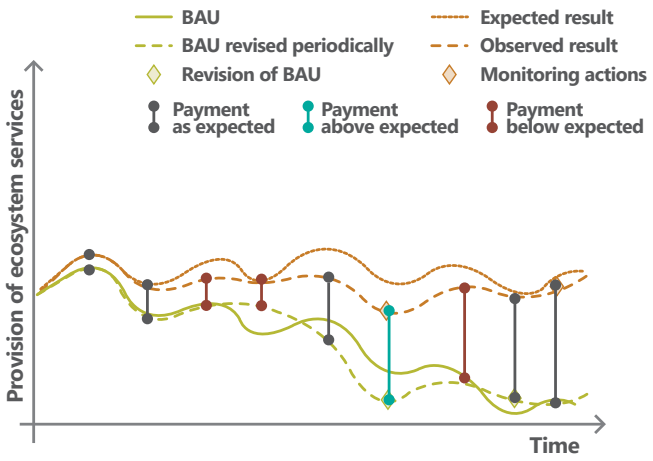


Figure 11. Conditional payments for observed results in relation to the **baseline (BAU)**

3.9.3 Additionality

Additionality is the degree of success that the implementation of a scheme has in providing the ecosystem services in comparison to a scenario "without the scheme" and with efforts additional to those covered by laws, regulations and direct financial returns. In the end it is the observed impact of the proposed scheme.

Having a consistent baseline study is fundamental to accurately estimating additionality. Additionality should be linked to the ecosystem service.

The projected additionality is conditioned by the estimated gains from the implementation of the environmental service in comparison to the estimated provision of the ecosystem service in the absence of the scheme (**Figure 12**).

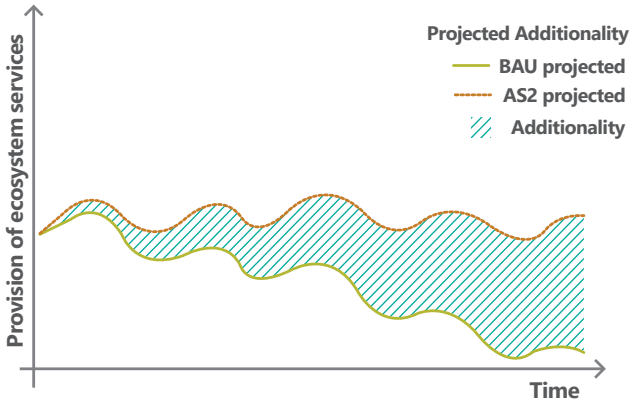


Figure 12. Projected additionality in function of the projection of implementation of the **environmental service (AS2)**

The additionality observed (**Figure 13**) is identified by comparing the observed results with (i) updated projections for provision in the absence of the scheme or (ii) with a control group (counterfactual). This process is called impact evaluation.

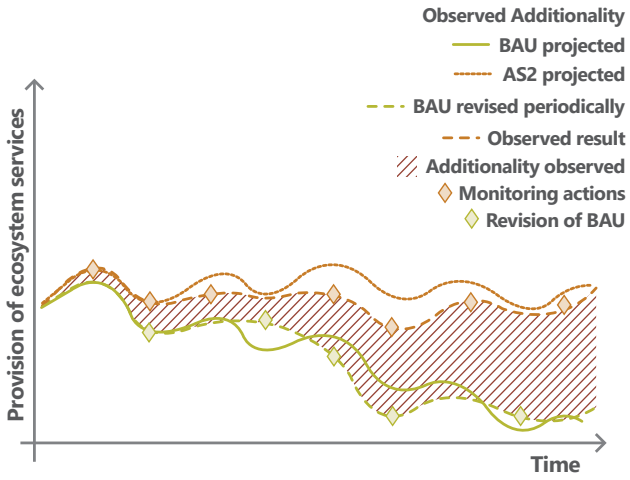


Figure 13. Observed additionality in function of observed result of **environmental service (AS2)**

In most cases, it is not possible to directly measure the ecosystem services and the estimate is made by a model that utilizes a suite of proxies to estimate the actual provision and project future provision during the timeframe of the scheme. These projections are periodically revised and updated. Examples of methods and models for measuring and valuing diverse types of ecosystem services were compiled in **Item 2.4 Measurement and valuation of ecosystem service** (pg33).

The definition of additionality for the scheme and how this additionality will be measured should be defined.

Many schemes fail on this aspect, paying for the adoption of practices that would have occurred anyway, or that already exist, and don't have a prospect of being altered (Arraigada & Perrings, 2009; Naeem, et al., 2015; Pattanayak, et al., 2010). On the other hand, schemes that establish reimbursements based on additionality are criticized for "awarding" areas with the largest historical environmental degradation to the detriment of regions with more sustainable standards for the use of land and natural resources (FAO, 2007).

Additionality is perhaps the primary measure of success of the scheme as a whole, but not necessarily of the providers individually. It is recommended that the schemes consider a balanced strategy between the providers with more additionality – normally in areas at larger environmental risk – with providers with less additionality and higher level of initial provision of ecosystem services that tend to be motivated (Engel, 2015).

3.9.4 Conformity, additional rules and penalties

Even while the central criteria for conformity is determined by conditionality, other aspects of conformity, additional rules and penalties can be required and should be clearly established in the design of the scheme.

The additional rules should have the objective of minimizing eventual problems and detours that occur through the duration of the scheme. One example is environmental safeguards that seek to avoid scenarios in which the effort to achieve the expected results for a given scheme create other social and environmental problems (Bonfante, et al., 2010).

In this sense it is recommended that the rules also consider mechanisms to: (i) facilitate – or not obstruct – access to the scheme and to natural resources by vulnerable populations (Pagiola, et al., 2005) and; (ii) promote gender equity (Reeves & Baden, 2000).

It is important to consider that PES schemes are associated with positive incentives (rewards) and that the establishment of these rules should have a supporting character to correct eventual distortions and guarantee the integrity of the scheme. The differential of the PES schemes is in focusing on autonomy and on performance, in contrast to other conservation strategies that focus on control (Stern (2006) cited by Engel (2005)). Autonomy does not mean the absence of effective monitoring for conformity. Failures in this area have negative impacts on the effectiveness of the scheme as a whole (ibid.)

3.10 Risks

Factors that can have an impact on the scheme and are outside its control and where institutional structures do not have governance, are considered risks. Risks can be divided between internal and external.

The primary internal risks for a scheme are:

- Negatively impact the provision of other ecosystem services;
- Limit access to natural resources, especially by vulnerable populations;
- Food insecurity (i.e. decreased areas available of crop)
- Incentivize the reallocation of environmentally destructive activities to other locations (leakage);
- Not present the proposed results for lack of necessary expertise in the implementation of the environmental service;
- Interfere negatively in social dynamics;
- Reduce the demand for labor in the territory of the scheme, which can lead to migration to city areas and;
- Create conflicts about the ownership of land and natural resources and dispossession.

The provision of a given ecosystem service is influenced by external factors – normally climatic – that go beyond the services installed by the providers (Naeem, et al., 2015). Depending on how the reference and conditions of the scheme were determined, these risks become internalized by the providers. The internalization of this risk can be assumed consciously – and negatively impact the disposition of the providers or create a need for a risk premium to be paid by scheme investors – or unconsciously – from an asymmetry in the negotiating process and having future impacts on the balance of the scheme.

The primary external risks to a scheme stem from:

- Changes in opportunity costs;
- Extreme climatic events;
- Political and institutional scenario;
- Macroeconomic scenario and;
- Identification of alternative forms of provision of the benefits from ecosystem services.

3.11 PES-canvas of the Bolsa Floresta Program

The use of the PES-canvas for the Bolsa Floresta Program PES scheme is presented below (**Figure 14**). Worth noting is that the PBF was not conceived of as an application for this tool, but that they were developed at the same time in order to facilitate reflection and a record of the scheme in its entirety.

3.11.1 Territory

The PBF is a PES scheme instituted by the State of Amazonas from a public policy in 2007. Beginning in 2008 the role of implementing this policy was given to the Sustainable Amazon Foundation, covering the territory that potentially contains all of its Protected Areas (PAs) for sustainable use that are part of the state system (SEUC) – 42 in total[20].

The implementation of the scheme in PAs occurs in a tiered manner and given the limited availability of resources. The process of prioritizing the areas was premised on multiple objectives and as a result the areas chosen had the highest additionality due to deforestation pressure (e.g. Rio Negro SDR and Juma SDR) and areas of low additionality and high provision in relation to investment (e.g. Cujubim SDR). **Table 6** demonstrates the tiered implementation of the scheme and the expanse in terms of area.

The process used to support the decision of area selection is presented further in **Chapter 4. Prioritization of areas for PES schemes** (pg63). It is worth noting that, beyond the prioritization process, multiple objectives of the scheme as well as logistical and budgetary issues were considered in the selection of areas.

[20] In December of 2015 the State Government of Amazonas enacted State Law 337/2015, in which other institutions can manage the family component of the PBF scheme in 26 state Sustainable Use Protected Areas (in 16 PAs the scheme as a whole is implemented by FAS).

Table 6. Territory of the PBF, date of creation of Protected Area and inclusion of family and income components of the program

		Beginning of the PBF family component		Beginning of the PBF income component	
Protected Area	**Date of PA creation**	**Year**	**Month**	**Year**	**Month**
Uatumã SDR	06/25/2004	2007	September	2009	February
Mamirauá SDR	03/09/1990	2008	March	2009	May
Cujubim SDR	09/05/2003	2008	March	2009	May
Piagaçu-Purus SDR	09/05/2003	2008	March	2009	August
Catuá-Ipixuna RESEX	09/08/2003	2008	March	2009	May
Uacari SDR	06/01/2005	2008	March	2008	August
Amanã RDA	08/04/1998	2008	September	2009	June
Maués State Forest	07/19/2003	2008	August	2009	August
Canumã SDR	05/22/2005	2008	November	2010	July
Rio Amapá SDR	06/01/2005	2008	November	2009	May
Rio Madeira SDR	07/03/2006	2008	July	2010	May
Juma SDR	07/03/2006	2008	July	2009	May
Rio Gregório RESEX	04/25/2007	2008	October	2009	June
Rio Negro SDR	12/26/2008	2009	May	2009	September
Rio Negro-Setor APA	04/02/1995	2010	March	Estimate on January 2018	
Puranga Conquista RDS	03/24/2014	2016	October		

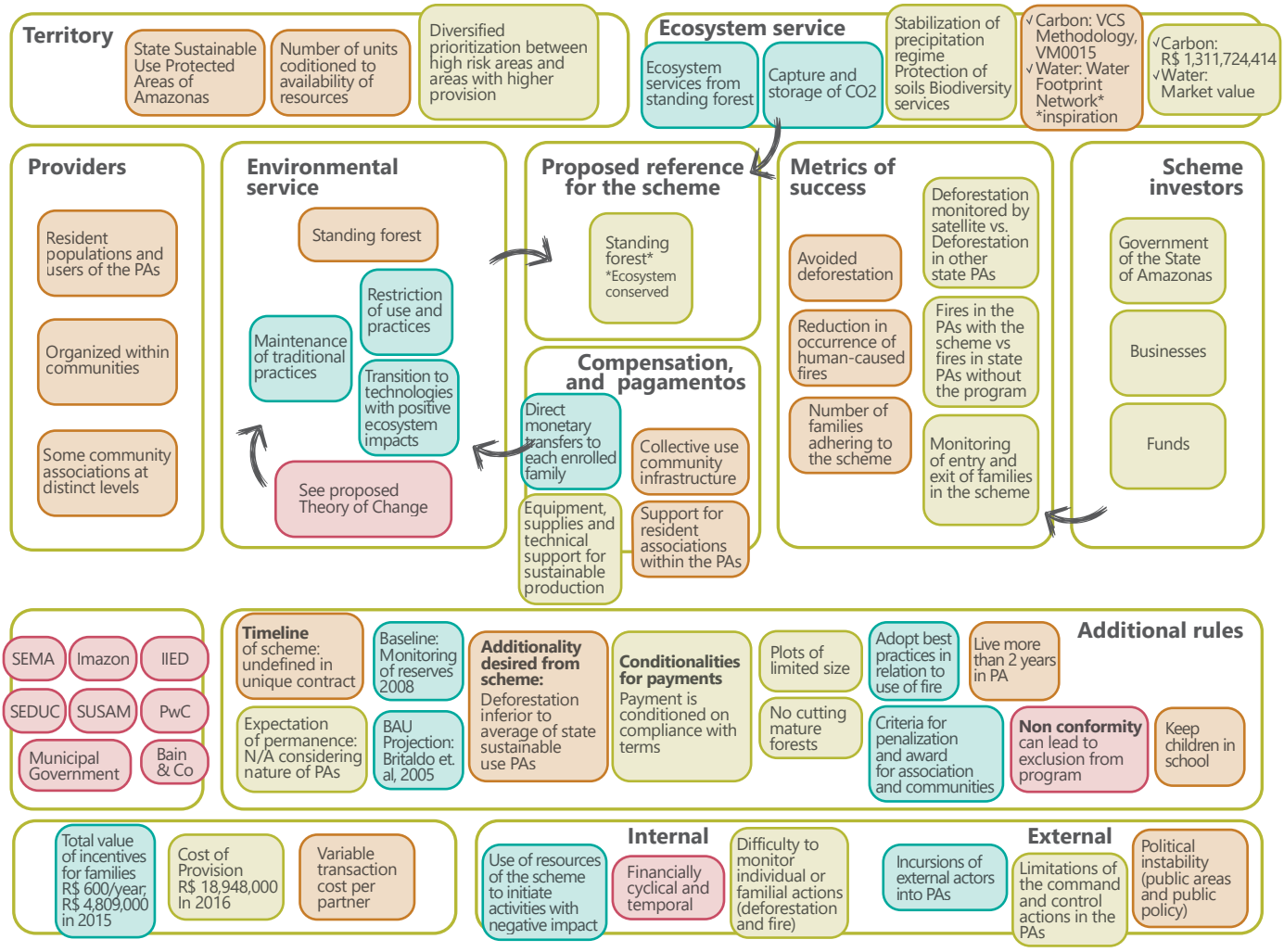


Figure 14. Application of the PES-canvas to the PBF PES scheme

3.11.2 Ecosystem services

The scheme has the objective to maintain – through avoided deforestation – the provision of **ecosystem services** related to standing forests. For this scheme, the services are considered together, in recognition of the inter-relation of diverse types of services (provision, regulation, cultural and support) such as the stabilization of hydrologic regime and of the rainfall regime in the region and in other regions (Aragão, 2012; Nobre, 2014) protection of soil and maintenance of fertility are essential to the maintenance of the services associated with extractive production chains, such as cacao, açaí, Brazil nut and fish (Foley, et al., 2007; Marques, et al., 2016) and agroecological practices as well as the maintenance of biodiversity (Wunder, 2013; Costedoat, et al., 2015) and climatic stabilization from the capture and storage of CO2 (Falloon, et al., 2012; Leduc, et al., 2016).

Results of measurements of the ecosystem service of carbon sequestration demonstrate the balance between positive and negative impacts. This is accomplished by measuring both the damages caused by the implementation of the actions in the scheme and the gains in terms of avoided emissions as a result of these actions. In addition, projects for emissions reductions and conservation measure fugitive or dislocated emissions (leakage), i.e., emissions that would have occurred within the territory but were dislocated to other regions due to the project's activities or scheme (Henders & Ostwald, 2012).

In order to ***monitor and value*** the services related to carbon in the scheme, one of the areas, the Juma SDR, adopted a methodology by FAS and the World Bank, VM0015, for the Verified Carbon Standard (VCS). In this case, there is monitoring of reductions in greenhouse gas emissions (GHG) of activities for later financing through the carbon market. In 2015, the last official report by INPE by August 2017[21], the Juma SDR did not have any registered deforestation. From 2006 to 2015, deforestation totaled 403 hectares. The project baseline, business as usual scenario, calculated using modeling of population increasing, road paving, economic indexes and others (Soares-Filho et al., 2006) projected, for 2006-16, 5.6 thousand hectares of de-

forestation. The difference between the baseline and the actual deforestation has avoided the emission of 6.1 million tons of carbon dioxide (tCO2) from within the Juma SDR.

In the other areas without a specific certification, accounting is done by the stock being protected. Estimates are that 1 hectare has 484 tCO2. In light of the entire territory of the PES scheme, and considering very low deforestation rates, there are 10.8 million hectares of forest with a total stock of 5.227 billion tCO2.

The ***measurement and valuation*** of ecosystem services related to water is in an early phase of development toward a scheme and legal and institutional maturation with the government of Amazonas and other partners.

It is true that the markets for each of the services are in quite distinct moments. This compounds with the absence of legal frameworks for services such as water and biodiversity. In addition, the establishment of markets depends on the scarcity of the product or service – however it is important to be aware of the risks of "commodify" environmental services (e.g., Gómez-Baggethun et al., 2010). As mentioned, FAS has pushed these agendas, supported state and national governments and captured resources via carbon market mechanisms.

3.11.3 Scheme investors

The ***scheme investors*** in the PBF scheme are the Government of the State of Amazonas, businesses and funds. Some of the businesses in the scheme specifically seek compensation for emissions. This is the case with the certification of carbon emissions reductions for the Marriott International chain of hotels, with a ***metric*** of 400 thousand tCO2 in the Juma SDR.

Other scheme investors create different ***metrics***, tied to environmental services, to the general reference of the scheme or number of providers involved. Additionally, scheme investors such as the Amazon Fund have as a metric the reduction of deforestation or maintenance of forest cover which are converted to values of avoided emissions and emit diplomas of recognition to investors who pay funds. The PBF scheme has had, since its origin, a total of 37 scheme investors.

Notably, almost all of the scheme investors in the scheme are tertiary scheme investors, those that invest in a scheme in the name of a society and not a specific segment or for direct benefit and are so not the final beneficiaries of the maintained provision of the ecosystem services from the scheme. This portfolio of scheme investors is far from the most seminal definition of PES schemes and is indicative that, at least for the meantime and on the subject of financing for conservation efforts, the simplification hoped for from the initial concept of PES as proposed in the literature is not a reality. Therefore, it is still quite challenging to connect partners with PES schemes' outcomes such as protection of specific animals, rain formation and soil conservation. The most reliable environmental service to properly link with any initiative is carbon due to its well-acknowledged methodologies and "market acceptance."

On this point, it is worth noting the importance of the negotiating autonomy and flexibility of the lead institution in order to actively seek scheme investors for the scheme. Naturally, working with a diverse portfolio of scheme investors adds complexity to the operation of the PES scheme, particularly in relation to accountability. Such a challenge should be addressed in a very transparent way with the scheme investors by assessing potential risks to involved institutions, mapping key stakeholders and their roles, and designing "plans B´s" for every type of situation.

3.11.4 Proposed reference for the scheme

The proposed ***reference for the scheme*** is the maintenance of a standing forest. The synthesis of the strategy for the scheme is to make the standing forest more valuable than a cut forest.

One of the lessons learned by the Bolsa Floresta Program is that having a proposed ***reference for the scheme*** – standing forest – which acts as a common denominator, contributes sensibly to the cohesion and coherence of the program. From this perspective the resources of the scheme investors, in the end, comprise a unique budget with a common objective, which avoids duplication of efforts, double counting and significantly reduces the risk that an action has negative impacts on another within the scope of the scheme.

3.11.5 Metrics of success

A suite of metrics of success determines the performance of the scheme as a whole. The primary success metric is avoided deforestation, or, the difference between absolute (in hectares), observed and the projected deforestation (the BAU scenario).

Annually, comparisons are made by percentage of the total annual observed deforestation in territories within the scheme with deforestation in sustainable use PAs not covered by the PBF scheme. Understanding that the group of PAs in the state system not engaged in the PBF scheme cannot be considered an ideal control group with-

[21] See in Portuguese at **http://www.dpi.inpe.br/prodesdigital/prodesuc.php.**

out adoption of more sophisticated matching techniques (Cisneros, 2016), it is a viable metric that contributes to the evaluation and performance of the program, serving as a predictor for avoided deforestation, determined periodically.

Additionally, the locations of fires are monitored for the territory in the scheme and in the sustainable use PAs not covered by the PBF scheme. The fire locations are considered good proxies for deforestation. They are directly related to the risk of forest fires and are indicative of the conversion of areas for agricultural cultivation or grazing.

Monitoring of deforestation and of the locations for fire is undertaken by the PPDUC Program (Participatory Monitoring of Protected Areas for the Bolsa Floresta Program). The PPDUC monitors deforestation and the occurrence of fires using data from INPE (National Institute for Space Research) and verifying in the field with FAS technical team together with locals. This monitoring program enables more reliable data, empowers communities on land management, and trains them on mapping and GPS techniques.

Also monitored within the scope of the scheme are the number of families adhering to the scheme and the flow of entries and exits. The effectiveness of the scheme, considering the specific conditions in which they are inserted, depends on a high percentage of acceptance in the territory, as it is difficult to isolate the efforts of each family. In monitoring adherence, the scheme is tracking the adherence of the design of the scheme to the expectations of the providers and to changes in the context of each area that has an impact on willingness to participate in the scheme.

3.11.6 Providers

The **providers** of environmental services are the traditional populations and users of the sustainable use PAs. These populations are descendent from migrants and indigenous people that adapted their way of life to the conditions imposed by the forest. They practiced subsistence rotational agriculture– with a system of slash and burn – primarily of cassava for the production of flour, which is the base of their diet. Some surplus is commercialized with seasonal forest products such as Brazil nut, fruits, oils, wood, and fish, among others.

Though the farm plots are familial, the area is abandoned after a few production cycles and after a period of rest, can be reused by the same family or by other members of the community according to informal local agreements. The forest areas used for extractive activity are utilized collectively and access to the resource is determined by local rules. Therefore, for the terms of the scheme, the use of land and natural resources is understood as a collective.
They are organized in communities of various sizes that share some common structures such as a church, school, community center, or soccer field. Each community has a leader selected by peers. The populations of the areas where the scheme will be implemented are dispersed. So each one of the areas includes a group of communities with the characteristics stated above as well as smaller locations and isolated residences.

In a fraction of the areas in which the scheme is implemented, there are existing resident's associations. As part of the process of developing favorable conditions for the implementation of the PES scheme, the formation of similar associations across all the areas of the scheme was incentivized. These organizations have the primary function of representing the resident populations and users to other institutional actors. Recall that each association of residents is at a different stage of organization, action and maturity.

The ways in which potential providers are distributed within the territory and how they use the soil and access natural resources were determining factors in the design of the scheme made explicit in the canvas. One relevant aspect is that despite the collective use of the soil and natural resources, the enrollment of the entire community was not obligated, as the terms of the agreement refer to restricted use and practices for each family.

This strategy proved to be correct, to the extent that high rates of participation by communities and consequently of the reserves was measured. Estimates are that an average of 88.6% of potential providers, residents who meet the requirements, participate in the program. The PBF PES scheme (**Figure 15**) has signed agreements with 9,597 families providing environmental services that act to maintain the standing forests. This totals 39,970 people who live in 578 communities[22].

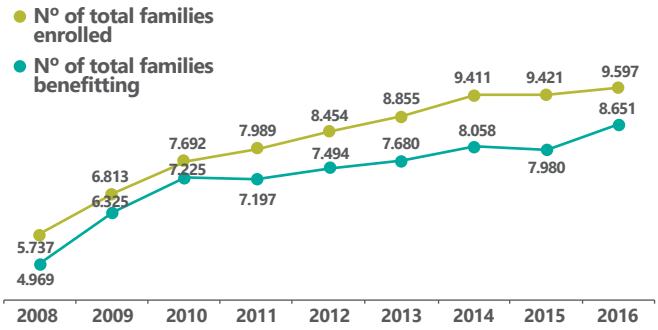


Figure 15. Annual evolution of families registered in the PBF (2008-2016)

[22] Source: FAS Database, accessed December 2016.

3.11.7 Environmental services

It is up to the provider to implement the ***environmental services*** to avoid the conversion and degradation of forests which they use and where they live. Environmental services are considered to be the suite of actions that reduce the occurrence of anthropogenic forest fires and eliminate deforestation of primary or mature forests in the areas of the scheme. In other words, keep the forest standing.

Implementing the environmental services means put into practice a variety of actions organized into a clear causal chain that has the objective of guaranteeing consistent and lasting results. The expected results of each of these actions were organized in the PBF ToC. It is a planning resource that contributes to the identification of the necessary pre-conditions for the proposed environmental services to truly generate the desired results and better explore the relationships between these conditions and the actions that set the course for those needed changes. The PBF ToC establishes a clear relationship of interdependencies between the social vulnerability of providers and their disposition to speak. The ToC for the program therefore calls for actions (or interventions) in the social as well as environmental areas to achieve desired results.

The environmental services can be classified into three categories (i) restricted in use and practice; (ii) maintenance of traditional practices and; (iii) transition to technologies with positive ecosystem impacts. As the first, the conservation of services is directly linked to use limitation, i.e. preservation of ecosystems. The second category, maintenance of traditional practices, considers traditional and indigenous activities as not harmful to the environment, and thus, sustainable. The third implies enhancement of techniques and technologies to better manage natural resources and enable thus positive impacts in the ecosystems.

3.11.8 Incentives and payments

The ***incentives and payments*** reward providers whose practices interfere positively on the provision of ecosystem services. These rewards aims at guaranteeing direct social benefits at the community level, sustainable production and income-generating activities for providers in the scheme. The design of rewards is family-based, not as other PES schemes based on hectares, and is structured in four components

A. *Direct monetary transfer*

Direct monetary transfer to each family (family component) that adheres to the scheme and commits to respect the terms of the scheme (see **Item 3.11.10 Terms of the scheme**, pg59). The amount is credited monthly (R$ 50) in a debit card and can be accessed with the frequency the provider finds adequate. There are no restrictions in terms of the utilization of funds. Represents 49.6%[23] of the set of payments in the scheme. Some might say that debit card may limit the use in isolated communities in the Amazon. But they forget every now and then, unrelated to distance, that people living in isolated communities go to the cities for other purposes (e.g., purchasing medicines, clothes, foods, visiting relatives etc.) and take the advantage of being in the city, cash out. As the money stays at the provider's bank account, they can cash out once a year if they wish. Nonetheless, FAS is designing together with Bradesco bank a strategy to provide banking services and financial education to isolated communities. So far, there are three advanced bank agencies in the middle of the forest providing services to 8.5 thousand people within 113 riverine communities (FAS, 2017).

B. *Collective investments in community infrastructure*

Collective investments in community infrastructure (social component), decided in a participatory manner by each community, has as reference the available amount calculated from the number of communities inserted in the scheme times a factor of R$ 350.00. This factor was stipulated in the beginning of implementation of the scheme: on the understanding that the average number of families of providers per community per PA is 11, and the value of R$ 4,000.00 is sufficient for annual investments by provider communities. The value of this calculation is R$ 363.63, which was then rounded to R$ 350.00. The resources are made available annually by the signing of the minutes of the meeting by resident providers indicating the intended infrastructure for the payment, which should be used in the support of improvements to communication, transportation, and health. In exchange, the providers manage the investment. In 2015 these represented 10% of the group of payments in the scheme.

Importantly, not all providers in the PAs currently receive this component due to reduced budgets and the fact that actual actions that have taken place have been through partnerships between the implementer of the scheme in the PAs (FAS) and specific scheme investors from fundraising. Currently the PAs that receive this component are: Rio Negro SDR, Maués State Forest, Uatumã SDR, Canumã SDR, Rio Madeira SDR, Juma SDR, Rio Gregório Resex, Mamirauá SDR, Amanã SDR, and Catuá-Ipixuna Resex.

[23] Related to reimbursements made in 2015.

C. *Investments in productive infrastructure*

Collective investments in equipment, supplies and technical support for sustainable production (income component). The investment plans can be realized by community groups with common interests (e.g. artists, fishermen), communities or integrating several communities. It is also decided in a participatory manner by providers. The groups or communities have flexibility to accumulate funds for up to two years to make larger investments. In 2015, represented 35.7% of the suite of payments in the scheme.

The investments must be made in sustainable production infrastructure which includes machines, equipment and structures for the production, storage, processing and commercialization or offer of services (e.g. sustainable community-based tourism). The communities can invest in one or more initiatives and change projects from year to year based on new training received from the investment. It is up to FAS and partners to offer technical support for the selected activities by the communities, but these costs are not included in the calculation of rewards and payments.

For investments in both community infrastructure as for production infrastructure, FAS (lead institution in the scheme) spends the funds and delivers the equipment, materials and services needed to the community to install the defined infrastructure. The communities frequently contribute in kind with local products (e.g. wood) and labor. In several cases, financial and economic resources from partners were raised to make the investment possible.

D. *Collective investments in support of resident's associations in the PAs*

The collective investments in support of residents associations in the PAs are transferred annually to each of the associations (14 currently) through presentation of a work plan. The plan should explain how the resources will be applied to benefit the residents of each area (providers in the scheme). In 2015, represented 4.6% of the suite of payments in the scheme (**Figure 16**).

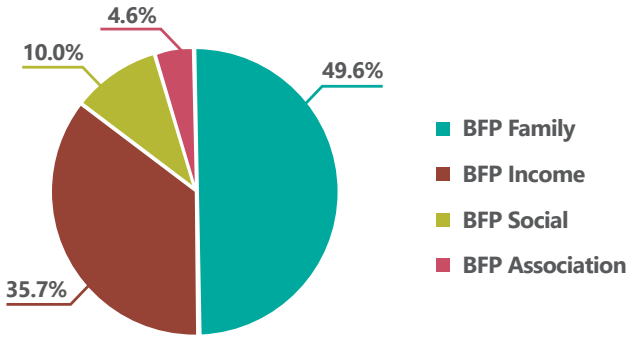


Figure 16. Make-up in percent of the rewards and payments from the PBF PES scheme, 2016

3.11.9 Costs

For the current territory covered by the scheme, circa 92% of residents and users, the total annual cost of implementing these environmental services is R$18,948,000, based on the 2016 budget and including all activities related to its mission. Transaction costs are estimated by each project and are compounded by administrative and management costs and environmental monitoring investments within the scheme. Run by its Board, and audited by PWC-Brasil annualy, FAS limited its administrative costs to 22% in the 2016 budget (FAS, 2017).

Considering the lack of available budget for the environmental service solution, it is implemented in a tiered manner, i.e. not all actions are implemented simultaneously in all the areas of the scheme.

On this point it is important to understand that the areas find themselves in distinct stages of development and have, at any moment, different needs. It is not realistic to presume all areas in the scope of the scheme will develop at the same pace and following identical paths. Thus, continual efforts are undertaken to prioritize resources to the areas in which actions are more relevant, urgent and necessary, in other words, of greater potential impact. This process of modular implementation increases the sustainability of the scheme in an uncertain scenario of the availability of resources (see **Item 3.10 Risks**, pg53).

3.11.10 Terms of the scheme

The terms of the scheme can be divided in two large groups: (i) terms defined between the scheme investors and the lead institution and; (ii) the terms defined between the lead institution and providers. In general, it can be affirmed that the terms defined between scheme investors and the lead institution concern the global impacts and results of the scheme from the collective actions of the group of providers. Now the terms defined between the lead institution and the providers concerns individual performance of the providers (and their families) and of the

communities in order to attain the general objectives of the scheme.

i. Terms defined between scheme investors and lead institution (FAS)

Time-frame

The PES scheme was designed to be implemented on an undetermined time-frame in renewable cycles of 5 years. The agreement[24] in vigor is in the second cycle and concerns the implementation of state programs and projects in climate change, environmental conservation, sustainable development and management of the PBF scheme in the state PAs.

Additionality

In the terms of the agreement, *additionality* (degree of success in the execution of the scheme as a whole) is considered *deforestation less than the median for the state sustainable use PAs.*

Baseline and Projection

The *baseline and projection* are considered necessary to guarantee follow-up of the insertion of a new buyer in the scheme and to guarantee the effectiveness of the scheme, providing assurance that the information later becomes a valid metric of success.

Conditionality

Conditionality (guarantee of provision of service) is considered the fulfillment of the terms of the agreement between the two parties.

Non-conformity

Non-conformity is based on pre-established terms of the agreement between the two parties and *non-conformity is directly related to the conditionalities, which is what guarantees the term.*

Additional rules

Additional rules, depending on the term defined between the buyer and the lead institution, guarantee the effectiveness and additionality of the scheme.

ii. Terms defined between the lead institution (FAS) and the providers

Time-frame

The terms of compliance signed with the providers do not have a set time-frame and renewal occurs every five years, the period of validity of the financial instrument through which direct monetary transfers are made (ATM card), through re-registration in the scheme made by the field team.

Additionality

There is no additionality defined at the level of families of providers and communities.

Baseline and Projection

The *baseline* is necessary to adequately estimate additionality. In the PBF PES scheme, as there is no additionality defined, the baseline is based on supporting indicators in the scheme, such as families registered and benefiting, number of people served by the scheme, etc. No *projection* is made.

Conditionality

The payments are realized *ex* ante, through adherence to the scheme and are conditioned on the fulfillment of the established conditions. This way the payments are continuous until it is found that a given family does not comply with qualification criteria as *provider* or they have infringed on some of the conditions in the terms of compliance, described below:

- Comply with the rules of the Use Plan or the Reserve's Management Plan;
- Maintain the areas in cultivation to sizes no larger than those of the year the scheme was initiated in the community, cultivating only in secondary forests or fallow land and managing forests, not advancing into areas of mature (primary) forest and;
- Make firebreaks around the cultivated areas and communicate burn days to the community.

Non-conformity

In the case of an infraction on the conditions pertinent to conditionality, *the provider* has its financial instrument (card) suspended for up to two years. In the case there is no return and the team following the scheme in the field prove so, the provider is removed from the scheme

[24] Terms for Technical Cooperation – nº. 003/2015 between FAS and the Government of Amazonas.

