Amazon Headwaters Initiative Monitoring and Evaluation Report

'The contribution of three conservation strategies to protected area consolidation

November 2012

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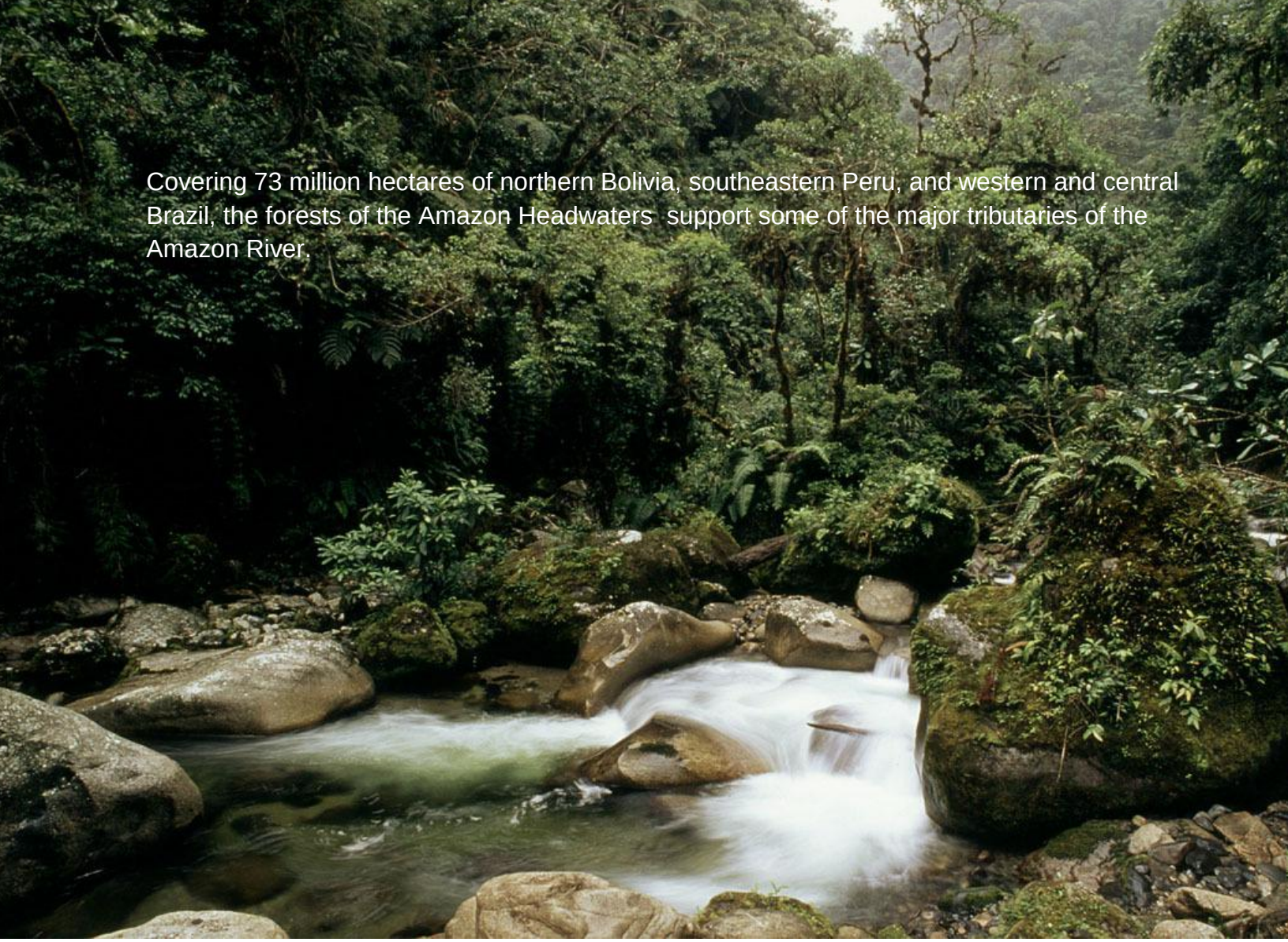


Covering 73 million hectares of northern Bolivia, southeastern Peru, and western and central Brazil, the forests of the Amazon Headwaters support some of the major tributaries of the Amazon River.

1 Introduction

The **headwaters** of the Amazon Basin, the 4,000km arc from Colombia to Bolivia, play a vital role in the long-term viability of the largest watershed on the planet. The upper catchments are critical to maintaining the hydrological cycle of the Amazon Basin. In addition, the tributaries originating in the Andes traverse habitats with staggering biodiversity and carry high levels of nutrients that are believed to contribute to the wide species diversity found in the lowlands. Nowhere is this more evident than in the **Southwest Amazon (SWA) moist forests ecoregion**. Covering 73 million hectares of northern Bolivia, southeastern Peru, and western and central Brazil, these forests support some of the major tributaries of the Amazon River – the Yurua, Purus and the Madeira rivers – and encompass some of the richest forest communities on Earth,[1] where some emblematic species long gone from other areas still persist. With more than 96% of the area still forested in 2010, a low population relative to other parts of the Basin and a sizeable portion of the region already set aside for conservation, the southwestern quadrant of the Amazon offers unique opportunities to achieve decisive conservation results.

[1] In 2000, WWF selected the Southwestern Amazonian (SWA) moist forests as one of the 200 most important ecoregions on the planet (WWF's Global 200). In 2003, WWF developed a biodiversity vision specific to the SWA based on biological importance and vulnerability. Some of the polygons prioritized for protection within the SWA vision are located in AHI's target blocks.

However, the window of opportunity is closing rapidly. In the past ten years the context of the southwestern Amazon has changed, with large-scale infrastructure projects, long dreamed of by some, now becoming a reality. Illegal artisanal gold mining is also putting increased pressure on the region, especially in Peru. Access to this relatively well-preserved region is increasing, with new roads and dams opening areas previously deemed inaccessible new threats expanding rapidly (such as artisanal gold mining in Peru and Bolivia), all spurring migration and unregulated extraction in turn. Pressure for access deeper into the forest is likely only to increase in the years to come.

In light of the importance of biodiversity in this region and its impending transformation, World Wildlife Fund (WWF) partnered with the Gordon and Betty Moore Foundation (GBMF) in late 2003 to launch the **Amazon Headwaters Initiative (AHI)**. The ultimate goal of AHI is to safeguard the southwestern headwaters of the Amazon Basin by preserving large expanses of forest and freshwater habitat (hereafter referred to as *forest blocks*) in Bolivia, Brazil and Peru. WWF selected two focal forest blocks upon which to focus AHI's efforts (Figure 1.1):[2]

- **The Amazon Headwaters Block** – This trinational area of 36 million hectares in southeastern Peru, southwestern Brazil and northeastern Bolivia encompasses the headwaters of the Purus, Yurua and Madeira rivers, three major southern tributaries of the Amazon that are hypothesized to be the spawning areas of large migratory fish species. This block is located near the Andean foothills of the basin, where biodiversity has been shown to be highest due to relatively rich soils in comparison to Central Amazonia. This large forest block likewise contains the world's last wild populations of mahogany (*Swietenia macrophylia)* and extensive natural groves of Brazil nut (*Bertholletia excelsa*) trees. Reaching from the high Andean grasslands of Peru to the lowlands of the state of Acre in the Brazilian Amazon, this mosaic of protected areas offers exceptional opportunities for large-scale conservation. Since the launch of AHI, however, the Amazon headwaters block has seen increased pressure from large-scale infrastructure development such as the construction of the Interoceanic Highway[3] and hydrocarbon concessions in Peru as well as the Northern Corridor Highway[4] in Bolivia.

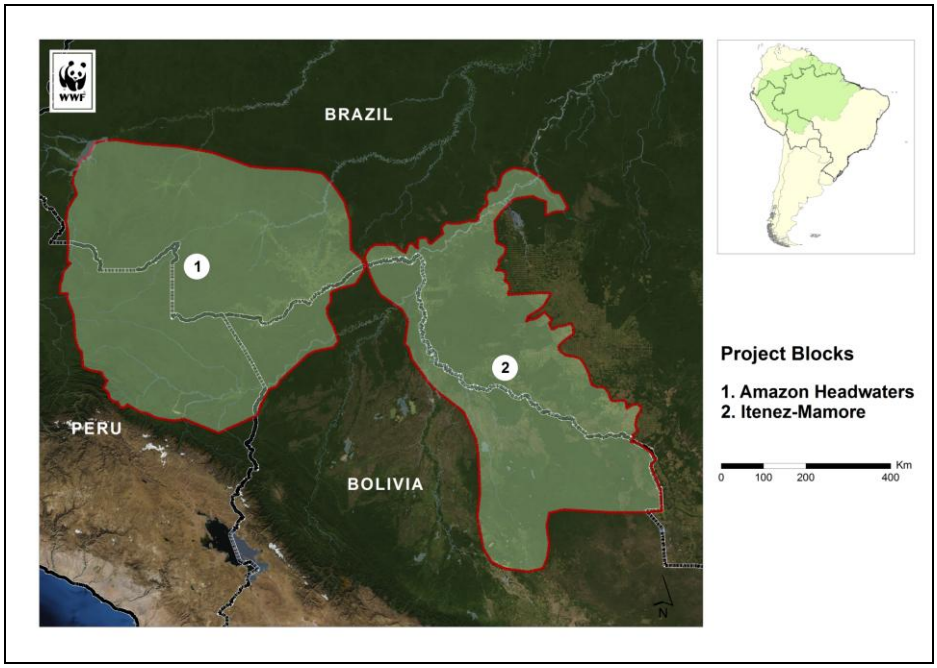
- **The Itenez-Mamore Block** – This adjacent binational area of 27 million hectares in northeastern Bolivia and southwestern Brazil makes up another key portion of the headwaters of the Madeira River, complementing our efforts in the first forest block (Figure 1.1). Equally important from a biodiversity perspective, the Itenez-Mamore block lies west of the famous Brazilian highway BR-364, the infrastructure project funded by the World Bank in the early 1980s that opened up the western Amazon and fueled extensive deforestation in the state of Rondonia. Despite the highway's incursion, the area contains important national parks and indigenous territories that together form an important barrier to the deforestation threatening the southwestern Amazon from the east. This landscape will face additional pressure in the coming years, given the ongoing construction of two dams in the Madeira River as part of a cluster of energy and transportation projects to be located in the heart of the Itenez-Mamore block.

[2] The SWA vision (2003) assessed biological importance by intersecting climate, soil and vegetation parameters. The resulting units were then mapped against threats to determine their relative vulnerability. Persistence was defined as the maintenance of more than 50% of the block's forest cover in that context. It is considered that these blocks are likely to persist by virtue of the high number of protected areas already in place and their geographic isolation relative to other portions of the Amazon Basin.

[3] The *Carretera Inter-Oceánica* connects the states of Acre in Brazil through the Madre de Dios in Peru and on to the Pacific coast of Peru.

[4] The *Corredor Norte* will connect La Paz, Guayaramerin and Cobija in Bolivia.

Figure 1.1 AHI Priority Conservation Blocks



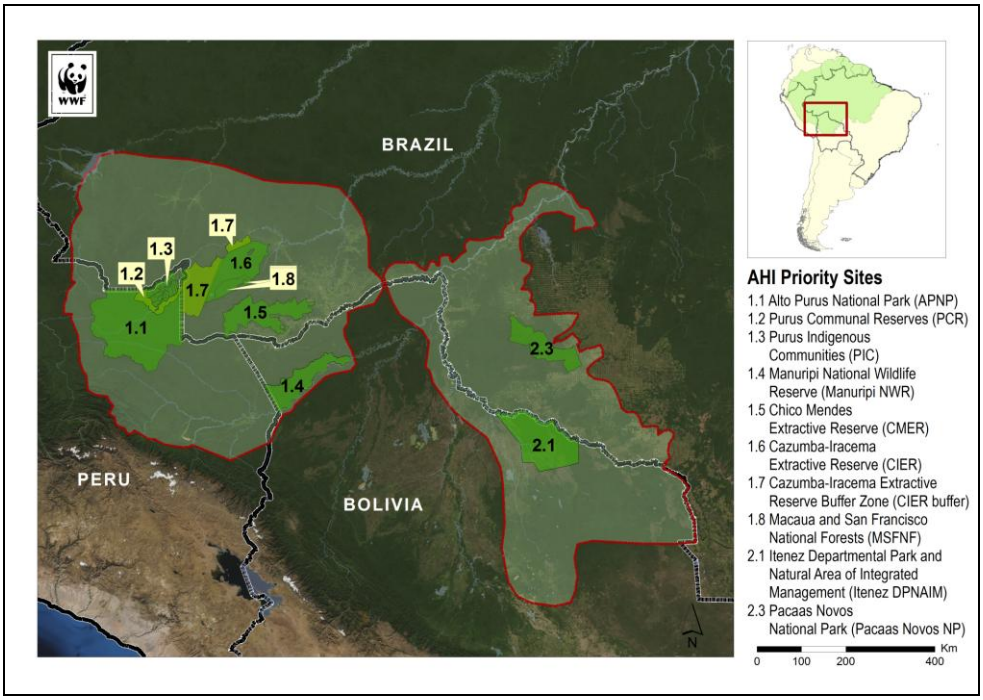
Following well-established precepts of landscape conservation planning,[5] **AHI's aim is to maintain an interconnected matrix of land uses that are compatible with conservation**. Given that AHI cannot support the entirety of these blocks simultaneously, AHI selected focal sites – primarily protected areas, as well as some indigenous territories and communal lands – that are strategically located to connect key pieces within the blocks, thus aiming to maintain the overall integrity of the blocks and effectively expand the area being conserved.