Additional rules

Besides these basic premises – tied to conservation– there are additional rules of the social kind to ensure the involvement of the population in the Program, such as *have lived for more than 2 years in the PA and maintain kids in school*, demonstrating that this community member is in fact a resident of the PA and has social responsibilities with their family.

The entire term of the implementation of the agreement is tracked from the *monitoring baseline for the reserves since 2008* (tied directly to the *metrics of success*) and non-compliance with the *conditionalities* lead – based on observations during the monitoring – to *non-conformity*, leading the provider to be excluded from the scheme and consequently diminishing the resource invested in the community through the components of collective reimbursements.

3.11.11 Partners

In the scope of the scheme, partners are considered the institutions that contribute to the implementation of the scheme, particularly in the set of actions that integrate the environmental service solution. The partner institutions contribute with technical support, economic match, and development of training actions, furnish logistical support, among others. They also implement complementary actions in themes outside the expertise of the lead institution, which are important in creating the conditions necessary for the implementation of the solutions proposed in the scheme for the maintenance or increase in the provision of ecosystem services. In the implementation of the scheme, as of 2016, FAS has a wide network of 210 partners, being 107 financial supporters.

3.11.12 Risks

Implementing the PES scheme on the part of the PBF can have internal and external risks, and FAS deals with them daily. Among the external risks are incursions of external actors in the PAs, limitations of command and control in the PAs, political instability (public land and implementation of state public policy), utilizing the resources of the scheme to initiate activities with negative impact, cyclical and temporal financing (volatile and with strong tie to speculation in external markets and exchange rate variability).

Among external risks are *incursions from actors external to the PAs, limitations in command and control in the PAs, political instability* (public land and implementation of a state public policy), *utilization of resources from the scheme to initiate activities with negative impact, cyclical and temporal financing* (volatile and with strong ties and speculation to external market and exchange rate viability) and *difficulty to monitor individual or family actions (deforestation and fire).*

BOX 3. Developing socio-environmental safeguards[25]

Given the socio-environmental opportunities and risks of PES schemes, specifically in the case of REDD/ REDD+ activities, and the inherent need to adapt actions that improve forest governance in developing countries – affecting the lives of thousands of people who live and depend on forest resources – one initiative of Brazilian civil society sought to discuss socio-environmental safeguards for these activities.

The development of these safeguards, principles and criteria came from a multisector process involving the private sector, environmental organizations, and representatives of indigenous people, traditional communities, small-scale farmers and research institutions.

*The socio-environmental risks associated with REDD+ activities were discussed by these groups and based on this discussion, the safeguards were developed to minimize the occurrence of these risks. Representatives of indigenous people, traditional communities and small-scale farmers took an important lead in this process, taking the discussion to the local level and bringing to the final document the real concerns of the people whose lives depend on the forest (**Figure 17**).*

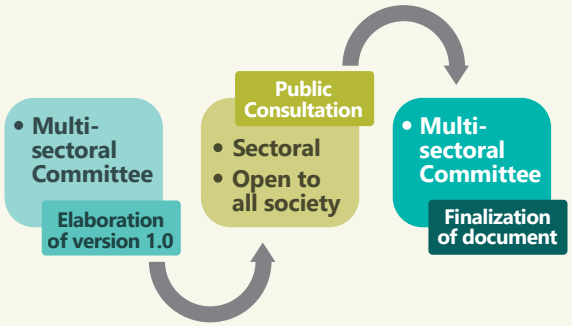


Figure 17. Process of collective construction of socio-environmental safeguards applicable to PES schemes

From the lessons of this process of collective construction, (Bonfante et al., 2010) developed a guide in order to contribute to similar processes in other countries, as the process is also valid for PES schemes not necessarily framed as REDD+.

The REDD+ Socio-environmental Safeguards developed in Brazil are now presented to governments by civil society in support of the development of related public policies, climate change and, in a more general sense, alternative forms for land use in forested areas. These include:

1. *Legal compliance;*
2. *Recognition and guarantee of rights of indigenous people, small-scale farmers and traditional communities;*
3. *Distribution of benefits;*
4. *Economic sustainability, improvement in the quality of life and reduction of poverty;*
5. *Conservation and environmental restoration;*
6. *Participation;*
7. *Monitoring and transparency and;*
8. *Governance.*

[25] Adapted from (Bonfante, et al., 2010).

4. Prioritization of areas for PES schemes

Prioritization of areas, in most cases, is necessary in light of budgetary limitations and variability in the attributes of the areas and providers (Engel, 2015), but should also be understood as a permanent management instrument, even in conditions of greater availability of funds at a given time. This because, in the next moment, the evaluation processes will analyze the results obtained for effectiveness that can be negatively impacted ("diluted") by investment in areas: (i) without real viability for adoption of environmental services proposed; (ii) in areas with little contribution to the provision or; (iii) without additionality.

The prioritization of areas, despite being related to the territory, increases in quality when there is more clarity about other elements of the scheme to be proposed. It is recommended to revisit this section when information about the ecosystem service and the environmental service, as well as about the potential providers, are minimally defined.

If there is, in the decision process, flexibility to define priority areas in a universe of significantly distinct areas, associated with the perception that effectiveness depends to a large extent on adherence to the territory, it is recommended to work in an integrated manner in this prioritization for the design of the environmental service. Use of the ToC approach is suggested, as described in **Chapter 3. Applying the theory of climate change in the design of environmental service** (pg36).

Another aspect to take into consideration is the education potential gained from integrated analysis of the prioritization criteria with the observed results after implementation of the scheme. The appropriate management of this learning can identify areas and user profiles that better respond to the proposed solution and others whose effectiveness demands adjustments as much in the process of prioritization as in the environmental service solution.

This should contribute to: (i) the development of criteria and prioritization of areas to orient the investment of available resources; (ii) the initial monitoring framework and; (iii) the management of understanding toward the implementation of an effective scheme. The process is organized in the following steps:

1. **Identification of relevant areas** that contribute to the provision of ecosystem services that are objects of the scheme;
2. **Identification of critical areas** at risk for continuing to provide ecosystem services due to environmental degradation and the adoption of inadequate practices in use of land or resources;
3. **Identification of potential areas** in which there are potential providers willing to accept the scheme;
4. **Identification of areas with adherence to the proposed solution** in which the environmental service has potential to positively impact the provision of the ES, is viable from the operational point of view, complimentary and additional to the other conservation efforts and;
5. **Priority areas for PES schemes** classified based on the overlay of attributes and criteria from previous steps.

Considering that the amount of resources available, in most of the schemes, tends to vary during implementation, and that the payment is normally conditional on the delivery of results, a dynamic process of inclusion and exclusion of areas should be established in the scope of the scheme. The establishment of clear criteria contributes to the transparency of the investment process (Forest Trends, Katoomba Group & UNEP, 2008).

The identification of priority areas for the development of PES schemes should be based on analysis of the conservation objectives for the ecosystem. These objectives can be associated with specific territories, ecosystem services or environmental benefits.

When the conservation objectives are associated with environmental benefits it is necessary to identify which ecosystem services that impact on the provision of these and estimate how much each area contributes to maintaining that provision (**Figure 18**).

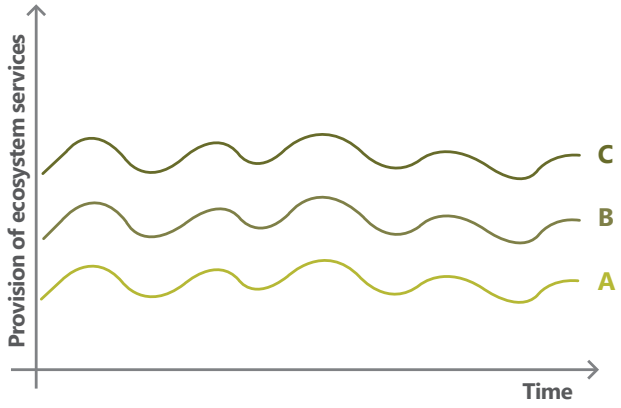


Figure 18. Projection for provision of an ecosystem service in different areas of a **conserved** ecosystem (**A**; **B**; **C**)

Zoning efforts (economic-ecological) and land management, establishment of protected areas, mapping of ecologically important or sensitive areas, are the sources of information most used in this stage of analysis. Understanding of spatial standards for ecosystem services contributes to the quality of the prioritization process (Izquierdo, et al., 2012).

Worth noting is that the effort to collect information for prioritization of areas does not necessarily translate into a guarantee of the success of a PES scheme. The challenge is to establish a consistent prioritization criteria based on a viable set of current information at the lowest cost possible.

The prioritization strategies influence the values of provision and can have distinct results due to the elasticity of demand (Wu, et al., 1999). Various studies indicate that a focus on the objective of conservation[26] associated with an objective cost-benefit analysis – for the provision of ecosystem services – significantly improves results obtained in relation to available funding[27, 28], (Engel, 2015; Wünscher, et al., 2008). A cost-benefit analysis avoids the tendency to simply maximize the area associated with the scheme, adding areas of low cost, but with low provision (Bulte, et al., 2008).

Environmental benefits > Ecosystem services > Relevant areas

Once the relevant areas for conservation are defined, the areas of highest degradation pressure and consequently larger risk to maintain the provision of the ecosystem services of concern must be evaluated (Fripp, 2014).

The processes of environmental degradation can be caused by numerous factors such as the politics of insufficient development, precarious land tenure rights, lack of environmental awareness, non-existence of incentives and subsidies for sustainable activities, large infrastructure projects, poverty, among others[29]. In most cases, the processes occur from a combination of these questions (Engel, 2015).

It is recommended to establish a suite of attributes relative to the vectors of degradation and associate values to each relevant area creating a point system as a base for estimating risk. These attributes frequently seek to capture the level of threat in relation to the singularity or fragility of the area.

There are diverse methods in the literature to select, normalize, analyze and compare the attributes or indicators, with variable levels of complexity. The choice of method should be based on conservation objectives, available data and the sensibility needed to differentiate areas in terms of degradation pressure. For additional information, consult Engel (2015).

Relevant areas + risk of degradation = critical areas

The identification of areas where a possible PES scheme makes sense is also determined by the presence of potential providers that can be incentivized to improve practices of natural resource and land use in order to positively impact one or more ecosystem services (Porras, et al., 2015).

Any scheme needs to recognize and consider the suite of existing rules and formal and informal norms relative to the social organization in the territory. These norms influence rights and access to land and to natural resources, determine relationships of power, social and political networks, and mirror values that determine existing management practices (Vatn, 2010). While it is interesting to have access to a wide set of information for the process of prioritization of areas, it is worth noting that the social scenario in territories is dynamic and, therefore, studies of this scope have an expiration date.

The potential incentive is directly related to the costs of provision (**Figure 19**). In cases in which these costs vary between the areas, and the information is available, it is recommended that an additional layer of prioritization be establish based on opportunity costs and of provision (Engel, 2015).

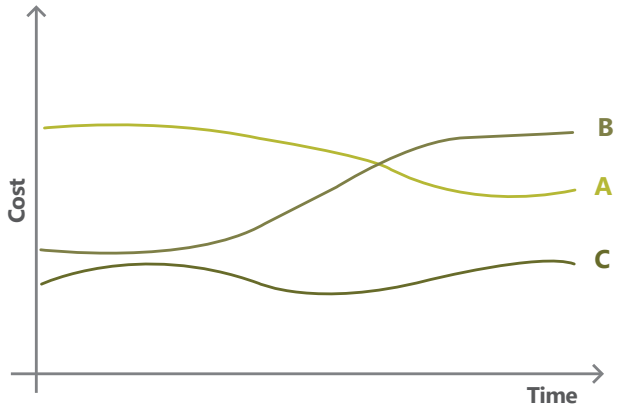


Figure 19. Behavior of cost of provision in different areas

[26] Avoiding interferences in secondary objectives and reasons for confusion.

[27] According to the same studies, results can be realized through the application of strategies to differentiate payments (vide **Item 3.8 Rewards, incentives and payments,** pg47).

[28] Wu and collaborators (1999) posit that there is efficiency in the cost-benefit strategy when the costs per unit of ES is fixed. In the cases in which the demand is inelastic, its efficiency is questionable.

[29] PES schemes should not be considered as a solution to all processes of environmental degradation.

If the heterogeneity of these costs is low, this prioritization step can be based on **willingness to accept** a potential scheme for environmental services. Conceptually, the willingness to accept combines a series of preferences of the potential providers, besides costs. As such, beyond the determination of an optimal value, adequate incentive design and adherence to the environmental service solution significantly influences willingness to accept the scheme.

Prioritizing areas with higher receptivity to the scheme, even if they do not have the best cost-benefit relation, can generate future gains through a process of positive leakage from the creation of **local references for success**. In this sense, other information relating to the organization of local populations, local expertise and positive leadership can be desirable, especially when the proposed solution (environmental service) is disruptive.

Critical areas + potential ES providers = potential areas

The intervention strategy, or environmental service, is ultimately a proposed solution to interrupt, minimize or reverse the process of environmental degradation in order to contribute in a decisive way to the maintenance of the provision of one or more ecosystem services.

An evaluation of the conservation initiatives already existing in potential areas is recommended, including legal documents, norms for territorial management tied to the conservation of resources, particularly in areas considered critical:

- Environmental legislation applicable to the territory, the ecosystem or the environmental service;
- *De facto* land title situation (or legal) of territories, restrictions in the use of land;
- Other measures for conservation already existing in the territory that limit access and the use of resources or prohibits specific practices and;
- Taxes, subsidies, charges for resource use, access fees, applicable environmental penalties in the territory.

This analysis, preferably including a reflection on the limitations and effectiveness of the conservation initiatives underway, contributes to determining the potential for additionality and eventual complementarity of the proposed environmental services.

While some secondary data are available, at this level of analysis studies in the field are necessary to evaluate the adequacy of the intervention strategy (ENS) proposed for the potential areas. At this stage, while the level of detail for the strategy is low, analysis of some areas of the strategy can contribute assertiveness to the prioritization process. To be considered:

1. The nature and intensity of the active vectors of degradation;
2. The point of no return or critical point in relation to the provision of the environmental service;
3. The evidence of effectiveness of the proposed ENS in conditions similar to those of the potential areas, and;
4. Minimum scale necessary to generate an impact.

Some additional aspects related to the intervention (ENS) can contribute to the consistency of the prioritization process of potential areas. In some cases, this information will only be determined during the process of designing the environmental service:

- The complexity of the changes necessary in use and practice (of the ENS providers);
- Operational restrictions that impede the implementation of the proposed ENS in the potential areas and;
- The time horizon needed for the proposed ENS to generate the desired positive impacts in the potential areas.

In the case this information is available, especially in the critical areas of accelerated degradation, evaluate if the time horizon for the proposed ENS to generate impacts is comparable to the **point of no return** for the provision of the ecosystem services in question. In certain cases the level of degradation is irreversible and the ecosystem service may already be lost (Wunder, 2005). In the prioritization process, it is strategic to identify areas in which the projections of degradation are comparable with the time needed for the proposed environmental service to generate the intended changes (FAO, 2007).

Proposed ENS with recognized additionality + viability to install = Adequate ENS

Priority areas for the PES schemes are areas relevant to the provision of ecosystem services in situations at risk from processes of ecosystem degradation, have the presence of potential providers of an environmental service with positive measurable impacts on ecosystem services, evaluated as viable and operationally recognized as complementary and additional to other existing conservation initiatives.

Potential areas + adequate ENS = Priority areas

4.1 Prioritization of areas to fight poverty

During the prioritization process, it is recommended to evaluate if the established criteria create the means to exclude areas with distinct socioeconomic profiles by conditions commonly associated with poverty – such as lack of legal title and other documentation pitfalls (Pagiola, et al., 2005) – and that can contribute significantly with the conservation objectives established. In this situation two options are possible: (i) make criteria flexible or (ii) establish complementary initiatives to resolve these limitations.

In initiatives that seek to integrate conservation objectives with fighting poverty, the process of area prioritization requires an additional step. In the case where there are similar priority areas with distinct socio-economic profiles, it is relatively simple to establish additional criteria for the preferential selection of areas with lower socio-economic indicators.

Nonetheless, it is reasonable to assume that areas with distinct socio-economic profiles will have distinct responses to the criteria established during the different prioritization stages. The option to pursue both objectives is valid and should be made explicit as well as the fact that this balanced approach to the objectives of conservation and fighting poverty implies **rewards** and not the establishment of optimal conditions for either of the two. Evidence to the effectiveness of PES schemes in fighting poverty are limited (Bulte, et al., 2008), and initiatives with this approach if not well designed, run the risk of not delivering on either one.

4.2 Prioritization of areas and operational aspects

There are situations in which the choice of areas with suboptimal cost-benefit or for tiered implementation independent of available financing can make sense. Operational aspects also should be considered in the process of prioritizing areas.

The need to test or adjust the proposed environmental service, whether due to the absence of a pilot stage or to increase adherence to specific contexts, may justify implementation in less critical areas with fewer factors for confusion or with easier access that would permit greater monitoring intensity.

In schemes in which non-monetary compensation are significant and variable due to some logistical aspects – such as technical support – the inclusion of additional areas in a given region can have a low additional cost if it is idle and there is already a structure installed with fixed costs.

Tiered implementation may be part of effective risk management in the proposed scheme. This allows for the development of local expertise and the gradual increase in operational capacity in the territory with positive impacts on the effectiveness of the scheme.

4.3 Prioritization of areas and impact evaluation

PES schemes that incorporate effectiveness evaluation from the design stage are rare (Baylis, et al., 2016). There is, however, growing demand for the schemes be subject to more rigorous processes of impact evaluation (Pattanayak, et al., 2010). Evaluating impact goes beyond monitoring indicators, involving estimation of the contribution of the scheme to the results observed from these indicators (Le Velly & Dutilly, 2016).

It is possible to incorporate relevant aspects of the monitoring process or impact evaluation in the process of prioritization of areas. The selection of control areas, on which the counterfactual in the evaluation process is based and example monitoring areas for the suite of indicators, reduces efforts and increases consistency in the evaluation.

4.4 Bias factors in the prioritization process

There are various bias factors that interfere in the process of prioritizing areas:

- Pressure to rapidly initiate operations;
- Pressure for rapid results;
- Evaluation of efficiency tied uniquely to financial execution;
- Pressure for visibility;
- Tendency to maximize indicators of effort (quantity in detriment to viability and need);
- Bureaucratic or documentation restrictions;
- Political pressures or ties to political cycles;
- Preference for areas with available information and;
- Pressure to accommodate social demands in detriment to the objective of conservation.

4.5 Prioritization of areas in the Bolsa Floresta Program

The prioritization of areas in the Bolsa Floresta Program have the following reference attributes:

Identification of relevant areas

- Sustainable Use Protected Area and;
- Presence of potential providers for environmental services in the area.

Identification of critical areas: risk of reduction in provision (**Table 7**)

- Provision of ecosystem services;
- Level of coverage by command and control structures;
- External pressure on the PAs with impacts on ecosystem conservation and;
- Occurrence of unsustainable activities in the territory.

Identification of potential areas: appeal of the scheme for potential providers (**Table 8**)

- Social vulnerability of potential providers, including access to public services;
- Level of social organization of potential providers and;
- Willingness to conserve (including traditional involvement in activities with larger potential for environmental degradation).

Priority areas for PES schemes (**Table 9**)

- Cost versus conservation impact (resident populations versus area of the PAs).

[30] Highlighted are the PAs in the **PBF territories.**

[31] Ex. Agriculture with fire, ranching, logging, mining.

Table 7. Application of criteria associated with risk to provision of ecosystem services (by conversion or forest degradation) in state Sustainable Use Protected Areas and with the presence of potential providers of environmental services[30]

State PAs	A. Sustainable use (s=1;n=0)	B. Presence of potential ENS providers (s=1;n=0)	C. Provision of ENS (high=3; medium=2; low=1)	D. Level of coverage by command and control structures (high=3; medium=2; low=1)	E. External pressures on PAs with impacts on the conservation of ecosystems (high=3; medium=2; low=1)	F. Occurrence of unsustainable activities in the territory (PA)[31] (intense/relevan =3; occasional=2; infrequent =1; nonexistent=0)	Risk of reduction in provision (sum C+D+E+F)
Juma SDR	1	1	3	2	3	3	**11**
Tapauá FLOREST	1	1	3	2	3	2	**10**
Uacari SDR	1	1	3	3	2	2	**10**
Rio Madeira SDR	1	1	2	2	3	3	**10**
Rio Amapá SDR	1	1	2	3	3	2	**10**
Puranga Conquista SDR	1	1	2	1	3	3	**9**
Guajuma APA	1	1	1	2	3	3	**9**
Cujubim SDR	1	1	3	3	1	1	**8**
Matupiri SDR	1	1	1	2	3	2	**8**
Igapó-Açu SDR	1	1	1	2	3	2	**8**
Piagaçú Purus SDR	1	1	2	2	2	2	**8**
Canutama RESEX	1	1	1	3	2	2	**8**
Rio Gregório RESEX	1	1	2	3	1	2	**8**
Canutama FLOREST	1	1	1	2	3	2	**8**
Amanã SDR	1	1	3	2	2	1	**8**
Mamirauá SDR	1	1	3	2	2	1	**8**
Rio Negro SDR	1	1	2	1	3	2	**8**
Uatumã SDR	1	1	2	1	3	2	**8**
APA MD Rio Negro - Setor Paduari/Solimões	1	1	2	1	2	2	**7**
SDR Canumã	1	1	1	2	2	2	**7**
FLOREST Maués	1	1	2	2	2	1	**7**
Rio Negro APA ME - Aturiá/Apuauzinho Sector	1	1	2	1	2	2	**7**
Rio Negro APA ME - Tarumã Açu/T.Mirim Sector	1	1	1	1	2	2	**6**
Catuá Ipixuna RESEX	1	1	1	2	1	1	**5**
Nhamundá APA	1	1	1	2	1	1	**5**
Caverna do Maroaga APA	1	1	1	1	3	0	**5**

Table 8. Application of criteria associated with the appeal of the PES scheme in state Sustainable Use Protected Areas and with the presence of potential providers of environmental services[32]

State PAs	A. Sustainable use (s=1;n=0)	B. Presence of potential ENS providers (s=1;n=0)	C. Social vulnerability of potential providers include access to public policies (high=3; medium 2; low=1)	D. Level of social organization of potential providers (high=3; medium=2; low=1)	E. Willingness to conserve (high=3; medium=2; low=1)	Appeal of the PES scheme to the providers (sum C+D+E)
Rio Negro APA MD - aduari/Solimões Sector	1	1	3	3	3	**9**
Matupiri SDR	1	1	2	3	3	**8**
Igapó-Açu SDR	1	1	2	3	3	**8**
Piagaçú Purus SDR	1	1	3	3	2	**8**
Canutama RESEX	1	1	2	3	3	**8**
Tapauá FLOREST	1	1	2	3	2	**7**
Cujubim SDR	1	1	3	2	2	**7**
Canutama FLOREST	1	1	2	3	2	**7**
Canumã SDR	1	1	2	3	2	**7**
Rio Negro APA ME - Aturiá/Apuauzinho Sector	1	1	2	3	2	**7**
Uacari SDR	1	1	1	3	2	**6**
Rio Madeira SDR	1	1	1	3	2	**6**
Guajuma APA	1	1	1	2	3	**6**
Rio Gregório RESEX	1	1	1	3	2	**6**
Amanã SDR	1	1	1	3	2	**6**
Mamirauá SDR	1	1	1	3	2	**6**
Maués FLOREST	1	1	1	3	2	**6**
Puranga Conquista SDR	1	1	1	2	2	**5**
Rio Negro SDR	1	1	2	1	2	**5**
Uatumã SDR	1	1	1	2	2	**5**
Catuá Ipixuna RESEX	1	1	1	2	2	**5**
Nhamundá APA	1	1	1	2	2	**5**
Juma SDR	1	1	1	1	2	**4**
Rio Negro APA ME - Tarumã Açu/T.Mirim Sector	1	1	1	1	2	**4**
Rio Amapá SDR	1	1	1	1	1	**3**
Caverna do Maroaga APA	1	1	0	0	0	**0**

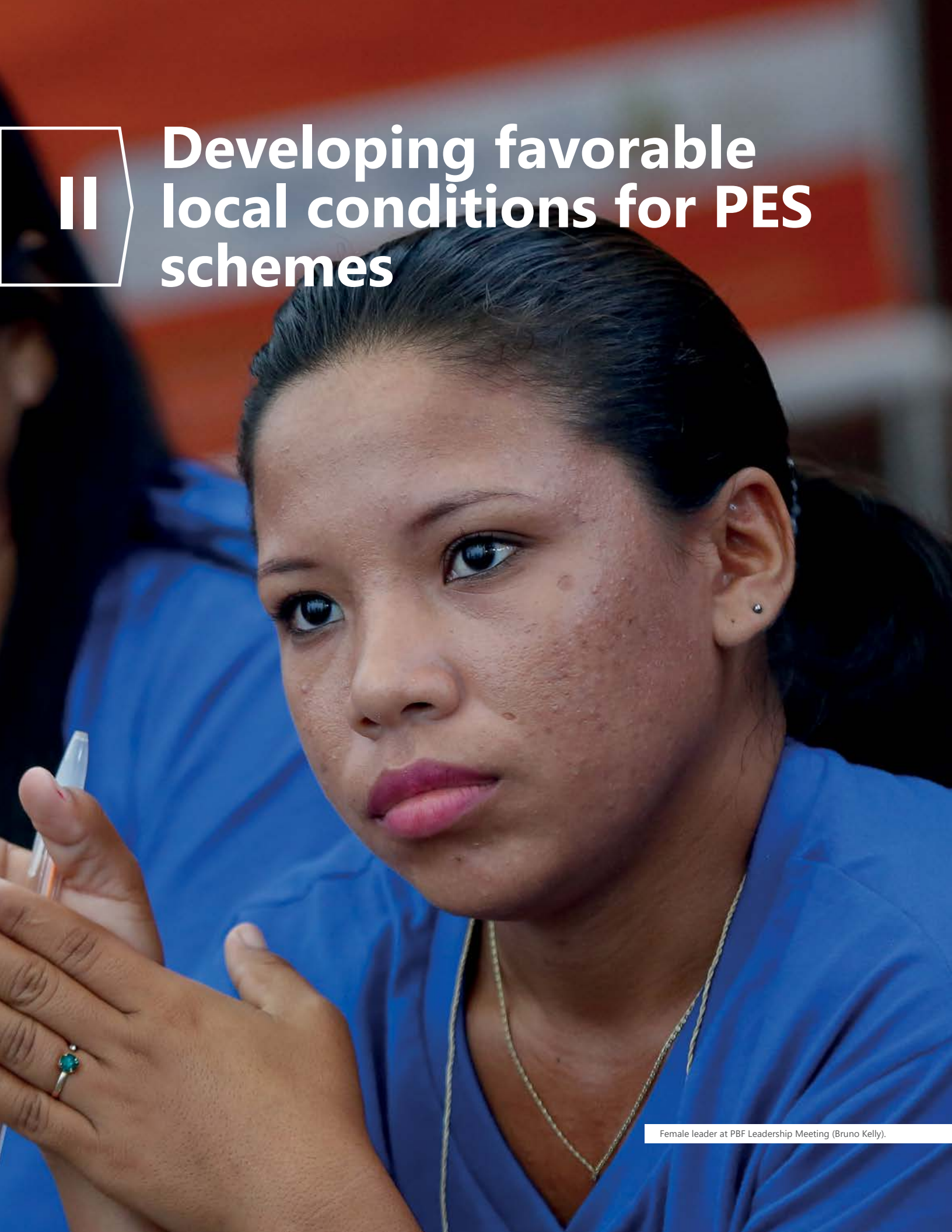
Table 9. Priority areas: application of the prioritization of areas to integrate the PES scheme – Bolsa Floresta Program[33]

State PAs	A. Sustainable use (s=1;n=0)	B. Presence of potential ENS providers (s=1;n=0)	C. Risk of reduction of provision (Block 7)	D. Appeal of PES scheme to providers (Block 8)	E. Costs versus impacts of conservation (resident population vs. PA area)	Prioritization (sum C+D+E)
Tapauá FLOREST	1	1	10	7	3	**20**
Cujubim SDR	1	1	8	7	5	**20**
Matupiri SDR	1	1	8	8	3	**19**
Igapó-Açu SDR	1	1	8	8	3	**19**
Piagaçú Purus SDR	1	1	8	8	3	**19**
Canutama RESEX	1	1	8	8	3	**19**
Uacari SDR	1	1	10	6	3	**19**
Rio Gregório RESEX	1	1	8	6	5	**19**
Canutama FLOREST	1	1	8	7	3	**18**
Rio Negro APA MD - Paduari/Solimões Sector	1	1	7	9	1	**17**
Canumã SDR	1	1	7	7	3	**17**
Rio Madeira SDR	1	1	10	6	1	**17**
Amanã SDR	1	1	8	6	3	**17**
Mamirauá SDR	1	1	8	6	3	**17**
Puranga Conquista SDR	1	1	9	5	3	**17**
Guajuma APA	1	1	9	6	1	**16**
Maués FLOREST	1	1	7	6	3	**16**
Rio Negro SDR	1	1	8	5	3	**16**
Uatumã SDR	1	1	8	5	3	**16**
Juma SDR	1	1	11	4	1	**16**
Rio Negro APA ME - Aturiá/Apuauzinho Sector	1	1	7	7	1	**15**
Catuá Ipixuna RESEX	1	1	5	5	5	**15**
Rio Amapá SDR	1	1	10	3	1	**14**
Nhamundá APA	1	1	5	5	3	**13**
Rio Negro APA ME - Tarumã Açu/T.Mirim Sector	1	1	6	4	3	**13**
Caverna do Maroaga APA	1	1	5	0	5	**10**

[32] Highlighted are the PAs in the **PBF territories.**

[33] Highlighted are the PAs in the **PBF territories.**

II Developing favorable local conditions for PES schemes



Female leader at PBF Leadership Meeting (Bruno Kelly).

II Developing favorable local conditions for PES schemes

CHECKLIST II. Analyzing favorable local conditions

It is important to continuously analyze the local conditions for the implementation of the PES scheme. These moments of critical reflection on the insertion of the scheme in the social context are crucial for its success. To this end, this section is organized into a series of questions to guide this process of reflection.

Environment of trust

- Are there objective actions for creating an environment of trust?
- Is there a clear strategy on focusing on maximizing the presence of technical teams and seeking proximity, availability and linkage?
- Does the deployment schedule provide time to build an environment of trust?
- Is there clarity regarding the different levels of trust for each group of providers?
- Are there technicians specifically assigned to manage the relationship within each group of providers (presence, proximity and linkage)?
- Is there a strategy for providers to easily access lead institution's contacts (availability)?
- Are there plans, goals and targets for the development of environments of trust required to implement the scheme?
- Do participants bring their experiences and local knowledge to the spaces for dialogue?

Effective spaces for dialogue

- How are effective spaces for dialogue encouraged?
- Are the spaces for dialogue continuous, structured and periodical? Therefore not limited to the initial stage of incentive to join the scheme or at times when problems occur?.
- Do the development of spaces for dialogue take into account logistics and local agendas, aspects and routine of the participants to determine appropriate schedules in order to encourage participation?
- Are teams responsible for implementing the scheme able to communicate assertively?
- Is it intended to attribute credibility to the information provided in these spaces fora (understandings are respected, agreements maintained, referrals are executed)?
- Do these spaces for dialogue respect differences of opinion?
- Are the incidents and unforeseen events properly communicated?
- Are these spaces open, accessible, and inclusive?
- Do the spaces prioritize active listening?
- Is there a concern on the amount of information and language following the targeted audience?
- Do the spaces help to broaden the understanding of the local context?

Positive Leaders

- Are the positive leaders identified?
- Are the new positive leaders being fostered?
- Does the lead institution of the scheme support the positive leaders?
- Do the technical teams recognize the positive leaders?
- Are the positive leaders informed about scheme issues at all times?
- Is there an understanding that positive leadership is going to be renewed and that legitimate changes are positive?
- Are the transition processes between leaders encouraged and facilitated, if necessary?
- Are there established strategies to accelerate and facilitate the integration of new leaders in the processes of reflection and discussion of the scheme?
- Are the training initiatives for young leaders, women leaders, local entrepreneurs, and others encouraged or supported?

Alignment of expectations

- Is there clarity regarding the expectations of the various players in the scheme?
- Is there clarity about the expectations of environmental service providers?
- Are the actors in the scheme, especially the providers, able to explain clearly the terms of the PES scheme?
- Is there a short-term shared agenda with defined goals, deadlines, and responsibilities?

Developing local capacity

- Is there a process of exchange of information relevant to the implementation of the PES scheme?
- Is there clarity about barriers that can be overcome and opportunities that can be accessed by training actions?
- Is there a local demand for training and capacity building actions?
- Are the existing demands clearly related to the environmental service solution proposed by the PES scheme?
- Is there a training offer that adheres to the demands of local capacity development?
- Has new knowledge been effectively incorporated into the practices of environmental service providers and other institutional actors as a result of the efforts of the PES scheme?
- Are new skills co-created by the actors in the PES scheme?
- Are the initiatives to share information and solutions among the groups of providers encouraged and observed?
- Is a continuing skill development strategy recognized and valued by provider groups?

Strengthening of grassroots organizations

- Is there a strategy for training and qualification of formal local leaderships?
- Do formal local leaderships have a defined participation in the governance structure of the scheme?
- Are grassroots organizations part of the scheme strategy?
- Do the grassroots organizations have clear roles in the PES scheme?
- Are the grassroots organizations representative of groups of providers?
- Are the grassroots organizations recognized as interlocutors in the decision-making processes under the PES scheme?