As shown under Figure 1.2, these sites tend to be large, with habitats in good condition and adjacent to other parts of the landscape that can provide conservation benefits such as indigenous territories, forest concessions, or other parks and reserves, some of which WWF supports through other programs.[6]

[5] Landscape conservation planning principles were used to develop the SWA vision in 2003.

[6] For example, WWF supports responsible forest management in private and indigenous forest concessions in Peru. Forest concessions surround key sections of Alto Purus National Park.

Figure 1.2 AHI Priority Blocks with Focal Sites



In each of the sites, AHI sought to create the conditions for their effective long-term management – in GBMF's language, to "consolidate" them. AHI understands a **consolidated protected area** to mean one that has (i) clear legal status,[7] (ii) operational and management capacity[8] as well as financial resources[9] that are appropriate to the protected area's characteristics[10] and context,[11] (iii) enjoys the support of its key constituencies[12] and (iv) achieves its conservation objectives[13] with the resources at its disposal. This definition implies that the consolidation process has not only operational dimensions but also social and financial ones. It is also based on the understanding that while there are site-specific benchmarks that protected areas may need to reach as they improve their management, consolidation by its very nature is a dynamic rather than a static stage, because for a protected area to fulfill its objectives it needs to have the appropriate resources to address the threats it might face given its context, and that context *will* change over time. Indeed, over the period of the AHI to date, we have seen the rapid emergence of new threats, often based on drivers created by the global market.

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[7] Clear legal status means that the protected area has been categorized, its territory has been appropriately demarcated and there are no unsolved titling claims.

[8] Operational capacity includes infrastructure, equipment, supplies and human resources with the appropriate skills. Management capacity means having staff with the appropriate skills and the regulatory instruments (e.g., management plan) in place to *plan* the management of the protected area to deliver on the site's objectives; to implement appropriate lines of action in support of those objectives; to *conduct research and monitoring* in support of the area's management; and to make informed adaptive decisions based on the protected area objectives, on-the-ground situation and monitoring/research results.

[9] Financial resources is defined here to mean a stable annual budget that is appropriate for the management needs of the protected area and provided by the government agency in charge; the financial mechanisms to ensure that resources are available every year may vary by site.

[10] Intrinsic characteristics to keep in mind include size, accessibility and population within and around the protected area, among others.

[11] Context here refers to the socioeconomic, institutional, legal and cultural drivers that affect the protected area, including the extractive activities and other land uses taking place in the landscape in which the protected area is embedded.

[12] Support of key constituencies refers to having the engagement and buy-in of local, regional and/or national actors that are relevant for the protected area's long-term management. Support in this case means that those actors know, respect and abide by the objectives and regulations of the protected area and participate in the decision-making for or advice toward the protected area as determined by the protected area's category.

[13] As determined by the protected area's category.

AHI's focal sites vary significantly from each other with regard to their size, accessibility and population. While some areas are remote, others are surrounded by roads and settlements and may also be positioned on international borders. In all cases, however, the areas face the prospect of further pressure and transformation. So in the case of areas that are remote, AHI's consolidation support aimed to establish management structures and capacity where oftentimes there were none before, with an eye not only on addressing the hard challenges of today but also on putting the management in place *before* the threats of deforestation, degradation and resource exploitation rise so high that they become much harder to handle. In sites that are more accessible but play an important role at the landscape level, AHI aimed to improve management to address the high pressures of today, with the understanding that while some of the actions (e.g., related to stakeholder engagement) may see their impact in the medium term, they are critical for these areas' long-term viability, knowing that conflicts for resources are likely only to increase in the years to come.

To achieve consolidation as defined above, AHI focused on five mutually reinforcing strategies: (i) legal categorization where needed); (ii) on-the-ground enforcement; (iii) participatory management of PAs; (iv) natural resource management within and around PAs; and (v) long-term financial sustainability of AHI focal sites. Through these strategies, WWF sought to improve the management effectiveness of our target sites, reduce major threats to them and establish the foundation for long-term viability of these areas. While the specific actions were tailored to each area's characteristics, context and needs, this common approach means that AHI applied strategies that had a similar intent and rationale in different conditions – protected areas with different characteristics in different contexts in different countries.

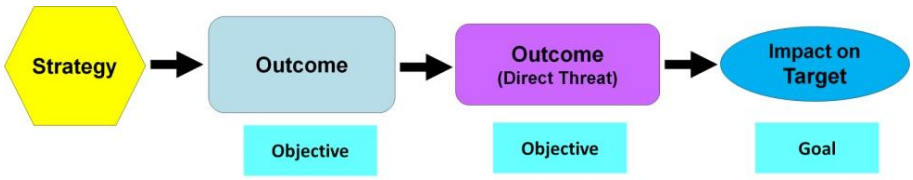
There was a recognition from the start that **the portfolio of AHI sites with a similar approach afforded this initiative a unique opportunity to learn *what consolidation interventions work under what conditions and why***. With that in mind, AHI designed its site-based interventions using WWF standards of conservation project and program management. These standards allow project managers to be explicit about assumptions and expected key results, to design a monitoring plan that can track impacts over time and establish a learning framework across sites.

We used "results chains" (see Box 1.1) to lay out the underlying theory of change inherent in each AHI strategy, identify potential intermediate results and gauge the extent to which AHI helped achieve the desired results.

Box 1.1 What Are Results Chains?

A **results chain** is a tool that shows how a project team believes that the particular action it plans to take will lead to some desired result. More specifically for conservation projects, a results chain represents a team's assumptions about how project or program strategies will influence indirect threats and opportunities, contribute to reducing important threats and ultimately lead to the conservation of priority targets. In essence, results chains are a graphical depiction of a project's core assumptions – the logical sequence linking project strategies to one or more conservation targets, mapped out as a series of causal statements that link short-, medium- and long-term results in an "if … then" fashion. As shown in Figure 1.3, there are three basic components of a results chain: a strategy, expected outcomes and desired impact. Using these components, a project team can identify commonalities across projects/sites.

Figure 1.3 Basic components of a result chain



For each site, AHI identified priority conservation targets, key threats to be addressed and site-specific strategies. Based on the similarities and differences among protected areas, the project then identified common strategies, defined as those being implemented in at least three sites: on-the-ground enforcement, participatory management and natural resource management. For each of these strategies, AHI developed common results chains that laid out explicitly the assumptions upon which the project interventions were based. These in turn were used as the basis for defining the learning questions for the entire portfolio.

Basically, each connection between two boxes (the relationship "if … then") established an assumption or hypothesis to be tested (a learning question). The portfolio approach – meaning the testing of common hypotheses across sites with different conditions – gave the project the chance to ask not only simply whether the hypothesis was correct or not but also, more interestingly, under which conditions it may apply and under which others it may not. It is important to note that these assumptions did not represent the only opportunities to learn within AHI, but they have provided a framework for systematic study, learning and exchange that was used not only as the basis for this report but also as a means to learn from implementation on an annual basis and to adapt interventions accordingly. In order to assess the results tied to each assumption, AHI selected common indicators for monitoring and evaluation and defined methods for collecting the data.

The purpose of this report is not to present specific information about each site or to explain for each whether specific results were achieved or not; interim and annual reports present this. Rather, the purpose of this report is to identify under which conditions the major assumptions behind the common strategies were valid and under which they were not and to share the lessons emerging from this analysis.

The report shares the findings on the major assumptions and the lessons learned from the three common consolidation strategies – on-the-ground enforcement, participatory management and management of natural resources – for a subset of the protected areas supported by AHI for which we have comparative data to carry out the analysis (see Table

1.1). The analysis of each strategy includes (i) the rationale of the strategy and its expected results, (ii) the results achieved until 2010 and whether or not they support the assumptions and (iii) the lessons learned based on the data available about the strategy itself and its synergy with other strategies. In addition, the final section presents the trends in the data available on deforestation and degradation trends for the featured sites during the implementation of AHI. Using these data as a proxy for the status of threats affecting these protected areas, the purpose of this last analysis is to assess the synergistic impact of the three primary field-based strategies used to consolidate protected areas under AHI.[14]

[14] This analysis *correlates* strategy results with deforestation and degradation trends, given the limitations of attribution and causality. In other words, AHI is not solely responsible for the increase or decrease in those trends, given that there are other factors at play besides the interventions supported by AHI.

Data presented in this report were collected over time through regular data collection mechanisms (e.g., patrolling logs from protected areas, minutes from management committees), interviews of key informants[15] and a process of collective reflection carried out with the main stakeholders in each country in 2011[16]. The collective reflection process was implemented through focal groups, based on a common methodological approach that included a thematic discussion guide with a series of key questions for which answers needed to be reached by consensus; when the consensus was not reached, it was registered as such.

Whenever possible we used quantitative data to present the results. It is important to note, however, that data were not collected uniformly across sites and thus only the data that could be subjected to similar analyses were included. There is a broader body of experience embodied in AHI. Some of this information was brought to bear where appropriate during the discussion of the results.

Table 1.1 AHI Focal Sites for Analysis

Protected Areas	Area (ha)	Country	Name in the Document
Itenez Departmental Park and Area for Natural Integrated Management	1,389,025	Bolivia	Itenez
Manuripi National Wildlife Reserve	747,000	Bolivia	Manuripi
Alto Purus National Park, Purus Communal Reserve and abutting Territorial Reserves[17]	4,024,228	Peru	Purus
Cazumba-Iracema Extractive Reserve	750,795	Brazil	Cazumba
Macaua and San Francisco National Forests	195,075	Brazil	Macaua
Chico Mendes Extractive Reserve	970,570	Brazil	Chico Mendes ER
Chico Mendes Buffer Zone	771,000	Brazil	Chico Mendes BZ
TOTAL	**8,847,693**		

[16] Some of this information was also reflected and captured in reports to GBMF (consolidation tables, narrative reports).

[17] Purus includes the Alto Purus National Park (2,510,694 ha), the Purus Communal Reserve (202,033 ha) and two Territorial Reserves for Uncontacted Indigenous People (Murunahua, 481,560 ha, and Madre de Dios, 829,941 ha) that are adjacent to the national park, given that these areas were managed as one conservation block for the purposes of strategy implementation.

The increase or decrease in the number of illegal actions within a protected area depends not only on the level of effort made in patrolling but also on the contextual incentives, such as increased market prices and demand, leading to ilegal activities.

2 On-the-ground enforcement

Key to the basic consolidation of all AHI target sites is the deployment of adequate human and physical resources to manage the areas effectively *on the ground*. This includes the hiring and capacity building of protected area staff; the construction of physical infrastructure for the headquarters and strategic access points; the purchase of equipment for the main office, permanent posts and mobile camps; and the operational costs for all field deployment.

Technical and operational capacity is essential to enforcing the protected area's regulations through outreach and patrolling as well as to implementing other management actions that are critical to the fulfillment of the protected area's objectives – such as communication and environmental educational activities, technical assistance for the management of natural resources, or research as prescribed by its guiding document (e.g., master plan or management plan). So while this strategy is aimed at improving the enforcement of regulations within the protected area, the impact of supporting staff for all matters operational goes far beyond the enforcement realm to serve as the means by which all other management actions (i.e., other strategies) can also be implemented in the field.

It is important to note, however, that on-the-ground enforcement differs among PA sites in Brazil, Bolivia and Peru based on how the government agency in charge in each country manages and supports protected areas:

- **Staff scope.** In the AHI sites located in Bolivia, the staff focuses solely on the protected area where they work. In Peru, staff used to oversee enforcement actions for the two protected areas supported by AHI (as they are adjacent to each other), though now the two areas each have dedicated staff who coordinate actions between the two sites. In Brazil, while some staff may be site-specific, often staff supports the management of multiple sites.

- **Staff number.** While none of the protected areas have enough staff given their size and needs, in general AHI-supported sites in Bolivia and Peru have more staff assigned per protected area than those in Brazil (e.g., Itenez with 18 and Purus up to 35, versus Macaua with four and Chico Mendes with 12). What this means is that given the staffing constraints in Brazil (few staff, often shared among protected areas), the regulation of activities taking place within protected areas is assumed to be largely dependent on self-regulation by local residents, given the limited presence of regular on-the-ground staff across the protected area, supplemented by satellite monitoring and periodic enforcement operations (variable across protected areas). This does not mean that self-regulation is not required in Bolivia and Peru as well, but the capacity for presence and outreach is different.

- **Funding.** While none of the protected areas have all the funding that they need for enforcement and operational capacity in place, the Brazilian government assigns a basic budget to each area, and since the split between IBAMA and ICMBio, ICMBio has further invested in increasing the operational capacity of protected areas. On the other hand, at the start of AHI in Bolivia and Peru, funding, including for operational capacity, was either very limited or nonexistent for the AHI focal sites.

As a result of these differences, the approach used by this project for supporting on-the-ground enforcement varied across countries, with significant support being provided to build the entire operational capacity of sites in Bolivia and Peru (staff hiring and training, all infrastructure, equipment and supplies) versus limited support for this strategy aimed at specific operational capacity needs (primarily physical infrastructure, equipment and supplies; rarely staff) in Brazil. **So, while Brazil has implemented certain elements of the strategy[18], because of these differences, the results and lessons learned for on-the-ground enforcement interventions are mostly derived from the experiences in Bolivia and Peru**, where AHI investment was most significant and consistent over time.

2.1 What is the logic behind the intervention?

The basic rationale behind this strategy (see Figure 2.1) is that to be effective, enforcement requires on the one hand operational capacity and on the other a protection plan for the area developed by skilled protected area staff with input from engaged local residents. It is important to note that a "protection plan" in this context is different from, yet aligned with, the overarching "master plan" for the area, the former laying out specific actions to improve the adoption of the area's regulations (e.g., patrolling and outreach), whereas the latter refers to a broader framework for all management actions within the protected area. If the two conditions mentioned above are present, the assumption is that this would result in effective implementation of enforcement actions, understood to mean that the primary illegal/unsustainable activities are registered at the correct season and

[18] For example, a protection plan was developed by indigenous communities, ICMBio and FUNAI with support from Kaninde and WWF and implemented jointly in the Pacaas Novos National Park and Uru Eu Wau Wau Indigenous Territory.

location and that the appropriate outreach[19] to stakeholders to inform them of regulations has occurred. It also assumes that these conditions would also facilitate the implementation of enforcement actions in conjunction with other relevant actors. It is assumed that effective and coordinated enforcement would act in turn as a disincentive for illegal and/or unsustainable activities and would encourage sustainable ones. The end result would be a reduction of the major threats to the protected area, with the assumption that this would lead to the conservation of its key biodiversity.

Three major premises underlie this intervention based on the logic laid out above:

1. The strategy assumes that the **participation of local residents in the design of the protection plan** is important to ensure its effective implementation. Engagement of local stakeholders in the design process assumes that the plan would be more robust and better tailored to the needs of the area as a result, because the protection plan would incorporate valuable local knowledge about issues such as what illegal/unsustainable activities are taking place where and when, and perhaps even who is perpetrating them. Local input may also be useful when considering what patrolling actions may be most effective, notwithstanding the need to keep the details of its subsequent implementation confidential. The design process itself is an educational opportunity; in other words, an opportunity to discuss with local residents what the objectives and regulations for the protected area are, how certain activities are undermining those objectives and putting the long-term availability of certain resources at risk, discussing with them the need to enforce the area's regulations through outreach and patrolling, and explaining what those actions might look like. The assumption is that this process would increase knowledge about the protected area and the role of enforcement actions, engender understanding and eventually lead to support for those actions as well as to respect for and adoption of the regulations of the protected area during implementation.

2. For enforcement to be effective, this strategy assumes that the **protection plan needs to be implemented in a coordinated manner**, with the protected area administration involving local residents and other relevant institutions in the process.

3. The strategy assumes that **operational capacity** – understood to mean physical infrastructure, equipment, supplies and trained staff – **is a critical factor for enforcement effectiveness**.

Based on previous assumptions and within the context of AHI, implementing on-the-ground enforcement activities was expected to achieve up to four key results:

i. Participatory strategic protection plans developed for every PA
ii. Protection plan implemented in a participatory manner
iii. Operational capacity of the PA strengthened
iv. Number of infractions decreased

The results and its corresponding indicators are summarized in Table 2.1.

The impact of these results on deforestation and degradation trends is discussed in the last section of the document.

[19] The information/education component of the surveillance and patrol strategy reinforces the communication activities established in strategies such as participatory management and natural resources management, which regulate access to the protected areas and resources within them.

Table 2.1 Key results and indicators

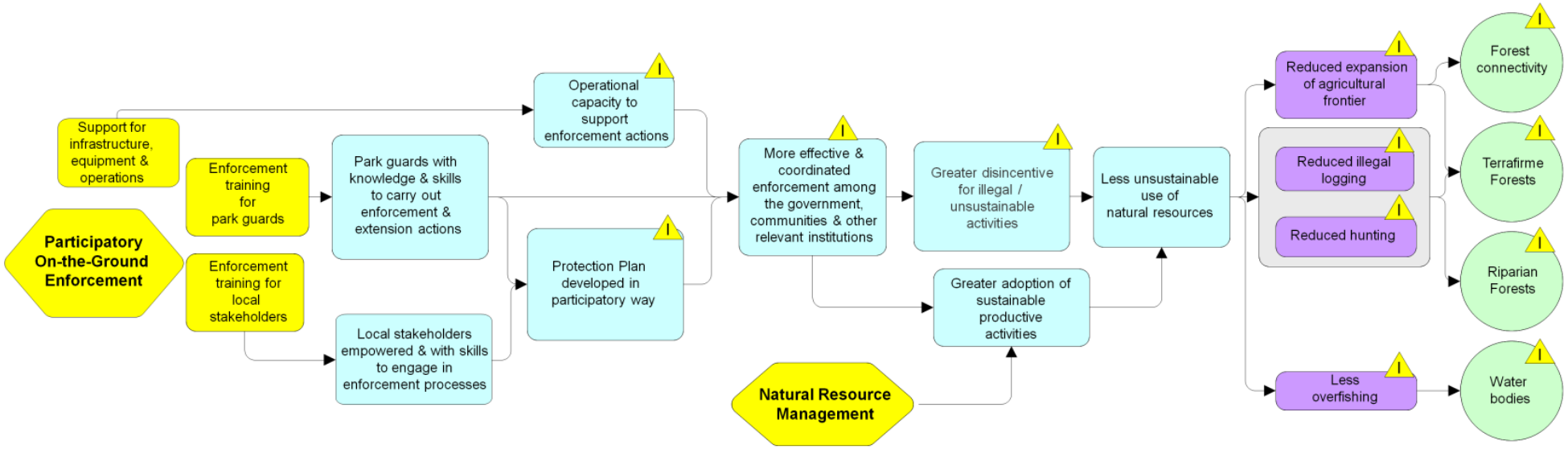
Key result	Indicator
Participatory strategic protection plans developed	Protection plan elaborated on and validated with stakeholders
Plan implemented in participatory manner (coordinated implementation)	Patrols: % of patrols that include local community participation % of patrols that include the participation of other institutions Prevention Degree of community participation (high, moderate, low, none) in terms of: - Dissemination of information re: protection plan objectives - Sharing of information in order to "adapt" interventions during implementation - Number of reports (e.g., about illegal activities) made by community members
Operational capacity of the PA strengthened	% of infrastructure, equipment, human and financial resources to cover operational costs achieved relative to the minimum necessary required by the site to fulfill its management objectives[20]
Number of infractions decreased (increased effectiveness)	Number of registered infractions with relation to the on-the-ground enforcement (CPUE[21])

The results and lessons learned from on-the-ground enforcement are derived from the data from three sites in Bolivia and Peru: "Purus," which includes both the Alto Purus National Park (APNP) and the Purus Communal Reserve (PCR); "Manuripi," the Manuripi National Wildlife Reserve (MNWR); and "Itenez," the Departmental Park and Natural Area of Integrated Management Itenez (DP NAIM Itenez).The effectiveness of the protection plan is directly related to the reduction of the number of infractions (threat reduction) as a result of its implementation (patrolling effort). However, the increase or decrease in the number of illegal actions within a protected area depends not only on the level of patrolling effort but also on the incentives generated by the context to perform illegal activities (including the market prices of the natural resources being extracted, market demand, basic needs of offenders, etc.). This generates a dynamic equilibrium between the pressures to carry out the illegal activities and enforcement efforts to respond to these. For each level of pressure of illegal activities, there is a minimum level of enforcement effort required to counteract them. Assuming that no management plan will ever eliminate illegal actions completely, we can say that a management plan would be considered to be effective if it employs the minimum amount of resources necessary to detect illegal actions, discourage them and thus reduce them. Later on we will explore how to measure this minimum.

[20] The operational capacity considered to be the minimum necessary required to fulfill the management objectives of a protected area (i.e., 100% for staff, infrastructure, equipment and operational costs) was defined for each site individually together with the staff in charge of the protected area (see Section 2.3.1).

[21] Capture per unit of effort.

Figure 2.1 Proposed theory of change for the on-the-ground enforcement strategy



2.2 Is participation necessary to achieve effective on-the-ground enforcement?

Participation in on-the-ground enforcement can occur during two closely interrelated stages: the development of the protection plans and their implementation.

The three protected areas included in this analysis developed protection plans as part of the on-the-ground enforcement strategy and have actively promoted the participation of local stakeholders in patrolling and other enforcement activities. These efforts included dissemination of information for prevention purposes, incorporation of new information to adapt future interventions (frequency, routes), direct participation in patrols and reports of ongoing or potential infractions.

2.2.1 Is it true that the community needs to participate in the design of a protection plan in order for it to be implemented effectively?

In short, *we can say that this is not a universal truth and, rather, that this is context-dependent. Participation in the design of the protection plan was not found to be absolutely necessary to increase the effectiveness of the enforcement actions*.

When looking at *participation in the design*, only one plan, ***Itenez*** in Bolivia, was designed with deliberate engagement of representatives from the local communities. Community participation in the design of the protection plan resulted in the definition of patrol frequency and routes, taking into account the most vulnerable areas and the seasonal frequency of the threats. This included local stakeholders providing information to design the plan, participating in decision-making with regard to key components of the plan and validating the final document. Local residents contributed useful information about vulnerable areas (zoning), the characteristics of illegal activities (threats), and the type and best location for what was needed to improve PA surveillance as well as for needs related to staff levels and equipment for enforcement efforts. General patrolling patterns were established, but the details of enforcement operations (including the specifics of when, where and how) were designed by the protected area staff to keep the element of surprise required for the enforcement operations to work.

The other two protected areas, ***Manuripi*** in Bolivia and ***Purus*** Park and Communal Reserve in Peru, did not organize any training or workshops to involve local residents in the design of the protection plan per se. Nevertheless, residents from Manuripi participated in identifying the threats. Local knowledge was incorporated via the park rangers themselves, several of whom are local residents.

Table 2.2 Results achieved in each PA in relation to community participation for the development of the protection plans

Key expected result[22]	Bolivia		Peru
	Manuripi	Itenez	Purus Complex
Key stakeholders (park rangers, community members) participated in the development of protection plans	No	Yes	No
Protection plan developed	Yes	Yes	Yes
Protection plan validated by local actors	No	Yes	No
Protection plan developed and validated in a participatory way	No	Yes	No
Protection plan implemented effectively (see Section 2.3)	No	Yes	Yes

When looking at the *effectiveness of the protection plan* (understood as a decrease in the number of infractions; see Table 2.2 above and Section 2.3 for more detail), we see that for both Itenez (where the community participated in the development of the protection plan) and Purus (where there was no participation in the design process), the protection plan was effective. In Manuripi (where there was no participation in the design process), the plan is still not fully effective.

We should take into account that the population and natural resource extraction context of the three PAs are different. In ***Itenez*** there is a relatively large population (432 families) living within the PA or directly adjacent to it who depend on its natural resources for their livelihoods, and these families openly opposed the presence of the park rangers in the area at the beginning of the intervention. The park rangers were perceived as coming to prevent them from using what they considered to be their own natural resources. In addition, while some of the infractions were committed by local residents, a significant portion of illegal use was carried out by Brazilian residents crossing the border (particularly commercial fishermen). Given this situation, community involvement in designing the surveillance plan was critical to help them understand that the park rangers were their allies in controlling illegal users from outside the PA and in providing good internal resource management; therefore, community participation in the design of the surveillance plan resulted in good implementation of the plan itself.

In the case of ***Manuripi***, where there is also a relatively large population living in the PA (374 families) who are using the PA's natural resources and there is a mix of illegal use by local residents and external stakeholders, the patrolling plan was not developed with local participation and still has not reached an adequate level of effectiveness.

In ***Purus***, on the other hand, there are no permanent settlements within the PA[23], and local residents do not tend to rely heavily on the park for their livelihoods. In addition, the majority of the infractions were by outsiders in search of valuable timber. Here the surveillance and patrol plan was designed primarily to control outside illegal loggers who tend not to belong to the surrounding communities. In this case, the plan was developed by park staff, several of whom were local residents, and community participation in the design process was not necessary to achieve effectiveness.

[22] Information summarized here was derived from reports to GBMF (consolidation tables, narrative reports).

[23] There are, however, uncontacted indigenous groups who move beyond the Territorial Reserves set up to protect them and into the protected areas during certain seasons in order to hunt and gather natural resources.

Therefore, we can say that *community participation was not crucial for the development of an effective protection plan in every case. The need for community participation during the design phase is instead context-dependent and related to who commits the bulk of the infractions – nonresidents (external stakeholders) versus locals – and the degree to which local stakeholders depend on the resources found within the protected area for their livelihoods.*

2.2.2 Is it true that to be effective, on-the-ground enforcement needs to be implemented in a participatory and coordinated manner?

Our information suggests that *the participation of local stakeholders during the implementation of the enforcement activities contributes significantly to the protected area staff's ability to patrol at the right place at the right time with the right approach to enhance the enforcement of the protected area's regulations.*

Engagement of local residents

As mentioned above, although in some cases the development of the protection plan was not carried out with local community participation, a certain degree of coordination with local stakeholders was promoted during implementation in all three protected areas. Between 2007 and 2010, there was an increase in the percentage of patrols that included the participation of the local community and other institutional stakeholders (Table 2.3).

Table 2.3 Participation of the local community and other stakeholders in the patrols

Participation in Patrols by Stakeholder Type	Itenez		Manuripi		Purus	
	2007	2010	2007	2010	2007	2010
% of patrols that include local community participation	9.91%	38%	5%	10%	1%	26%
% of patrols that include the participation of other institutions	8%	14%	0%	5%	1%	0%

According to the PA management teams and patrolling records, the participation of local residents was not limited to conducting joint patrols but also included reporting ongoing or potential infractions (in all three areas) and implementing community patrols (i.e., patrols carried out exclusively by community members in Itenez and Purus).

In ***Itenez***, the participation of local residents in the patrols increased significantly between 2007 and 2010. In 2007, local community members participated in only one out of every 10 patrols, while in 2010 participation was noted in almost four out of every 10 patrols (Table 2.3).

Likewise, the number of patrols started or organized as a result of reports made by community members has also increased. These patrols show a significantly higher level of "efficiency" (number of registered violations per patrol) compared to regular patrols (Table 2.4).