Administration of conflicts

- Are the co-existence agreements co-created? Are they capable to encourage participation, allowing divergences of opinion in the search for solutions and avoiding processes of embarrassment or intimidation?
- Are the conflicts understood with the needed importance and naturalness?
- Is the leading institution team prepared to deal with conflicts?
- Are the leaders empowered to manage conflicts?
- Is there a clear flow of governance to deal with conflicts?

Strategic actions in the institutional environment

- Is there an increasing understanding of the actors and their institutional roles within the PES scheme?
- What is the current ability of groups of providers to have access of public policies of their interest?
- Are actions or necessary interventions that are beyond the scope of action or governability of the actors in the scheme identified in the environmental service ToC?
- Do the groups of providers (and organizations representing them) manage to access the relevant institutional actors to maintain the institutional conditions necessary to maintain the gains from the scheme?
- What is the current ability of groups of providers to seek and negotiate issues of their interest with institutional stakeholders?
- Are there advances in accessing and negotiating capacity of the groups of providers with the institutional actors?
- Are there actions planned to encourage and enable access to providers to institutional actors?

Social learning

- Are the interactions given as moments of reflection on practice and learning?
- Are the moments of reflection on practice cyclical and inclusive?
- Does the planning for future actions in the framework of the scheme always take into account the lessons learned from previous efforts?
- Is there a continuous effort to develop and maintain a common understanding about the PES scheme and its components and current situation?
- Is the team of the lead institution and institutional partners able to co-create solutions with the groups of provides?
- Is there institutional openness in the lead institution and partners to adopt changes proposed by other actors, especially the group of providers?

This checklist may be revisited periodically throughout the deployment process. There will be no immediate answers to all the questions asked and their relevance for each scheme should be considered. The issues proposed here are likely to raise the need for consultation with the various actors involved.

Logging the answers to the questions in whole or in part may be interesting allowing a better understanding of the decisions made during the design stage of the scheme. However, this exercise may be overly bureaucratic, damaging the interaction and creative process that the PSA-canvas intends to encourage.

5. Introduction

PES schemes are fundamentally about changes in the use of the land and natural resources. This influences a change in the pattern of development for human populations within a given ecosystem or territory. Even in the cases in which ownership of land and natural resources are organized individually, the positive impacts expected from the provision of ecosystem services are a result of collective action.

To incentivize changes, it is necessary to recognize existing local knowledge, bring new understanding and develop awareness (Cundill, et al., 2014). Nonetheless, the PES scheme requires going beyond an understanding of best practices or the impacts that current activities have on the provision of ecosystem services. Changes in attitudes and practices are necessary.

It is important to stress that while the experience and operational capacity of the institutional lead are important, its role is in most cases is limited to mediation, facilitation, incentives and promotion. Thus the success of the scheme depends essentially on the local capacity to put the necessary changes into practice. In this sense, the development of capacity of the providers and the grassroots organizations that represent them is fundamental to the effectiveness, sustainability and permanence of the positive impacts of the PES scheme.

Though technological solutions play an important role in the process of change, increasing the set of alternatives, their impacts are limited if social and cultural aspects are not appropriately considered (Cundill, et al., 2014). Projects are dynamic systems influenced by the perceptions of the actors involved (Diallo & Thuillier, 2004). There are considerable challenges of reaching the desirable outcomes and those include understand human behavior and social change.

With such an aim it is important to not ignore the complex and evolving interactions between community members, state entities, and underestimate the dynamic nature of institutional governance in socioeconomic systems. Also important is to acknowledge that local actors do not simply follow the rules, but most of the time reformulate them in practice, or reject them based on socially embedded beliefs and conventions. Institutional processes aiming at changing behavior, in this sense, are dynamic and occur in very different ways, in diverse contexts.

The implementation of PES schemes is impacted by diverse aspects of the social context, such as, power structures, existing political relations, different access to resources, among others (Vatn, 2010). In most cases, an equilibrium is established in existing relations that are regulated by a collective, normally informal, of social rules and norms not easily perceptible from the outside.

It can be affirmed that the point of departure for the creation of adequate conditions for the implementation of the PES scheme is to develop an environment of trust that permeates the diverse actors involved in the scheme, especially the groups of providers, their leaders and representatives. The process of implementing a scheme is more inclusive and effective in social contexts in which an environment of trust is created.

During the implementation of the PBF, it was possible to observe that groups of providers that receive equal reimbursements and payments had very different results in terms of local development. This diversity of results, from a single incentive, is due to intangible aspects of local development: (i) capacity for engagement and interaction; (ii) a culture of collective learning; (iii) the way in which conflicts, challenges and failures are understood and handled; (iv) the capacity to understand institutional roles; and (v) objectively identify necessities and demands for needed support. These aspects determine the success of a PES scheme.

It is important to notice that this heterogeneity and the capacity of local actors to adapt to new rules should be should be expected. Local actors normally do not just follow new rules, but adapt them to their realities.

Consideration of these intangible aspects increases the capacity to incorporate perceptions of value held by the providers as to natural resources and the management practices adopted, into the operation of the scheme. These aspects are indicative of how a specific group of providers will perceive the desired actions of a given scheme. This perception determines the understanding of which actions can have the effect of adding or subtracting providers to the PES scheme (Engel, 2015). Intangible aspects are, by nature, difficult to be measured and as a consequence become neglected in the process of implementing PES schemes.

The identification, qualification and training of local leaders is another important aspect of implementing PES schemes. Positive local leaders are central elements to the organization process needed for PES schemes to deliver expected results. In this sense, instead of investing in training local leaders, it is necessary to make possible their participation in decision processes and the governance structure of the scheme. Kosoy and collaborators (2008) (apud Eloy, et al., 2013), stress that few schemes have favored the participation of providers in the decision processes.

One of the possible reasons for this can come from the fact that upon increasing the participation of providers, a wide range of local demands, related or not to the management of natural resources, is brought to the negotiating process. This scenario increases the operational complexity, compromising those schemes that do not include the participation of providers from the beginning, or that were not designed to be dynamic or adjustable.

As the socioeconomic context is intrinsically related to the standards for use of land and natural resources, it is reasonable to assume that the disposition to conserve is inversely proportional to social vulnerability (Bakkegaard & Wunder, 2014). While a simplified PES scheme approach recognizes that effective change is a direct consequence of positive financial incentives, in practice there can generate only a temporary and limited change, lasting as long as the incentives remains. There are many shortcomings and problems of interventions based on solely on rewards. This can be more evident in socially vulnerable contexts, but is not restricted to those. It is more probable that significant and lasting change in the scope of the schemes occurs from designs in which compensation happens simultaneously, increasing the disposition to conserve immediately, decreasing structural stressors related to social vulnerability.

It is necessary, therefore, to think of local development as a whole. Consider that in many cases the most prominent demands and those with the most potential to mobilize are not, at least in initial stages, directly related to conservation efforts. This frequent scenario requires a strategy to address local demands and does not signify a loss of focus in the maintenance of ecosystem services.

Schemes that for diverse reasons avoid questions of health, education, access to energy and water, guarantee of permanence on the land or access to resources in order to focus on the conservation objective, has a large possibility of achieving neither one nor the other.

In dealing with complex problems in a dynamic social context it can be expected that the day-to-day operation of the scheme will be replete with unforeseen events. Dealing with unforeseen events and alterations should be considered natural during the operation of the scheme. Thus a good design for the PES scheme should be flexible enough to allow for changes in strategies and priorities. This flexibility should permeate the entire scheme, but particularly the design of the environmental service.

Thus, the development of local capacity cannot be based exclusively on instrumentalization for a particular situation or interventions that were initially predicted. The development of critical capacity and facilitation of leaders is needed, as well as a collective culture of continual reflection on practices to evaluate opportunities and barriers, understand the need for space to fail, and to act based on what was learned in this reflection.

This approach is essential in order for the change process to occur efficiently, timely, autonomously and continually. This process by which collective change occurs from social interactions is called **social learning** (Reed, et al., 2010; Wals, et al., 2009; van Epp & Garside, 2014).

In this section, various elements related to social learning will be discussed and their ramifications for the effective implementation of a PES scheme. As was observed by several authors, there is no one model to follow, but components to be considered (Cundill, et al., 2014). Various possible precursors have the potential to gradually create local capacity and adequate confidence levels for the desired change.

Local conditions favorable for PES schemes were organized in this section into three components with incremental levels of complexity: (i) building an environment of trust; (ii) developing local capacity and; (iii) expertise for strategic work in the institutional environment (**Figure 20**). Upon analysis of the elements that comprise each of the conditions, a desired evolution can be seen in relation to the scheme and social learning.

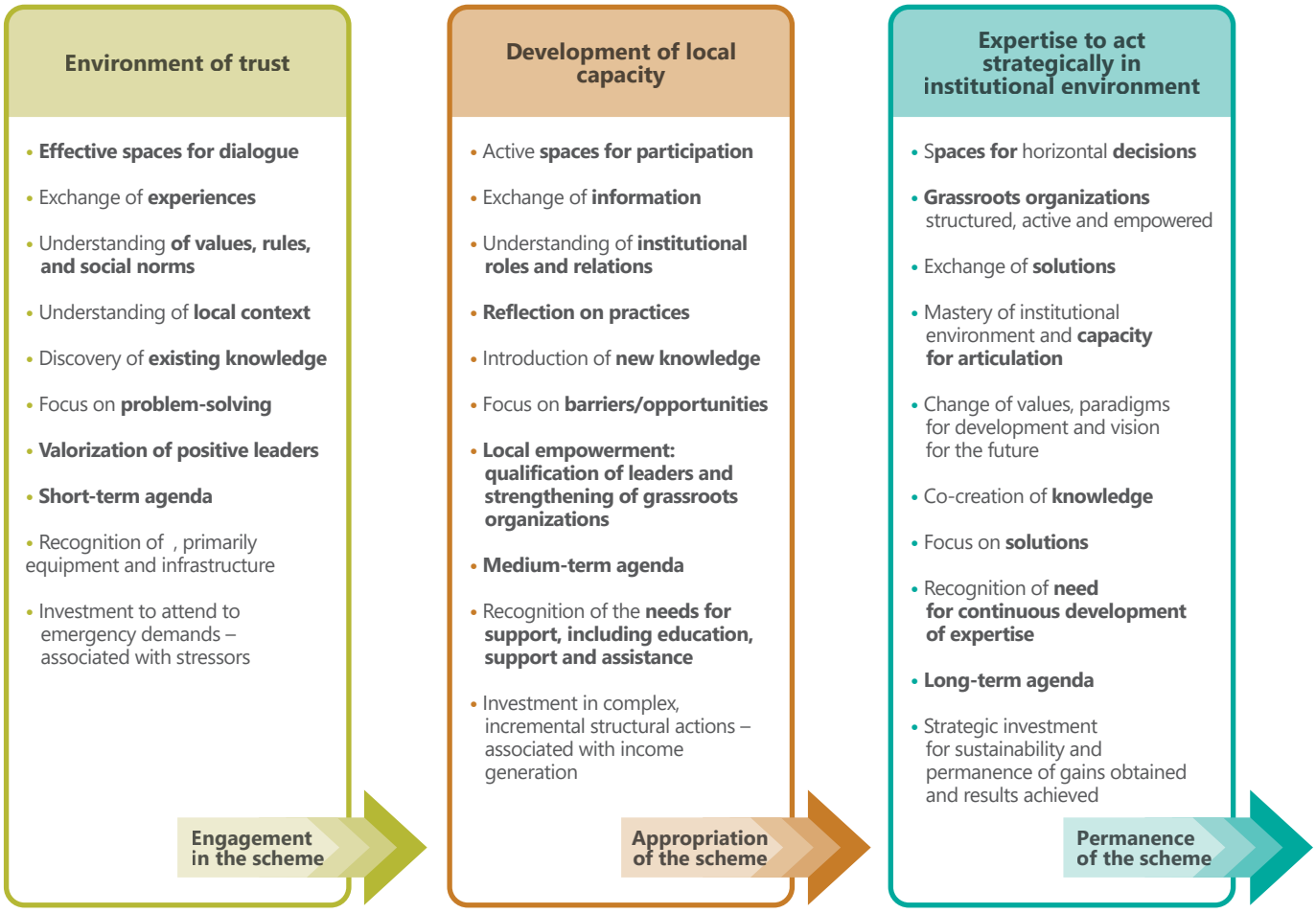


Figure 20. Components of favorable conditions for a PES scheme

It cannot be anticipated if a specific development process with favorable conditions will exactly follow this model. One should not, then, have the pretension of positioning the provider groups in one sole component, nor surmise that it is necessary that all the elements of a given component be present or satisfied before acting in relation to others. It is possible that distinct groups of providers need more investment (or time) in one specific component or that one element does not make sense for the context in which the scheme is inserted.

Participatory processes should be prepared to travel distinct paths from those originally foreseen (Cundill, et al., 2014). More than a formula, what is needed is to consider a vision of the process in which the collective construction of adequate conditions for the scheme occurs concurrently with the implementation itself.

5.1 Cycles of social learning

As already stated, the process by which collective changes occur from social interactions is called **social learning** (Reed, et al., 2010; Wals, et al., 2009; van Epp & Garside, 2014). Social learning is understood as an incremental process of reflection about context, attitudes and practices – described by McCarthy and collaborators (2011) as cycles of social learning (**Figure 21**).

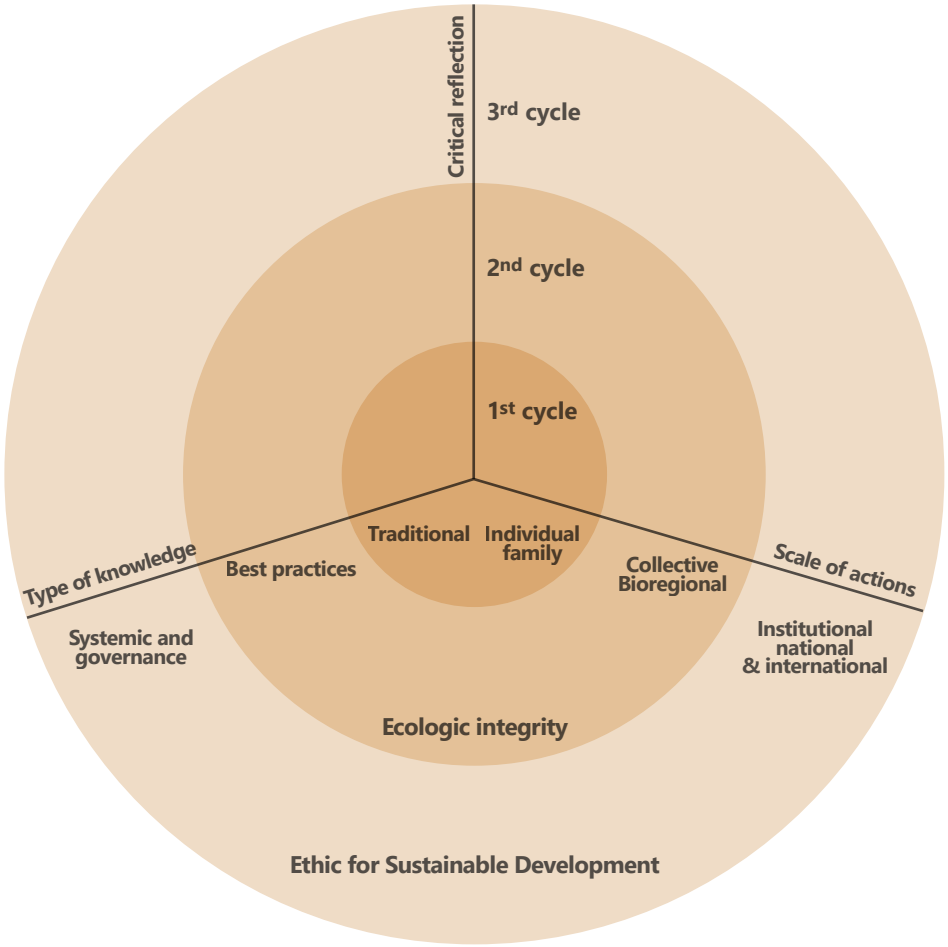


Figure 21. Cycles of social learning[34]

The first cycle of social learning is centered on the efficiency of the work and their routines. It is a process of reflection in which questions are raised as to whether the actions being implemented the best way or are the correct ones. At this level of reflection indicators for success do not have a clear causal relation with the established objectives and are normally associated with levels of effort, the relation between resources employed and a perception of results obtained directly from each action. The objectives or the chosen actions to achieve them are not questioned.

The second cycle of social learning, integrates the process of reflection about if the chosen actions are the most adequate to direct a given situation or to achieve the established objective. At this level, the reflection seeks, through analysis of context, barriers and opportunities to identify the best group of actions to achieve a specific objective.

The metrics of success are related more clearly to the objective and the evaluation of actions is relative to its contribution to the total result.

The third cycle is associated with questions concerning values, beliefs, relations of power and systems of governance. At this level, reflections include critique over what is decided, what is correct and what are the references to establish the intended objectives. In this step, the process of developing local capacity passes from incremental to disruptive. The third cycle of social learning should be the ambition of initiatives with a transformative agenda.

The interactions required for social learning require an environment of trust. To the degree the questions, which incite a process of reflection, become more sophisticated, different types of understanding become integrated (**Figure 21**) and new expertise becomes necessary. The processes of reflection deepen and the scales of time tend to grow, allowing for planning with extended time-frames that accommodate more ambitious and more impactful objectives.

[34] Adapted from McCarthy, et al., 2010.

During the implementation of the scheme, it should be anticipated that part of the actions will not come out as planned, that mistakes and failures occur. Besides considering the need for space for error in the design of the scheme, it is important to use these situations to identify the opportunities to improve and propose actions that increase the success rate of actions and the effectiveness of the scheme as a whole.

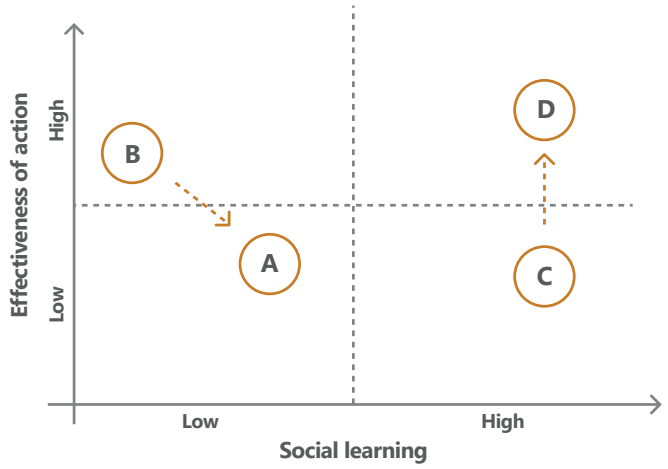


Figure 22. Different scenarios of social learning

In **Figure 22** the worst-case scenario possible is one in which there is a failure and no learning (A). Following this rationale, when there is success without learning (B) it is possible to consider that the same will not repeat itself in future actions. On the other side, there are cases in which learning is enabled in situations of action (C) with low effectiveness, the possibility of success in following actions is increased (D).

The more disruptive the change proposed by the PES scheme, the greater the efforts should be to incentivize social learning in the group of providers. To the extent the social learning process achieves more advanced cycles, structural challenges to local sustainable development and the permanence of gains obtained are identified and recognized by providers. Acting on these challenges requires reflection in terms of paradigms of development and vision for the future.

With time, spaces for active participation should come to pass spontaneously, requiring less external effort to incentivize, support and facilitate – coming to function as horizontal decision spaces where reflection ought to take place. These come to be enabled by local organizations that are structured, active and empowered. Efficient and objective exchange of experiences, information and co-creating solutions becomes practice and routine.

6. Building an environment of trust

The point of departure for the creation of adequate conditions for the implementation of the PES scheme is an environment of trust that includes diverse actors, particularly local communities or provider groups, their leaders and representatives. The construction of an environment of trust has significant influence on the willingness to accept the scheme. The process of implementing the scheme is more inclusive and effective in social contexts where an environment of trust is prevalent. The building – and maintenance – of an environment of trust is a continuous process (Christopher, et al., 2008).

There are different levels of trust (**Figure 23**) associated with the levels of involvement and participation. These make different levels of action possible. The environment of trust requires an investment of time, resources and a clear strategy for it is not the natural state of relations at the beginning of implementation.

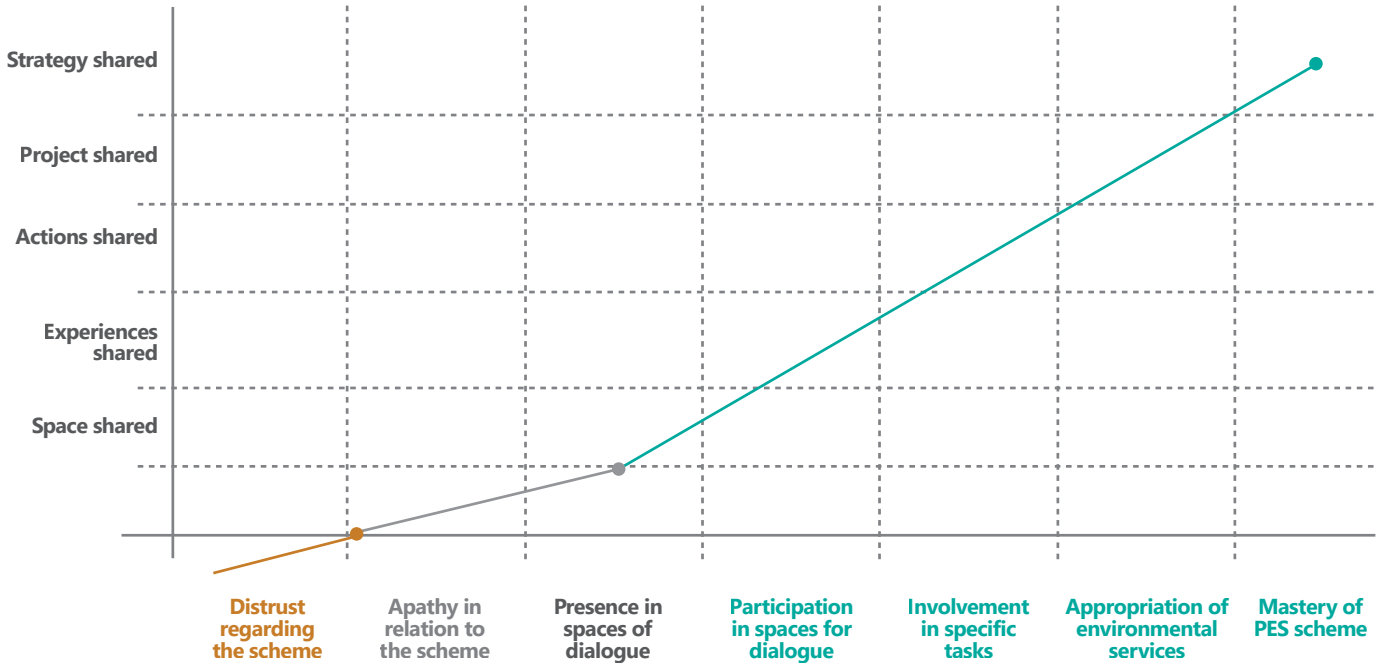


Figure 23. Levels of trust and action in the scope of the PES scheme

Based on the FAS experience implementing the PBF, there are five essential elements to build an environment of trust for PES schemes: (i) effective spaces for dialogue; (ii) valuing positive leadership (iii) aligning expectations; (iv) shared short-term agenda and; (v) presence, proximity, availability and connections.

6.1 Effective spaces for dialogue

Effective spaces for dialogue are those in which relations are: (i) based on honest and assertive communication; (ii) in which credibility is given to the information provided; (iii) in which actions are realized as agreed; (iv) in which differences of opinion are accepted and; (v) in which incidents and unforeseen events are disseminated and shared.

Efforts to improve honest and assertive communication should observe:

- Creation of spaces for dialogue that are appropriate and inclusive;
- Exclusive moments for active listening;
- Appropriate quantity and wording of information and;
- Co-creation of rules that incentivize participation, allow for differences of opinion in the search for solutions that avoid processes of constraint or intimidation.

Avoid limiting the emphasis on creating spaces for dialogue to the initial phases of implementation of the scheme, as far as public consultations and diverse meetings. The maintenance of an environment of trust and the development of local expertise requires that these spaces be continuous, systemic, structured and periodic. Appropriate spaces for dialogue take into consideration logistics, schedules of the participants to determine appropriate hours and incentivize participation. This normally implies an additional effort on the part of the team responsible for implementation of the scheme to adapt to local conditions.

Consideration should be given to the need for affirmative actions to create real inclusive spaces for dialogue. Young people, women, the elderly, isolated providers or at the base of the local structures of power can require specific strategies and eventually active recruitment. The Bolsa Floresta Program, for example, uses a strategy of specifically inviting women from the community to the first meeting. By inviting the women, the entire community tends to follow. This way participation is increased as is a common understanding of the subject.

While it can appear counter-intuitive, actions that initially prioritize moments for dialogue with active listening and postpone moments for information have better results. Upon realizing they have been heard, actors also increase their disposition to hear. Effective spaces for dialogue should prioritize:

- Recognition of the actors in the scheme;
- Understanding of values, rules and social norms;
- Comprehension of the social context;
- Alignment of expectations and intentions;
- Clarity in relation to what is valued, desired and intended;
- Discovery and understanding of existing local knowledge and;
- Exchange of experiences.

This initial step of listening can prioritize the reporting of initiatives, collective efforts and current demands already realized in the community. These moments allow greater understanding of the local context and allow for a better understanding of the group of values, rules and cultural norms that determine the social relationships between the providers and influence their decisions.

Information gained from active listening allows for adjustments on the part of the lead institution and exchange of experiences for building or improving the scheme. Points of contact are created between the information intended to be shared in the scheme and the local reality, allowing for a clear presentation of the differences between the proposed scheme and the previous experiences of that group of potential providers.

6.2 Positive leaders

Positive leaders are essential to the process of building an environment of trust. Positive leaders are recognized, respected and considered trustworthy by a group of providers. Leaders should have a constant and active presence in spaces for dialogue. In terms of practice, it is expected that positive leaders act in order to:

- Promote broad participation in spaces for dialogue;
- Prioritize collective interests;
- Act constructively;
- Respect differences of opinion and seek consensus;
- Contribute to the construction of a clear work schedule and;
- Incentivize collective action.

Positive leaders don't need, despite their leadership, to occupy specific roles or represent only groups of potential providers. Others considered positive leaders are the local social entrepreneurs recognized for their experience or capacity and their disposition to engage in the scheme, serving as an example for other potential providers. One should be prepared to work with a diversity of positive leaders with different profiles.

The PBF experience broadened this scope by including other local leaders that represent groups of youth, women, local entrepreneurs among others, which were invited to participate in capacity building efforts for leadership, contributing not only to increase diversity of the group but to qualify these efforts by adding different points of view about the same territory and thus expanding the quality and breadth of trainings.

One of the possible steps in the building of an environment of trust, particularly in larger groups, is to organize a group (smaller) of positive leaders that take on the responsibility of multiplying the spaces for dialogue and sharing information in the territory. In these cases, it is important to guarantee that there is structured representation (i.e., through elections or nomination) for all the groups of providers from diverse regions.

Valuing positive leadership requires that their credibility be reinforced, or, that agreements are followed, even if they, due to circumstances, are no longer of interest to the scope of the agreement. Because if there is a break, there are risks of mining the confidence of provider groups in those leaders and impair progress in implementing the PES scheme.

The limitations of these positive leaders should also be considered: Giving them disproportional and responsibilities not agreed to, can erode credibility and create instabilities in social relations of the group of providers.

There should be a degree of rotation in the leadership groups. This rotation can occur for a variety of reasons, among them – and inevitably – in the case that leaders occupy elected positions with defined terms. Political rotations and changes are normal, positive and should be perceived as natural. But they tend to impact the environment of trust and the development of local capacity in diverse ways. In this sense, it is essential to:

- Consider that the leadership group will struggle through processes of renovation and rotation that will require adaptive planning;
- Not to take sides in the process of alternating politics in the provider groups, seeking always to maintain the spaces for dialogue open to all groups;
- Register and save all the agreements and decisions with the groups of providers;

- Incentivize a period of transition between leaders, with facilitation if needed;
- Establish strategies that accelerate and facilitate the integration of new representatives into the processes of reflection and discussion and;
- Be proactive in the process of building young leaders, women leaders and local leadership, among others.

6.3 Alignment of expectations

The social context is impacted by the implementation of the scheme. The interventions that comprise the PES scheme have a great potential to create positive and negative expectations. In the same way, schemes can cause imbalances in existing relationships and eventually provoke conflicts.

These situations are associated with poor management of expectations in relation to the potential benefits derived from a scheme. This is associated with a lack of clarity as to the terms that condition receiving these benefits which contributes to an undesirable environment lacking trust.
An environment lacking trust can be triggered by stressors that include (i) situations of social vulnerability or social exclusion; (ii) precarious nature of land title; (iii) precarious nature of guaranteed access to resources; (iv) situations of violence; (v) impacts from extreme climatic events that drastically alter subsistence conditions.

Trust and communication are inseparable critical factors in the success of development (Diallo & Thuillier, 2004). It should be stressed that "understanding what is being proposed" and "agreeing to that which is proposed" are two different things and many times are treated as equivalents in outreach processes due to difficulty in communication across cultures. The effort to establish honest, clear and assertive communication, within a continual information process of alignment of expectations, is essential to reduce strain and nourish an environment of trust for the scheme.

It is reasonable to expect that during this stage the initial focus of providers is in problem-solving and identifying needs. As detailed further, with the adequate development of local capacity, there is a gradual change toward co-created solutions and the search for an institutional and governance structure appropriate for the collectively established development objectives.

Alignment of expectations is essential to reduce noise and create an atmosphere of reciprocal trust in relation to the scheme intended to be set up. Thus, beyond communicating the terms of the scheme it is important to be explicit about the associated risks, potential adverse impacts, necessary investments and the time horizon used for results to be observed and payments distributed.

An initial indicator that efforts to align expectations are going well comes when a group of providers – and other actors in the scheme – can explain the PES scheme and its terms clearly. When they are able to share a clear and well-defined objective and a work plan, we can consider that efforts to align expectations have advanced.

6.4 The importance of a short-term agenda

Communication efforts should, as soon as possible, converge on the alignment of expectations and the next steps to be taken by the actors. In order to build an environment of trust, it is recommended that an agreement should be made as to a set of next steps that include simple and tangible short-term deliverables. Medium and long-term actions are incorporated incrementally and in a structured way. The longer the planning proposed, the more it is subject to changes, requiring an established environment of trust in order to move forward with the needed adjustments.

The period the start of the initiative and the implementation of benefits is crucial for building trust. Most of the problems with such initiatives are related to unfulfilled promises or the time it takes to fulfill them.

At this point, it is worth evaluating which planning cycle is culturally used by providers, which can be associated with harvests, seasons, months or years. An initial emphasis on planning and commitments to actions outside of these cycles can be tiresome, create disinterest reduce participation.

It is more reasonable that providers initially commit to short-term actions with less risk and investment. If other actors in the scheme receive the agreed benefits, credibility is given to the scheme, generating potentially positive ramifications for engaging new providers and on the willingness to commit to medium and long-term actions.

The ideal is that initially the establishment of actions are approached didactically, prioritizing questions that are relevant to providers, with tangible and easily measured results. One possible strategy is to break-up a determined ENS intervention into smaller actions. For being short-term, these actions also incentivize and create opportunity for reflection about the practice in the spaces for dialogue, prompting involvement and awakening actors with positive results. Additionally, this practical short-term agenda allows for the evaluation of intangible aspects of development: (i) capacity for engagement and interaction; (ii) culture of collective learning; (iii) manner in which con-

flicts, problems and failures are faced and addressed; (iv) capacity to understand roles, identify needs and request needed support. These aspects are key to the success of a PES scheme.

Social learning from efforts to realize short-term actions allows for the development of expertise to mediate differences and deal with more complex actions and problems to come later in the implementation of the PES scheme. It develops the confidence to communicate, share incidents and unforeseen events, and create habits of accepting different opinions and collectively creating solutions to the problems faced.

6.5 Presence, proximity, availability and connections

The entire process of building trust requires presence, proximity, availability and connections. These elements demonstrate that the representatives of the lead institution are interested in the community broadly (Christopher, et al., 2008) and not merely in that which concerns the PES scheme.

Contact with the providers should not be limited to formal moments or situations in which something needs to be resolved. Participation in social, cultural and sporting events in the communities by groups of providers is a positive way to participate in community life and increase understanding of the social context. Participation provides routine for the providers - e.g. a game of soccer at the end of the afternoon such as is the custom for PBF providers – is important to create connections.

In this light, it is recommended that facilitators – mobilizers or representatives – be organized by region, and not by theme, or by stage of implementation of the PES scheme. This allows for continual presence together with the community, the creation of connections and the establishment of a point of reference in the lead institution for the scheme for each group of providers.

Additionally, it is important that the facilitator and the team assigned to each group of providers be accessible and can be contacted whenever necessary and not only at pre-established times. Having a predictable calendar with the community reduces anxiety associated with the PES scheme and contributes to an environment of trust.

Communicating ahead of time with local leaders about the arrival of facilitators, partners in the territory, nourishes local leadership, who demonstrate understanding of the actions relating to the scheme, as well as predicting local needs and demands that arise during field work. Nonetheless, once in the territory, even if for a scheduled meeting with a provider, leader or local institutional partner, it is important to be available and accessible to the other providers.