Table 2.4 Number of regular patrols and registered violations vs. number of patrols initiated by community member reports and registered violations during those patrols in Itenez

	2006	2007	2008	2009	2010
Regular patrols[24]					
Number of patrols	124	297	420	403	577
Number of registered violations	11	57	89	82	52
Number of registered violations detected per patrol unit (CPUE)	0.09	0.19	0.21	0.20	0.09
Patrols initiated by community reports					
Number of patrols	4	8	8	13	21
Number of registered violations	3	8	11	13	14
Number of registered violations detected per patrol unit (CPUE)	0.75	1.00	1.38	1.00	0.67

It is important to note that patrols initiated by community reports (3.5% of patrols in 2010) have resulted in some instances in the prevention of infractions and in others in the identification of the offenders, thereby allowing the implementation of the corresponding sanctioning process.

In the past two years communities have begun organizing their own patrols (22 community patrols in 2010), some of which support the park rangers during their patrols when operating in the same area.

In ***Manuripi***, community participation in the patrols has had some limitations given a distant and/or at times strained relationship between the PA administration and local residents. In 2010, however, improvements in the relationship between the PA management and the Management Committee (see following strategy 3) have resulted in the engagement of local leaders in some particularly controversial operations (such as the Brazil nut harvest) with an oversight role, which has resulted in an increased percentage of patrols involving community members as well as other authorities (see Table 2.3).

Like Itenez, ***Purus*** shows a significant increase in the percentage of patrols involving community members (Table 2.3). In 2007, the number of this type of patrols was almost negligible, while in 2010 they made up three out of every 10 patrols. While community members do not rely extensively on the park and the communal reserve for their livelihoods, community leaders increasingly joined patrolling efforts led by the PA's management team in an effort to curb illegal incursions by outsiders. Park rangers indicated that in a remote area such as Purus their engagement lent legitimacy and strength in numbers to their efforts.

Such involvement in Purus was mirrored by the creation of voluntary patrolling committees supported by WWF in 2005, which eventually directly coordinated with them. These committees patrol the indigenous territories and support protected area staff when the patrolling operations occur at the boundary between the protected areas and the territories where they operate. Even though the original design was not participatory, engagement has occurred in practice during the implementation phase, and some patrols have been launched as a result of community reports of illegal encroachments. By 2010, the percentage of patrols involving local residents was 26% (Table 2.3).

[24] Not including patrols initiated by community member reports.

In sum, regardless of context, all three areas contemplated in the analysis are large (e.g., 0.75 million-2.7 million ha) with few (15 to 35) staff to manage such expanses. Staff members are not armed (at least in Bolivia and Peru), while those groups conducting illegal activities (especially contentious ones) often are. In addition, in some areas local opposition to enforcement operations was high when AHI first began. Given this context, a retrospective look at the execution of the on-the-ground enforcement strategy reveals that *while not all protected areas may have sought out the knowledge of local residents for the plans, all the protected areas engaged local residents in enforcement actions during implementation because this lent support to enforcement efforts: (i) buy-in/legitimacy/backing and recognition of the government's role (with a virtuous cycle – as community residents saw the park rangers in action and found their role valuable, support grew further); (ii) strength in numbers (in joint patrols); (iii) greater scope (as afforded by the creation of complementary voluntary patrols); and/or (iv) valuable information to refine/better target enforcement actions (e.g., as with reports of illegal activities) contributing overall to greater governance in the PAs and their buffer zones.*

Engagement of other institutions

While engagement of local residents has increased in enforcement implementation across areas regardless of context, the participation of *other* actors has been more sporadic. These institutions included, for example, the Bolivian Marines or Brazilian authorities patrolling the international boundary that Itenez – a Bolivian-protected area – shares with Brazil, the People's Advocate Office (*Defensoría del Pueblo*) in Purus and the Forestry Department in Manuripi. Results indicate that PA staff reached out to such institutions when they did not have purview in the area where the patrolling was needed (e.g., a territorial reserve for uncontacted people in Peru or in Brazilian territory) or if the action involved a high risk (Table 2.3).

According to WWF's site-level technical teams, the benefits of engaging other institutions included increased manpower, official legitimacy during such patrolling operations and armed support in dangerous situations (which is particularly important given that park rangers in Peru and Brazil cannot carry weapons). The challenges of making the engagement of other institutions a common occurrence is that it requires a significant amount of coordination on the part of the PA management team (particularly the director), and this competes with other priorities and even limited budget resources, given that such coordination often involves trips to the state/nation's capital to set up those partnerships. In addition, in order to engage such institutions it was often the case that the PA had to cover the costs of participation. This was often prohibitive for the PA's budget and often possible only because there was external support (through AHI) to make it happen.

So while potentially valuable, experience so far raises questions as to whether the engagement of external institutions can be turned into a regular feature of enforcement efforts in PAs, particularly remote ones. Participation of other institutions was found to be useful for the implementation of the protection plan as well, though coordination constraints were found to limit the regularity of that participation.

2.3 Is it true that the operational capacity is a critical factor for enforcement effectiveness?

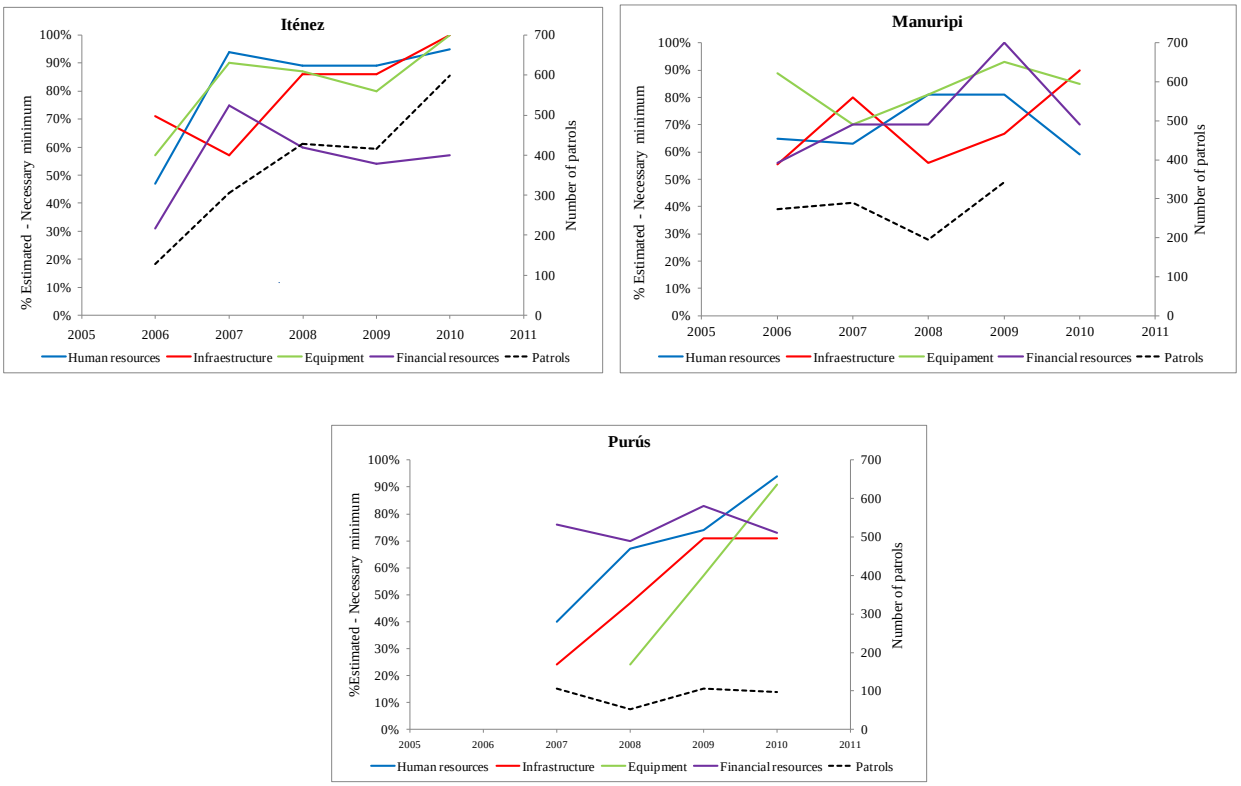
In short, yes. *An increase in operational capacity does result in an increase in the number of patrols (a detection mechanism and a disincentive for illegal activities) and a decrease in the number of infractions detected/registered (i.e. greater effectiveness). However, the decrease in the number of infractions detected/registered does not occur immediately. There are context-dependent variables that affect how capacity, patrols and infractions relate over time, with a discernible pattern that can help understand how close to or far from consolidation a protected area is when it comes to addressing infractions.*

2.3.1 Trends in operational capacity

Implementation of strategic protection plans requires not only human resources but also infrastructure, equipment and a reliable budget to purchase supplies and cover other operational and administrative costs. The following figures show the changes in operational capacities from 2006 (our baseline year) to 2010. Operational capacity needs were spelled out for each site through a joint exercise with the protected area authority. Minimum necessary operational capacity was defined as 100% and was site-specific, directly related to the site's individual characteristics, context and needs. For each site, we characterized the minimum operational capacity (disaggregated by variable; i.e., staff, infrastructure, equipment and operational/administrative costs) that the protected area administration estimated would be needed to carry out enforcement effectively. The progression in operational capacity investments over time was reflected as a percentage.

In all three sites, operational capacity improved from 2006 to 2010 (broken down by the operational capacity variable in Figure 2.2 and shown as overall operational capacity, calculated as the average of the four variables in Figure 2.3). In the case of ***Itenez***, overall operational capacity increased from 52% in 2006 to 88% in 2010 (Figure 2.3), with some adjustments for human resources, infrastructure and equipment in 2008 and 2009 (Figure 2.2a) as overall funding for operations became more constrained in the 2008-2010 phase of AHI compared to the previous phase. This financial constraint is also reflected in the financial resources available to cover operational costs (Figure 2.2a).

Figure 2.2 Operational capacity and patrol frequency by variable for (a) Itenez, (b) Manuripi and (c) Purus



In ***Manuripi***, operational capacity increased from 66% in 2006 to 76% in 2010 (Figure 2.3), though it is important to note that progress has been uneven for the different components of operational capacity over time (Figure 2.2b). This is due to particularly rapid turnover in park staff (park director, conservation director and park rangers) in this PA over the years, the uneven capacity of the park administration to execute activities over time (i.e., use funding for the designated purposes) and political turmoil, all of which have significantly affected the rate and status of operational capacity in Manuripi. WWF's investments focused primarily on physical infrastructure and equipment, staffing support being provided mostly for park ranger training and consultant advice on key issues such as processing of infractions and non-timber forest management because SERNAP accepts financial support only for staff salaries if it can be guaranteed for at least five years. The government agency was in charge of staff salaries in this area.

In ***Purus***, operational capacity increased from 47% in 2007 to 82% in 2010 (Figure 2.3), reflecting a progressive increase in investment across all variables (Figure 2.2c) supplemented by the recent addition of government funding to bolster operational capacity, replacing AHI investments for some variables and supplementing it for others. This PA showed a decrease in financial resources in 2010, reflecting a dip in the government's allocation in financial resources for operational costs, which AHI partly replaced.

2.3.2 Trends in number of patrols and relationship with operational capacity

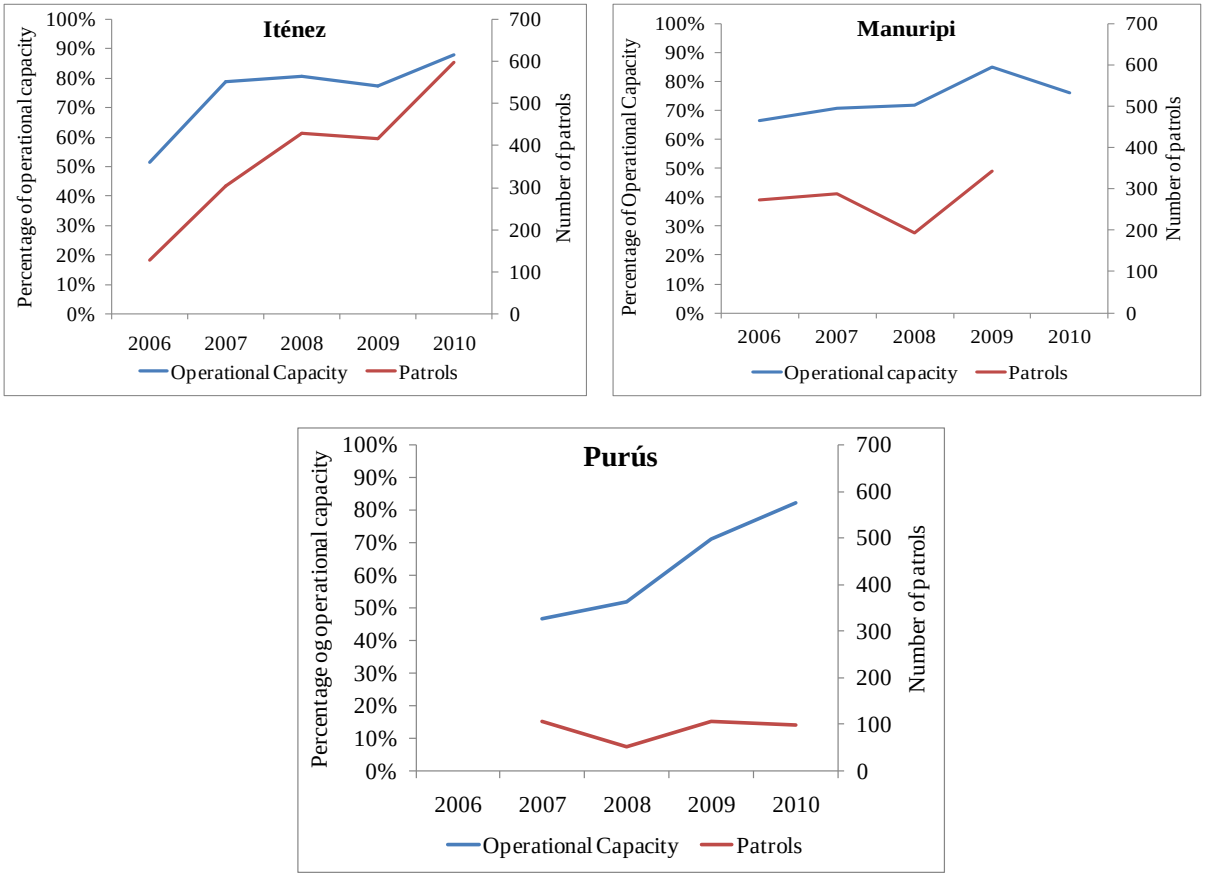
The number of patrols was defined in each of the sites as continuous patrolling along a predetermined route ending at the starting point and involving the same team members. Patrols could involve travel by boat or land, be planned or unplanned (conducted in response to community member reports), or be based on a regular pattern of visitation or with no previous notification (unannounced or surprise patrols). In all cases, these patrols were aimed at maintaining the integrity of the PA and ensuring compliance with the rules governing the use of the area and the natural resources found within the PA.