It is improbable that all interactions between social actors in the process of change – such as PES schemes – occur in predictable ways, in other words, without noise, lapses in communication, slip-ups due to cultural insensitivity or other friction. Investments in presence, proximity, availability and connection create the network of assurance that is key to overcoming situations such as these (Christopher, et al., 2008).

7. Developing local capacity

The development of local capacity is more effective and less expensive when a level of engagement already exists prior to the scheme.

In order to implement the environmental service, deliver the results established in the PES scheme and receive conditional payments, providers need new skills and expertise. Besides the technical skills relative to improved practices in the use of land and natural resources, inter-personal and management expertise are also frequently needed. It is important to have a collective understanding of which skills and expertise intends to be developed and for what purpose, while at the same time being flexible in a dynamic context to change these presuppositions.

The development of local capacity cannot, however, be limited to instrumentalization for a particular situation. Critical expertise needs to be developed, including a collective culture of reflection about the context and practice, evaluation of opportunities and barriers, understanding of the need for a space for mistakes, and primarily learning through mistakes.

7.1 Spaces for active participation

In the process of developing local capacity, the effective spaces for dialogue improve in terms of their representation, quality and effectiveness, coming to become spaces for active participation. The elements that tend to be present in these tend to include:

- Exchange of information;
- Reflection on practices;
- Understanding of roles and institutional relations;
- Understanding of opportunities and barriers and;
- Introduction of new knowledge.

If in these dialogue spaces the focus is on exchange of experiences and on problem-solving, in the spaces for active participation there is already a more clear definition of the challenges and priority actions. Thus, the focus departs from exchanging information to prioritizing actions, building a better understanding of institutional roles.

The spaces for active participation should be periodically retrofit with information from transparency activities such as financial and social accounting. During these events there is a declaration of investments made and the resources used. It is important that actors have clarity as far as what was realized in relation to the plan and promote reflection as to the implementation of the PES scheme (e.g., history, accomplishments and opportunities, barriers). For this purpose, it is important to consider cyclical moments for evaluation in the regular operational planning with the groups of providers. In PBF scheme, due to logistical limitations, these moments happen as part of the leadership meetings that take place twice a year and during the investments workshops at the communities or sectors of each PA. Additional meetings, gatherings and workshops are included in the agenda whenever necessary due to specific demands. In spaces for active participation, the introduction of new understanding allows for and promotes the development of local capacity.

7.2 Training offer

There is a delicate balance between centering efforts and resources on themes considered relevant for the success of the scheme, but that do not attract immediate interest from potential providers, and themes of great interest but little potential for impact in the scheme. The process of implementation should be flexible to balance efforts and resources, including a distribution of the resources destined to the offer of training among the themes considered relevant for the implementation of the scheme and others of interest to the potential providers. In the most common scenario, training demands with the largest impact on the PES scheme are associated with levels of ecologic integrity, ethic of sustainability (**Figure 24**) and local demands restricted to questions of an individual order that are short-term and related many times to emergency questions. It soon becomes important to dedicate some time to building common understanding of the expertise needed for the implementation of the scheme, but also to identify stressors and seek to create local capacity to address these.

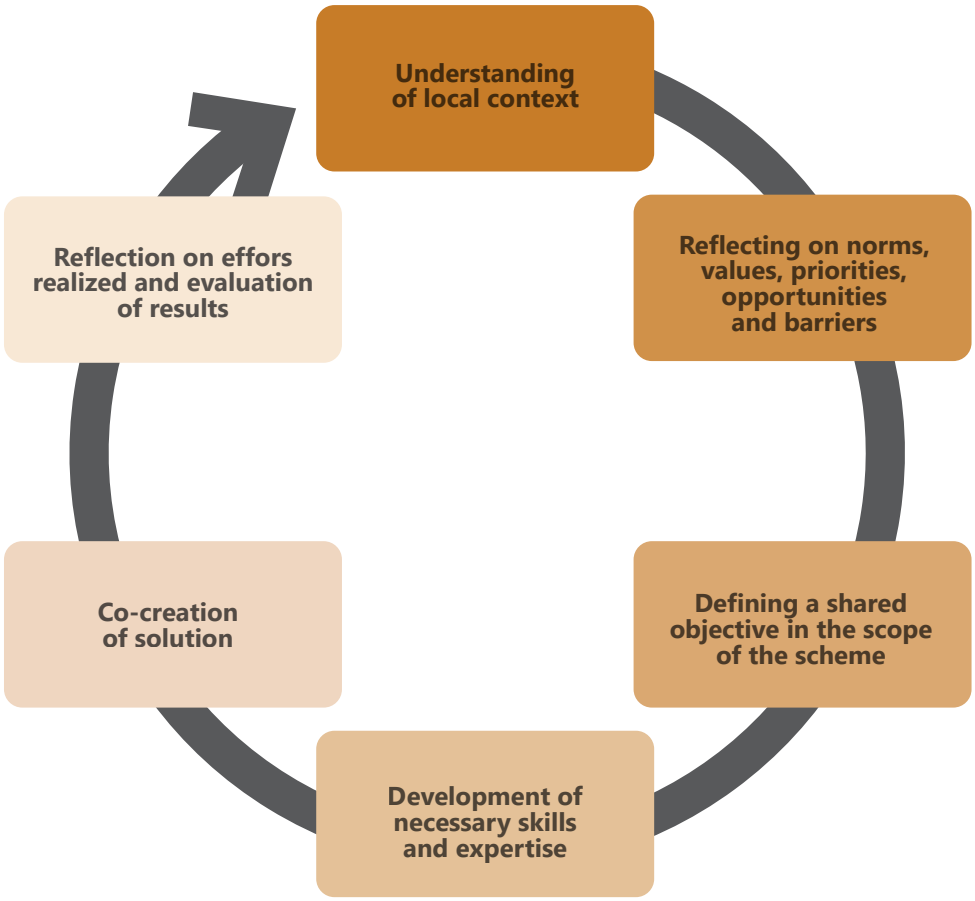


Figure 24. Development of integrated skills and expertise for the operation of PES schemes[35]

It is possible to point to examples in the PBF experience in which, in earlier moments, training associated with sustainable business management had much less participation than others associated with the repair and maintenance of electric generators or motors for local boats. The training needs can be technical in nature, managerial or relational. In the scope of the scheme, trainings of a technical nature are focused on best practices, mastery of new knowledge around techniques and technologies on the use of land and natural resources. Technical trainings intend to develop: (i) collective understanding of the negative impacts of unsustainable practices in order to raise consciousness and implement socially regulated models and (ii) the capacity to do differently.

Many PES schemes have the purpose of adopting alternative uses of land, diversification and addition of value to production, seeking to reduce impacts on the ecosystem and as a result, increase the provision of ecosystem services. Management trainings, on the other hand, are focused on contributing to the development of executive and managerial competency.

This type of training is difficult in groups of providers with a low level of instruction, with limited access to low-quality formal education, or low connectivity.

One of the lessons learned from the PBF is that investment in relevant education, whether by direct investments in access and quality, enabling partner actions or through advocacy, allows for a significant increase in the effectiveness of specific training efforts for the PES scheme over the medium-term, particularly for those of a managerial nature (see **Box 4. Access to quality education: the development of an integrated and relevant education model based on reality of the forest**, pg85).

Trainings of a relational nature are based on expertise to promote collective action, engagement and in developing concepts such as equity and inclusion. These can be planned training actions for mobilizers, facilitators, mediators, and team leaders, among others. Still, it is recommended that initiatives with the purpose of increasing relational expertise for the groups of providers be incorporated in all the opportunities for interaction and in technical and managerial trainings.

The strategies for these trainings should take into consideration that understanding and information do not lead to automatic and effective changes in culturally rooted attitudes and practices. There are various barriers to change that require much more than the offer of trainings to overcome. Overcoming these barriers is a consequence of the processes of reflection described in the cycles of social learning that occurs in the spaces for active participation. Structured moments for trainings are important, but the development of training requires other aspects that should be considered by the institutional lead in the planning process, their proposals and partners for developing local capacity:

- Proximity and frequent interaction;
- Adapt language, content and dynamic to local context;
- Integration of moments for training, practice and reflection;
- Implementation of demonstration areas, pilots or equivalents and;
- Monitoring, analysis and dissemination of results of training efforts.

Training efforts compete, in many cases, with subsistence efforts. Even if in the medium-term the knowledge gained has a positive impact on the quality of life of providers, it is possible that in the short term, the dedication required has a negative impact on subsistence conditions. This situation tends to reduce willingness to accept the scheme or diminishes adhesion to the development of local capacity. For schemes in which payment is exclusively conditional and does not include an ex-ante incentive, groups of providers in vulnerable situations will probably not have the means to participate sufficiently in efforts to develop local capacity. In these cases, as discussed in **Item 3.8 Rewards, incentives and payments** (pg47), it is recommended that the proposed rewards make participation of the providers possible in efforts to develop local capacity.

The direct monthly transfer of resources called for in the PBF contributes to meeting the immediate needs of families, increasing their participation in training actions. Additionally, the training offers take place in the territory instead of relocating providers to other areas. Since the beginning of the PBF, a schedule of diverse training was created, addressing local demands, specific interests and opportunities in the scheme. In several cases, it fell to the FAS, as lead institution, to articulate and enable opportunities for partner organizations and local demand.

At first look, some of the training actions may seem distant from the objective of conservation, but are sufficient to justify the investments in the scope of the scheme when considering the positive impacts (e.g., inclusion of women and young people, gains in terms of autonomy, self-esteem and quality of life), as well as opportunities for interaction between groups of providers and finally, the credibility and reputation stemming from these initiatives.

[35] Adapted from **Cundill, G., et al. 2014**. *Social learning for adaptation: a descriptive handbook for practitioners and action researchers*. s.l.: IDRC/Rhodes University/ Ruliv, 2014.

BOX 4. Access to quality education: the development of an integrated and relevant education model based on reality of the forest

Education is the foundation of citizenship and sustainable development. Intention, innovation and strategy are required to overcome the challenges of universal access, quality and relevance to the social context in isolated regions distant from urban centers, oftentimes the priority areas for PES schemes.
Themes such as access and quality of education were among the first to come up in interactions with providers in the PBF PES scheme.

The context of the Amazon has additional challenges to those faced in other parts of the country, requiring different solutions against barriers such as higher logistics costs which limits the training of professors and the dispersion of the populations in the territory. Add to this a context of high levels of illiteracy and a network of schools with precarious structure and operation (i.e. a large majority do not have water supply, lack energy, no sewer and no waste collection).

In response to this demand in the PBF PES scheme, compensation was allocated to increase access and qualify the offer of education for provider groups. In this way the perceived value of the scheme grew as did the willingness to adhere to it (WTA).

This required thought into new strategies to improve education for students from a reality very different from a majority of Brazilians using the existing school and with the instructor who is already there. Adaptation to the particulars and lifestyle of riverine communities is vital for projects and policies to be truly inclusive, reach all and contribute to reducing social vulnerability and improve quality of life.

Objectives

1. Bring about the arrival of public policies for education in isolated regions of Amazonas;
2. Develop pedagogy compatible with local realities;
3. Improve indicators for education in schools in the Amazon and;
4. Replicate innovative educational technologies in the Protected Areas.

One of the pillars of this strategy is the construction – by FAS – of school infrastructure in various areas in the territory of the scheme, called Nucleus for Conservation and Sustainability (NCSs). Besides adaptations to the structure of the curriculum and the expansion of the technological platform for education the distance operated by the State of Amazonas (partners) to reach isolated schools and regions, the planning of integrated education activities, with areas of interface such as health and income generation. The primary objective of these actions is to make education in these areas relevant to the lives of people that live in and from the forest.

Through the existing municipal (Primary School) and state (Middle and High School) public education system, the NCSs converge the application of a methodology beyond the regular curriculum, with an emphasis on culture and the aptitude for local production. The model is based on an alternate schedule in which students have classes and related activities for 15 entire days and then return to their communities. There, over the same time, they do chores around the house applying what they learned to the environment in which they live and to production – from sustainable timber management to manioc farming or fishing for pirarucu, for example. The dialogue between scientific and traditional knowledge is one of the foundations of the NCSs.

NCS Agnello Bittencourt Uchoa at Tumbira community, Rio Negro SDR (Bruno Kelly).

7.3 Training and qualification of leaders

Within the efforts to train, the qualification of leaders should be considered strategic. Local leaders have important roles in:

- Engagement of providers in the scheme;
- Establishment of channels for transparent and assertive communication;
- Process of changing local norms and values;
- Appropriation of scheme by providers and;
- Local sustainability of scheme and permanence of the results achieved.

The process of leadership training adopted by the PBF is structured in 10 steps (**Table 10**) and comprised of specific trainings, meetings for the exchange of experiences, in loco support and moments for group practice, or "learning by doing". When changes in leadership of the areas in the scheme occurs, additional re-leveling efforts take place for new leaders in order for them to be able to effectively participate in the other training actions. The process of training leaders has as reference the capacity for critical reflection, independence and the capacity to position oneself assertively independent of the environment.

Table 10. Steps and focus of leadership training process adopted by the PBF

Steps		Focus
1	What does it mean to be a leader	Norms and values
2	Role of a leader	Norms and values
3	Rights and obligations of a leader	Relational
4	How to relate to those you represent?	Relational
5	Sustainable development	Technical
6	Planning: management of projects and resources	Managerial
7	Administrative controls, accounting and transparency	Managerial
8	Political action and ethics	Relational
9	Institutional relationship and articulation	Relational
10	Understanding public policies	Technical

The leadership training process was focused in the beginning on formal leaders appointed by groups of providers. These leaders are, to a large part, members of boards of the reserve associations. This strategy is detailed in **Table 13. Strategy for training local leaders of the Bolsa Floresta Program** (pg103).

With the qualification of leaders, the level of expectation in relation to adherence and effectiveness of the scheme increases. This should not, however, be understood as an additional factor of complexity to implement a scheme, but as an opportunity to improve the scheme and avoid crowd-out effects. In the experience of the PBF, qualified leaders contribute significantly to the implementation of the scheme.

In the case of the PBF, despite the initial demand by leaders focused on urgent social questions, gradually questions were incorporated relating to the external vectors of degradation – caused by agents external to the group of providers – and later, the internal vectors of degradation – caused by agents within the group of providers.

This process tends to create a socially regulated mechanism in relation to the objectives of conservation and indicate a process of paradigm and value change in terms of the use of soil and natural resources, but also points to changes in relation to the role of providers.

7.4 Strengthening of grassroots organizations

The strengthening of grassroots organizations is a complementary action to the training of leaders and contributes to institutionalizing, establishing norms and references for action, provides structure, and ultimately, enables the work of local leaders.

Grassroots organizations are self-organized groups of individuals pursuing common interests through a volunteer-based, non-profit organization (Anheier, 2005), usually strongly linked to a territory or community instead of being issue-based. Grassroots organizations can be legally structured in different ways. In the case of the PBF, the creation or formalization of residents associations was incentivized to represent the providers from each territory (in PBF case, Protected Areas) in which the scheme operates.

Grassroots organizations can be great allies in the process of implementing a scheme. For such, a minimal structure is needed as well as the means to create and promote spaces for participation, be present in the territory and act as contacts, improving communication, support and monitoring efforts for the scheme.

It is important that the mandates of the grassroots organizations be established in a participatory and official manner. This mandate may or may not be representative of providers, for management of actions in the scope of the scheme, include monitoring of providers, institutional articulation or direct implementation of components of the scheme and other social, production, training or other initiatives.

7.5 Local empowerment

Local empowerment fundamentally seeks the autonomous and relevant participation of providers – their leaders and organizations that represent them in the decision processes of the PES scheme. The anticipated result of investments in training and qualification of local leaders is the strengthening of grassroots organizations.

Additionally, it is necessary to enable the participation of leaders and the organizations that represent providers in the decision processes for the governance structure of the scheme. Besides logic, Kosoy and collaborators (2008), (apud Eloy, et al., 2013), note that few schemes have favored the participation of providers in decision processes. One of the reasons for this can reside in the fact that in increasing the participation of providers in the decision processes, wide range of local demands, related or not to the management of natural resources, is brought to the negotiating process. This scenario increases the complexity of the operation of the scheme, primarily where the participation of potential providers was not designed to consider the need for flexibility during operation.

Innovative schemes based on participatory processes that recognize local empowerment should consider these flexibility as an essential value, which in turn must be reflected in the governance structure of the scheme. This way, every decision point is determined in terms of composition, norms for limits to action and mandate (i.e., limits to or the autonomy a given body has for decisions).

The PBF has several bodies in its governance structure that include the participation of providers and their representatives – with clearly defined mandates. The process of involving providers in the decision process occurs at the most basic level in the annual planning and community investment workshops and runs through the entire governance structure to the Administrative Board of the FAS – in which a representative of leaders with voting rights is chosen by their peers, has a seat and vote. **Table 11** (pg91) presents the diverse bodies of the PBF with participation by providers.

This governance structure is not limited to the ordinary or day-to-day decisions in the process of implementing the scheme, but also to improve the processes of the scheme itself. One example are the improvements to the criteria for penalties to providers due to non-conformity – and their imposition – which were discussed and approved during the PBF Leadership Meeting (see **Box 5. Leadership Meeting: process of training and continuous improvement of PBF**, pg89) before entering into force. This new process increases the responsibility of residents associations for a socially regulated model and for the compliance with the terms of the scheme and has a direct impact on the amount of resources destined for rewards at the collective-community level.

BOX 5. Leadership Meeting: process of training and continuous improvement of PBF

Each semester, the FAS sponsors an edition of the Leadership Meeting of the Associations supported by the PBF – one week of activities that brings together community leaders from all the PAs supported by the program.

The meetings consist of a process of continued training for leaders, which includes exchange of experiences for continual improvement and engagement with governmental and non-governmental institutions, businesses, research, education and innovation institutions and multilateral organizations.

*Management of the partnership between FAS and the mother associations occurs at the Leadership Meeting. Debates around the implementation of PBF become environments ripe for social innovation (**Figure 25**), to the extent that they seek solutions to latent demands and promote conditions for exchange of knowledge and experiences.*

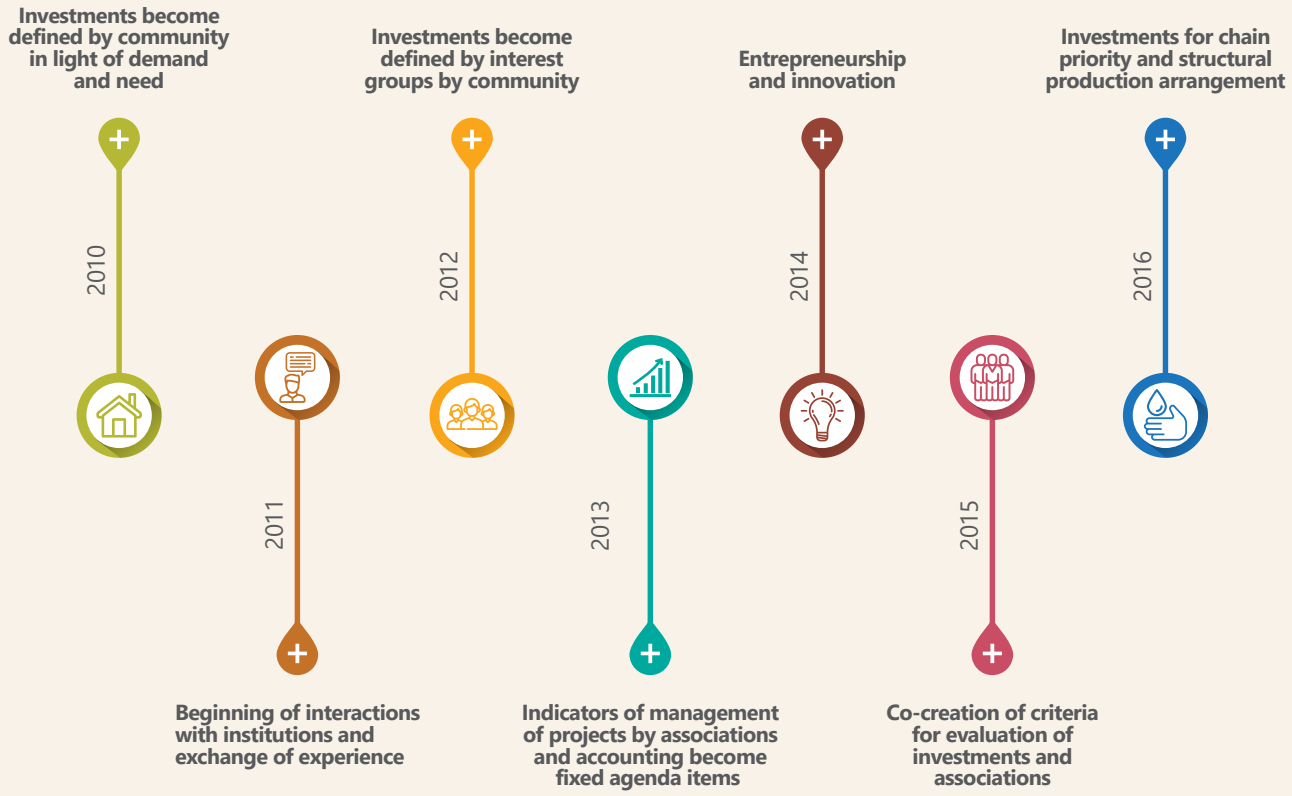


Figure 25. Chronology of innovation and important methodological and process changes seeking to improve scheme

Participants of the XVII PBF Leadership Meeting (Bruno Kelly).

Activity with local entrepreneurs at the XVI PBF Leadership Meeting (Rodrigo Thomzhinsky).

Table 11. Governance structure, its diverse bodies, participation by PES providers, mandate, norms and limits

Level	Body	Composition	Participation of ENS providers	Mandate in the scope of the PES scheme	Norms and limits
Strategic	Administrative Board of the Sustainable Amazon Foundation	Representatives of public sector, civil society, academia and private initiative	Representative of elected leaders by their peers	Strategic definitions within the scheme Take measures to guarantee coherence and consistency of scheme	Statute of the Sustainable Amazon Foundation Law 3135/2007 that creates the State Policy on Climate Change and Sustainable Development and the PBF; Complementary Law 53/2006 and Decree 26581/2007 that regulates and provides changes
Programatic	PBF Leadership Meeting	Leaders of Protected Areas and invited institutional partners	Leaders of each PA	Revision of rules for application of payments and incentives in the scheme Definition of rules, rewards and penalties Proposed adjustments in the scheme Represents scheme providers to the institutions	Statute of the Sustainable Amazon Foundation Law 3135/2007 which created the State Policy on Climate Change and Sustainable Development and the PBF; Complementary Law 53/2006 and Decree 26581/2007 that regulates and provides changes
Bio-Regional	Assembly of residents associations from Protected Areas	Community leaders, Manager of Protected Area and invited partners	Leaders from each community Open to all providers in the Protected Areas	Definition of specific rules for the distribution of resources of the PA for communities or sectors Defines application of incentives for support to community organizations Establishes partnerships to make application of scheme incentives possible in the PAs	Management Plan of the Protected Area
Collective – Community	Annual workshop of community investments	Providers	All the providers in a community	Definition of the application of incentives in the scheme for community infrastructure and sustainable production projects	Rules of Scheme Terms of commitment of the Scheme

7.6 Administration of conflicts in the context of PES schemes

Conflicts are inherent to processes of change. Actors involved in PES schemes should, in a short time, be prepared to deal appropriately with conflicts. Avoiding conflict by restricting actions to those initially seen as consensual tends to limit the potential for change and the impact on the scheme. It associates conflicts with problems, or the perception that something is wrong. A mature attitude towards conflict is needed. Moving the focus from how to avoid it to how to recognize it and deal with it in a constructive (Dinur, 2011) manner is a key point of this issue.

In other words, conflicts should be understood as divergences in understanding about a given situation, in the choice of path to take or still as the result of critical reflection about the value, principles and established norms and look to treat them naturally and appropriately, creating a significant opportunity for social learning. This does not mean that conflicts should be treated lightly. Some, if they are not well-administered have the potential to create ruptures, setbacks, draining of the spaces for dialogue and participation and in the next moment, have the effect of de-aggregation (crowd-out) in the scheme.

Faced with the need to administer a conflict one perceives the relevance of the group of actions proposed in this section to develop adequate local conditions for the PES scheme, including the construction– and maintenance – of an environment of trust and cooperation, the development of local capacity – especially of the relational nature – and the efforts to identify and train positive leaders. Even with these actions, some conflicts will require external mediation support. It quickly becomes necessary to identify from within the lead institution, in the group of leaders and partners, who are the individuals with the character, sensibility and credibility to manage conflicts. One possible strategy to this end is to form a working group for the exchange of experiences and to promote the use of tools for conflict management for continued refinement of the work they have developed in the territory.

Some of the lessons learned in the experience of the PBF in dealing with conflicts were:

- Treat conflicts seriously – do not relativize its importance or relevance – but as natural;
- Take consistent, balanced, horizontal, transparent and up-front positions;
- Institute process and governance to address conflicts and complaints about the program, providers and FAS, following community-level meetings, reserve-level assemblies and the Leadership Meetings, twice a year, for more strategic issues (vide also **Item 11.4 Evaluation of institutional environment**, pg127; **Item 11.7 Opinion research and perception of providers**, pg128; **Item 11.8 Participatory evaluation**, pg129; and **Table 11**, pg91);
- Create moments and fora for decisions for each of the groups in conflict to openly express their problems, frustrations and demands;
- Seek to understand the different perspectives, if possible, in loco, getting hands dirty in each group – this improves understanding over the objective reasons for the conflict and creates credibility in speaking about them;
- Once the step of airing grievances has been overcome, incentivize each group to search for an objective reason for the conflict[36];
- In some cases, it is necessary to create moments, conduct ice-breakers and change the focus momentarily to reduce tension in the environment;
- It is important to emphasize the points of convergence and the things that are going well;
- Resume reflection on the objective reason for the conflict, incentivizing honest and assertive communication and the co-creation of solutions and;
- Identify the moment to interrupt the process and restart at another time, always establishing a clear time-frame and concluding each moment with a positive focus.

[36] Separate fact from sentiment (Dinur, 2011).

7.7 Strategic action in the institutional environment

Acting at the institutional level is an essential part of easing and overcoming structural barriers that can prevent a PES scheme from being successful. Many changes that will be identified during the ToC development might require willingness and openness to change from institutional players. These players can be part of the scheme partners or not. In the same line, gains in terms of increasing conservation and reducing social vulnerability can be lost due to changes in the institutional environment.

Therefore the capacity of providers to strive for strategic long-term objectives and perform competently and autonomously to articulate and develop partnerships and implement advocacy actions in the institutional environment are important and should be part of the efforts to develop local capacity.

These efforts translate into greater clarity about the institutional environment and the need to act strategically and in dialogue with other institutional actors. It is not only about demanding specific support, but to establish common objectives and enable results through partnerships with clear objectives.

Organizations are treated horizontally and invited to be part of spaces for decision-making by providers and their leadership. Discussions permeate the three cycles of social learning with the objective of co-creating and sharing solutions and collectively overcoming challenges.

After eight years of implementing the PBF it is possible to affirm that there is an environment of trust in the universe of providers in the program. This does not mean, however, that the efforts have concluded. Strategically, efforts to maintain this environment are part of the everyday implementation of this scheme.

In terms of the development of local capacity and the expertise to act strategically in the institutional environment, it is possible to assess that the diverse groups of providers find themselves in distinct places. At the same time, the second and third cycles of social learning are observed with more frequency in some groups as compared to the others.

If on the one hand it is possible to observe progress by the groups of providers engaged in the PBF, on the other it is not possible to predict the time that each provider group will need to achieve deeper levels of reflection about the practice and strategic engagement in the institutional environment.

7.8 The challenge of monitoring and evaluating favorable conditions in the implementation of PES schemes

It is important that the development of favorable local conditions be considered in PES schemes and that efforts for such are planned and well defined. It is impossible, however, to determine which time horizon a group of providers will take to reach the different cycles of social learning or, beforehand, each step on the path to incentivize is in this process. In this sense, it is important to know it is a continuous process.

The proximity of mobilizers to the groups of providers allows for adjustments of actions and support for the implementation of the scheme, as a way to facilitate meetings, workshops and other moments for interaction. Still, the program does not have a specified structure for monitoring to accompany each group of providers in terms of social learning and customizes support to the specific needs of each group in the hope of increasing adherence and effectiveness. Development agents have noticed challenges in monitoring intangible aspects of local development, which in many cases are associated with social learning aspect previously mentioned in this section.

The ability to deal with unforeseen situations and drawbacks during the implementation of actions along with openness to discuss issues and learn both from success and failure are, for instance, some aspects associated with better results from groups of providers. The process to capture these aspects in order to disseminate them among other groups as a factor for success is not yet fully developed.

One of the more promising tools evaluated by the PBF team is the "Climate Change Social Learning M&E Framework" (van Epp & Garside, 2014) being developed in the scope of an international effort supported by the Consultative Group for International Agricultural Research (CGIAR)[37].

The proposed monitoring structure seeks to evaluate social learning underway through a group of indicators organized into four dimensions: (i) engagement; (ii) iterative learning; (iii) development of capacity and; (iv) influencing institutions. The indicators are, for their part, grouped by (i) processes that indicate that efforts to enable social learning are being realized; (ii) learning that demonstrates direct results of these efforts and; (iii) changes in values or practices, associated with the impact of the social learning process in the form of interaction, reflection and action.

[37] Consultative Group for International Agricultural Research. http://www.cgiar.org

The PBF has also launched independent opinion polls to evaluate the understanding and perception of providers in terms of the scheme. These surveys permit analysis of the confidence of the providers in the scheme and the institutional leader, evaluation of understanding of the terms of agreement, and the efficiency of communication and of spaces for dialogue. Opinion polls also evaluate changes in attitude in relation to the conservation practices. This has shown itself to be a good instrument to monitor some aspects of the scheme process that are difficult to capture in other ways, such as self-esteem and perception of the future, for example.

BOX 6. What is the process for adhesion of new providers in the PBF?

When a new area is identified for integration into the territory of the PES scheme, some preliminary steps are taken before potential providers are joined into it. The process begins with an initial field visit to all of the communities whose residents could become providers within the scope of the scheme.

This visit is followed by an initial workshop with the leaders identified during the initial visit and the scheduling of a "Seminar on Climate Change and the Bolsa Floresta Program" in which information is shared and the concepts to support a successful scheme mechanism are developed, particularly in relation to the responsibilities of the providers and the rewards tied to fulfilling those requirements. The process of joining the new providers to the scheme follows established procedures to guarantee greater efficacy in the implementation of the scheme as well as to incentivize the active participation of families from the beginning. The process of joining uses the seminar as its reference, which is based on the andragogic method[38].

The participation of providers is incentivized by visits to the communities, and invitations to the mothers of each family. The experience of the program shows that the social response when mothers are invited is that the entire family comes, whereas when the fathers are invited only the men tend to show up. During the entire process, collective attitudes and common sense are developed. The potential providers are encouraged to ask questions and clarify doubts. All technical content is presented in the form of group exercises to encourage active participation.

The seminar has the objective of creating common understanding of the operation of the "Bolsa Floresta Program". It is structured to encourage conversation with potential providers on topics such as (i) environmental services, (ii) climate change, and most recently (iii) Sustainable Development Goals (SDGs). The process is based on the experiences of potential providers and their relationship to the environment to find a reference which allows for understanding of the logic of the scheme and, as a consequence, their conscious adhesion to the scheme.

The seminar is structured to reflect the importance of the moment of adhesion to the agreement. After the welcoming statement and well wishes by the President of the community chosen to host the seminar, the institutional actors and facilitators from the lead institution are introduced. An agreement of ground rules for the seminar is established, which in many ways is analogous to the accord that the providers will sign for the scheme.

Criteria for participation in the scheme, which documents will be necessary for registration and details of the content of the terms of compliance are presented as well as clearing up any questions. As mentioned, compliance is voluntary and it is not a requirement that all families in a community sign up. Families do not need to commit immediately and can wait until the following visit by the team from the lead institution.

Time is set aside for registration of interested families. At this time socio-economic information from each registered family is collected (see **Chapter 11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientific research**, *pg123). After the seminar, registrations are sent to be evaluated and the requests for debit cards are made that will be used for payments of the family component. Cards are distributed to each family at a later visit specifically for that purpose.*

[38] Andragogic method: the art facilitating process for adult learning.

Participants of the Seminar on Climate Change and the PBF at Juma SDR (FAS).

Seminar on Climate Change and the PBF at Uacari SDR (Marcelo Castro).

BOX 7. Concepts used in the design of training actions

The development of training actions are referenced on concepts of popular education, using a specific format to realize participatory activities that integrate a set of actions oriented by a bundle of values, principles and ideas that mark the way in which the training action is realized.

The training workshop is a process of raising awareness to a shared pedagogy of scientific knowledge that values popular understanding. Through games and group think exercises, participants are encouraged to expand their channels of communication and through this, their knowledge and taste for learning and interaction. The process works on collective attitudes.

The translation of concepts associated with climate change is guided by principles of the andragogic method, the "art of facilitating adult learning"; which begins with existing knowledge to a concrete experiment, passing through collective analysis in which technical-scientific information is added, creating at the end, a common language. It is a space that seeks to join "knowledge with knowledge," making the activity of information, education, and communication more enjoyable and efficient, for all the interventions have an intention; to mobilize and awaken a willingness to act.

The inclusive environment is essential for the education process. It should fundamentally combine motivation to learn the material to be developed with confidence. To be enjoyable and for participants to experience the content, the space needs ideas and energy. The messages should be made widely understandable and tied to individual and collective well-being and happiness.