It is important to note that the probability of being able to detect an illegal activity is related to numerous factors, including the distance that was patrolled, the type of environment and time of the year, the number and ability of park rangers to detect the illicit activity, the type of activity and the infractor's own ability to evade enforcement efforts. For the purposes of this analysis, the probability of detection was assumed to be constant. The analysis assessed how patrolling effort (defined as the number of patrols per year) changed over time in relation to operational capacity and how infractions in turn changed in relation to patrolling effort (see the next section).

The assumption was that there is a positive correlation between operational capacity and number of patrols (patrolling effort – i.e., that as operational capacity increases, the number of patrols also increases). The data collected for AHI show that while the sites experienced an increase in their operational capacities[25] and a subsequent increase in the number of patrols between 2006 and 2009-2010, the overall relationship was not consistently positive during this period (Figure 2.3). What we see is that even though there is a positive correlation for the three sites, there are other factors (internal, external) besides operational capacity that influence the number of patrols.

[25] Calculated by estimating the percentage for each component: human, infrastructure, equipment and financial resources.

Figure 2.3 Overall operational capacity vs. patrolling effort for (a) Itenez, (b) Manuripi and (c) Purus



For **Itenez**, the correlation is 0.91 (2006-2010). Here we can say that the variation in the number of patrols responded mostly to a change in the operational capacity. However, according to protected area staff, some internal factors (see below) may be important for increasing the efficiency in the relationship between operational capacity and the number of patrols. In ***Manuripi***, the correlation coefficient between patrols and operating capacity is 0.6 for 2006-2009. If we leave out 2008 (an irregular year due to external/internal factors), there is a higher correlation (1) between patrols and operational capacity. ***Purus*** had the lowest correlation coefficient (0.3) among the three areas. Several external/internal factors explain this low correlation (see below).

External factors

Results from AHI suggest that external factors can hinder or enhance the relationship between operational capacity and the number of patrols. In 2008, ***Manuripi*** showed a decrease in the number of patrols (Figure 2.3b) as a result of a volatile national political context, which prompted local violence in the Department of Pando (where MNWR is located) and curtailed all activities in the state, including patrolling. In 2009, the situation began to improve, and this was reflected across the board, including in the number of patrols that the PA management team was able to conduct.

In ***Purus***, on the other hand, we saw that a change in the policy context reduced the pressure and in so doing allowed the protected area to be more efficient with the operational capacity available. Prior to 2008, the pressure of illegal logging of mahogany was very strong, and all the available resources[26] were focused on enforcement measures (106 patrols in 2007). In 2008, the pressure of illegal logging of mahogany fell as a result of the fall in the price of mahogany in the international market, the ban enacted by the Peruvian government and the depletion of the resource within the economic frontier. As a result, Purus was able to deploy its available resources more efficiently to cover a greater area (more sectors/flanks of the park) given that there were fewer pressure points and less intense pressure to handle. (Note that the number of patrols did increase post-2008, though not as markedly as in other sites, given that a significant part of the patrolling is done through static checkpoints along the river.)

Internal factors

Factors intrinsic to the PA and to the management of the area can directly hinder or enhance the relationship between operational capacity and the number of patrols as well. Two such factors include (i) the administrative capacity of the PA management team to use the human and financial resources available for patrolling effectively and (ii) the technical capacity to plan and execute patrols as efficiently and effectively as possible in light of the financial and human resources available.

In the case of ***Manuripi,*** the political turmoil in Pando in 2008 led to high turnover of Manuripi administrative staff and precluded adequate use of human, financial, technical and logistical resources that year. This resulted in fewer people being available for patrolling, slower disbursement of financial resources to the PA by the national agency and slower execution by the available PA team. By the same token, 2008 was the year during which more local partners became engaged in supporting the protected area staff in on-the-ground enforcement efforts (one per sector/flank of the park) in ***Purus***, and implementation was uneven across sectors. While some partners were able to assume these responsibilities effectively, others showed technical limitations and delays in budget execution, leading to decreased spending in key recurrent costs. This in turn directly affected the number of patrols that were conducted that year. (Note that in Purus, given the size of the PA and the relative isolation of each of its flanks, significant resources needed to be invested to establish a physical presence in new flanks of the area –infrastructure and operational costs to deploy human resources permanently in the area regardless of the number of patrols conducted out of each checkpoint.)

Experience from ***Itenez*** suggests that technical capacity of the PA staff can be an important factor to maximize the available operational capacity when it comes to patrols. Despite a decline of 21% in the financial resources available for operational costs and a 10% decline in equipment, Itenez was able to maintain its personnel, prioritize the construction of infrastructure in strategic locations (more than a 20% increase) and, most important for this section, increase the number of patrols by 36%. A key investment during this period and beyond was capacity building of the PA management personnel. This included formal training and hands-on technical assistance on how to develop and refine the protection plan; how to track information while patrolling and use that information to hone the where/when/how of patrolling operations; how to develop, implement and adapt work plans; and how to apply and follow up on sanctions. This was also accompanied by the development of training materials as well as tests to assess the annual performance of existing staff and to select new park rangers. This information suggests that *practical, hands-on capacity building for enforcement operations may be a critical variable (and a critical component of operational capacity) for maximizing the use of available resources for the purpose of patrolling.*

As a concluding remark, we can say *operational capacity is crucial to ensure the implementation of patrolling activities, though the number of patrols and their effectiveness is also influenced by internal and external factors.*

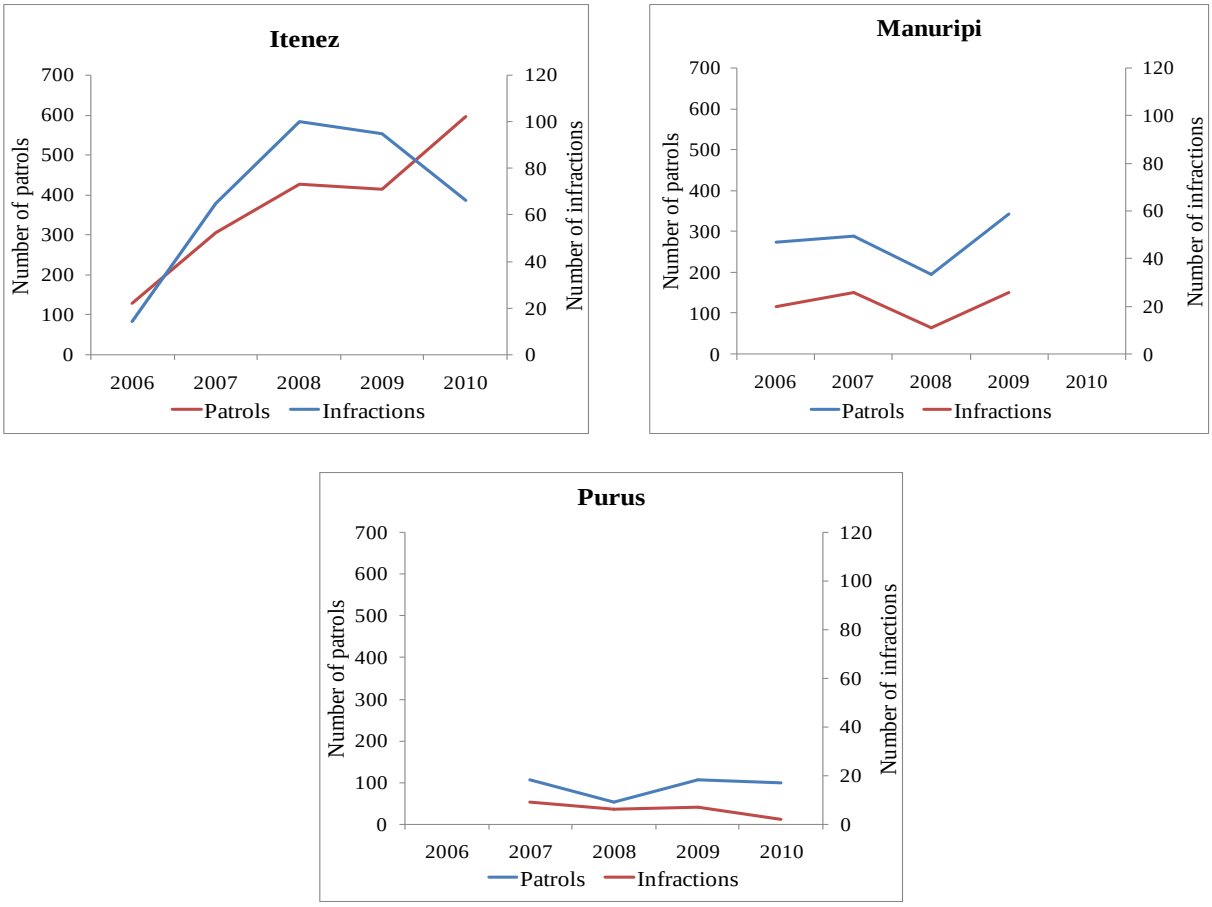
[26] During this period, the participation of the voluntary surveillance committees was critical due to the limitations in staff in the PA. Their participation helped lend further strength to efforts against illegal loggers.

2.3.3 Trends in number of patrols and relationship to the number of infractions

Previous sections showed that there is a clear relationship between operating capacity and the number of patrols. We still need to see whether this operational capacity translates into an increased ability to detect illegal activities and ultimately reduce them.

As shown in Figure 2.4, the number of infractions registered in Itenez increased between 2006 and 2008 and decreased between 2008 and 2010, while the level remained stable in Manuripi (though with some variations) and decreased in Purus during the same periods.

Figure 2.4 Number of yearly patrols and infractions detected in (a) Itenez, (b) Manuripi and (c) Purus



When looking at the relationship between patrols and infractions, up to 2009 the number of infractions registered in Manuripi and Itenez is directly related to the increase in the number of patrols. This means that as the number of patrols increased, so did the number of infractions detected and vice versa. Furthermore, the number of infractions per patrol unit (CPUE) also increased (especially in Itenez).

These results could be interpreted in different ways. We could say that it is a consequence of an increase in the threat (more infractions being committed, thus more probability to detect them), or we could also argue that greater deployment led to greater detection and that greater enforcement capacity (quality of

patrols) led to a greater probability of detecting illegal activities. According to our key informants in both ***Itenez*** and ***Manuripi***, there is no evidence of increased illegal activity during the reported period, whereas there is considerable evidence that the quality of patrols increased during the first year of the project as a consequence of park rangers' training and the development of more organized patrolling systems. Before the project, park rangers did not systematically register the illegal activities that they detected; likewise, they lacked adequate equipment for effective patrolling. After a couple of years, the quality of patrols became more stable.

In ***Itenez*** after 2009, the increase in patrols, despite maintaining the same quality (in terms of number of park rangers, training of park rangers, duration of patrol time, etc.) did not translate into an increase in registered infractions. In fact, data show a clear decrease in the number of sanctions. Again, this result could be interpreted in different ways, either as a decrease in illegal activities in the area or a decrease in the effectiveness of the enforcement actions (park rangers losing interest in detecting offenders, increased ability of offenders to avoid detection by park rangers, etc.). People interviewed during our consultations agree that this decrease was due to an actual decline in illegal activities in the PA, which in turn is clearly related to a deterrence resulting from increased presence, capacity and activity of the park rangers.

In ***Purus*** during 2008 and 2009, despite an increase in the number and quality of patrols, the number of infractions registered did not increase. This result suggests that the level of patrolling was already sufficient to detect the illegal activities in the area.

Therefore, we can say that *the relationship between the number of patrols and the number of detected illegal activities is not direct. Instead, there is a dynamic balance, and if one or more of these factors changes significantly, it can directly affect the impact/effectiveness of the patrols.* One such example was the change to the policy context operating in Purus. As mentioned before, in the beginning of 2008, the government of Peru implemented an already existing provision banning the extraction of mahogany to comply with the environmental stipulations of the free trade agreement with the United States soon to be brought into effect. This was a single, decisive blow against illegal logging that, while not eliminating the activity completely, greatly discouraged it. While increased operational capacity and patrols still played a valuable role for detection and dissuasion, in effect the context changed and allowed the operational capacity available to match and even surpass the pressure.