The experiences and relation to nature are the point of departure for the training actions intended to balance the accumulated experience and knowledge of community members and the relationship they establish with the environment. From there comes enrichment of the vocabulary for environmental services and climate change. Also from there comes attention to the discussion produced in the workshop and its later reproduction in the interior of the PA.

Participative pedagogy should not be understood as participation merely in discussions on the rights of a "voice and vote", it is required that community members assume responsibility within the workshop. For this reason participation from planning to realization is so important. This format guarantees the development of a truly participative process, taking into consideration that all knowledge is collective, in other words, "all are indispensable within this process" and not the opposite.

It is important to consolidate the advances from each training action. In this sense the final step of each action is particularly relevant. It is a moment that should function beyond a closing activity, in which a synthesis of the content developed in the plenaries and work groups is presented. An effort by the team is required in order to motivate all present to participate in this moment. One way to attract participation from everyone is to say that only after this moment will certificates of participation be given.

7.9 The role of grassroots organizations in the PBF scheme

The success of the PBF PES scheme depends on the collective action of providers. To the degree in which the implementation of actions relative to the environmental service advances, coordinated and integrated action by providers from diverse communities of each area become more necessary. Grassroots organizations are central to the process of cohesion of the communities, reducing the tendency of a community to benefit from the scheme without committing to the terms (free ride) on conservation efforts.

Each of the 14 formal grassroots organizations[39] represent an average of 40 groups of providers organized in communities per association. These organizations play an important role in the development of an agenda of intercommunity demands including the shared management of natural resources in the discussions of the management plans for the areas that represents the interests of providers.

Resources are applied to strengthen the grassroots organizations, integrate with communities, and catalyze participation by leaders in decision processes relevant to the providers and in socially regulated models under the scheme. They also contribute to the development of local capacity and the positive leaders acting within each area scheme territory. Functions of each of these associations include:

- Represent providers of environmental services within the scheme;
- Incentivize the participation of providers in decision processes relevant to the management of each area;
- Realize community actions to raise awareness with providers to adopt new management practices, in order to maintain the provision of the ecosystem services;
- Develop a network of partners, adding new techniques and understanding, co-creating solutions for local development;
- Act in a pro-active manner to leverage resources to improve quality of life and working conditions within the protected areas;
- Support the local development of each community, incentivizing transparency and participation, and qualifying the processes of reflection;
- Share experiences and lessons learned with other communities, contributing to the process of social learning and;
- Disseminate information to contribute to the development of a common understanding of the concepts relevant to the context of the protected areas.

Over the long term, the grassroots organizations can gradually assume some of the activities of the lead institution in the scope of the scheme. This process should be gradual and take into consideration the structure, maturity and stability of the organization. While the 14 grassroots organizations in the areas of the PBF scheme receive equal support, the differences between them in relation to their functions are evident.

One of the lessons learned during the process of implementing the PBF scheme is that a group of well-intentioned positive community leaders is not enough to guarantee that a grassroots organization is functional and efficient.

The proper functioning of organizations requires clarity in the understanding of roles, well-structured processes and objective planning compatible with operational capacity. In a survey together with the organizations representing the providers in the PBF schemes, positive and negative aspects of their activities were raised, summarized in **Table 12** below:

[39] The organizations of each area have the legal structure of a residents association of a sustainable use protected area. Two out of 16 reserves do not have formal association so far (August 2017), and it intends to have them by early 2018.

Table 12. Positive and negative points in the activities of associations of providers within the PBF scheme

Positive points	Negative points
The associations create a channel for dialogue with the lead institution, with institutional partners. The associations catalyze the exchange of experiences with other areas in the scope of the scheme (particularly during the Leadership Meeting). The associations make possible projects and resources additional to the scheme for areas that contribute to social and conservation efforts. The associations (with resources from the PBF association component) guarantee a minimal agenda for dialogue and integration between communities. The associations act as practical location for local leaders in managing projects. The associations play an important role in supporting actions of the lead institution and other partners in the areas, mobilizing providers and providing logistical support and local knowledge. The associations form officials, who in some cases assume positions in local governments, making the agendas of protected areas more visible. The associations have physical infrastructure to access and support communities. Actions to train leaders have contributed to qualifying officials of the associations.	The grassroots process, to bring awareness to communities and the development of a participatory organization is not always attractive for providers to associate with. In the short term many providers expect more clear and tangible returns from acting with the associations, which in many cases is not compatible with the ongoing agendas. It is difficult for the local population to identify results of the work with associations, primarily in relation to representation. Few providers make voluntary contributions to the association beyond what already exists as part of the compensation in the scheme. In many cases the participation of community members is limited to assemblies and there is a tacit understanding that the objectives of the association should be pursued by the board and not by the collective of providers. Some representatives tend to mimic the actions of local political representatives (patronage and acting for private interests), which has a negative impact on the credibility of the association. The associations have difficulty in managing administrative and bureaucratic processes associated with its operation, with impacts on transparency and accountability. The associations have had particular difficulty in moments of transition between one board and another.

7.10 Difficulties faced in the process of strengthening grassroots organizations

Even in the case of a well-structured and organized grassroots organization, there are difficulties that go beyond questions of its governance. The lack of a culture of association, of interest by providers to associate, and the consequentially low participation by those that do associate creates a vicious cycle that undermines good operation.

In many cases, meetings between the boards and associates occurs with low frequency, the number of active board members is low or there is a lack of capacity in the board to establish partnerships and amplify their work. These difficulties in turn demotivate the board, repel and reduce the participation of associates causing the weakening of the organization.

Some of the grassroots associations supported by PBF struggle to foster collective participation. In this challenging scenario decisions occur in a monocratic form, unrecognized by many of the associated providers, and as a consequence go little noticed or valued. In other cases the lack of participation by associated providers reflects un-transparent annual planning, which leads to a lack of trust and credibility for the work of the organization.

The lack of clarity in terms of the functions and limitations of the leader is the most frequently cited worry shared by the leaders themselves. There is a clear and constant need for interaction with other leaders, support in the planning of investments and trainings specific to their function.

7.11 Lessons learned in the strengthening of grassroots organizations

The structure of a grassroots organization should be accompanied by well-defined rights and responsibilities for their associates. Boards of the associations need to realize the importance of transparency in accounting and the focus on tangible returns for the associated providers.

Actions that are planned and accomplished as foreseen confer credibility to the associations in the eyes of the associates. It is important to distribute actions in order to reach and interact with the largest number of associates, with special attention to the more distant and isolated groups.

Institutional work includes the development of a network of partnerships, participations in debates about adherence to public policies, among others. The Leadership Meetings, twice a year, are part of a continuous process of exchanging experiences between leaders from diverse areas and creating opportunity for dialogue with governmental and non-governmental institutions that work in the territory of the scheme. The process of continued training should create opportunities for the leaders who participate in forums to share the realities of the areas with other institutions.

One positive aspect of inserting leaders in global discussions about sustainable development is the broadening of the reach of the leaders and the visibility of traditional communities and their agenda for development.

It is important to connect the results of articulation efforts to improve quality of life and that have the participation of grassroots organizations, as they bring credibility to the work of the same, creating conditions for a virtuous cycle of recognition and participation.

The work of leaders should, however, be balanced in two directions: outward as institutional representation and inward with focus on associates. Leaders should be available to facilitate the spaces for participation by the communities, qualify debates and develop criteria to better define the best course to follow for local development.

Winning trust and maintaining social cohesion in the territory of the scheme, the incentive for active participation and social learning are central focuses of grassroots organizations in the scope of PES scheme.

7.12 Conditional compensation for grassroots organizations

As a result of the process of development and maturing of grassroots organizations, a process of conditional compensation was developed. Annual transfers foreseen in the PES scheme – that were tied merely to the number of providers in each area – came to be subsidized or penalized according to the performance of the association through a set of criteria.

Based on these criteria, a grassroots organization can expand or reduce its annual resources from the PES scheme up to 20%.

The primary criteria are:

1. Achieve more than 80% of the project targets and results;
2. Deliver 100% of use and asset forms at the Leadership Meetings;
3. Deliver 100% of accounting invoices on time and without exceptions;
4. Realize 100% of meetings and assemblies;
5. Participate 100% in the PBF Leadership Meetings;
6. Participate 100% in in meetings of the PA management council;
7. Promote at least one training/year for directors;
8. Monitor compliance with BFF rules and disconnections;
9. Incentivize best practices in the opening/clearing of farm plots and;
10. Support 100% of the activities of the PBF in communities.
The complementary criteria are:
11. Number of pending documents and;
12. Outstanding debts referring to pending document issues.

This process was developed with broad participation by leaders and allows for a focus on the desired results of the PES scheme through the work of grassroots organizations in each area.

7.13 Strategy for training local leaders of the Bolsa Floresta Program

See **Table 13** (pg103)

BOX 8. How do the community-based investment decision workshops work?

The community investment workshops seek, from active participation and social learning, to achieve the objectives of the PES scheme. Active participation requires clear objectives and mandate to be sustainable. By empowering the communities to build solutions adapted to their needs, the practices promoted in the workshop also contribute to raising awareness in relation to the ethic of sustainable development.

In these annual workshops the providers define how the resources from the reimbursements will be applied to (i) improve collective-use community infrastructure and; (ii) to create or improve activities for sustainable income creation.

Initially, providers in each community are mobilized by facilitators of the lead institution, to take part in the workshop, which occurs locally. Before the workshop communities are encouraged to interact to identify local priorities that act as support for the process of reflection that occurs in these workshops.

This process of mobilization occurs until that group of providers adopts the workshop as routine, requesting less support and facilitation by the institutional lead's team. While they have the same objective and a similar base structure, the workshops are evolving in distinct paths and rhythms in each community. This flexibility allows for more appropriation of the workshop by each group of providers that can create their own prioritization process.

In each workshop, regional and other invited institutions also take part. Their participation serves to encourage social learning through the exchange of experiences and interaction with leaders from other communities, as well as inclusion of the agenda of each community in the agenda of the grassroots organization from each area.

The decisions are developed as the discussions advance, recounting the accumulated experiences of each community and nearby communities, enabling the technical context and experience of regional coordinators, promoting credibility in the decision process and responsibility for their results.

During the workshop, each demand brought up is discussed in order to identify elements for a prioritization process of local demands in the face of limited resources. At the end of each workshop, decisions are formalized in the minutes. The minutes also function as an instrument to register the topics discussed, making the decision-making process transparent. The document is signed by all providers in the respective community. The minutes are sent to the lead institution in the scheme, which uses funds and delivers the materials, equipment and services to the communities.

Beyond its mechanical function in the PES scheme, the community investment workshops develop a culture of active participation in the communities and comes to be adopted in other decision processes and enable cyclical moments for reflection that are fundamental to social learning. The cycles of social learning will be achieved within the community investment workshops to the extent that the quality of interactions and depth of reflections increases.

Community investment workshop (FAS).

Community investment workshop (FAS).

Table 13. Strategy for training local leaders of the Bolsa Floresta Program

#	Steps	Values	Detail of content	Primary messages	Impact on operation of the scheme	Impact on operation of the scheme
1	**What does it mean to be a leader**	Norms and values	The leader as a facilitator of collective decision-making processes The leader as a converging element of balanced work that establishes relationships of trust The importance of promoting the development of new leaders	Discussion processes should be inclusive and work to actively involve marginalized publics The importance of alternation of power and understanding of the collective	Improved dialogue with groups of providers Establishment of spaces of trust Continuity and stability of participatory management processes	
2	**The role of the leader**	Norms and values	Representation of group of providers Articulation and dialogue for promotion of local development Participation, proposition and decision-making	Leadership should develop a vision for the future with the community and work to build it It is important to overcome the stage of critical reflection about barriers and be purposeful and proactive	Agility in overcoming barriers to implementation Purposeful action at points of divergence	Based on experience of leaders' understanding, attitudes and practices related to decision-making
3	**Rights and responsibilities of a leader**	Relational	Share information about the processes that impact local development Work for the collective, from ethical principles and with transparency Make decisions and prioritize actions and investments in moments of impasse Negotiate and make decisions in the name of the group of providers How to do accounting and guarantee collective appropriation of results of actions	Information about the scheme should be widely disseminated Work should seek local inclusive development and respect for terms of the scheme Leadership should have mandate to speak and act in name of the group it represents Accounting for the work developed as a leader is essential	Contribute to building of common understanding Create bridges between local demands and the scope of work of the PES scheme Confers agility in the implementation of the PES scheme and creates consistent process for decision and governance	
4	**How to relat to your representative?**	Relational	How to identify common interests, consensus, and leverage points How to prioritize in order for different interests to be contemplated over time	The importance of active listening and establishment of relationships of trust The necessity to understand the different subgroups and make interests compatible with available resources	Increase in adherence to PES scheme and appropriation by groups of providers Proposals by groups of providers with highest viability	
5	**Sustainable development**	Technical	Understand the concept of sustainability Understand the impact of decisions and actions on the community in relation to economic, social and environmental aspects Understand the repercussions of work in the scope of the scheme and why it has value The systemic impact (positive and negative) of work with diverse groups of providers (community)	Promote the local sustainable development of communities, seeking to increase their quality of life, but without promoting the conversion or degradation of the ecosystem in which they live The group ofproviders needs to act on the same set of premises in order for desired results from the environmental view, are achieved	Better understanding of fundamental concepts that orient the PES scheme Understanding the model of local development that is compatible with the practices the scheme pretends to incentivize	

#	Steps	Values	Detail of content	Primary messages	Impact on operation of the scheme	Impact on operation of the scheme
6	**Planning: management of projects and resources**	Managerial	The content is dynamic for at any moment there are new projects and activities to be worked on with leaders and planning and management are considered essential for the development of actions and includes: • Development of projects and proposals • How to request technical support for development of proposals • Planning of actions • Follow-up and monitoring of actions • Accounting, transparency • Management of resources, procedures for use of resources	Planning allows for coordinated work and development of more complex actions The development of local planning and management expertise enables results from investments	Increase the effectiveness of actions in the scheme Reduce the need for intensive technical support	
7	**Administrative controls, accounting and transparency**	Managerial	Develop local capacity to better direct the grassroots organizations and adequately access and utilize resources from different sources. Systematization of information in order to create new partnerships Management of results and impacts of the grassroots organizations Knowledge, reputation and image of organizations together with groups of providers	Adequate management processes are essential for the process of autonomous development of grassroots organizations (residents associations in the case of the PBF scheme) Necessary to act in a way that is recognized in the local environment	Gains in terms of autonomy of grassroots organizations Possibility to leverage other resources to meet local demands Strengthened local organizations expand conditions for implementation of the scheme	
8	**Political action and ethics**	Relational	Political work, democracy and participation Understand what is a public policy Work in spaces for participation in public policies Advocacy and ethical principles related to political work by leaders Interaction and forwarding demands to government agencies	Need to practice active citizenship, understand and seek rights and ample access to public policies Leadership by example through ethical posture	Improved awareness of barriers and opportunities in terms of public policies and activities of government entities Greater autonomy of groups of providers in search and maintenance of gains in terms of quality of life, access to natural resources, etc.	
9	**Institutional relationship and articulation**	Relational	Understand the partner entities and other institutions and establish agenda of relevant terms Build institutional relations Establish purposeful partnerships Make agenda of communities evident in the planning process of partners	Necessity to act in a network The importance of identifying right partners for each theme Enable results through partnerships Partnership as a form of overcoming technical, managerial and training needs	More horizontal process of implementation and with greater interaction between groups of providers and partners Develop local capacity to proactively seek resources necessary to achieve results of the scheme	Representatives from government bodies are invited and have space in the agenda of meetings. Some get involved, including in training proces
10	**Understanding public policies**	Technical	Repercussions of steps 8-9 in which aspects of public policies are detailed	The importance of understanding public policies and how these affect the local sustainable development objectives of the communities	Reduce risk and increase possibility of permanence o results of scheme	

III Important management aspects for the effectiveness of innovative PES schemes

Entrepreneur from the Rio Negro SDR (Bruno Kelly).

III Developing favorable local conditions for PES schemes

Checklist III. Analyzing appropriate institutional design

It is important to analyze whether the institutional design proposed for the operation is consistent with the design proposed for the scheme and with local conditions. These moments of critical reflection on how the scheme will actually be operated are decisive for the success of the arrangement. To this end, this section is organized into a series of questions to guide this process of reflection.

Institutional design to operate

- What functions should be considered for operationalizing the scheme in place? (vide **Table 15**, pg111)
- Which roles should be assigned for the lead institution?
- Is there a need to develop expertise in the lead institution to perform any of the functions?
- Which of the other functions that were not assigned to the lead institution already have a defined partner?
- Which of the other functions that were not assigned to the lead institution have one or more potential partners?
- Is there a need to develop skills in partners to perform any of these functions?
- Which of the functions considered relevant were not assigned to any institution?
- How will the evaluation of the partners, by the lead institution, be performed for each activity?
- Is there a clear understanding on the pros and cons of the proposed lead institution?
- What are the strategies to mitigate the identified disadvantages?

Adaptive management of PES schemes

- Is planning flexible to incorporate adjustments throughout the deployment cycle?
- Are there enough time and resources to be invested in developing of spaces of trust and participatory processes?
- Do decision-making processes have the flexibility to allow adjustment of actions as a result of collective decisions with providers and partners?
- Do field agents have autonomy in management to reach agreements with local actors, establish partnerships and act adaptively, and promote planning adjustments?
- Are there space for error and resources for adjustments that may be needed?
- Are there periodic and structured moments of evaluation of the design of the scheme and incorporation of lessons learned?
- Does ongoing analysis of opportunities have a clear process established and is appropriated by the teams?
- Are actions that integrate the ToC implemented in a modular way in each territory (or fraction of the territory) depending on local conditions?
- Does the lead institution seek to aggregate skills from networking and to develop local skills?
- Does the lead institution play the role of articulator of the various actors of the scheme, seeking a collaborative action with clear purposes?
- Is there a possibility of self-organization of teams and territories?
- Is the proper importance to the record of agreed choices, decisions and changes given?
- Does the team have an adequate profile for the adaptive management of the PES scheme (critical analysis, scenario / context reading)?

Monitoring, diagnostics, baseline and evaluations

- Is there a viable and efficient set of indicators established to follow the implementation of the scheme in its various aspects?
- Is there clarity of the differences between management controls, intermediate process indicators, intermediate

results indicators, predictors of the impact of the scheme from the proposed ToC?

- Is there an initial reference (baseline) to assess the impact of the scheme (additionality) on the provision of ecosystem services?
- Is it intended to monitor the institutional environment within the scope of the scheme?
- Are legal and regulatory opportunities and barriers for the adoption and perpetuation of the proposed environmental service solution evaluated?
- Are changes in providers' perceptions, opinions, attitudes and practices monitored?
- Are the legitimacy, acceptance, and credibility of the lead institution monitored?
- Are evaluation processes accessible, transparent and where participation is possible?
- Are the results of the monitoring and evaluation processes actually used in the revision of the design of the scheme and subsidize changes in the implementation strategies?

Continued innovation and development of solutions

- Is there a clear strategy of the lead institution to continuously create and adapt solutions to ensure adherence to the scheme and its effectiveness?
- Are there institutional framework and an innovation system in the lead institution that enable dynamic capacity building through appropriate partnerships, resources and incentives, policies and institutions?
- Are the stakeholders affected by the process (employees, partners, suppliers, distributors, providers and scheme investors) identified?
- Were current interactions among stakeholders mapped and understood?
- Is the innovation system in the framework of the scheme participatory and inclusive?
- Are workshops organized where stakeholders share experiences and look for ways to improve?
- Have platforms been built to implement ideas for new interactions and to continue the dialogue among stakeholders to generate additional ideas?

Effective communication

- Is there an area in the organizational structure of the lead institution responsible for the communication within the PES scheme?
- Is the communication directed to the various actors of the scheme with appropriate strategy, format and language?
- Is communication an integral part of the provider engagement strategy in the scheme?
- Do the strategies seek to ensure that information related to the updates and adjustments in the design of the scheme is disseminated consistently to all actors?
- Is the communication carried out continuously, in line with the planning of the operation of the scheme?
- Are campaigns carried out to contribute to information processes, changes in attitudes and practices related to the proposed environmental service solution in the scheme?

This checklist may be revisited periodically throughout the deployment process. There will be no immediate answers to all the questions asked and their relevance for each scheme should be considered. The issues proposed here are likely to raise the need for consultation with the various actors involved.

8. Introduction

An innovative PES scheme requires an adequate management model to maintain consistency throughout its implementation. As presented above, and environmental services solution based on a ToC is composed of innumerable interconnected causal relationships in a dynamic and uncertain implementation context. The environmental service solution is a central element of the process of implementing the PES scheme. Consistency in implementation is central to the maintenance or increase in the provision of ecosystem services, the primary objective of the PES scheme.

Application of the design tools for the schemes, such as developing favorable local conditions for implementation of the PES scheme are incompatible with management systems based on deterministic processes. As mentioned in the previous two sections, efforts to design the scheme and maintain favorable local conditions should be continuous. The strategies, processes and tools presented below have the objective of sparking attention to important elements that support the efficient management of the scheme.

In order to determine the efficiency of the scheme, broad monitoring is needed based on a set of tools that indicate the PES scheme is on the right path and is not generating undesirable results.

The PES schemes work to guarantee the provision of ecosystem services in complex and dynamic socio-environmental contexts. Under these conditions, solutions need to be created and adapted continually to guarantee adherence with the scheme and its effectiveness. In order to incorporate the complexity inherent in the scheme and deal with uncertainty, the management model should create an environment ripe for the development of solutions based on innovation in response to the demands that will arise throughout its implementation.

PES schemes can also offer compensation to adopt or develop innovative approaches for environmental services at a lower cost, reducing costs of the scheme and as a consequence the provision of the ecosystem services (Jack, et al., 2008). Structured innovation processes are essential for the transition toward sustainability. It becomes even more important to obtaining systemic and lasting results. This requires, however, that social and ecological criteria be considered during the innovation process. This component should be consciously structured and incorporated into the PES scheme.

The efficiency of implementing the scheme depends on efforts to integrate communications with operational processes, as a key part of the operation and not juxtaposed to it. They should intersect with all actions in a continual effort by collaborators of the lead institution and incrementally with partners and supporters to create common understanding around the concepts, agreements and other information through the entire network of actors involved in the PES scheme.

9. Institutional designs for operationalization

While conceptually the flow of resources in a PES scheme occurs from the buyer to the provider, in practice diverse intermediary actors are required to adequately and efficiently implement and operate a PES scheme (Engel et al., 2008).

The complexity of the institutional design associated with PES schemes can be explained by two factors: (i) the schemes are inserted in contexts with complex problems of great interdependence and with widespread governance limitations (Bours, et al., 2004) and, (ii) recent changes in the governance of environmental policies with an emphasis on decentralization and flexibility that enables the actions by the private sector as the provider of the public services, corporate self-governance processes, responsible consumption and socially regulated models (FAO, 2007).

Appropriate attention to the conditions of implementation is a determinant of success of a PES scheme. This attention begins with the identification of an institutional design adequate for operation. Different financing structures determine the additional challenges of the institutional design. PES schemes demand management processes that are not viable for many providers (Forest Trends, Katoomba Group & UNEP, 2008), private or public intermediaries (Bracer, et al., 2007). Intermediaries have varying roles in the operationalizing of the schemes especially the integration between scheme investors and providers, development of local, expertise that is trustworthy, credible and legitimate, certification, risk management, among others (Porras & Nhantumbo, 2015).

The PES schemes also have the expectation of promoting the participation of new actors in the politics of conservation, and in this way, enable new institutional designs (Eloy, et al., 2013). The result of the PES scheme, even when well designed, will only be put in action with an adequate institutional structure to operate it. This structure begins with the selection of an institutional lead for the scheme.

The institutional lead should have the necessary skill set to perform the essential functions of operating a scheme: (i) general management; (ii) management of resources; (iii) management of information; (iv) monitoring of results and e; (v) verification of conformity and compliance with penalties (Greiber, 2009). There is, however, no standard structure for the schemes, and the institutional structure should reflect the scheme and the reality in which it is inserted (ibid.) and how the environmental service will be implemented.

The implementation of the environmental service, in turn, occurs at various levels of participation by institutional actors:

1. Implemented exclusively by providers;
2. Implemented by providers based on information provided by partners;
3. Implemented by providers based on information, trainings and technical support provided by partners;
4. Implemented by providers based on information, trainings, technical support, equipment and supplies provided by partners;
5. Implemented by providers based on information, trainings, technical support, equipment and supplies and actions or services provided by partners and;
6. Implemented exclusively by partners.

According to Pagiola and collaborators (2005), the lead institution is responsible for the basic functions of operation: (i) services of purchase and sale of commodities related to ecosystem services (capture of resources); (ii) promotion of the scheme; (iii) engagement with providers; (iv) payment to providers; (v) supervision; (vi) monitoring. It is worth adding a sixth item: accounting for partners, scheme investors and providers. This structure of lead institution should be capable to offer, among other, sufficient administrative, monitoring and supervisory capacity (Engel, 2015).

It may be necessary to create or influence institutions to operationalize PES schemes. The creation of an appropriate institutional design requires the definition of roles with a sufficient balance of governance and responsibility.

Table 14 below is an effort to synthesize the pros and cons of each type of institution for leading the operation of a given scheme. It is inevitable that efforts of this nature require a generalization of the characteristics and stan-

dards of operation of the institutions which may or not be necessary for a particular situation. Within these limits, the table accomplishes a critical reflection exercise about the limits and potential of each institution. This will help in the definition of the lead institution and how to take measures that minimize possible limitations of the chosen institution.

Table 14. Pros and cons of different types of institutions to lead and operate PES schemes

Lead Institution	Advantages	Detail of content
Community-based organizations	Understanding of the territory Confidence of the providers Increased autonomy Better chances of behavior change Consideration of local heterogeneities Increased trust in the initiative Decentralization	Difficulty to access partners that are not local or regional Local organizations are normally poorly equipped in terms of human resources, financial, and in infrastructure to promote the necessary changes (Porras & Nhantumbo, 2015) Have a larger risk of prioritizing social demands first to the detriment of conservation objectives Expectation of rapid results – immediacy view
Non-governmental organizations	Allows for creation and adjustment of the structure in order to operate the scheme Greater agility and flexibility in operating the scheme Greater agility in adjusting the strategy based on changes in scenario Institutional independence in terms of making unpopular decisions for the scheme and providers	Depend on external flows of resources to guarantee continuity of operation No mandate about the standards for use of land and natural resources Requires consistent legal instruments to have management over ecosystem services
Social enterprises	Larger appetite for risk and the possibility of achieving larger gains conditional on the results of specific metrics They are well informed about opportunities to access understanding and financial resources (Porras & Nhantumbo, 2015)	Low demand for credits for carbon, biodiversity or poorly structured markets (Porras & Nhantumbo, 2015) Tend to not consider services that cannot be negotiated or are of public domain (Arraigada & Perrings, 2009)
Government agencies	More environmental governance and management over standards for use of soils and natural resources (Muradian, et al., 2013) Increases possibilities of better synergy with command and control efforts and the development strategy of the territory Possibility of developing a portfolio of diverse sources of financing for specific actions foreseen in the scheme	Little agility in operating and lower level of operational efficiency (Arraigada & Perrings, 2009) Rigid and bureaucratic processes Subject to change of priorities associated with political cycles Schemes with operations led by government agencies have put less emphasis on monitoring and penalties for non-conformity (Engel, et al., 2008)

BOX 9. What is the process of training and aligning within PBF team?

The PBF team, responsible for the implementation of the scheme, is organized into regional teams, with each responsible for the implementation of a group of areas. Teams relocate to bases established in the cities in the interior of the state, determined by logistical options and access to the areas.

A decentralized team allows for an intensification of the relationship with the groups of providers and local partners, but makes the process of internal alignment between the teams more difficult. In this light, the process of developing a team should include an ample evaluation of the profile of the professionals. It is important to define the team responsible for the implementation of the scheme and analyze the trade-offs between technical, executive and relational expertise.

The focus of the team should be balanced between achieving the desired results from actions and the relationship process with the groups of providers, understanding the time needed to guarantee that quality participation occurs. This takes place through the training process that occurs in the field with support from more experienced members of the team and coordinators. The performance evaluation process occurs annually.

At the beginning of each annual cycle of implementation of the scheme, a workshop is held with the entire team. The workshop allows for reflection on practices, and the development of better-integrated operational plans between the areas. The workshop is also a central element in the integration of the team and establishment of relations that will be necessary during the dynamic process of implementing the scheme.

In addition, periodic meetings take place in which actions under development and the results from each region are shared as well as other coordination and support from the lead institution (FAS) with the goal of conceptual alignment and updates in terms of the progress of the program as a whole. Institutional cohesion and the global vision of the scheme, built in these moments, are essential to giving unity to the scheme, whose implementation occurs across 16 distinct areas.

The list below, with no pretention of being exhaustive, compiles the primary functions associated with the operation of the scheme (**Table 15**). The functions below can, in each case, be centralized in the lead organization or be attributed to partners. Some of the functions can be attributed directly to providers or scheme investors.

Table 15. Functions in the scope of the PES scheme

Articulation of the scheme design

- Articulation with partners;
- Facilitating the process of co-creation;
- Collecting data about the ecosystem, socio-environmental context;
- Study to fill gaps in information;
- Measurement and valuation of ecosystem services;
- Development of baseline studies and projection of "BAU";
- Prioritization of areas according to the established criteria;
- Identification and mapping of potential providers;
- Development of proposal for environmental service;
  - > Innovation in the scope of the environmental service and;
  - > Prototyping and implementation of pilot program;
- Consolidation of proposed scheme (PES-canvas).

Facilitation and articulation

- Promote the participation and involvement of providers;
- Articulation with partners and;
- Resolution of conflicts.

Negotiation and funding

- Fundraising and;
- Negotiation (trade).

Operational management

- Coordination;
- Implementation of environmental service and;
- Supervision.

Financial management

- Investments in the scope of the scheme;
- Delivery of payments;
- Processes and controls and;
- Contracting of consultants, audits, among others.

Communication

- Communication directed to providers;
- Communication directed to partners and;
- Management of information

Monitoring, verification and reporting

- Monitoring the metrics of the scheme:
  - > Monitoring for conformity (terms of the scheme);
  - > Application of penalties;
  - > Reporting and;
  - > Verification and audit.

Each of these functions can be split into diverse actions or activities that can be realized in a centralized manner by the lead institution or decentralized by specific actors. The function of orchestrating these actors is normally attributed to the lead institution in the scheme. These functions are identified during the design of the PES scheme and need to be attributed to specific institutional actors with specific expertise to execute them.

One appropriate institutional design begins with a lead institution and is built by integrating institutions of different types that add complementary expertise to the process of operating the scheme. Besides adding expertise, the lead institution creates a favorable environment for implementing the scheme, guaranteeing that the institutions have governance over the themes in which they intend to act.

Another aspect to consider is the need to balance technical mastery of the theme, or function, and the understanding and capacity within the territory. In the **Figure 26**, the actor (1) represents the ideal situation in which the potential partner has: (i) ample understanding and installed capacity in the territory and; (ii) mastery of the theme or function required for the scheme. The actors (2) and (3) represent actors with one of the desired characteristics. In this case, analysis is needed to determine which investment is needed to move these actors to a closer position to (4).

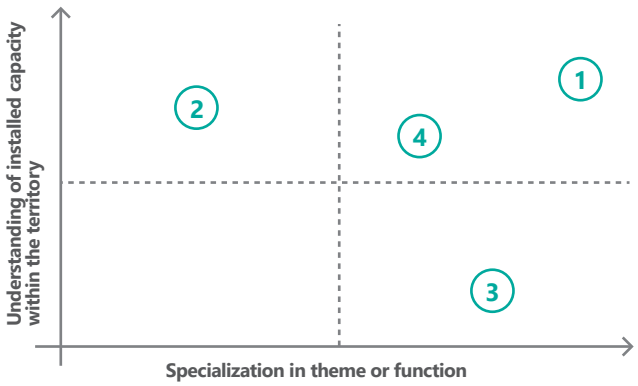


Figure 26. Evaluation of partners for a specific function in a PES scheme

The actors can have various institutional forms, from informal collectives of providers, to non-profit organizations, government organs or multilateral agencies. Each actor profile has advantages and disadvantages. This coordination requires active management and implies a cost in the scope of the scheme.

Determining the specific functions and levels of authority means putting the right people in the right roles, structuring a consistent decision system that minimizes arbitrariness (Greiber, 2009) and distance from the reference for the scheme. In other words, besides the division of functions, a governance structure needs to be established to guarantee a consistent decision-making process.

On the other hand, a more centralized model with a dedicated institution for operation of the scheme creates an institutional identity for it and tends to guarantee more consistent standards and allocation of human and financial resources (Greiber, 2009).

The specific context for each scheme is determined in the definition of the operating design. Local conditions supply the needed support and the choice between a more centralized structure with a smaller number of partners adding more functions or decentralized. While both models have advantages and disadvantages, consider that the effort to orchestrate a much decentralized structure is significant. While decentralization allows, in theory, individual responses to local problems and potentially more agile processes for the providers (Greiber, 2009) there is a considerable risk of losing internal coherence and operational consistency.

Additionally, it is likely that in a decentralized structure, in which functions are too compartmentalized, the institutions have the scheme as just one more initiative underway, negatively impacting its operation in various ways. In both designs, it is essential that the institutional leader be held to high standards for: (i) conformity; (ii) transparency; (iii) governance and; (iv) Free, Prior and Informed Consent (FPIC).

Conformity is a result of robust processes of planning and execution based on clear standards for quality and associated with internal and external controls – that guarantee that the actions and investment realized can be traced and verified.

Transparency is determined by the ease of access to financial and operational information including, among others: (i) publication of operational results; (ii) the publication of periodic external audits; (iii) the openness of external evaluation processes and; (iv) publication of announcements for the contracting of equipment and services, among others.

Governance is established from clear and consistent flow of decisions that includes the creation of councils with equitable participation from the segments of society (public sector, private, academia and social organization). The participation by representatives of scheme investors, providers and other actors in the scheme in these councils is highly recommended.

Free, Prior and Informed Consent (FPIC) is the local and indigenous communities' right to free, prior and informed consent and has been recognized by a number of intergovernmental organizations, international bodies, conventions and international human rights law in varying

degrees and increasingly in the laws of State (UN, 2004). It is a process of active listening to the actors involved in the scheme, beyond their representatives in the diverse councils of the governance structure. The participatory process should be organically inserted into program's action in a way that galvanizes the direct and equal participation of providers, scheme investors and other actors. These communities may have the option to accept or oppose a proposed scheme or development that may impact on their community.

10. Adaptive management of PES schemes

Efforts to design the scheme and maintain favorable local conditions should be continuous. The strategies, processes and tools presented below have the objective of sparking attention to elements that are important to the efficient management of a scheme.

As mentioned, an innovative PES scheme requires an adequate management model to maintain consistency throughout its implementation. As presented above, environmental services solutions based on a ToC is comprised of innumerable causal relationships, in which the behavior of one of the parts interferes in the behavior of the system, in an uncertain and dynamic context. The environmental service solution is a central element of the process of implementing the PES scheme. Consistency in implementation is central to the maintenance or increase in the provision of ecosystem services, the primary objective of the PES scheme.

Unpredictability is an inherent characteristic of managing natural, human and social resources. Unintended results can also occur due to limited vision on the part of actors in the PES scheme and limited control over the causal relations in decision-making and the possible lack of understanding or agreement among the involved parties about the processes that interfere in the dynamics of the resource that guarantee the provision of the ecosystem services.

The conventional mechanistic approach to management seeks to maximize objectivity, quantification and control. It tends to concentrate on environmental and ecological controls and considers human behavior to be exogenous to ecosystems, a subordinated relation between society and nature (Bauer, 1999; Kofinas, 2009). In this type of approach, decisions can be fragmented, focused only on a part of the system, which can cause problems for conformity, limited relations of trust, prolonged conflict, non-responsiveness to local conditions, to human means of subsistence and the concerns of the community (Kofinas, 2009).

Thus, management models characteristic of hierarchical organizations with high levels of control are inadequate for innovative PES schemes. However, uncertainty and recognition of the limited vision of the system should not represent paralysis in terms of decision-making and operational planning. Collection of data and the use of scientific capacity to better understand the scenario is crucial, but one can't wait for perfect information to act. This would mean losing not only opportunities, but also levels of provision of ecosystem services that the scheme is looking to maintain (Williams & Brown, 2012).

The social context in the territories in which PES schemes are intended are dynamic and require constant adjustments to the design of the scheme. Along those lines, the capacity of institutional partners to deliver what was agreed changes frequently, requiring a revision of the agreements and a search for new partners to guarantee that the actions occur in an appropriate manner. Thus, planning for innovative should provide for periodic moments for evaluation and revision of the scheme design, seeking to incorporate the lessons learned during its implementation.

Governance of factors that deal with socio-economic systems requires a flexible approach that promotes collaboration among actors at different scales and facilitates understanding (Kofinas, 2009). They are models that assume the impossibility of reaching any integrated understanding, but recognizes uncertainty and has dialogue with it (Bauer, 1999). An adaptive management approach thus serves as the reference for lead organizations to direct their work together with the network of actors that comprise the schemes. This approach has been presented by various authors over the last decades as adequate governance models for organizations and projects that deal with the management of natural resources, social and community development projects (Ramalingam, 2013), processes involving behavioral change (Anderson, 2005) and that create networks for innovation (Melo & Agostinho, 2007).

Thus the adaptive operational management of the PES scheme should consider:

1. The dynamic nature of planning;
2. Time and resources for the development of spaces of trust and participative processes;
3. Flexibility to allow for adjustment of actions resulting from collective decisions with the providers and partners;
4. Management autonomy of the field agents to make agreements with local actors, establish partnerships and act in an adaptive manner to promote adjustments to planning;
5. Space for mistakes and the resources for the corrections that become necessary;
6. Periodic and structured moments for evaluation of the design of the scheme and incorporation of lessons learned;

7. Continual analysis of opportunities;
8. Actions that integrate the ToC in a modular way for each territory (or fraction of territory);
9. Add expertise by working through networks and developing local expertise;
10. Cooperation among actors, with the lead institution in the role of coordinator and not correspondent;
11. Self-organization of teams and territories;
12. Importance of registering choices, decisions and agreed changes;
13. Adequate profile of team (critical analysis, reading of scenario/context) and;
14. Awareness of the risks associated with adaptive manag ment;

Adaptive management depends on a robust, structured and iterative process for decision-making in the face of incomplete information, with the objective of reducing uncertainty over the long term through monitoring of the system. In this way, besides its function of managing resources, decision-making has the objective of accumulating the necessary information to improve future management. It is a tool used not only to influence the system but also to learn about it.

As adaptive management is based on a learning process, it improves management results over the long term. The challenge in using the adaptive management approach is to find the correct balance between acquiring knowledge to improve future management and reaching better short-term results based on the current available knowledge.

As presented in **Section I. Tools for the design of innovative PES schemes** (pg20) it is important to dedicate substantial efforts to align and understand the agreements that regulate the scheme. One fundamental initial step is the establishment of common understanding between those involved in terms of the proposal, including normative questions – shared values between the diverse parties involved that establish the foundations for the construction of a community with shared authority. The actors in the scheme will organize themselves guided by these norms to operationalize the strategy.

This initial task is dynamic in nature and constitutes an agreement that needs to be periodically renewed. In the model presented in **Section I**, the process of building the ToC is a moment that makes the most of these foundational discussions, incorporates different approaches about the logic of the proposed change and provides the grounding on which more pointed strategic decisions and actions are aligned with the general design of the scheme.

It is important to recognize that the scheme may be comprised of actors that represent varied cultures and visions of the world, mental models that interfere with the way in which each group interprets events and interacts with their socio-ecological system. Negotiating and establishing common ground sufficient to achieve effective social and ecological governance can require the development of a common vocabulary and mutually agreed protocols potentially increasing resilience in the system (Kofinas, 2009).

Adaptive management demands a model for participative learning. The exercise of design based on the canvas is the ideal moment to create the base of strategic information and should be developed in a participatory way with the objective of tracing common directions. In this way, reflective action is a collective effort and incorporated from the beginning by all key actors in the scheme.

The canvas then comes to be an initial marker that remains open to adaptations retroactively fed by research-action and lessons learned. The framework is maintained as reference, but should be flexible to be updated and incorporate adjustments in the needed fields according to the results of operation and changes in context.

Planning becomes a map which represents the vision of where efforts want to go. Different than a recipe that provides the step-by-step, the map has various possible pathways to achieve the destination.

The operational plan for the design of the scheme and the environmental service solution should be modular in character, of short to medium term, becoming a model of tests and prototypes of action, based on innovation efforts and make the implementation of the proposed ToC possible. In this way, for each cycle of applications, training can be revisited and incorporated into the next cycle, in a cumulative and continuous way. Modular implementation makes comparison of results possible between different geographic regions with their own ecosystem characteristics, different areas of interest or social contexts, which makes the learning process rich and dynamic.

Along these lines, the modular character allows for the proposed environmental service solution in the PES scheme to be implemented in different ways in each territory of the scheme in function of (i) distinct local priorities, (ii) availability of specific resources for a given territory, or they may not be sufficient to implement a given module in all of the territories in a given scheme and (iii) analysis of local conditions that become opportunities or barriers to the implementation of each module of the environmental service solution throughout the implementation of the scheme.

The process of prototyping and modular projects should be combined with a process of reiteration and evolution. A deliberative process of continual exploration of improvements and adjustments in process should be foreseen for the model, focused on participatory revision and evaluation and incorporation of possible changes based on increased accumulated knowledge and the desired future.

It is recommended that modules that integrate an environmental service solution be implemented at a pilot scale, taking advantage of lessons prior to scaling to all the territories in the scheme. This way, besides the lessons from implementation of the pilot, it is possible to develop local capacity, identify and engage multipliers, establish demonstration areas that can be visited by leaders from other territories, increasing the receptiveness of a given action in the scheme, thus contributing to the creation of favorable local conditions for the implementation of the scheme.

Learning depends on the creation of spaces of trust in which participatory processes are systematically led with the intention of encouraging open dialogue about improving the program. Over time, adaptive learning is a cyclical process through which observations support learning processes, decision-making and actions (Kofinas, 2009). The difference of adaptive management is the process of retroactive inputs for decision-making through reflection on the consequences of past actions before realizing new actions. The aspects discussed in **Section II. Developing favorable local conditions for PES schemes** (pg71) are key to the quality of reflection made possible during these moments, but the relevance of this reflection comes from the mandate that these moments of evaluation have in actually influencing the design of the scheme.

An essential part of the social learning process is receptivity to the failures of previous implementation, the creation of space to share mistakes. Thus an organizational culture of continual learning is created where practices are observed and the ability to reflect on them is developed. It is important to emphasize that the creation of spaces for reflection, with a mandate and the resources to make the needed corrections, is fundamental for the success of the process as a whole.

Ties of retroactive inputs connect the agents pertaining to the scheme. Learning by one of them feeds all in the system, which absorbs the new intelligence and evolves (Silva & Rabelo, 2003). Thus a complex adaptive system is created, characterized by autonomy, cooperation, aggregation and self-organization (Agostinho, 2003).

Managerial autonomy and the decentralized structure of decision-making allows agents in the scheme to feel able to sign agreements with local actors, establish strategic partnerships and make adjustments in operational plans.

This characteristic is only possible with strong bonds of trust, alignment in purpose and a robust strategy shared among actors. The implementation of the PES scheme can, many times, be dispersed across areas with limited communication and high costs to access. The agility needed for implementation is only possible when this autonomy is encouraged and supported by the actors in the scheme and internalized in the governance structure of the lead organization.

However, autonomy by itself does not guarantee good systematic performance. There is a need for mutual cooperation and coordination in order for the group of actions by various autonomous individuals to converge for the benefit of the system (Agostinho, 2003). Coordination has the role of disseminating information in order for the agents to be up-to-date on the plans of others, creating the capacity for self-awareness through the strategies of others.

In order for these principles to be incorporated by the team, organizations in the scheme need people with flexibility, capable of dealing with change, capable of critical analysis, reading of context and pro-active in reference to the established strategic direction. It is important that the lead organization focus on hiring people that embrace uncertainty and do not become paralyzed in the face of complex operations whose actions do not have immediate returns or consequences.

The dynamic character of the scheme also depends on the establishment of institutional partnerships that add expertise and complementary resources to the scheme. These are local providers of goods and services, grassroots organizations, specialists in relevant fields to those of the scheme, facilitators of local processes, among others.

These partnerships become the action network and it is essential that, upon establishing these connections, processes for alignment with the design of the scheme and the management model be established to ensure that they come together effectively, without, however losing their individuality or independence. The lead organization, despite helping in the creation of these ties, does not assume the role of correspondent between the parties. Instead of speaking in the name of the providers and represent the partners in the scheme, it creates the opportunities and spaces in which the parties can dialogue in a purposeful manner about the topics and questions associated with the solutions proposed in the ToC. The scheme becomes a platform that launches innovations and encourages a space for exchange.

The iterative process of evaluation of the scheme, the partnerships and the decisions made should align reflections on lessons learned with constant observation of the current scenario, with continual analysis of opportunities for technical, financial and innovation partnerships. Adapting does not signify a reactive posture that adapts to its environment, but an active adaptation in which the organizations, coordinated by the institutional lead, influence the behavior of the environment in ways favorable to it (Melo & Agostinho, 2007).

The evolution of the model and the incorporation of new formats, paths and measures that an adaptive management fosters, can lead to a loss of focus with the entrance of new partners, collaborators and actors that have not followed the process from the beginning. It is fundamental to document each iteration and turn by the system in order to maintain clarity of the initial map, the macro vision of the scheme.

The flexibility of this management model presents inherent risks. A space always open to change and opportunity can lose focus of the central objective of the scheme. Upon initiating parallel projects to take advantage of favorable scenarios, there is a chance for a loss of focus and dispersal of activities. These detours can affect the primary results as well as generate an excessive flow of demands that was not foreseen by the teams responsible for the implementation of the scheme, which, on losing focus, can burn out and create distance from the causal chains that will guide the primary objective of maintaining or increasing the provision of ecosystem services.

Social communication as facilitator of the entire adaptive management process is of prime importance. None of the processes described previously can happen effectively if attention is not paid, both internally as among partners, to communication between the actors in the scheme.

The impossibility of understanding all of the possible scenarios cannot be seen as a barrier to the beginning of the implementation of the scheme. In the same way it is important to recognize that windows of opportunity to advance the implementation of the scheme can arise in moments when conditions are suboptimal. This, however, should not impede progress in the implementation of the scheme, as changes and iterations will occur throughout the entire process.

Having pioneered the creation of PES schemes since 2008 in the Amazon region, the choice since the beginning was to develop a scheme with adherence to its context, created together with partners, academic references and groups of potential providers. The innovative character and the inherent uncertainties in the process demanded, from the outset, a form of management that did not fit with traditional models. Below, some examples of the adaptive management process adopted by the FAS can be seen.

10.1 Flow for handling opportunities

The FAS, as lead institution in the PBF scheme, adopted an adaptive management model aimed at agility in response to providers (**Figure 27**). The field technician that receives a demand from a local partner or a provider is responsible for guiding that process through the organization and the response back to the partner.

Direct involvement with the process ensures that the information is forwarded and is not lost in bureaucratic processes. Since the lead organization deals with many families in distant territories, it is fundamental that the agents responsible for that region assume the agility to process the demands.

In the same way, the lead institution team was trained to identify and process positive opportunities with potential to enhance the implementation of the scheme. Positive opportunities are seen as chances for technical partnerships, financing, offer of volunteers or innovative inspiration that, without having been foreseen, can be incorporated into the operation to expand the impact of the scheme.

These windows of opportunity are created from meetings with providers, scheme investors, partners, participation in events, technical and prospecting meetings, for example. These opportunities also reflect the openness of the lead institution to proposals and new ideas that may or may not arise from actors involved in the scheme.

In order to guarantee innovation and keep itself open to possible additions to the scheme, without negative consequences for planning, a flow for analysis of opportunities was developed which allows for possibilities of new projects and partners to be analyzed through the design of the scheme. The crucial point of this analysis is to understand if the opportunity has adherence and can be added to the operational plan in a way that enhances the proposed environmental service solution.

Over the short term, these unforeseen actions can have an impact on the team's planning, prompting modifications of plans and focus or of functions. These efforts, however, have a positive impact at the institutional level in the medium and long term, with the building of new institutional relationships that improve the design of the scheme.

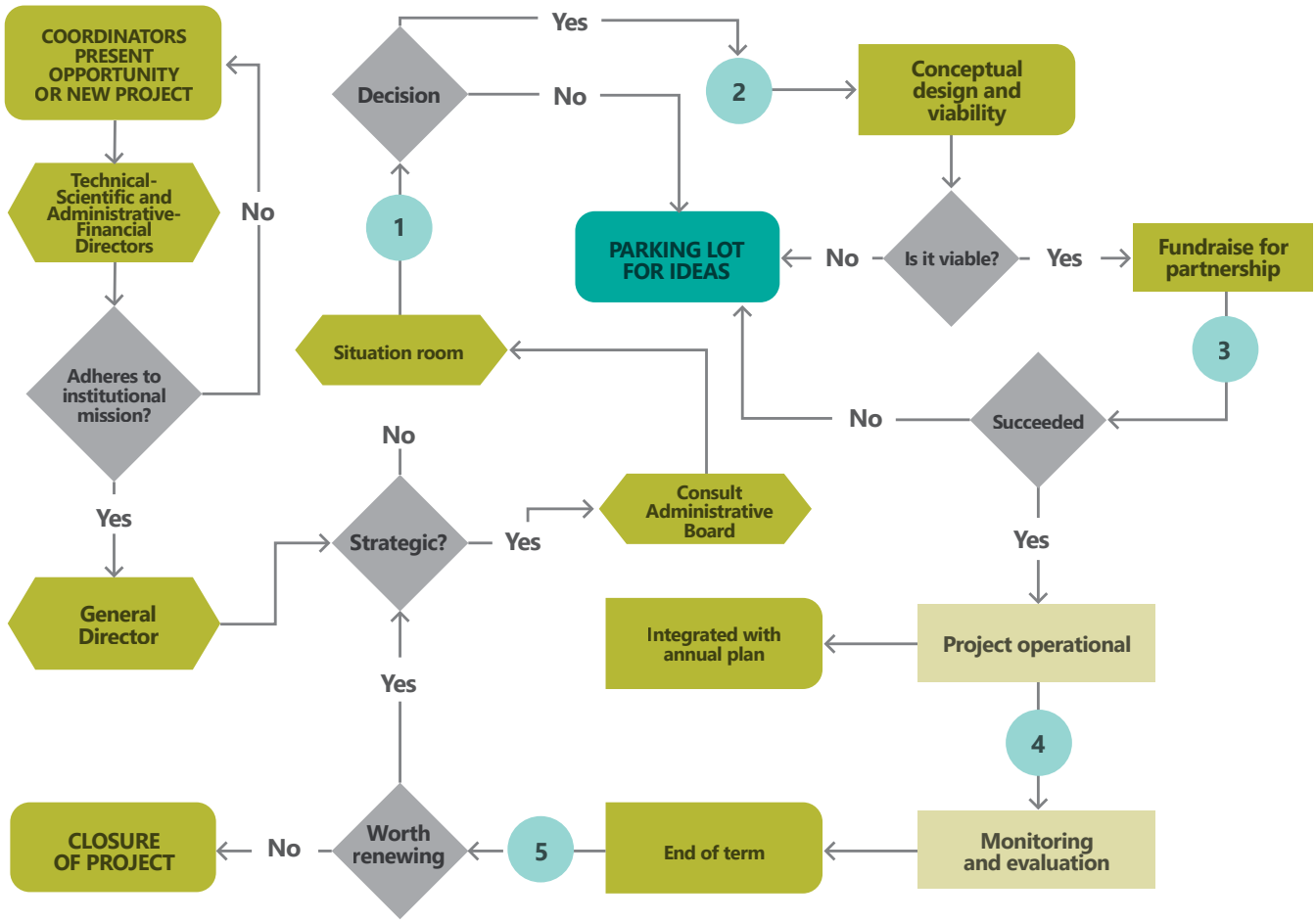


Figure 27. Flow for processing opportunities and new projects

10.2 Flexibility in the definition of reward

The collective decision for rewards at play in the PBF scheme and its operational system represent a process whose management must be very flexible. The model of the scheme foresees periodic investments to communities in different categories. Three of these blocks of reward (income, social and association) are decided collectively. At annual meetings with the providers, budgets are presented, and in a participatory way with technical support and facilitation by the lead institution, the next cycle for distribution of resources is decided.

After the first rounds of decision-making and the distribution of rewards in the form of incentives and payments and in investments for income generation, some group of providers began to see that the choices should be improved. Among diverse examples that can be cited stands out:

- The choices were not broad enough. Some groups of providers benefitted while others that didn't work with the same product did not;
- They realized that the value invested was not sufficient to complete the project and it would be more opportune to wait a few cycles to accumulate sums in order to fully implement the project;
- They perceived synergy of interests with other groups of providers and opted to invest together, creating more robust value and sharing the benefits;
- During the implementation of actions, providers made other partnerships to fulfill investment needs and requested a change to make the implementation complementary and;
- A training, education, or technical development process was necessary for providers to better implement the actions they chose.

The examples above are local responses that could not have been predicted beforehand and based, on adaptive management, were considered and incorporated as learning in the process of implementing the scheme. Adaptive management is a flexible process of implementation which does not require that all actions, interventions and resource allocation be defined beforehand. It relies on a strong and dynamic governance structure to be able to continuously adjust criteria as procedures seeking for the best fit with the actual context. This innovation-based arrangement enables to seize unforeseen opportunities, integrate innovative actions and change in response to local demands and reflection over practice.

These situations demand of the institutional leader an open posture and personal and technical capacity to incorporate new elements and address necessary changes. The mobilizers and coordinators in the field are facilitators of these dialogues and articulators of processes. They seek to understand the demands of the providers and promote reflective processes that will gradually lead to more appropriate decisions. Each of these nuances unlock a process of managing resources and processes that are better absorbed by an adaptive management model.

One effort that requires attention is alignment of expectations with the scheme investors, creating institutional margins to absorb adaptations in planning from decisions in the field. Some cases demonstrate the differences between what is expected by the buyer and what is delivered by the providers.

It is important that some principles be aligned in the process of negotiating with scheme investors, as is the case in the collaborative and participatory models for investments in the field, with a work plan with goals and defined schedule that is updated and revisited periodically. This constant realignment is crucial to minimize noise in communication and create mutual understanding between providers and scheme investors, facilitated by the lead institution.

There are three primary sources that support strategic decisions of change in the PBF scheme: (i) field observations on the part of the technical committee; (ii) reflections and evaluations on the part of community leaders and; (iii) monitoring indicators.

Moments of reflection and revision in the design of the scheme are fed by a flow of information collected from the primary sources above over the course of the operational year which are brought to strategic participatory discussions. The presence of field agents and the results of events and workshops held with providers generates the reflections in each territory about successes and lessons learned. The coordinators of strategic planning workshops can perceive patterns, bottlenecks, challenges and needs for adaptation.

During the Leadership Meeting, spaces are created in order for providers to reflect on their practice, which promotes deeper analysis not only of results but of the root of the problems raised as well as by observation of the situation from different angles.

Figure 28 below demonstrates the model of learning loops applicable to operational adaptations that interfere in the form that actions and strategies take, which requires adaptations in the model of the scheme.

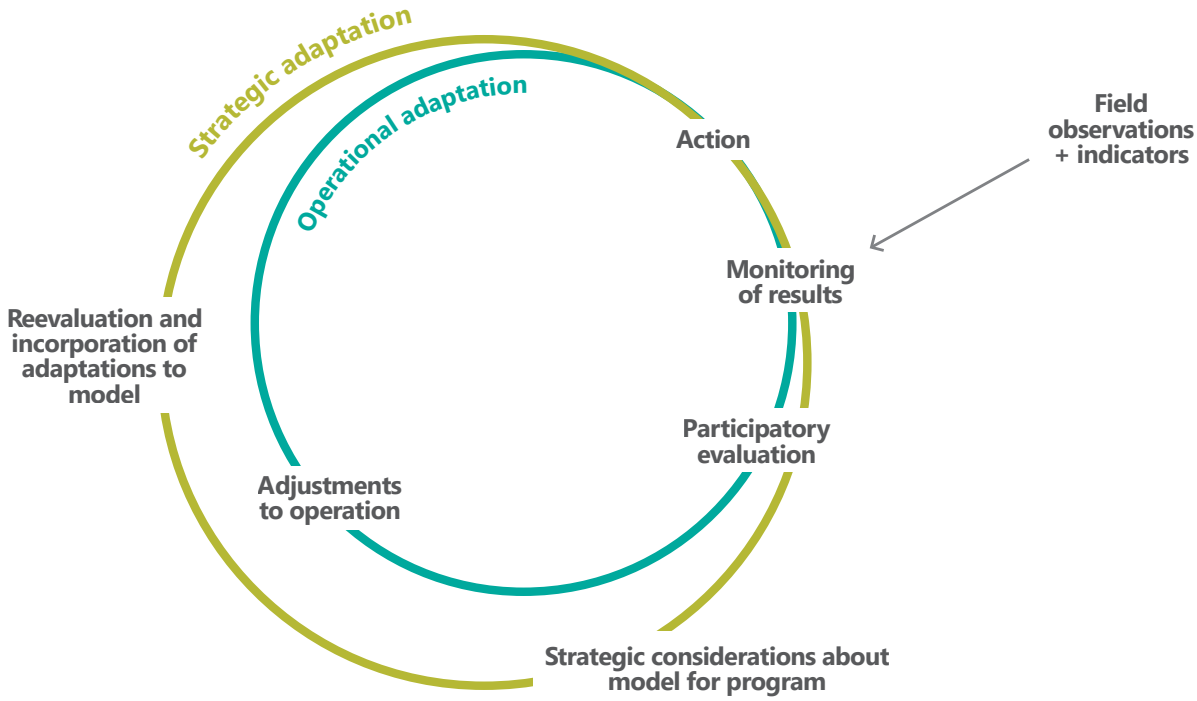


Figure 28. Learning loops and adaptation

BOX 10. Redesigning compensation ("reward") during the implementation of the scheme

In the initial design of the PBF scheme, the format of compensation associated with the promotion of sustainable alternatives for income generation was directed at investments in the potential traditional production chains in the territory. The region of the Rio Negro SDR, for example, has a history of timber extraction and the first approach would be to work on management plans to achieve a sustainable form for this activity.

After some rounds of investment, this production chain faced barriers to implementation: precarious land title conditions for the approval of management plans in all of the regions of the reserve. The approval process was drown out to the point that the providers did not see the investments foreseen as incentives or compensation for the environmental services provided. This situation provoked a request on the part of providers that investments be made equally by community and not by Protected Area in order to not privilege large communities over small ones.

This adaptation was made, and for this subgroup of providers, investments in other chains were chosen, such as, for example, community-based tourism. After some years of operation with this model, the providers realized that even after diversification, there were groups interested in production chains that were not considered. Once again a model of investments in production chains was adopted in consideration of these specific interests. Other investments are being added to the scheme to support individual local entrepreneurs (vide **Box 11. Riverine entrepreneurship in the Amazon: strategy to increase income generation, empowerment of traditional communities and environmental conservation***), as an incentive for innovation and leadership.*

This case represents a clear evolution in the design of the scheme in regards to rewards stemming from demands from the providers, local observations and which, after reflection and strategic decisions, were incorporated into the design of the scheme.

Upon proposing to use a participatory methodology, the lead institution and other partners must adapt to respond to this type of situation involving providers and other partners, without losing sight of the objectives of the scheme. There should be capacity to reformulate and reinvent.

[40] http://anprotec.org.br/cerne/

BOX 11. Riverine entrepreneurship in the Amazon: strategy to increase income generation, empowerment of traditional communities and environmental conservation

FAS bets on stimulating entrepreneurship in local riverine communities based on accumulated experience in the field with income generation, conservation, education, health, grassroots organizations, innovation and community development. An approach that became part of all the income generation initiatives of the PBF and integrates environmental conservation with social development under a long planning horizon.
As a result, an alternative methodology to the classic models of associativism was developed and is being consolidated for the development of business in Amazonas, focused on local entrepreneurs that are part of the groups of providers in the scheme.

The strategy is an expansion of the leadership of providers in the scheme in the development of production chains and sustainable economic activities that value the knowledge of traditional populations, incorporates technological innovation from research institutions, and values the economic potential of a standing forest, which contributes to the proposed environmental service solution.
Upon making different production arrangements and economic activities more efficient and sustainable, with greater local income generation, social vulnerability is reduced and the willingness to conserve natural resources increases.

Objectives

1. *Contribute to the conservation of nature by valuing the standing forest;*
2. *Stimulate improvements in quality of life through increases in local income;*
3. *Enhance local capacity for social, financial, technological and commercial management of production arrangements and economic activities;*
4. *Promote the differentiation of more efficient and sustainable production arrangements and economic activities through innovative solutions;*
5. *Enhance the access of local entrepreneurs to quality credit;*
6. *Enhance the access of Amazon products to different markets and;*
7. *Promote and spread a culture of entrepreneurship with riverine populations and other related actors and build their capacity.*

Strategy for action

1. *Mapping the profile of entrepreneurs: identification and support to endogenous riverine entrepreneurs;*
2. *Financial certification and education: valuing traditional knowledge and the economic potential of the standing forest; specific training in financial management; identification of priority production arrangements and their bottlenecks; co-creation of solutions and investments;*
3. *Access to the market: make conventional business management tools available to traditional and indigenous populations;*
4. *Investments for sustainability and social impact; adoption of technological and social innovation by research institutions;*
5. *Promotion and access to credit: financial orientation for qualified access to credit;*
6. *Innovation: begin cycle of incubating promising enterprises;*
7. *Sustainable business: support for the qualification and graduation of incubated enterprises, following the Cerne[40] model (Centro de Referência para Apoio a Novos Empreendimentos- Center for Support of New Enterprise) and acceleration of promising ventures through seed capital or angel funding and;*
8. *Lessons learned: analysis of results and impacts in the continual process of improvement of actions and support for riverine entrepreneurship.*

Amazon nut processing facility (Clovis Miranda).

Andiroba and murumuru production at Uacari SDR (Oitorama Filmes).

11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientific research

One of the pillars of effectiveness of a PES scheme is monitoring and evaluation (Arraigada & Perrings, 2009; Naeem, et al., 2015) – tools, metrics and methodologies used to track the process and verify impacts.

Evaluation ideally begins prior to implementation. Without a more careful evaluation design the knowledge about what works and what not in PES will remain limited.

As conditional cash transfer programs, for instance, PES programs could be rolled out in a "randomized phase in" fashion, or participants could be randomly selected in an oversubscription design. However, this kind of approach can face technical barriers (i.e. not enough information of the potential providers to allow randomization) or even ethical issues on keeping a control group without access to the rewards from the scheme. Monitoring and evaluation of a PES scheme requires thus a set of tools to systematize information in a way that covers all involved actors. In this sense, all stakeholders, including the lead institution, must manage information properly to establish systems and flows for monitoring and evaluation to register performance. In addition, it also necessary to bring together technical documentation that allows for recognition of results achieved and supports decision processes.

However, results related to the maintenance or increase in the provision of ecosystem services tends to be significantly deferred over time. The scheme then should be in operation for considerable time for providing perceived and significant results.

Thus, an ample monitoring process must consider a set of tools that indicate if the PES scheme is on the right path and that it is not generating undesired results as a result of its implementation (e.g. internal and external risks).

Besides the changes in the provision of ecosystem services and the estimate of additionality generated by the scheme, the following must be monitored:

1. Management controls and intermediary indicators of processes;
2. Indicators of intermediary results, predictors of impacts of the scheme through the proposed ToC;
3. Institutional environment in the scope of the scheme;
4. Opportunities and barriers in laws and norms for the adoption and perpetuation of the proposed environmental service solution;
5. Adherence of the proposed scheme to social context – often very dynamic;
6. Changes in perception, opinions, attitudes and practices of the providers and;
7. Legitimacy, acceptance and credibility of the lead institution.

Considering this context, the selection of monitoring and evaluation tools should be identified in function of the information needed to make decisions, including analysis of scenarios, attention to standards, safeguards and criteria. Clear and succinct dissemination of results is imperative.

Especially in tropical regions that do not work in regulated markets that establish common parameters for this dissemination. In this context the entities responsible for regulating the ecosystem services markets are very volatile (Samndong, et al., 2014) and end up demanding an additional monitoring effort to attend to diverse standards for dissemination of results. As a result, organizations that develop PES schemes in tropical countries face continuous difficulty with financial support.

The processes of monitoring and evaluation should always be appropriated by the actors in the scheme. Thus, it is important that adaptive and flexible tools be selected to allow for this appropriation, particularly by providers of environmental services, which promotes social learning.

In this manner, the information comes to be utilized in a more effective manner in the prevention of risks and consideration of uncertainties associated with the scheme and still contributes to the establishment of management policies and the resolution of conflicts related to the PES scheme at different scales of coverage (Peixoto, 2011).

Transparency in the process of monitoring and evaluation is fundamental for the credibility of the PES scheme. The process of monitoring and evaluation should be integrated with the spaces for dialogue and participation and support reflection on the practice (Garside, et al., 2016).

The process of monitoring and evaluation includes diagnostics, elaboration of baselines, evaluations that allow tracking of metrics of success established and the terms of the scheme, as well as intermediary indicators of results that should support action plans for continuous improvement of PES schemes.

The more detailed the diagnostic tools adopted, the less chance there will be for failures in the design of the scheme (Leimona, et al., 2009). However, the more detailed a diagnostic, the larger the cost of operation; and it is necessary to consider cost-benefit and if there is a tool (or a set of

them) to cover all the existing variables in a scheme.

The literature seldom covers effectiveness and efficiency of monitoring initiatives for PES schemes (Martín-López, et al., 2014). The combination between training the providers, local empowerment for the definition of goals and indicators (Skutsch, et al., 2009), use of adequate techniques (OECD, 2010) and the design of indicators and processes for realistic evaluation (Sommerville, et al., 2011) is relevant and essential to develop a robust, executable, efficient and effective system for monitoring and evaluation of PES schemes.

11.1 Initial diagnostics

In the diagnostic stage, biotic, abiotic, social and economic factors are examined that influence the potential PES scheme design or initial phase of development, such as, for example, specific harvest periods, extractivism, fishing, or even peculiarities of the cycles of high and low flows of rivers and lakes as well as the timing of rain that impedes or complicates access to a determined area of the scheme. This first action comprises an initial diagnostic of the group of providers (organized in communities), called by PBF a "precursor mission," made possible by the application of community questionnaires and the use of the Rapid Diagnostic Assessment (RDA) methodology (Souza, 2009), which seeks to bring together enough understanding of their reality to make the planning for the implementation of the PES scheme possible.

Diagnostic actions generate data related to population dynamics, access to essential public services, the primary pressures on ecosystems and identification of details around the dynamics of maintenance of the provision of ecosystem services, as well as current practices for the use of natural resources and the identification of relevant challenges, mapping the network of actors involved and the organizational aspects of the group of providers.