Broadly speaking, this underlines the importance of working on complementary approaches (e.g., policy advocacy) to support landscape conservation and the fact that the consolidation process is a dynamic exercise in the balance of countervailing forces playing out in the PAs. For Purus specifically, it underlines that while the trends are encouraging, their resilience may be tied to the policy environment. According to the technical team, if mahogany logging were allowed to resume in earnest, the PA capacity and patrols might prove insufficient if their operational capacity is not improved in terms of quantity, staff capacity building and "legitimacy" building.

2.3.4 Relationship among operational capacity, patrols and infractions: implications for consolidation

The relationship among the level of effort in conducting patrols and the number of registered infractions is similar to the "sustainable maximum yields" concept in fisheries, where patrols are equivalent to "effort" and infractions are equivalent to "yield." Based on this, we can define **three phases in the consolidation of management capacities as pertaining to on-the-ground enforcement.**

Phase I: The number of patrols is lower than needed. There is no disincentive to commit an infraction; therefore there are many infractions. But since there are not enough patrols, the infractions are not registered. Under these circumstances we could expect that an increase in the number of patrols would show an increase in the number of registered infractions.

Phase II: The number of patrols is concordant with the PA's needs. The quantity and quality of patrols is good enough to register most of the infractions. There is a dissuasive effect to the degree that it has stabilized illegal incursions. Under this circumstance, we could expect that an increase in the number of patrols would not lead to an increase in the registry of infractions.

Phase III: The number of patrols within the PA reduces the incentive to commit infractions (i.e., without changing the patrol intensity, there are fewer registered infractions due to threat control). At this point, the operational capacity available and the number of patrols deployed not only detect but also discourage infractions.

*A high, positive correlation in the number of patrols and registered infractions would indicate that a PA is in **Phase I** of consolidation.* In our case, while the data are not statistically robust with just four years of information, we can say that for ***Itenez*** and ***Manuripi*** the high correlation between the number of patrols and the number of infractions shows that both these areas were in Phase I of consolidation in terms of operational capacity (Itenez: 0.999872; Manuripi: 0.9104688) until 2009.

*In 2010 in **Itenez**, the increase in the number of patrols did not translate into an increase in registered infractions; in fact, there was a decrease, suggesting that the PA might be reaching **Phase III*** in terms of its consolidation of the operational capacity for on-the-ground enforcement. There is no data available for Manuripi for 2010.

In the ***Purus*** complex between 2007 and 2009 there was a positive correlation between the number of patrols and the number of registered infractions (0.7452342); the correlation is lower than in Manuripi and Itenez. This means that a variation in the number of patrols did not translate into a variation in the same proportion in the number of registered infractions*. The increase (100%) in patrols between 2008 and 2009 was important. However, it shows almost the same number of infractions, suggesting that Purus was in **Phase II** in 2009.* Purus in 2010 had a slight decrease in the number of patrols, and the infraction log shows a significant decline that could suggest a move toward **Phase III** based on the current context (see impact of policy decisions on the environment in the previous section).

Table 2.5 Phases and operational capacity reached in each PA

PA	Itenez	Manuripi	Purus
Phase	III	I	III
Operational Capacity	88%	85%	82%

The implementation of the protection plan, as we have seen, requires resources (minimum operational capacity) to be effective*. The results obtained (Table 2.5) suggest that the minimum level of operational capacity is not static in time* to the extent that there are or might be changes in the threats, changes in policies/regulations (discussed above), changes in market demand, population size and other changes that cause the balance (ability to sustain operational effectiveness) to be a rather dynamic equilibrium. This raises the need to maintain a patrolling and enforcement monitoring system as a tool to adapt the protection plan to the needs of the area.

In addition, results indicate that *the level of effort expressed as the number of patrols carried out and the time needed to achieve consolidation of on-the-ground enforcement (Phase III) greatly varies among PAs.* In terms of resources, the effort to reach Phase III required 107 patrols in Purus, while it required 598 in Itenez. In terms of time, in Manuripi this strategy is still not as effective even though it has been implemented for the same amount of time as in the other areas, indicating again the importance of putting operational/management capacity in context with other internal/external factors.

2.4 What can we say about protected areas consolidation in relation to on-the-ground enforcement?

Based on the definition of consolidation used by AHI:

AHI understands a consolidated protected area to mean one that (i) has clear legal status, (ii) has operational and management capacity as well as financial resources that are appropriate to the protected area's characteristics and context, (iii) enjoys the support of its key constituencies and (iv) achieves its conservation objectives with the resources at its disposal.

The results presented above suggest that *on-the-ground enforcement plays an important role in determining the protected area's degree of consolidation.* This is due to the fact the operational and management capacity deployed to enforce the area's rules and promote other PA goals (component ii in the definition above) is a strong determinant of the number of infractions committed in an area, understood here as a proxy for the degree to which the PA's objectives (component iv above) are being undermined due to anthropogenic pressures. However, it is important to note that *the ability of PA staff to use available operational capacity efficiently and effectively for the purposes of enforcement is mediated by internal and external factors.* Factors including the stability of the political context, administrative and human capacity to execute resources, and technical capacity to direct available resources as successfully as possible can enhance or hinder patrolling efforts and ultimately the detection of infractions.

Likewise, results indicate that *the approach and intensity of on-the-ground enforcement needs to be monitored over time if this strategy is to contribute to the overall consolidation of the protected area.* The relationship between the PA's enforcement approach, its context and the pressures on the area was found to be highly *dynamic*. Monitoring these variables over time is critical to ensure that operational capacity and the enforcement response remain appropriate and effective at any given time. This underscores the importance of the consolidation definition above: "(ii) has operational and management capacity as well as financial resources that are *appropriate* to the protected area's characteristics and context."

Results suggest that *support from key constituencies (*component iii above) *can increase the effectiveness of patrolling efforts (thus contributing to consolidation), and that on-the-ground enforcement is one strategy through which this support can be built over time*. Results indicate that engagement of different stakeholders may not be essential for the design of a patrolling plan in all contexts but that their engagement during implementation was found to be important across different contexts.

2.5 What have we learned by implementing this strategy in different sites?

As discussed above, on-the ground enforcement was found to be important across PAs to reduce infractions and to contribute to their consolidation. But the approach and level of enforcement may not necessarily be the same for all PAs. While the sample for this analysis was limited, implementing the same strategy in PAs with different characteristics and contexts has highlighted valuable lessons regarding the pertinence of and approach to on-the-ground enforcement.

2.5.1 Effectiveness and participation in the design and implementation of the protection plan

<u>Lesson learned 1</u>: PA protection plans do not always need to be *developed* in a participatory manner to be effective

This depends on the PA's context and more specifically on who commits most of the infractions (local residents versus external actors) and the degree of dependence of local stakeholders on the natural resources of the protected area for their livelihoods.

Broadly speaking, when the bulk of illegal activity is carried out by external stakeholders and local stakeholders are affected because they depend on the PA's resources for their livelihoods, engaging local stakeholders in the design can be very valuable, as local residents have a direct stake in making the

protection plan effective to keep outsiders from harvesting the PA's resources and can provide important information in this respect. In this scenario, participation of local stakeholders in the design of the PA's protection plan can increase understanding about the PA's purpose, goals and relevance to them; incorporate their knowledge to design an enforcement approach appropriate for the local context; and create support for implementing the protection plan. More specifically, in situations of high conflict between the local population and the PA management team, participation in the design process can also be very useful to reduce those conflicts.

On the other hand, when most infractions are carried out by outsiders and local residents do not depend heavily on the protected area for their livelihoods, participation of local stakeholders in the design of the protection plan may not be as necessary as long as the protected area staff has the internal knowledge necessary to develop a robust protection plan (e.g., if park rangers are themselves local residents with intimate knowledge of the area). When infractions are carried out primarily by local residents, participation in the design of the protection plan becomes more complicated, requiring a careful assessment of who should participate to ensure that accurate information is provided with the genuine intention of improving the effectiveness of enforcement efforts. Likewise, it is important to assess in which aspects of the design that participation is more pertinent (e.g., providing valuable information on the seasonal and spatial variations in natural resource availability and resource extraction rather than engaging local stakeholders in the design of the patrolling operations themselves, which would eliminate the surprise factor required for these operations to be effective).

The need to involve stakeholders in the development of the protection plan should be assessed at the beginning of the process, taking into account the particular context of each PA, including the location and size of the population living within and around the protected area, their level of dependence and use of the PA's natural resources, who commits most of the infractions, the relationship between the PA's management team and local inhabitants, and the level of knowledge of the area by the PA's management team.

Lesson learned 2: Stakeholder participation during the *implementation* of the protection plan, particularly of local residents, contributes to the effectiveness of enforcement efforts

Engagement of *local residents* in enforcement actions during implementation can generate buy-in/legitimacy/backing and a recognition of the government's role (with a virtuous cycle – as community residents see the park rangers in action and find their role valuable, support for the PA can increase). Local residents can also provide valuable information to PA staff to refine/ better target enforcement actions, which can improve the accuracy, rate of response and impact of patrolling efforts, thereby allowing PA staff to use its limited operational capacity as efficiently as possible. Participation of local residents in enforcement efforts can also provide strength in numbers during joint patrols and even increase the scope of patrolling efforts when communities organize themselves into voluntary patrols to complement PA staff patrols.

Coordination with *other institutions* to implement enforcement actions can also provide benefits, including (i) increased manpower, (ii) official legitimacy during such patrolling operations and (iii) firepower in dangerous situations (particularly in places where park rangers cannot carry weapons). It is important to note, however, that these benefits entail costs, given that engagement of other institutions often requires a significant time investment for efficient coordination and that the PA may need to cover the costs of participation of other institutions in patrolling efforts.

2.5.2 Operational capacity and effectiveness of the protection plan

Lesson learned 3: Improving operational capacity is critical to the effectiveness of the protection plan

An increase in operational capacity can increase the number and improve the quality of patrolling activities, contributing in turn to a decrease in the number of detected/registered infractions. However, these improvements in operational capacity can be hindered or enhanced by available administrative and

technical capacity. It is thus not enough to hire the right number of park rangers and purchase the right equipment and infrastructure; it is also important to invest in training of PA staff, so that they have the capacity to plan, implement and adapt enforcement operations to maximize the detection of infractions and the dissuasive effect of patrolling efforts. Likewise, it is important to invest in administrative capacity to ensure that resources are disbursed in a timely manner to avoid execution bottlenecks that can hinder patrolling efforts.

<u>Lesson learned 4</u>: There is a *dynamic* balance between operational capacity, patrolling effort, infractions detected, and infractions committed, and this balance is highly influenced by other factors

While the relationship among these variables exists and is important for the purposes of consolidation, it is not direct, immediate or static. There are context-dependent variables that affect how capacity, patrols and infractions relate over time, with a *discernible pattern* that can help PA managers understand *how close or far from consolidation* a protected area is when it comes to addressing infractions. This pattern includes an initial phase in which the number of patrols is lower than needed (Phase I), followed by a phase in which the number of patrols is concordant with the PA needs though not sufficient to be entirely dissuasive (Phase II) and finally a phase in which the number of patrols within the PA reduces the incentive to commit infractions (see Section 2.3.4).

Registering infractions is a product of patrolling. However, why these infractions are *committed* depends on a host of other factors. These range from external factors to the protected area, including market forces (e.g., overall demand and price per unit), socioeconomic conditions of users (e.g., cash needs, overall household economy and importance of extractive activities within the PA) and policy framework (e.g., incentives or disincentives for extraction) as well as factors directly linked to the protected area itself – such as accessibility to the PA, quality/quantity of enforcement actions (patrols) by protected area staff and other strategies that contribute to encourage compliance with the regulations of the protected area (see other strategies later in the document). All these factors play against each other to "encourage" or facilitate infractions or to "discourage" them. This underlines the importance of working on complementary approaches (e.g., policy advocacy) to support landscape conservation and the fact that the consolidation process is a dynamic exercise in the balance of countervailing forces playing out in the PAs.

None of these factors are static. Protected area managers must thus assess whether the number of patrols (alone or in combination with other strategies) is – or is not – enough of a dissuasive/discouraging strategy to balance out the factors that encourage infractions. In other words, there is a dynamic balance among capacity, patrols and infractions (detected/committed) in light of the prevailing context and pressures on the PA, and if one or more of these variables changes in a significant way, it can directly affect the impact/effectiveness of the patrols.

Thus the protection plan should be continuously adapted based on a systematic monitoring effort. The effectiveness of the protection plan should be monitored to adjust the minimum requirements in terms of operational resources (i.e., human, infrastructure, equipment, financial) that are necessary to ensure that enforcement actions are effective at detecting and dissuading infractions. The enforcement requirements (frequency, routes, times) need to respond to the intensity of the threats, which can change depending of the evolution of the context of the PA. Patrolling logs should also systematically register key variables[27] in order to be able to assess the quality of the patrolling effort itself. Monitoring should thus include at a minimum a tracking of operational capacity, patrols and detected infractions, though ideally it would also keep a finger on the pulse of critical conditions in/of the PA and of the quality of the patrols themselves. A culture of adaptive management is thus *essential* to ensure that the right investment is made in on-the-ground enforcement.