These data determine the design of the PES scheme particularly in what involves the potential providers, and increases the possibility of adhesion (Ocampos, 2014; Viana, 2008; Viana, et al., 2012).

The selection of environmental indicators for monitoring is a fundamental measure for which parameters for evaluation of additional benefits of the PES scheme and other programs and projects, are brought together.

As a complement, social data cannot be ignored, being that PES schemes are considered relevant to the promotion of sustainable development, generation of income for providers of environmental services, as well as poverty reduction (Wunder, 2005; Pagiola, et al., 2005; Zilberman, et al., 2016; Andrade & Fasiaben, 2009).

Even with little evidence as to the importance of PES in the reduction of poverty, the potential for synergies is clear in cases in which the design of the initiative is adapted to local specificities (Andrade & Fasiaben, 2009).

The initial diagnostic allows a broadening of the scope of the baseline beyond the status of the ecosystem and the dynamic and projection for provision of the ecosystem services, establishing a base of comparison for the other monitoring components listed before.

11.2 Panel of management control and process indicators

Having a system for monitoring and evaluation of processes and results is essential for quantifying and qualifying the results obtained through the implementation of the PES schemes. However, it is important to consider the financial impact of the scheme's monitoring system.

Primarily in order for the costs of obtaining and processing data to not compete with the costs of implementing the environmental service solution, the challenge is to establish a set of information of high relevance that does not compromise the resources destined for the environmental service. In this sense, the viability of using secondary data and the possibility of involving other actors for obtaining data should always be considered.

Tracking implementation can be made with simple indicators such as rate of adherence to the scheme; or economics (e.g. income per capita) and social empowerment (e.g. number of women and children participating in meetings and trainings).

The breadth and complexity of these metrics are determined by the size of the actions of the PES scheme and influence the evaluation strategies, above all in relation to temporality, level of depth of the instruments, registry for data collection and availability of analysis.

In the evaluation stage (i) management controls and (ii) process indicators (Buvinic, 1999) should be considered. The PBF scheme brings together metrics and indicators from the diverse actions that make up the theories of change for the scheme - e.g. occurrence of flash points, per capita income, female participation, and indicators of infant development, among others.

In the scope of the PBF scheme 80 indicators of processes and management controls are used, of which 24 are specifically for monitoring the efficiency of management of the scheme by the lead institution. The indicators that are systematically tracked are grouped by generation of income, social empowerment, social infrastructure, educa-

tion, health, citizenship, research and innovation and the participation of their partners (**Table 16**).

Table 16. Set of indicators and metrics grouped by theme

General	Income generation	Social empowerment	Social infrastructure
Management Participation Partnerships FAS audience	Investments Production Commercialization Management	Investments Activities Trainings Management	Investments Solutions Improvements Management
Education	**Health**	**Citizenship**	**Research and Innovation**
Projects Trainings Structure Management	Situation Illnesses Trainings Management	Socio-economics Situations of risk Trainings	Public Scientific research Innovation Funding

One of the great challenges to implement and generate consistent and current information is related to the frequency of data collection and how rapidly they become dated and obsolete. In this sense, it is necessary to consider technological limitations in the field, where there is no connectivity and the availability of electric energy is extremely limited. In these cases, the definition of more adequate mobile applications with good cost-benefit is key to resolve the situation and reduce the possibility of accumulated errors and losses in the process of inserting data into the system.

A mechanism for offline data collection in the PBF questionnaires is currently being developed. Until that solution has proven its viability, however, data are primarily obtained by filling out printed questionnaires by hand. The collected data is added to the database and supports analysis used in different levels of internal and external reporting.

The panel of indicators developed for monitoring the PBF seeks a balance between the diverse specific points of view proposed in the technical literature. Some authors suggest focusing only on adopting quantitative regional indicators to infer (model) the provision of ecosystem service (Smith, et al., 2013); while others have higher criteria and see the need to isolate the "cause-effect" relation to determine the impact of the PES scheme (Le Velly & Dutilly, 2016), while still other authors recognize that these conceptual approaches can be unviable and suggest using practical indicators that can be collected, audited and able to be presented and discussed with scheme investors (Porras, et al., 2013).

11.3 Evaluation of results and predictors of impact through the theory of change

Le Velly and Dutilly (2016) propose the evaluation of impacts from PES schemes through the ToC (Ferraro & Miranda, 2013). The intermediary results to be evaluated are established from the causal chains in the ToC proposed for the scheme. In the cases in which there is no a priori ToC developed, a posteriori one should be developed from the mechanisms and contextual presumptions to be evaluated in the scheme. After analyzing the causal chains, the geographic and temporal limits are delimited: periods, scale and units that will be part of the evaluation process.

In the sequence, the measurement tools are evaluated with consideration for temporal aspects, isolation of cause and effect (endogeneity) and analysis of presumptions (comparison of executed to planned). Finally, after evaluations of impact, it is important to interpret impacts through internal and external analysis to nourish the design of the scheme and the ToC.

The authors suggest still that there be a confirmation of the evaluation to prove the appropriation of lessons learned and the internalization of the design of the PES scheme and to what degree the evaluation of results influences institutions and the improvement of the scheme over the long term.

This confirmation can be accomplished from opinion and perception studies or participatory evaluation processes. Both strategies have been used by FAS in distinct tiers (**Figure 29**) and are discussed below.

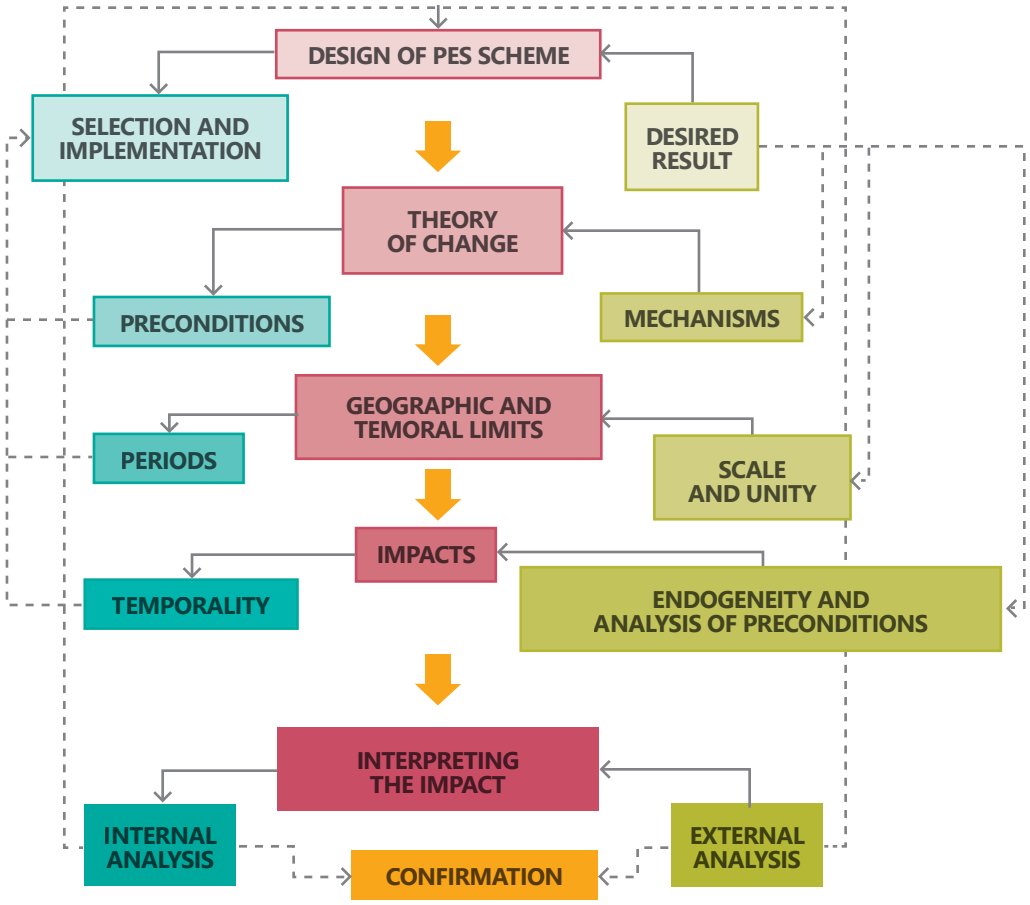


Figure 29. . Flow chart for building impact indicators for evaluation of PES schemes[41]

The complexity of implementing a model for monitoring and evaluation of schemes is proportional to the sophistication of the measurement instruments and their analysis processes. It is essential to define the scope of evaluation and the instruments for the collection and analysis of data, as well as the costs associated in order to define its viability and, as a consequence, the success of the monitoring process.

This not only deals with the complexity of ecosystem services and the proposed environmental service solution, but the accuracy of the proposed evaluation process and the availability of resources for its operation – to enact the missions and associated activities, cost equipment involved in the various stages from data collection to the publication and dissemination of results, and finally, but no less important, the dedication of upper management to discuss and incorporate possible managerial changes (Le Velly & Dutilly, 2016).

Due to the complexity of the process of evaluation and the references in the specialized literature, many institutions end up contracting external agents to develop these activities. However, even if the involvement of institutions with expertise and operational abilities can contribute to the quality of the evaluation process, this should not be considered everyday praxis. Therefore it is a mistake to consider efforts of involved actors in the scheme, and also from the lead institution, as negligible. The process of managing continuous or focused evaluation efforts exists even when an external institution is involved. In **Item 11.6 Independent external evaluation** (pg128), some aspects on this subject are discussed.

[41] Based on Le Velly and Dutilly (2016).

11.4 Evaluation of institutionalenvironment

Another evaluation modality, focused on the institutional environment, are the External Review Committees. The committees are comprised of specialists with a great deal of credibility on the subject, in the territory or in aspects relevant to the scheme.

The committee has the mandate to contact private partners, social movements and public agents with direct or indirect work in the scope of the scheme without interference from the institutional lead and report directly to the Director to bring up issues identified from (i) the experience of the evaluators and (ii) the results of the interviews.

The committee can cover questions related to:

1. Governance and structure: especially in relation to the structure of internal governance and the team of the lead institution in the scheme as well as potential arrangements between private and public partners;
2. Transparency and Accountability: analyzing the politics of transparency;
3. Activities: analysis of external perception about the choices of tools for implementation, monitoring and research and the scope of work of the scheme;
4. Inter-institutional relations with the providers and other actors: including questions about the relationship between the lead institution with the associations of providers and other civil society organizations present in the territories;
5. Institutional identity: analysis and perception of external public as to the identity of the lead institution in the scheme;
6. Institutional position: deals with questions of the role of mediator/facilitator in meetings;
7. Relationship to science and research: points out the potentials for expanding the network of contacts in the academic and research universe and;
8. Financial sustainability in medium and long term: poses questions related to the strategy for mobilizing resources for the scheme.

The results of the evaluation process can indicate opportunities to improve the flows of communication, dissemination of results, points of institutional conflict, governance in the scope of the scheme, among other aspects related to the institution and the network of actors that contribute to the institutional sustainability of the scheme.

It is important, nonetheless, to consider the inherent difficulties in organizing and managing data, making the process periodic, analyzing the products and incorporating lessons learned. Required institutional efforts to balance cost-benefit of this type of evaluation should be reviewed.

11.5 Baseline, studies of impact and additionality

Evaluation of the impact of the provision of ecosystem services (or group of services) should compare to a baseline to determine the additionality generated by the scheme, as Wunder (2005), posits, additionality is "an increase of the effects of conservation vis-à-vis predefined baselines", while Engel and collaborators (2008) defends the importance of the PES scheme as additional to the present efforts in the "without scheme" scenario.

On the other side, May (2015) showed PES schemes that do not clearly address additionality and still contribute to conservation and increase of ecosystem services. May cited Pagiola (2006) about the PES scheme in Costa Rica, which relativizes the unique focus on additionality in detriment to the broad conservation strategy.

FAS, in 2008, chose to use a baseline methodology for the Juma Sustainable Development Reserve (SDR). Based on completed scenario studies (Soares-Filho, et al., 2006), the project to reduce emissions from deforestation and degradation in the Juma SDR ("Juma REDD project") was one of the first REDD projects in the world to be validated by the Climate, Community and Biodiversity Standard (CCBS) (Viana, et al., 2008).

The modeling proposed by Soares-Filho and collaborators (2006) considers factors such as population growth, paving of roads and macroeconomic context to project the evolution and spatial pattern of deforestation in the Amazon. In partnership with FAS and other organizations, the researchers considered a clip of these projections to the Juma SDR to: (i) demonstrate the grave future scenario that the region will face; (ii) attest to the additionality of the project and; (iii) foresee impacts reducing emissions (Viana, et al., 2008).

From this baseline, annual comparative analysis are made with official deforestation data published annually by the Brazilian government to track the performance of the scheme in this area. Reimer and collaborators (2012) attest to the efficacy of the PES scheme in this area and in its buffer zone. In addition, compared to the project baseline (2006-2016) with official deforestation data (INPE - PRODES, 2017) there was an accumulated reduction (2006-2015) of 11.6 thousand hectares and 6.1 million tCO2e.

The capacity for monitoring and evaluation, strictly speaking, is tied to external technical and financial resources. This means that, in the absence of funds to cover institutional costs and a permanent system, capacity is compromised. Hence the importance of understanding and tracking the cost-benefit relationship for monitoring and evaluation.

There are many references about methodologies, approaches and costs associated with monitoring of biodiversity (Gardner, et al., 2008; Ekstrom, 2008; Proença, et al., 2016). But these tools are not often used in PES schemes due to their complexity and high costs (Sommerville, et al., 2011). One of the major challenges is finding a better cost-efficiency: increasing the effort and the complexity of monitoring allows tracking of impacts with greater assurance but makes the operation of the scheme more expensive (Pollock, 2006).

Monitoring of biotic and abiotic aspects, related to PES, can be accomplished with data collected in the field and/or from remote sensing (Sommerville, et al., 2011). While the first is recommended for social and human aspects, the second is for physical and ecological ones. The ideal is that the scheme combines, in some cases, both approaches. Additionally, it is understood that the involvement of scheme investors, at various levels, is important (Skutsch, et al., 2009).

FAS monitoring program, aforementioned, applies a combination of approaches of GIS analysis and on-the ground verification with locals (Valente, et al., 2015). This approach, engaging and building capacity with locals, is very effective and efficient (Skutsch, et al., 2009).

11.6 Independent external evaluation

Various specialists highlight the importance of independent processes for evaluation of results, realized by external agents to the PES scheme (Fisher, et al., 2005; Blom, et al., 2010). In this case, the costs related to this external evaluation process should be considered in the scope of the PES scheme. This process can become very onerous due to the complexity of the scheme or level of detail of the evaluation.

It is possible, nonetheless, to incentivize the development of diverse external actors in the process of independent evaluation of the PES scheme or of specific aspects of it. Based on FAS experience in implementing PBF scheme, the involvement of researchers, independent specialists in the evaluation process of strategies, approaches results and impacts, demands active management.

FAS stimulates interactions with researchers around the world with interest in developing scientific studies about: (i) the PBF; (ii) management of the scheme by the lead institution and; (iii) specific and methodological questions in reference to the PES scheme. To get a sense of the demand, between 2011 and 2016, the FAS received more than 50 proposals for research involving 60 researches (24 from Brazilian universities and 36 international). These requests resulted in the publication of various theses, articles, reports and presentations at scientific events.

Considering the strategic importance of stimulating studies and technical-scientific research, FAS developed a flow to receive and attend to requests, whether vetted or spontaneous. The first group are considered researchers interested in priority topics established and shared by FAS, or, submit directed proposals; while the second group are considered those researchers who submit proposals that require analysis by an internal committee to evaluate criteria and relevance.

Though undertaken by independent researchers, processes of external evaluation demand resources from actors within the PES schemes. Limitations of language and understanding of cultural practices, seasons and other local customs are examples of situations that reinforce the importance and necessity of establishing a planning stage for the evaluation process together with the lead institution in the scheme and other actors, in order for the required resources to be made available for the rigorous application of field studies.

Along these lines, FAS identified the need to maintain institutional channels of communication with researchers to avoid: (i) poor interpretation of results due to insufficient understanding of the context; (ii) lack of richness in details that can lead to partial and incorrect interpretations of data and; (iii) publication of data without recognition or credit given for cooperation.

11.7 Opinion research and perception of providers

New to PES schemes, studies of opinion (Viana, et al., 2012; Swinton, et al., 2015; Rodríguez, et al., 2016) are normally applied to the managers of PES schemes (Young & Bird, 2015) with the objective of understanding the mechanisms, managerial and financial bottlenecks and the primary challenges to implementation of activities in the PES scheme.

The importance of this type of work, carried out by third parties is indisputable, but the scope of participation must also be enhanced (providers, beneficiaries, scheme investors and partners), primarily to include the perception of the providers. Results discovered from these studies can orient important changes in the design of the PES scheme or reinforce corrective strategies.

FAS, in 2011 and 2015, contracted opinion/perception research to evaluate understanding of the scheme, its components and actors, as well as changes in attitude in di-

verse areas covered by the scheme. The research had the objective of improving management of the PES scheme, guide other schemes through the lessons learned, and identify the opinions of the local population about bottlenecks and possibilities to resolve them (Viana, et al., 2012).

11.8 Participatory evaluation

The use of a participatory approach in PBF scheme occurs in diverse components in the monitoring process. Three examples are: (i) the participatory monitoring methodology of PBF scheme (PPDUC); (ii) the Leadership Meetings (leaders among the providers) and; (iii) the annual evaluation seminar of PBF scheme.

PPDUC was developed to attend to the specifics of the land use dynamics of riverine communities and the methodological bottlenecks of the monitoring system for the Amazon by the Brazilian government (Valente, et al., 2015). In general terms, PPDUC is based on three axes: (i) remote sensing (analysis of deforestation and forest fire data), (ii) community involvement (presentation and discussion of remote sensing data with providers), and (iii) integrated analysis and dissemination of data.

In the first axis, preliminary analysis of land use based on official data are made for the Brazilian Amazon. However, the available sensors, due to the plurality of vectors for deforestation and local contexts, are not adapted to the reality of river residents of Amazonas: their culture of slash and burn and very low absolute rates of deforestation.

For this reason the remote sensing data are taken to providers for discussion and qualification (the second axis). This interaction presents an opportunity to adjust data, information and verify incongruences. In the third axis, an integrated analysis takes place (data from remote sensing by satellite and in the field) for later dissemination together with the providers and team of the PES scheme. Through this methodology, the PBF defines strategies and channels efforts to specific locations.

The Leadership Meeting has, (see **Box 5. Leadership Meeting: process of training and continuous improvement of PBF**, pg89) among its diverse objectives, a process of participatory monitoring and evaluation. It was created in 2010 and consolidated as a practice every semester since 2013. In this space, leaders from the 16 areas in the territory of the PES scheme discuss strategies, evaluate results, and analyze bottlenecks in implementation during a week with an intense agenda. From its different editions, important methodological and process changes were proposed in order to improve the scheme.

Participants in the Leadership Meeting – community leaders that represent more than 40 thousand people between the providers and their families, have the responsibility to register progress, accumulate experiences and lessons learned in order to disseminate them to other groups when they return to their territories.

Additionally, FAS also promotes annual seminars of PBF scheme, during which results of scientific research and technical reports made about the scheme are shared to stimulate discussion between researchers, specialists, leaders and the technical team. The organization of these seminars was a response to demands by government institutions and civil society, which was a group external to the evaluation of the scheme.

These participatory moments are important to increase the social capital of PES schemes (Leimona, et al., 2009). It is essential that the manager of the PES scheme build bridges and strengthen connections and networks that involve providers, beneficiaries, decision-makers, financers and supporters. This not only demonstrates the transparency of the scheme, but also the institutional maturity of the lead institution.

12. Continued innovation and development of solutions

The development of solutions such as results from innovation processes are essential for the success of PES schemes. As mentioned, PES works to guarantee a provision of ecosystem services in complex and dynamic socio-economic contexts. In these conditions, solutions need to be created to continuously adapt to guarantee adherence to the scheme and its effectiveness.

For this, research is needed that looks at the society facing the current challenges and contributing to sustainable development (HLG, 2008; OECD, 2009; European Union, 2010; Leitner, 2013). This effort should seek new responses and effective solutions to big challenges, such as: cut carbon footprints; keep people healthy; and eradicate poverty (Murray, et al., 2010).

The promotion of inclusive sustainable development is incomplete without considering the role of science, technology and innovation (UN, 2012). Access to technologies, as long as they are adapted to the social and cultural context, has the potential to improve living conditions of the most vulnerable populations, generate increases in productivity, guarantee an increase in income and reduce degradation pressure on ecosystems (UN, 2012; Arts, et al., 2015).

It is important that the process of continual innovation be internalized in the PES scheme. Policies based on incen-

tives that promote innovation will be more profitable over time (Jack, et al., 2008). According to authors, PES schemes can also offer benefits for adopting innovative approaches to provide environmental services at a lower cost, reducing the cost of the scheme and as a consequence the provision of ecosystem services. However, PES schemes based exclusively on direct financial incentives can make providers averse to the risk associated with the innovation process.

Examples of innovation that promote the transition of the system to sustainability, instead of the development of isolated products, become increasingly important to obtain systemic and lasting results. This requires, for example, that the social and ecological criteria be considered during the entire innovation process. Innovation is an approach built on processes – it can be managed, supported, and nourished. These processes should be structured conscientiously and incorporated in the PES scheme.

Innovation is the concrete application of understanding, contrary to invention, which is the first conception of something new (Dahlman, 2014). Innovation can be within a product, a process, a business model, a service or a new way to organize production and distribution of goods and services. Continual innovation and the development of PES schemes occurs in various perspectives. It is not recommended that any innovation be replicated without critical analysis of the context of each PES scheme.

There are different categories and standards of innovation. In the context of PES schemes in Latin America, there are four types: radical innovation, incremental, catch-up and inclusive or social. In developing countries particularly, technological change is not only radical or incremental (innovation of frontiers), but it is also about adapting existing products and processes to achieve higher levels of productivity and effectiveness, to the degree it is applicable to local contexts.

Therefore these standards refer to the efforts of production, acquisition and distribution of knowledge directed at meeting the needs of low-income populations or those at the base of the pyramid – often the case of providers in PES schemes. The focus of inclusive innovation is to provide high-performance or maximum-experience products and services at accessible cost to vulnerable populations (Mashelkar, 2013; Dahlman, 2014). That said, the potential for internal innovation within communities and providers of environmental services should not be dismissed, and to the contrary, many times these are capable of innovating based on understandings of traditional causes and knowledge, in an efficient and adapted way.

Innovative solutions can contribute in different ways:

1. In the scheme – governance, payment methods and transfer of resources, etc.;
2. At the institutional level – financing, governance, human resources, management, communication, etc.;
3. In field activities – developing leadership, etc. and;
4. In new technologies in the field that promote change in behavior to more sustainable behavior – access to water, renewable energy, standards for sustainable production, accessible transportation, accessible communication, management of natural resources.

However, learning opportunities for innovation processes do not occur automatically or without costs within the PES scheme – they require institutional structures and innovation systems that allow for the creation of dynamic capacities through partnerships, resources and appropriate incentive, policies and institutions.

Innovation systems within PES schemes can be understood as the network underlying all other actors, economic or non-economic – interactions among which are fundamental to promote learning and the accumulation of knowledge.

These systems should be participative and inclusive in order for there to be a big public effort with the entire spectrum of social actors, including women, the young and traditional communities (UN, 2012), as much in the planning and adaptive implementation (cited above) as in processes for monitoring and evaluation (described below).

Innovation is a thought that can be translated into a process. This process should be structured conscientiously and incorporated into the day-to-day implementation of the PES program with a focus on environmental service providers, involving different institutions, actors and financing models.

The approach of co-creating the design solutions looks to serve the interests of all interested parties. It is focused on experiences and how the actors interact with one another through the following basic stages (Ramaswamy & Gouillart, 2010):

- Identify all the interested parties affected by the process (staff, clients, suppliers, providers, distributors, communities);
- Understand and map the current interactions between interested parties;
- Organize workshops in which interested parties share experiences and seek ways to improve and;
- Build platforms to implement ideas for new interactions and continue to dialogue between the interested parties to generate additional ideas.

Tools for innovation are continuously developed through the creative mixture and the recombination of different elements and ideas. According to Murray and collaborators (2010), who analyzed social innovation methods, there are innovators who combine financing methods utilized for science and risk capital through bidding and donations; the business sector adopting some of the mobilization models for networks of users that were developed by the non-profit sector; or some NGOs that are using risk capital to finance emerging ideas and abandoning those that are not advancing as planned.

There are different methodologies and tools for the management of innovation processes that can be applied to the development of solutions. Some are cited below:

- Business Model Canvas[42];
- Collective Impact[43, 44];
- Design Thinking;
- Design Essencial[45];
- Dragon Dreaming[46];
- Guide to Social Innovation[47];
- Open Innovation;
- Theory of Change[48] e;
- The Open Book of Social Innovation[49].

However, in the context of PES schemes, innovation needs a specific approach built within the reality in which it is inserted, i.e., the same ToC methodology, for example, applied in a PES scheme in Peru should be different to a scheme in Costa Rica, Indonesia or in Brazil. This is due to new forms of cooperation and collaboration for each scheme. As a result, the processes, metrics, models and methods used in innovation in the commercial sector or technological domains, for example, are not always directly transferable to the social economy (Murray, et al., 2010) field of PES.

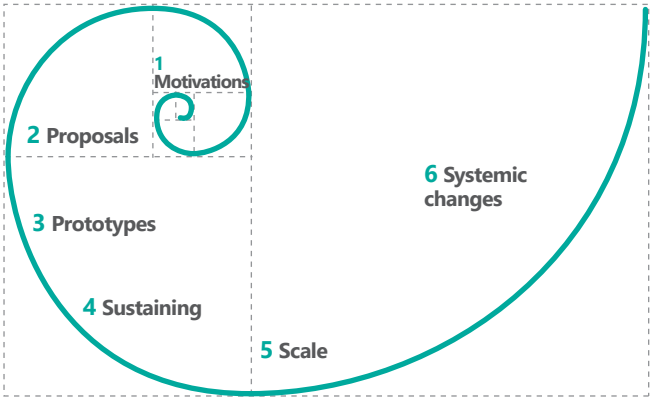


Figure 30. Social innovation stages (not necessarily sequential) to take ideas from concept to impact[50]

Murray and collaborators (2010) also identified six stages (not obligatory sequences) to take ideas from concept to impact (**Figure 30**). They offer a useful structure for thinking of the different types of support that innovators and innovations need to grow in the social innovation process:

1. Motivations, inspirations and diagnostics;
2. Proposals and ideas;
3. Prototypes and pilots;
4. Sustainability;
5. Scale and diffusion and;
6. Systemic change.

[42] https://strategyzer.com/canvas/business-model-canvas

[43] https://ssir.org/articles/entry/collective_impact

[44] http://www.fsg.org/

[45] http://rosenbaum.com.br/

[46] http://www.dragondreaming.org/

[47] http://s3platform.jrc.ec.europa.eu/documents/20182/84453/Guide_to_Social_Innovation.pdf/88aac14c-bb15-4232-88f1-24b844900a66

[48] http://www.theoryofchange.org/what-is-theory-of-change/

[49] https://www.nesta.org.uk/sites/default/files/the_open_book_of_social_innovation.pdf

[50] (Murray, et al., 2010)

BOX 12. Stages of social innovation[51]

1) Motivations, inspirations and diagnostics

This stage deals with the factors that show a need for innovation and the inspirations that bring them about, from creative thinking to new evidence. It involves diagnosing the problem and framing the questions in such a way that the primary causes of the specific problem, not only their symptoms, are addressed – getting halfway along the path to finding the correct solution.

2) Proposals and ideas

This is the stage of generating the idea, which can involve formal methods – such as design or creative methods to expand the menu of available options, helping to extract inspiration and experiences from a wide gamut of sources.

3) Prototyping and pilots

Stage in which the ideas are tested in practice, in a simple way, more formal pilots or controlled experiments. Stage is particularly important in the social economy because through iteration, trials and error, coalitions gain strength and conflicts are resolved. It is also through these processes that measures of success come to be.

4) Sustainability

When the idea becomes daily practice. This involves refining ideas (and many times rationalizing them) and identifying financial necessities and fluxes to guarantee sustainability.

5) Scale and dissemination

There are a series of strategies to scale and disseminate the innovation – from organizational growth, to licensing and franchising, to softer diffusion. The innovations become stuck in the social economy in various ways, whether by inspiration or emulation, or by the provision of support and understanding in a more organic and adapted way.

6) Systemic change

This is the final objective of social innovation. Systemic change generally involves the interaction of many elements: social movements, business models, laws and regulations, data and infrastructures, and entirely new ways of thinking and doing. Normally, the social innovations face barriers and hostilities from the existing and older order. Pioneers can avoid these barriers but the growth of innovations, many times, depends on the creation of new conditions to make innovation economically and institutionally viable.

In the effort to apply existing tools for the development of solutions it is important to define – adopt or adapt – which are the orienting principles that match the local social, environmental and economic contexts, which increases adoption and effectiveness.

[51] Adapted from The Open Book of Social Innovation (Murray, et al., 2010).

12.1 Innovative Solutions Program: innovations in the scope of the PBF scheme

In the case of PBF, since the beginning of the implementation of the program by FAS in 2008, a set of principles has been under constant improvement, guiding opportunities for the development of solutions. Opportunities for development (adoption or adaptation) of solutions are selected following some orienting principles:

1. Value the standing forest;
2. Improve local livelihoods;
3. Value the local culture and traditional knowledge;;
4. Value local products and services;
5. Seek to work in networks and promote participatory institutional schemes;
6. Seek to solve local issues;
7. Improve at all times and it is disruptive;
8. Deliver results with positive high quality impacts;
9. Monitor impacts and seeks greater efficiency and effectiveness;
10. Provide a high quality buyer experience and;
11. Co-create or co-adapt guaranteeing the previous principles.

These were derived from field experience, the primary regional challenges and some guiding questions, in a non-exhaustive list aligned with the institutional mission of FAS:

- How to make the standing forest worth more than it cut, increase the income of local traditional populations and avoid deforestation and forest degradation?
- How can innovation improve the quality of life of the local population while promoting conservation of socio-biodiversity?
- How to be disruptive in the Amazon to intensify benefits and inspire other regions?
- How to develop communities and preserve local cultures?
- How and with whom to co-create through shared purpose and value?
- How to guarantee qualified, representative and periodic participation of the actors involved?
- What is the best arrangement for the design of solutions for sustainable development?
- How to finance sustainable development in order to guarantee long-term actions and impacts?

Continued innovation has been part of the institutional values at FAS since its creation and it has demonstrated results since then. The foundation of the organization and the PBF scheme had an innovative character – in the design and the building process – which involved government agencies, the private sector, including social movements and academia. This configuration is repeated by the representation of those sectors in the Administrative and Deliberative Board.

The innovations at FAS have been made on several fronts. Mechanisms and approaches for financing; such as the Juma SDR REDD project[52], with revenue coming from the commercialization of emissions reductions from private businesses; the partnership with the Bradesco bank, which sends annually 50% of the administrative fees of a specific credit card to the lead institution for the implementation of the scheme; or by financial support to environmental conservation for points in the LEED green building standard of the Green Building Council.

Within institutional processes; such as financial management of resources (in part realized through specific and finite funds that enable the captured values using financial returns); and the development of software under demand to attend to the needs of the scheme (e.g. systems for payment and reporting, platform for systematizing, managing and visualizing indicators).

And innovations in practices and activities in the field; such as participation and empowerment tools and approaches for young people and women, the process of analysis of lessons learned, and dissemination, incorporation and implementation within PBF.

Organization of the stages of an innovation process – including motivation, design, prototyping and sustainability (Murray, et al., 2010) – is accomplished by the Innovative Solutions Program (ISP), in constant evolution since the creation of FAS. The subsequent stages (scale and systemic change) are implemented by other programs at FAS with technical support from ISP.

In this way, FAS has as one of its objectives to lead the discussion, conception, implementation and dissemination of innovative solutions for sustainable development. Together with partners, it co-creates and improves solutions focused on environmental conservation, quality of life, social empowerment, education, entrepreneurship and income generation, among others in the scope of the Sustainable Development Goals (SDGs), the agenda defined by the United Nations for 2030 which reflects the new global development challenges.

[52] More information at **http://fas-amazonas.org/projeto-SDR-do-juma/projeto-de-redd-da-SDR-do-juma/**

ISP promotes, supports and evaluates transformative solutions for sustainable development through transversal actions and integrating several coordinators of the institution into an area in which the State of Amazonas is working.

Through the process of implementing a PES scheme, the need was seen to institutionalize the innovation process. Even if innovations were incentivized and integrated into actions, it was determined that there was space for gains in efficiency. The process of developing solutions presented below (**Figure 31**) synthesizes these efforts to institutionalize the innovation process into the design of the scheme.