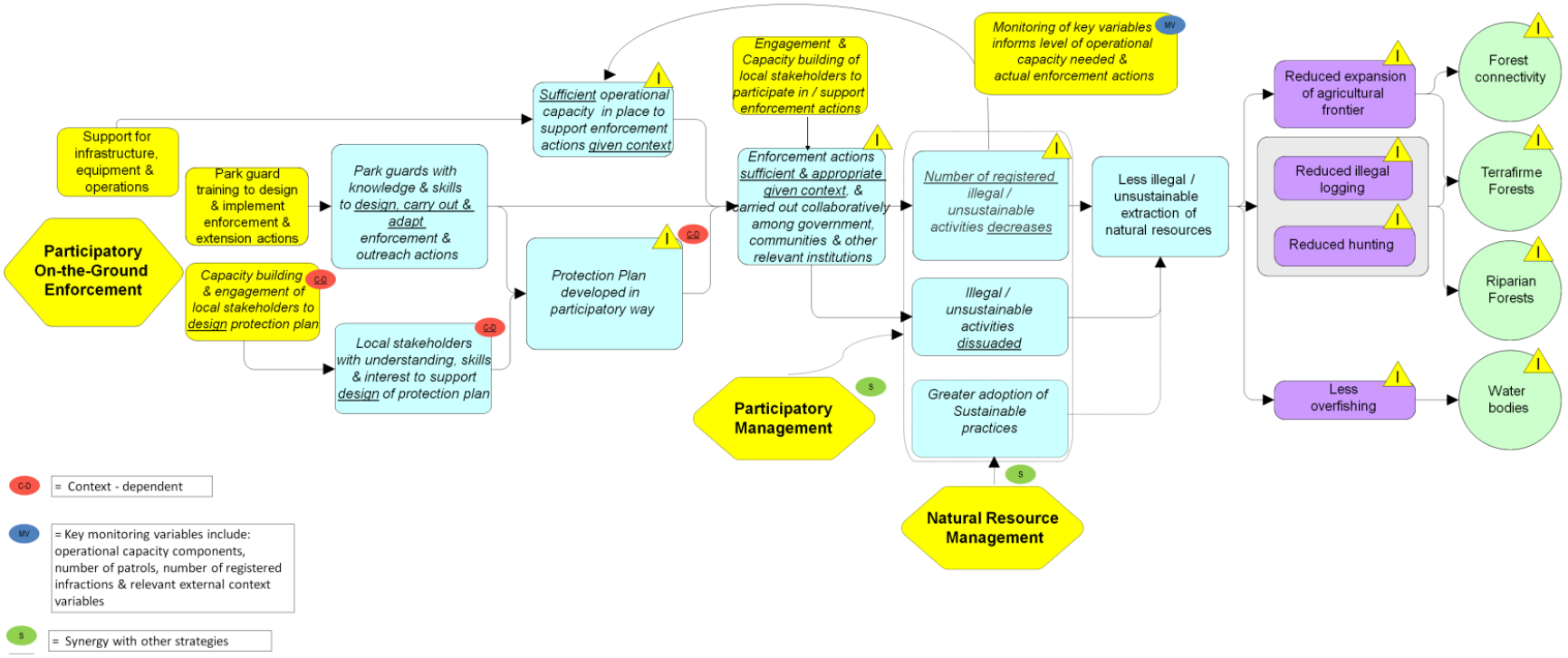
[27] Key variables to assess the quality of patrolling efforts include the distance traveled, the time devoted to a given patrol (with starting and finishing times), environmental conditions (including terrain conditions and visibility), the number of people involved and their capacity to implement the task at hand.

2.6 Adjusting the logic of the intervention

Based on our experience, the overall logic of this strategy should be adapted and reflected in the theory of change (see Figure 2.5) as follows:

1. **Engagement of relevant stakeholders during the *design* of the protection plan needs to be framed as context-dependent**, and this should be assessed prior to deciding whether to undertake a participatory design process. See the "red dot" disclaimer in the revised results chain (Figure 2.5).
2. **Outreach efforts to relevant stakeholders need to be carried out during enforcement *implementation* regardless of context.** See the new activity (yellow box) of engagement and capacity building to relevant stakeholders to inform the implementation stage of on-the-ground enforcement.
3. **Monitoring of key variables (at a minimum, operational capacity, patrols and detected infractions) must be implemented and inform enforcement efforts on a regular basis.** (See the yellow box and feedback loop.)
4. **Capacity building of PA staff on how to design, implement and adapt enforcement and outreach actions is essential** to ensure that operational capacity is used in the most effective and efficient way at any given time. (See modification to the relevant box.)
5. As we will see in the next chapters, **there are synergies with the other strategies that contribute to creating disincentives for illicit activities.** (See the link to other strategies along the results chain.)

Figure 2.5 Revised theory of change for the on-the-ground enforcement strategy



The participation of local residents in protected area management included conducting joint patrols, implementing community patrols, and reporting ongoing or potential infractions.

3 Participatory management

Protected area implementation today assumes that management should take place in a participatory manner through the proactive engagement of relevant stakeholders. However, *how* that participation should occur, *when* it is most effective and *whether* it is indeed necessary in every situation is often unclear. Testing this paradigm under the different conditions offered by AHI focal sites aims to shed light on some of these questions.

AHI's definition of *consolidation* (see Chapter 1) considers the *support of key constituencies* to be a critical component of protected area consolidation. Under this definition, *participatory management* is understood to mean the engagement of relevant stakeholders in decision-making and/or the provision of advice (depending on the PA category) regarding critical PA management issues, as well as their compliance with PA objectives and regulations. What is implicit in this definition is that there is a *space or mechanism* for that participation to occur in a systematic manner.

While patrolling and surveillance (Chapter 2) and natural resource management (Chapter 4) aim to promote participation for specific aspects of PA management, this strategy aims to address the broader process by which relevant stakeholders are engaged in PA management overall (i.e., the PA's main rules and the direction in which the PA is headed). In light of this, the strategy is aimed at creating a space for

stakeholder participation (management committee) and supporting the design and implementation of the main overarching document based on which the PA is managed (the *PA's management plan*).

The specific characteristics of management committees and management plans vary according to the national laws of each country and the PA's category. In Peru, the MC is a "support" mechanism for management of all categories of PA. This means that it is a space for eliciting contributions and generating dialogue among stakeholders but not for official decision-making, which is the sole responsibility of the PA authority. In Brazil, this depends on the PA category. In areas created for the purposes of strict protection (e.g., parks) or responsible timber extraction (national forests), the Management committee (known as *Conselho Consultivo*) advises the managers and debate proposals but does not make decisions or issue resolutions to be followed by the managers. In areas aimed at supporting local livelihoods (e.g., extractive reserves), the MC (known as *Conselho Deliberativo*) is a space where members do make decisions and approve key documents. In Bolivia, the MC has an intermediate role (i.e., it is a space for discussion where decisions related to the management of the PA are made, with ultimate official approval for some decisions residing with the park authority).

In all three countries, a protected area management plan (or master plan, in the case of Peru) defines the key lines of action that need to be taken to fulfill the PA's objectives (e.g., patrolling, management of resources, research, education and/or others), the rules that regulate use of the space and resources, and where these activities will take place, with the specifics depending on the PA's category. Likewise, in all three countries there are stipulations for involvement of local stakeholders in the design of the PA and validation of the results, though the technical design and ultimate approval of the MP are the responsibility of the park authority.

3.1 What is the logic behind the intervention?

The central logic behind this strategy is that the sustainability of a consolidated PA – its integrity in the medium term and long term – is dependent at least in part on the support for the PA shown by key stakeholders, particularly local residents and governmental authorities. The strategy's basic rationale (see Figure 3.1) is that for participatory management to be effective, it requires local stakeholders to be trained and empowered so that they can participate in a functional space for stakeholder engagement on PA affairs, the so-called management committee. The assumption is that if the committee is functional, the main instrument for PA management, the management plan, will then be developed in a participatory manner and achieve approval by local stakeholders and the government alike. If participation in the design of the MP and the approval are in place, the assumption is that implementation of the MP will be done with the active engagement of local stakeholders and that this in turn will result in a significant adoption of the PA's regulations and then generate disincentives for illegal and/or unsustainable activities and encouragement for sustainable ones. The end result would be a reduction of the major threats to the protected area and a conservation of its key biodiversity.

Based on the logic laid out above, four major premises underlie this intervention:

i. The management committee **(MC) is the most appropriate vehicle** for generating stakeholder engagement (participation) on broad PA management issues;
ii. A **functional management committee is a precondition for the development of a participatory management plan (MP)** for the area;
iii. The management plan **is the main output to be sought** after following participatory engagement of key stakeholders on the definition of key rules and regulations from the area; and
iv. The act of participating in the development of the MP results in **greater endorsement and adoption of the PA's rules**, which, in turn, de-incentivizes unsustainable activities by local residents and encourages the adoption of sustainable ones.

Based on the rationale and key premises underlying the intervention within AHI, implementing participatory management was expected to achieve the following key results:

i. Functional management committees in place with the participation of key stakeholders,
ii. Management plans approved by relevant governmental authorities and local stakeholders (note that, as explained above, local stakeholders validate and the relevant government agency approves officially), and
iii. Decreased infractions by local residents.

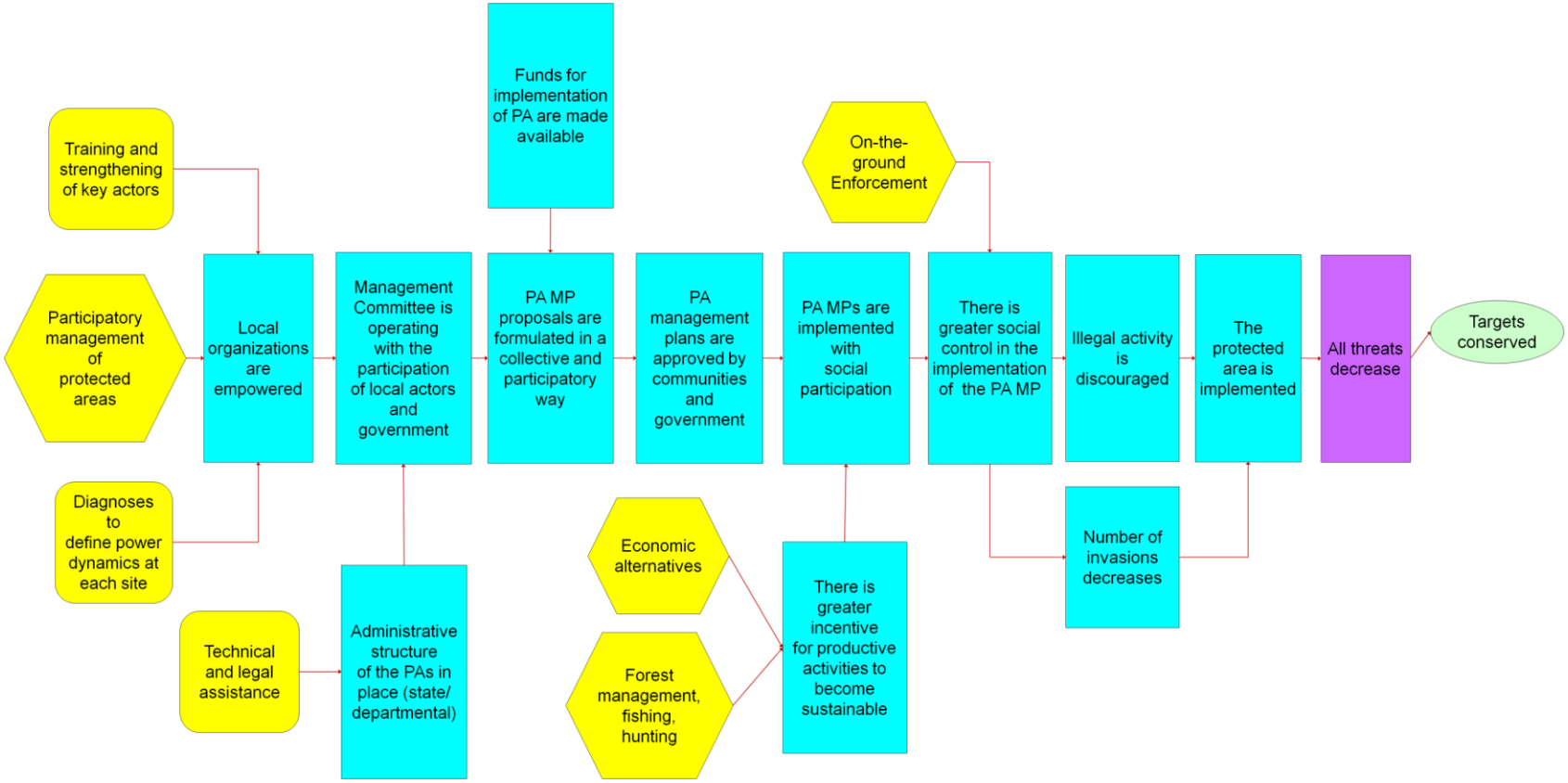
The results and its corresponding indicators are summarized in Table 3.1. The impact of these results on deforestation and degradation trends is discussed in the last section of the document.

Table 3.1 Key results and indicators

Key results	Indicators
Management committee functioning with the participation of local stakeholders and government	# of management committees functioning with participation of local stakeholders, governmental authorities and other relevant institutions.
Master plans approved by the communities and government	# of master plans approved.
More social control over the implementation of the management plans	# of infractions by local residents.

The results and lessons learned from participatory management are derived from data from six sites: “Manuripi,” the Manuripi-Heath Amazonian National Wildlife Reserve (MNWR), and “Itenez,” the Itenez Departmental Park and Natural Area of Integrated Management (Itenez DP NAIM) in Bolivia; “Chico Mendes,” the Chico Mendes Extractive Reserve (CMER), “Cazumba,” the Cazumba-Iracema Extractive Reserve (CIER), and “Macaua,” the Macaua and San Francisco National Forests, which are adjacent to each other and managed as one unit in Brazil; and “Purus,” which encompasses both the Alto Purus National Park (APNP) and the Purus Communal Reserve (PCR) in Peru.