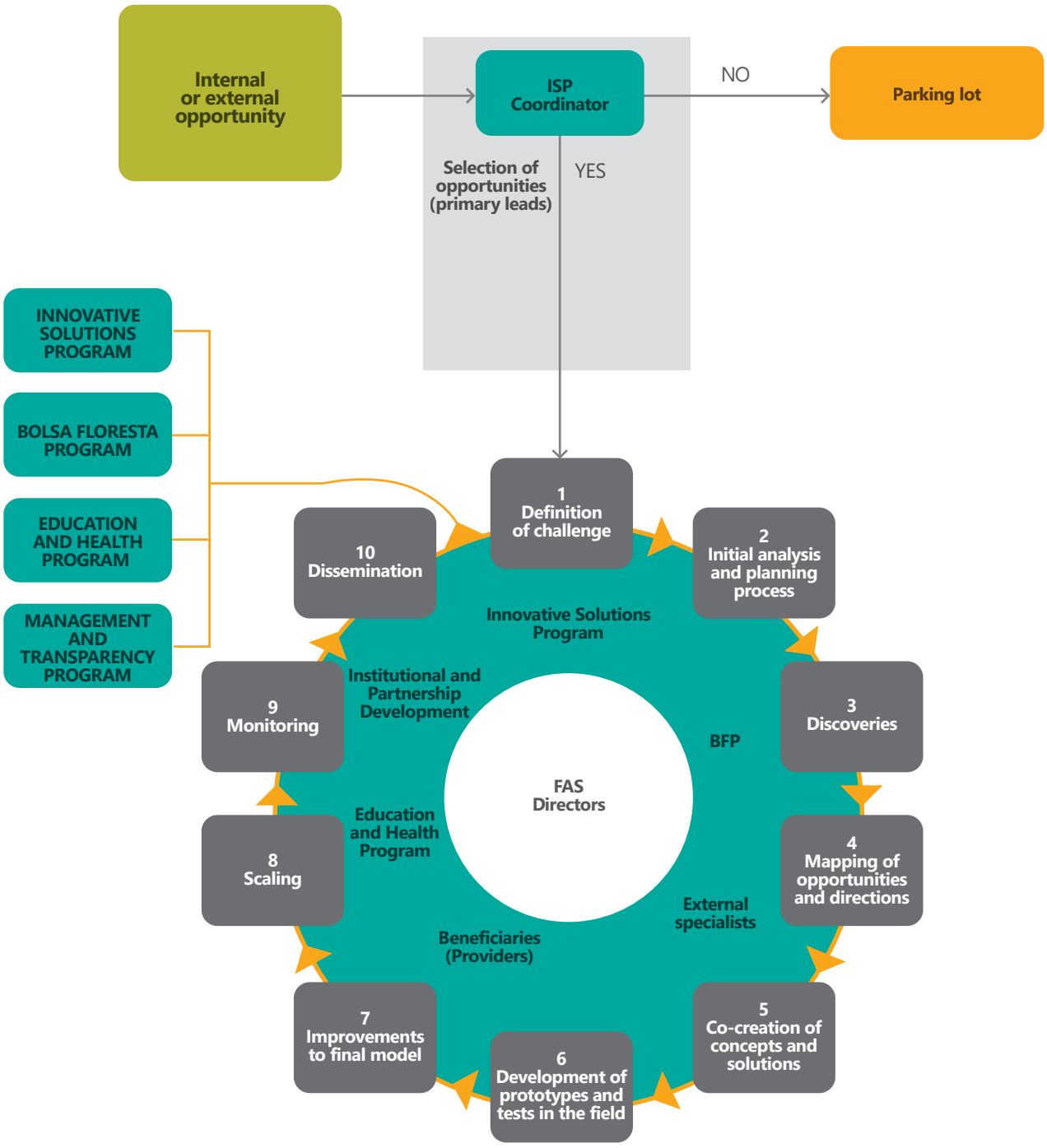


Figure 31. ISP process model for development of solutions within FAS

ISP process for developing solutions interacts with **Figure 27. Flow for processing opportunities and new projects** (pg117). This flowchart comes into play in the cases in which these opportunities or internal or external demands adhere with the guiding questions of ISP. Innovation team at FAS is responsible for evaluating these opportunities and decide if it will be developed or not, in which case it is left in a "parking lot of ideas". Upon being selected, it is sent through a flowchart that begins with the definition of the challenge (1) and ends with the dissemination of the solution (10) seeking to incorporate it into one or more FAS programs. The whole process is led by ISP and monitored by FAS with participation from the different areas of the foundation, external specialists and PBF providers. Some of the results of this process are presented in **Box 13. Results from innovation processes in the scope of the Bolsa Floresta Program PES scheme** (pg136).

BOX 13. Results from innovation processes in the scope of the Bolsa Floresta Program PES scheme

1. Network of sustainable development solutions of the Amazon (SDSN-Amazonia[53]): the FAS is the Executive Secretary of SDSN-Amazonia, a network tied to the UN to support the tracking and implementation of the Sustainable Development Goals (SDGs). Through the integration of actors such as universities, NGOs, businesses and governments, SDSN-Amazonia supports the identification, dissemination and interaction of organizations for the co-creation of sustainable development solutions. One example is the online platform at **maps.sdsn-amazonia.org.** *The network had, in 2016, 24 active members and has promoted events (in person and from distance) to support the countries of the Amazon basin in incorporating a regional Amazonian biome perspective into the SDGs.*

2. Project for the Reduction of Emissions from Deforestation and Forest Degradation (REDD) in the Juma Sustainable Development Reserve (SDR): the Juma reserve was created in 2006 by the government of Amazonas, with the intent of having its conservation activities financed by financial mechanisms known as REDD[54]. The Juma project was one of the first in the world to be certified, in 2008 (Viana, 2008), and is the first to have systemic engagement with private companies such as Bradesco bank, Coca-Cola and Marriott International. In additional to its innovative financial mechanism, the Juma project also presented a new institutional arrangement in 2008: definition of investments through meetings with providers, grassroots organizations, state government, the FAS as institutional lead and private partners.

The initiative sent, in the form of rewards, incentives and payments R$ 445.8 thousand annually in the form of investments focused on the strengthening of local organizations, income generation, transportation, education, communication, development of research and solutions and improved structures for the monitoring of ecosystems. Some impacts include: 85% of residents of the reserve believe their lives have improved after the implementation of the scheme (ACTION, 2015), 74% of residents believe the project has decreased deforestation, and the rates of deforestation fell from 63 km2 (2006) to zero (2015) (INPE - PRODES, 2017).

3. Bauana forest products processing center: through partnerships with different business groups, a processing center was opened for essential oils from andiroba and açaí for consumption by groups of local, trained providers/entrepreneurs. In 2016, the initiative produced 660 kg of murumuru butter involving 61 families of collectors, providing 6.9 tons of seed.

For 2017, a center maintained by youth in the Médio Juruá region with support from AMARU and FAS incubator, signed a contract for the provision of 8 tons of andiroba oil and murumuru butter to the cosmetics industry, with an expected gross income over R$ 100 thousand. The concept of partnerships, structured investments, training and education of entrepreneurial leaders is an innovative model that the FAS has implemented in the PAs benefiting from the Bolsa Floresta Program.

4. Standing Forest bid: In partnership with the Amazon Fund, FAS launched, in March of 2017, the Standing Forest bid with the objective of supporting local entrepreneurs to develop environmental conservation projects through financial and technical support for sustainable production chains (cacau, pirarucu, handicrafts, community-based tourism, etc.). Through this initiative, the FAS and the Amazon Fund hope to select at least 16 initiatives that will receive up to R$ 150 thousand and technical support for the development of the project, for monitoring of indicators and accounting. This initiative has three primary innovations: expansion of the territory surrounding protected areas of the state of Amazonas, in the selection process there will be training for the design and management of projects, the selected projects should commit to contributing financially to the residents association directly impacted by the business for social investments defined by the collective (e.g., construction and repair of schools and social centers, acquisition and maintenance of water ambulances and radios, etc.).

Bradesco Expresso - (Alex Pazuello).

Bradesco Expresso - (Clovis Miranda).

BOX 13. Results from innovation processes in the scope of the Bolsa Floresta Program PES scheme

5. Incubator for Sustainable Business: FAS believes that sustainable business initiatives, especially in protected areas, are strategic solutions with enormous potential to positively contribute to the reduction of deforestation and their effects on climate change and the incentive for the sustainable use of biodiversity, promoting income generation, environmental conservation and local social development.

However, off-the-shelf solutions do not help in the challenge of enterprise in the Amazon, and approaches need to be customized for the forest entrepreneurs in their search for different results with social, environmental and economic impacts. In order to incentivize sustainability-based innovations, FAS invested in the creation of the Sustainable Business Incubator with specialty consulting actions focused on improvements in the management of small enterprises in the PAs supported by the foundation. The project is fruit of a partnership between FAS and the Amparo Foundation for Amazon Research (FAPEAM), with support from Bradesco bank, Videolar/Inova, Coca-Cola, Natura and SAP, British Council / Newton Fund.

The incubator has the objective of leveraging community-based entrepreneurial initiatives initially from five SDRs: those of Rio Negro, Uacari, Juma, Rio Madeira and Rio Amapá. Besides providing consultations for the development of business plans, the incubator follows the financial management of the enterprises and studies possible new modes of accessing the market.

6. Financial inclusion: one of the challenges of river communities is the difficulty of accessing banking services, such as withdrawing money, financial transfers and investment options. Confronted with this need, the FAS and Bradesco bank initiated, in 2011, the installation of banking service centers within the PAs in Brazil. The initiative achieves FAS line of work to promote integrated solution strategies for sustainable development through incentives to the local economy.

The third unit was inaugurated in June of 2015 in the Piagaçu-Purus SDR, in the municipality of Beruri (173 km from Manaus). The action was a strategic step in the financial inclusion of nearly 5000 people spread across an area of over 1 million hectares. Besides facilitating access to the benefits of the PBF, the bank stimulates local community development, facilitating the circulation of resources, primarily from the production and commercialization of managed pirarucu, one of the production chains supported by the FAS in that region.

The other two working units of the Bradesco Express, in the Rio Negro (nearly 70 kilometers from Manaus) and Uacari SDRs (approximately 800 kilometers from the Amazonian capital), within the communities of Tumbira and Bauana, respectively, have directly impacted the lives of 3,500 riverside residents in 49 communities, in an area comprised of 730 thousand hectares.

[53] **www.sdsn-amazonia.org**

[54] Financial mechanism created by the UN to support native forest conservation by countries and organizations in exchange for certified emissions reductions, under the logic of a carbon market.

13. The importance of communication in PES schemes

The efficiency of implementation of a scheme depends on a communication effort integrated with the operational processes as an integral part of the operation and not juxtaposed to it. It should intersect all the actions as a continual effort by the collaborators in the lead institution and in an incremental effort by partners and supporters, in order to create common understanding around concepts, agreements and other information across the entire network of actors who comprise the PES scheme.

Communication is a fundamental tool of the PES schemes – to incentivize engagement of providers in the scheme, as well as to increase efficiency of its implementation. Considering the design and implementation process of innovative PES schemes proposed in this publication, consistent communication efforts are essential for:

1. Incentivizing engagement with providers in the PES scheme;
2. Incentivizing engagement with other actors in the PES scheme;
3. Guaranteeing that the information relative to updates and adjustments in the design of the scheme are disseminated consistently to all actors;
4. Creating a base of common understanding about the scheme, contributing to internal cohesion;
5. Contributing to reinforcing the role of positive local leaders;
6. Contributing to the creation of a necessary environment of trust for the implementation of the scheme;
7. Contributing to the management of expectations;
8. Facilitating learning of the system and the exchange of information among those involved, creating the basis for an innovation process;
9. Supporting the efficient management of information;
10. Incentivizing the registration, systematization and dissemination of understanding and;
11. Increasing the credibility and reputation of the PES scheme.

Efficient communication that guarantees alignment and cohesion among the actors in the scheme contributes to the creation of a positive image for the scheme and as a consequence allows an expansion of the network of "incentivizers" and supporters of the program.

The role of communication goes beyond being a "spokesperson" for events and actions, but represents an instrument for participation and involvement of actors in the scheme as a facilitator of dialogue and social and innovation learning processes. The activity helps to give meaning to these actions, connecting them to their motivations, the logic behind them and to the actors involved, in a way to collectivize them in order for receivers of these messages to appropriate and connect to them.

As can be seen in various passages of this study, PES schemes involve innumerable influencing factors and represent a complex system with diverse interconnected parts. The challenge of communication is to simplify understanding of this process and bring more clarity to the diverse audiences as to the central goal of the model and how the actions are connected to it. Independent of the target audience for the message, there should be a central message that translates the concept, the purpose and the workings of the scheme clearly to different audiences to provide excellent engagement with interested parties.

Despite having a central unified message, it is important to stress that the language, the means of communication the frequency and the objective differ according to the public. In all the phases of the implementation of the scheme there is a need to involve different audiences to incite different responses. Through this clarity, the communications strategy can reach the audiences in appropriate and relevant ways.

Communication can also be centralized; working in modules that integrate the environmental service solution whose strategy of changing understanding, attitudes and practices is based on or includes a campaign. Examples of communication with impacts on PES schemes are campaigns that promote:

- Appropriate use of petrochemicals;
- Appropriate disposal of petrochemical packaging;
- Adoption of best practices in the use of fire in agriculture;
- Respect for the closed areas;
- Sharing products or services incentivized by the scheme to grow its market;
- Waste management and;
- Adaptation to climate change.

For shared understanding by all interested parties, communication should be clear about the end goal, and which means will be used to implement the proposed ToC. In this way, the specific actions shared make sense in the larger scheme and are not seen as fragmented actions, but as integrated to the PES scheme.

From this clarity, the different audiences can connect with the aspects that interest them or go after more related information (**Figure 32**). Monitoring of actions provides key indicators and information, but it is the intelligence of the communication strategy that makes these interesting and intelligible to the target audience. It is not only the

role of one department or area to realize this effort, which, from a common understanding among primary actors involved, becomes a decentralized effort.

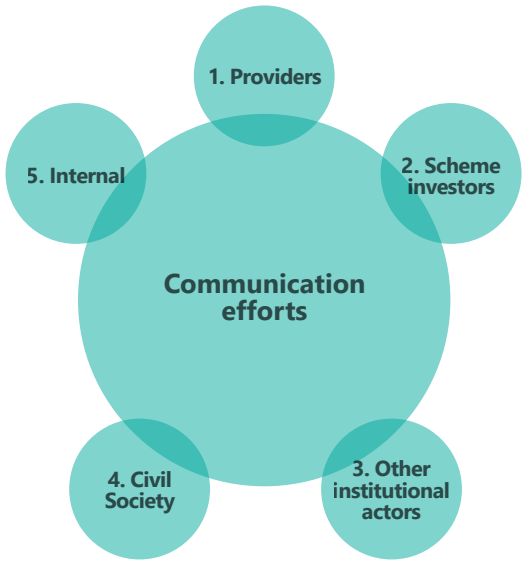


Figure 32. Communication efforts in the PES scheme

Transparency falls to the institutional lead, who provides the information required for the parties to follow, engage and collaborate with the scheme, as well as establish channels for dialogue specific to each of these audiences:

1. Providers of environmental services;
2. Scheme investors;
3. Other institutional actors;
4. Society and;
5. Internal.

13.1 Communicating with specific actors in the scheme

13.1.1 Providers

The success of the proposal is conditional on the adequate comprehension by the group of providers of the environmental services. Without the correct understanding of the proposal and its operation, there is no adhesion and the desired changes established in the environmental service solution will not be adopted as expected.

Communication should act as a tool for appropriation and empowerment with this public. The public understands what is taking place, has space to collaborate, and feels a part of a collective effort and wants to participate. Besides promoting understanding, the process of communication can imbue providers with critical analysis in order for them to contribute to the evolution of the design of the scheme. The first moment of contact of the community with the proposal is crucial. During this step the relationships are created that develop the mechanisms for collaboration.

The space for communication should facilitate and nourish exchange of knowledge, negotiate roles and responsibilities and create trust among parties. The space to listen and discuss impressions should be ample. In **Section II**. **Developing favorable local conditions for PES schemes** (pg71), the steps for creating an environment of trust together with providers and later with the suite of actors in the scheme were presented. For this, adequate communication is assertive and essential.

The adherence of this public to the environmental service solution is solidified from the moment in which they can get clarity on the role and the commitment they are assuming under the scheme and, at the same time that they understand the entirety of the PES scheme, realize their own involvement and contribution. With the incorporation of this message, they come to be more than providers, to social mobilizers and communicators in their relationship networks.

Communication also has a central role in the management of expectations with providers. Keeping the message simple, with a focus on the proposal and with established limits to the work can help to avoid noise in communication and possible miscues between what the community expects and the limits to the scope of the scheme.

This role of communication and exchange should be maintained throughout the implementation and the evolution of the project, and the aspects considered in **Table 17**.

Table 17. Aspects of assertive communication with providers of the PES scheme

	Aspects of assertive communication with providers
Adaptation of language	In various cases there is an educational gap and high degrees of illiteracy present in the communities involved. The spoken language prevails in these cases, with the use of local terms to establish a common vocabulary in respect to the subject being covered. The conversation can have the support of simple graphics, drawings and facilitation processes to promote understanding. On this note it is also important to recognize the roles of different social groups and the direction of communications. For example, it is important to make the distinction between the needs of men and women, the young and adults, to establish communication with all the groups.
Consistency	The proposal of PES schemes many times encounters the need to promote a change in habits. Consistency in communication directly influences this aspect. The more present a program makes itself in people's day-to-day, the more natural the content becomes and the adherence of the providers with these proposals tends to increase. The continuity of this communication also promotes the security and confidence of providers with the process.
Proximity	Personal interaction and direct communication are always preferable to channels of communication from a distance in relation to providers. Recognizing the logistical and resource barriers, the maximum possible first-hand personal relationship between this group and the organization is recommended. Informal spaces for conversation and exchange in person in the territories create a sense of proximity and belonging and are moments of extreme importance for learning about adherence of actions in the field.
Capillarity	The logistical complexity of some territories also requires some logistical intelligence in the communication strategy, which should map and ask how to make the message reach the maximum number of providers, developing a process that guarantees capillarity of information. This characteristic stands out during processes of mobilization for participation at events and in adherence to timely or seasonal campaigns.
Channels of communication	It is important to establish two way communication, in which there is space not only to pass on a message, but open and easy access to receive information, complaints, suggestions and to discuss any questions needed. The channels for this exchange should be relevant to the available technology, with thought to the structures of easy access for providers and that are easily received on the part of the institutional lead, which is responsible for the response.

13.1.2 Scheme investors

The scheme investors of ecosystem services are key actors who make the implementation of the program possible. The attention of communication to them involves an alignment of expectation to the different factors that compose and influence the results as well as adequate accounting.

Partner scheme investors can be from very different realities than the territory of the PES. This implies a potential unfamiliarity with the region and the local processes that influence the workings of the implementation. Communicating this reality, the nuances and unique characteristics of the territory creates a common understanding. It is a constant and extremely important process to generate cohesion in respect to the alignment of rhythms, expectations and factors that influence implementation.

Accounting for the buyer also requires a flow of information that should integrate the whole network. Quantitative and qualitative indicators are demanded in exchange for an investment. This information should be worked and translated for each buyer, specifically in accordance with the signed contract, to demonstrate the effectiveness of the partnership.

Some partners require more technical and numerical data, such as the number of providers reached, values invested in each territory, etc. Others connect more to personal stories and qualitative cases. This alignment should be agreed upon from the beginning of the negotiation in order to unlock a process of collection of adequate information to be translated and communicated accordingly.

13.1.3 Other institutional actors

The scheme is comprised of diverse direct or indirect actors both private and public. The audience involves partners that work on specific implementation activities of the program, academics and researchers of related topics that can require more technical or specific information not fulfilled by the open channels of communication.

It is important that these partners feel open to the dialogue on different topics and that the institutional points of contact are aligned to pass on information that the encounter between institutions may require.

These more timely demands should be fed by a system of registration and systematization of knowledge, in order for the information and the message to be easily accessible and not demand extra effort. The agility to respond to specific demands of the diverse actors reinforces the credibility and the reputation of the program.

13.1.4 Society

Civil society, beneficiaries of the ecosystem services maintained by the scheme, should be a target audience of mass communication, with more general messages with a larger reach. It is also a form of accounting to this audience.
Ideal communication about PES programs with the public includes:

- Production of timely content that is easy to understand, that covers specific themes but connects them to the general purpose of the scheme;
- Production of audiovisual content that facilitates improved visualization of the scenario in which the scheme is inserted;
- Holding engagement campaigns that help attract the public to the cause and promote social participation;
- Publications with simple language and open access to the efforts realized and;
- Open channel so that the public can express itself, give opinions and suggestions.

13.1.5 Internal

The registration, systematization and dissemination of understanding among individuals that are directly dedicated to implementing the program are necessary efforts to its efficiency and evolution. The central mission of the PES scheme is manifest in numerous different actions, generally in teams that work in specific modules and diverse areas.

There is a risk of fragmentation of the operation. Communication is the tool that unites the areas around the relevant information about actions and processes in the different areas so that all can understand, get involved and give suggestions. A systematic vision of the actions generates a space for learning and crossover, a fundamental point for creating conditions for the system to learn and adapt, as covered in **Chapter 10. Adaptive management of PES schemes** (pg113).

To create cohesion, the lead institution in the scheme assumes the role of articulator of communication flows and processes among organizations and partners, through diverse internal contacts. Collaborators involved more directly in the scheme should be aligned to the central message and see the moments of involvement and negotiation with local partners as opportunities to align the message and engage them in the central cause.

As important as communication of current efforts are the registration of the information and the history of actions taken place to date, in order to create a logical line of evolution of the program's implementation. The role of communication goes beyond transmission of information and becomes a process of managing knowledge and information, feeding processes of reflection and decision-making.

13.1.6 Risks

The transfer of the message to the diverse audiences does not guarantee by itself comprehension and alignment with the proposal and the schemes, even if it causes hoped for changes in habits. It is necessary to stay attentive to the responses generated from the communication, added to the monitoring exercises, they can inform the strategy for communication itself as well as the design of the scheme. In this sense, opinion/perception research is very useful, and presented in the **Chapter 11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientic research** (pg123).

13.2 Communication strategies of the Bolsa Floresta Program

The communication of a complex and highly public program such as PBF is challenging and requires constant attention. To meet the needs of interaction and to provide rich information to the various interested groups, efforts should continue in constant evolution and test various channels and types of messages (**Table 18**).

Table 18. Examples of communication efforts at FAS for diverse actors in the PES scheme

Aspects of assertive communication with providers	Providers	Scheme investors	Partners	Society	Internal
Atlas	x	x	x	x	x
Report of Activities		x	x	x	
Reports on open media (News, TV and Radio)	x			x	
Sustainable Chat					
Site		x	x	x	
Day of meeting – Field visits					
Institutional videos		x	x	x	
Videos of field missions					
DSC					x
Reporters of the Forest + News	x			x	
Voices of the Forest	x				
Newsletters		x			
Campaign posters + Calendars	x				
System of Indicators					x
Radio communication	x				
Internal leveling and planning workshops					x
Research/ Technical-Scientific Articles					
WhatsApp Groups			x		x
Site				x	

Over its years of experience, FAS has engaged in various formats to communicate the model and actions of the program, but always maintained a central message as motto: "Making the forest worth more standing than cut". The phrase clearly expresses the central mission that guides all of PES scheme efforts, promoting alignment of its intention with the interested public.

Communicating the diverse factors related to its implementation and how the actions are integrated to a central logic is challenging. FAS has different initiatives and uses different channels to communicate with different interested audiences. The main ones are presented below, according to the different initial priority audiences.

13.2.1 Providers

Residents of PAs are the public that demand the largest communication strategy, due to the logistical challenge and technological isolation. The majority of communities do not have access to telephone or internet.

Initiatives

- **Reporters of the Forest:** with the intention of bringing to light the voice of young residents of riverside communities, this education initiative trains and incentivizes youth in the reserves to speak firsthand about their reality. It is a means of communication to reinforce the role of positive local leaders and disseminate local knowledge. The groups of youth are trained and receive the necessary equipment to register their actions through the project in the field as well as express themselves in relation to the diverse topics of local interest. The produced content is shared through social networks, through the FAS site and other media of interest and in the production of a newspaper for distribution among communities. The circulation

of the newspaper within the PA, with material produced by the communities themselves, guarantees that the point of view is aligned and close to that of other providers. Besides being an opportunity for more people in civil society to understand and connect with a distant reality, the project also works on communicating initiatives without the need to bring in other actors.[55]

• **Voices of the Forest:** A radio program focused on engaging providers in program activities. The spots, recorded in Manaus, were opportunities to pass on important messages, promote mobilization campaigns, inform and also entertain the public. Channels with broad coverage and capillarity, radios are present in a large majority of houses in the interior of Amazonas, and the program is recorded in language that speaks to the reality of the interior of the state, based on demands for communication with the public.

Channels

• **Radio communication:** the installation of a network of 160 VHF radio communication devices, made possible through PBF Social in the implementation of the program, are one of the actions with larger impact for the most isolated communities involved in the scheme. The community devices are a more practical communication methods between communities and between the FAS base and the communities. Subjects related to the management of local health, exchange of information and transmission of notes exclusive to the PAs are carried on the channel and facilitate proximity between communities in the same regions or different from each other.

• **Posters:** Print media has already become a proven channel among riverine communities. The annual calendar and other campaigns realized through print media are present in the homes of providers. Traditionally, communities have a close relationship with graphic materials and make an impression on the walls of their homes. They have already been used for engagement in terms of strategic subjects such as the adaptation of homes and farms to deal with floods and prevention of forest fires. The annual calendar comes with useful and relevant information for the public such as tips for agro ecological practices, attention to management of common goods, such as health. The topics are developed in a participatory way during leadership workshops.

• **Internet:** Access to the internet has gradually increased in communities through the system of distance education implemented by the State Secretary of Education. Where it is present, the tool offers community members a chance to approximate other realities and shorten distances that always made them feel isolated. Primarily the youth have been interested in the tool.

• **Telephone:** The FAS has a number of telephones that the providers can, at any time, call for free to clarify doubts about the program and present their demands and suggestions.

13.2.2 Scheme investors and other institutional actors

FAS's institutional partners are crucial for the maintenance of the scheme. They are funders of the PBF as a whole or of specific initiatives, academic institutions that realize studies that contribute understanding of the program and technical partners that qualify the work and add to its execution. To maintain them engaged or prospect new partners, communication efforts are directed in different ways within the institution.

Initiatives

• **Field visits:** There is no communication at a distance that substitutes for the direct experience. Periodically the area of institutional relations of FAS invites groups of representatives from different partners, existing or prospective, to understand the work implemented in the field. Through the experience, visitors see the reality of the amazon with their own eyes, with space to understand how the actions they support are realized in the field.

• **Scientific production**: Supported by a wide network of researchers, the scheme offers rich material for academic exploration on different topics. The organization has incentivized, for example, the production of studies and technical reports about local production chains to enrich understanding about the subject in the field.

• **Direct institutional relations:** The area of institutional relations has the function of facilitating communication with key partners, identifying specific requirements of each partner and processing and directing the necessary information to each of these through informative newsletters directed at this audience.

[55] For more information access: **https://www.facebook.com/reporteresdafloresta**

13.2.3 Society

The involvement and engagement of society through easily accessible and understandable information shared through open media and platforms are part of the daily communication activity of the organization, which translates the collected stories, creating interesting and informative agenda for the public.

Initiatives

• **Activity Reports:** Produced since the first year of the program, the report is a book that annually summarizes the actions realized by FAS. Through it, the images and text transmit information to readers about the actions in the field and promote transparency and trust of audiences with the scheme.

• **Report of independent audit:** openly available report resulting from an audit process every semester.

• **Sustainable Chat:** through periodic events realized at FAS, specialists in diverse topics related to sustainability are invited to share their experiences in events that are open to the public of Manaus and transmitted online, promoting proximity between the public and the scheme.

• **Production of audiovisual material:** Internet channels bring together videos produced by the field team that tell the stories and present the people involved in the implementation of the program, registering the team's efforts in implementation. The videos help to contextualize the actions of the scheme for the public not directly involved in the theme.[56]

Channels

• **Open media:** Sharing of PBF agendas in national and regional media are a primary way to connect with the open public. Connection with public opinion makers helps pique the interest of new people in the topic.

• **Site:** FAS website is the primary portal for access to information about the scheme. There all of the production of communication content is housed as well as contact channels for connection with those interested. Current efforts are directed to the creation of a map in which all actions and investments of the PBF are georeferenced, as well as their impacts in the reduction of deforestation in that region.

13.2.4 Internal

Alignment between the team directly involved in the implementation of PBF, in the support actions and in administrative support and innovation.

Initiatives

• **Workshops for leveling:** Are trimestral spaces that count on the participation of all the areas of the organization for them to present their work, their learning and doubts, to promote horizontal understanding about their activities and collaboration between areas. Besides facilitating learning for the team and the exchange of information among those involved, they create bases for internal innovation.

• **System of indicators, data collection and production of content:** The area focused on for communication at FAS depends on the information collected and shared by all of the organization. FAS recognizes and promotes the role of collaborators in the institution to engage in efforts. The field agents collectively register data and stories and register the evolution of the project. The organization provides trainings and equipment needed to qualify this activity, which brings richness to the data for following and understanding the scheme.

Channels

• **Internal mailing and WhatsApp groups:** PBF team and their support programs demand the constant presence of the team in the field. The communication tool of the group through instant messages has gained great importance for internal alignment. The teams go on missions in the field, send news and the activities they realized to the other collaborators. This promotes the support of the team and brings a sense of teamwork despite actions being geographically separate.

[56] Available on the channel: **https://www.youtube.com/tvfasamazonas**

14. Challenges and opportunities for incentive-based provision of ecosystem services

Increasingly, the relevant areas for conservation include landscapes inhabited or managed by man (Zimmerer, 2006 apud Eloy, et al., 2013). PES schemes fundamentally deal with incentivizing changes in the standard of development of human populations living in a specific ecosystem or territory.

Thus it is not possible to disassociate conservation efforts from sustainable development processes. Social vulnerability and pressure on ecosystems are complex, interconnected problems that need to be resolved together. The Sustainable Development Goals are a clear signal in this regard.

The planet is living a grave ecological and humanitarian crisis. The solutions to this crisis include, necessarily: (i) stop environmental degradation and (ii) promote ecological restoration. These two strategic objectives depend on valuing ecosystem services provided by natural ecosystems and agroecological systems. This valuation is essential to influence societies to get on a different path than the current one. In other words, it is necessary to create incentive mechanisms in order for societies and people to perceive benefits from reducing environmental degradation and in ecological restoration, incorporating the inherent complexity of the problems they hope to solve into their development strategies and not reduce them to financial transactions.

It is in this context that payments for environmental services have a strategic role for the future of humanity and the planet. These compensations can be monetary or non-monetary. Many times an investment in improved education or in access to potable water can be more relevant than monetary transfers. Beyond the semantics, diverse positive incentives recognized as rewards by providers are more appropriate than payments that easily are associated with a process of acquisition or appropriation of something.

The use of the term reward also contributes to building bridges between segments of our societies that are resistant to the idea of attributing monetary values to environmental services and making payments in function of them. It can be said that there is a great convergence around the need to economically value environmental services and compensate those responsible for conservation and restoration of ecosystems.

A first challenge is the definition of reward to be offered to the stewards of ecosystems that realize environmental services and promote the maintenance and increase of the ecosystem services (vide **Item 3.8 Rewards, incentives and payments**, pg47). One of the lessons learned by the experience of the PBF is that this should be fruit of a decision process and participatory management, capable of capturing the priorities of the populations involved. It is worth emphasizing the concept of "process." The definition of a PES scheme is not a technical and tight exercise.

It is something dynamic over the long term and with a strongly subjective character. It is not the application of a mathematical formula of opportunity costs. It is much more complex, for it involves values and perceptions by social segments generally different from those in power in urban institutions. This is why the constructivist and participatory approach presented in this publication is of great value as a reference. Obviously, the methods presented here can and should be improved and adjusted to distinct realities.

The second challenge is to create financing mechanisms that are at the necessary scale and have long-term sustainability (vide **Section I. Tools for the design of innovative PES schemes**, pg20). Many PES schemes in Latin America and the Caribbean have still not achieved these strategic objectives. Many are still in a pilot scale or depend on financing without guarantee for the long-term. Again, there is no recipe to be reproduced in a mechanical or linear fashion. It requires taking advantage of local opportunities and circumstances, which vary from one place to another and also over time. One of the lessons learned by the Sustainable Amazon Foundation is that the development of multiple partnerships is a strategy to reduce dependency on large sources of funding and creates resilience to local, national or international political changes.

The third challenge is to monitor results of the PES schemes based on the appropriate indicators. These indicators should be locally relevant, especially for the providers of the schemes (vide **Chapter 11. Monitoring and evaluation: diagnostics, baseline, evaluations, indicators, and associated technical and scientific research**, pg123). At the same time, these indicators should dialogue with more generic conceptual targets, as is the case with the SDGs.

The use of appropriate indicators is essential to conquer and maintain partnerships. It is not enough that schemes make defined investments seen as priority by local communities: it is essential that the results be analyzed as to their quantitative and qualitative impacts for the reduction of poverty, improvement of the quality of life, income generation and environmental conservation.

The fourth challenge is related to ethical and transparent management. The management of PES schemes should be efficient. In other words, the cost of the mean activity should be low and the end activities should achieve high quality results and impacts (vide **Section III. Important management aspects for the effectiveness of innovative PES schemes**, pg105).

Transparency in the management of the entire process, from fundraising to internal administration and the relationship with providers, partners, beneficiaries, is essential to build relationships of trust. Ethics should guide conduct of all relations and, especially of teams responsible for the PES scheme. The adoption of Codes of Conduct and Ethics for all involved is recommended.

Finally, relating to all these challenges, the good news is that it is not difficult to design and implement efficient and effective PES schemes – for this, a strategy to address the complexity requires an appropriate design, efforts to develop local conditions and different management processes. This toolkit sought to offer some guidance based on lived experience – the Bolsa Floresta Program – and the lessons learned over the last 10 years.

We conclude with a call to multilateral institutions, donors, governments, socio-environmental movements researchers and teachers to get more involved in improving the initiatives underway and support new initiatives. It is essential and urgent to multiply PES schemes throughout Latin America and the Caribbean. This is a vital component to mitigate climate changes and, at the same time, promote adaptation to the new context ahead.

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