Figure 3.1. Proposed theory of change for the participatory management strategy



3.2. Is a functional management committee necessary to generate a participatory PA management plan?

Based on the information available from the six focal sites, we found that while a PA management plan can be developed without the presence of a management committee, there is correlation between the development of *participatory* PA management plans and the presence of an *active* management committee (though not necessarily a fully functional one). However, the presence of an active management committee does not necessarily *guarantee* that the PA management plan will be developed in a participatory way or that a PA MP will *automatically emerge* in the short term. Instead, experience suggests that a protected area can achieve *participatory management of the PA by different means*, the development of a comprehensive PA management plan being only one of them. Investing on building the *functionality* of the MC and on using that space to develop *PA agreements and regulations* organically is emerging as a more important element for participatory PA management than is pressing to generate the output of PA MP itself.

3.2.1. What is a "functional" management committee?

For the purposes of this analysis, we have differentiated between an *active* MC and a *functional* MC. Whereas an *active* MC means simply that an MC is bringing stakeholders together without assessing the quality of that engagement, a *functional* MC needs to meet the following criteria:

(i) Be **stable**, understood as maintaining a regular number of meetings per year, in accordance with MC bylaws, with at least 65% attendance rates;
(ii) Be **representative**, with the participation of key stakeholders;[28]
(iii) Have members who are **informed** to make decisions (i.e., have the technical capacities to perform their role within the MC); and
(iv) Be **funded** (i.e., have adequate financial resources to cover the needs of the MC, including meeting costs and transportation costs).

Based on information about the six sites gathered from the minutes of MC meetings and interviews with key informants (MC members and WWF staff) during the national consultations in 2011 (Table 3.2), we found that two sites, ***Cazumba*** and ***Itenez***, had functional MCs as of 2010. Both reached a stable periodicity to their meetings, achieved representation of key stakeholders, had MC members with the basic knowledge and skills to perform their functions within the MC, and had financial resources to hold their meetings on a regular basis.

The remaining MCs (Manuripi, Chico Mendes, Macaua and Purus) were found to be in a process toward functionality but not fully functional yet, not having reached all the benchmarks for functionality as of 2010. Sites met stumbling blocks with several of the criteria and were working to overcome them.

[28] We assume that each PA undergoes a stakeholder analysis to determine participation in the MC. If there is no supporting analysis that supports the MC conformation, we assume that the MC was not formed with adequate representation.

Table 3.2. Functionality of management committees, based on stability, representation, technical capacity and financial resource criteria

Sites	Stability	Representation	Technical Capacity	Financial Resources	Functionality
Manuripi	Non-stable	Reached	Not reached	Short term	Under way
Itenez	Stable	Reached	Reached	Short term	*Functional*
Cazumba	Stable	Reached	Reached	Short term	*Functional*
Chico Mendes	Non-stable	In process	Not reached	Short term	Under way
Macaua	Non-stable	Reached	Not reached	Short term	Under way
Purus	Recently formed	Reached	Not reached	Short term	Under way

With regard to MC stability, ***Chico Mendes***, for example, found significant challenges in reaching regularity in their meetings. Although Chico Mendes's MC was established in 2003, it only met for the first time in 2005, went dormant again and became active in 2006. Since then, it has met in fits and starts despite significant efforts to bring stability to the process. The high stakeholder complexity of the reserve (1,100 families gathered in weak local associations) and the many governmental and nongovernmental entities that participate in the MC, some as a means of positioning themselves politically in the state of Acre's foremost extractive reserve, have made it extremely complicated to bring all the MC members together on a regular basis.

The issue of representation was found to be highly contentious in ***Manuripi***, for example, where extraction of Brazil nuts, the main natural resource used within the reserve, is carried out by two main types of stakeholders – peasant communities and *barraqueros.*[29] However, because of conflicts between them, and because the PA management authority decided to support the stance of peasant communities on occasion, *barraqueros* were at times included in and other times excluded from the MC during the period covered by this analysis. From the PA's management perspective, this presented a significant management challenge, given that Brazil nuts are the primary source of income from Manuripi's forests, *barraqueros* hold large swaths of Brazil nut groves within the reserve and not having them as members of the MC meant not having a key stakeholder at the table. After years of conflict, *barraqueros* were finally asked to join the MC toward the end of this period, thereby resulting in Manuripi reaching the benchmark for representation.

[29] *Barracas* are concessions given to individuals known as *barraqueros* for the purposes of harvesting Brazil nuts. This user-right category has been highly contested, given a past history of "patronage" among some of the *barraqueros* and that as prices for Brazil nuts have increased, claims over Brazil nut groves have increased, leading to conflict between local communities and *barraqueros* with historic titles to these concessions. Beyond the conflict, both types of stakeholders extract Brazil nuts from significant tracts within the reserve and, as such, are relevant stakeholders for the Management committee.

In relation to technical capacity, strengthening the capacity of MC members has been a need expressed by all. While all are still building the capacity of MC members, it is obviously more palpable in the recent MCs, such as ***Purus*** (in the process of establishing subcommittees by park sector by 2010[30]).

Financial resources have been provided to cover the basic costs of all the MCs, including venue and food, travel and lodging costs of MC members who could not afford it, capacity building, and, in some instances, support to local representatives to strengthen the quality of their participation at the meetings (see below). While all this is positive, the challenge faced by all MCs is that these costs are supported by outside sources (project) with a limited time frame. In addition, certain associated costs have not been covered due to budget constraints (see below).

From the experience gained through these six sites, the following observations and lessons have emerged with regard to MC functionality.

First, for the MC to be seen as a relevant space for decision-making, it has to demonstrate that it is functional *over time*. Evidence from ***Cazumba*** and ***Itenez***, which had been functioning for five years by the end of 2010, is that it took them two to four years to hit each of the individual benchmarks of functionality and around five years to sustain them all. In other words, *MC functionality is not gained overnight, and sustained support is critical for these spaces to come to be perceived as reliable*.

Second, representation is not just a matter of inviting the right stakeholders to the MC and them showing up: *who sits or does not sit at the MC's table is often a political statement, a reflection of a power struggle that needs to recognized and patiently addressed as part of this strategy.* The example of ***Manuripi*** above speaks to that point. Likewise, in ***Itenez***, where opposition to the PA was rampant when the project first started, it took almost two years following the creation of the MC for the most reticent communities (Versailles and Mategua on the border with Brazil) to join and begin to participate actively in the MC.

Third, *representation goes beyond presence: legitimacy and the ability to present positions clearly in the MC are critical for that representation to work effectively.* While this was echoed across sites from Manuripi and Itenez to Cazumba and Chico Mendes, nowhere was this more telling than in the case of ***Chico Mendes***. With 1,100 families living in the PA, the role of local associations was found to be essential for the MC to function as a participatory space for the benefit of all residents. Three challenges were found when first beginning to work with the Chico Mendes MC: not all communities living within Chico Mendes had local associations to represent them; information flow between local association representatives and the residents they were supposed to represent was weak, leading to residents lacking faith in these associations' ability to represent residents' interests in a legitimate manner; and the local associations were weak relative to other MC members (particularly governmental authorities) when it came to present and defend their positions. What this meant for implementation of this strategy was that support for building the functionality of the MC went well beyond supporting the MC itself as a space for transparent participation. It required focusing on the local associations as well. This experience and similar concerns echoed in other sites suggest that *support for this strategy must include investing in stakeholder empowerment for representation within the MC in order to be effective.*

[30] The Alto Purus National Park is so large that its various flanks, or sectors, are isolated from one another. Subcommittees were established by sector, followed by the establishment of the PA management committee in 2011 (after the period of this analysis).

Fourth, we found across the board that *capacity building for MC members was critical for the MC to function in an organized, transparent and respected manner.* This included basic training on the objectives of the PA itself and what they meant in terms of what is and isn't allowed within the PA, given its category; the functions of the MC as a mechanism for PA management; and the roles and responsibilities of MC members themselves. It is important to note that it was not enough to do the training once but rather that capacity building needed to be repeated periodically as MC members rotated and as clarifications/reminders were found to be needed. Beyond specific training, experience during implementation suggests that technical support was required over time to build the MC statutes and internal regulations, facilitate meetings to ensure that all agenda topics were addressed and conflicts were managed in a constructive manner, take minutes that reflected the agreements reached by MC members, and ensure that agreements were indeed followed up on. It was found that external support was often essential at the beginning, but as MC members gained the knowledge and skills, external support shifted and subsided over time. Having said this, different sites were at different stages in that process by the end of 2010.

Lastly, *sustained financial resources were found to be essential for MCs to gain functionality*. Our experience, however, suggests that *financial support must encompass not only support for the meetings themselves (venue and food) but other costs as well, including the costs of participation of MC members* (while MC members participate on a volunteer basis, they often live far away, and they don't have the resources to make it to the MC and pay for their stay, particularly in the case of local residents), *the investments to local stakeholder empowerment and legitimacy, and capacity building for all MC members*. Oftentimes this creates a challenge, because the costs associated with MC implementation tend to be included partially, at best, in the annual costs of the PA, thereby making this strategy dependent on outside support in order to be implemented effectively. While in the case of places like ***Itenez*** increasing commitment by MC members was reflected over time in some MC members contributing to cover the costs of MC meetings, key informants during the national consultations of 2011 explained that support for certain costs – particularly travel costs for local representatives to report back to their bases – was hard to come by. This points to the challenge ahead for the MCs' long-term functionality and sustainability once individual projects such as AHI exit the sites.

3.2.2. What is a participatory protected area management plan?

For the purposes of this analysis, a protected area management plan (PA MP) was considered to be developed in a participatory manner if relevant stakeholders were engaged in one (or more) of the following: providing input for the development of the PA management plan; decision-making regarding what would be included in the PA MP, such as the types of allowances and restrictions regarding the use of certain natural resources as permitted by the PA category; and/or validation of the PA management plan. The results below include only management plans that encompass all the lines of action for the PA (PA Management plans) rather than individual plans for specific natural resources. Likewise, only those plans that had been fully fleshed out and approved by 2010 were included in this analysis of stakeholder participation.

Based on information provided by stakeholders during the national consultations in 2011 and by WWF technical staff working in these areas (Table 3.3), we found that only two protected areas, ***Cazumba*** and ***Macaua***, had approved PA management plans that were developed in a participatory manner as of 2010. ***Purus's*** management plans for the national park and the communal reserve were originally developed without stakeholder input by a consultant hired by the government back in 2005. In 2010, the process was under way to update them with broader stakeholder input, but it was still in the early stages and thus too early to include it in the analysis. Likewise, ***Manuripi*** had a management plan developed back in 2002-

2003 that had some stakeholder input but was never approved or validated. Toward the end of the period covered by this analysis, the protected area authority was jump-starting a process to update the plan with stakeholder input, but as in Purus, it was still in the early stages in 2010. Lastly, in ***Itenez***, due to initial opposition to the development of a PA management plan by local stakeholders, the approach was to develop the elements of PA MP in stages (management plans for specific resources [see below and Chapter 4] and a patrolling plan [Chapter 2] in a participatory manner). As of 2010, the protected area still lacked a comprehensive management plan, though at this point it was due to funding constraints rather than opposition from local stakeholders.

Table 3.3. Participation in the development and approval of the protected area management plans

Sites	Approved PA MP	Participatory	Form of Participatory Engagement			Participatory PA MP
			Inputs	Decisions	Validation	
Manuripi	No	N/A	N/A	N/A	N/A	No
Itenez	No	N/A	N/A	N/A	N/A	No
Cazumba	Yes	Yes	Yes	Yes	Yes	Yes
Chico Mendes	Yes	No	Limited	No	Yes[31]	No
Macaua	Yes	Yes	Yes	Yes	Yes	Yes
Purus	Yes	No	No	No	No	No

It is important to note that *in the two cases of already-approved PA MPs that had been developed in a participatory manner* (***Cazumba*** and ***Macaua****), the engagement involved a comprehensive approach* that included capacity building about the role of protected areas and the specific objectives of the PAs in question hands-on work on the regulations to be included (within the range of what is allowed by the PA category); validation of results and, in the case of Cazumba, eventually formal approval by relevant stakeholders. Because neither area has high population density (300+ people and 30 families, respectively), it was possible to involve a significant proportion of the population in the MP development process.

In addition*, the management plans generated in a participatory manner were tailored to local conditions and, as far as the PA category allowed, incorporated local concerns.* In relation to the MP regulations for ***Cazumba*** and ***Macaua***, local stakeholder engagement focused particularly on those rules with implications for local livelihoods, such as harvesting of forest resources; hunting, fishing and deforestation for small-scale agriculture; and cattle ranching. In ***Macaua***, the process went one step further and encompassed discussions around the regulations that should apply to timber concessionaires in the area (such as zoning and the identification of indirect social benefits to accrue to the communities from

[31] Chico Mendes's MP was formally validated by a recently formed management committee without a significant engagement in the development or the review of the content.

commercial timber extraction), given that Macaua and its adjacent San Francisco area are national forests, a category established primarily for timber extraction. Through the participatory MP process, the goal was for local residents to have a say on where and how that extraction should take place (within the range of what is allowed by law) and for local livelihoods to be recognized in the MP. The result of this process was not only that the rules were tailored to local conditions but also that, in the process, the rules were built collectively (rather than imposed from far-away authorities) and knowledge related to them was automatically broadly disseminated among participating local residents. This comes in contrast to what happened in the original design of the ***Chico Mendes*** PA MP, where input into the regulations was limited and the process was done on a compressed time schedule. The result was regulations that not only lacked site-level specificity but also were not known, let alone supported, by the Chico Mendes population by the time the MP was approved. ***Purus's*** original plan was also found to lack site-level specificity and, for some components, accuracy, having been generated without local inputs.

3.2.3 What is the relationship between functional management committees and participatory protected area management plans?

Evidence laid out above and summarized in Table 3.4 below suggests that *while an MP can be generated without an MC, there is a correlation between the development of **participatory** plans and the presence of an **active** management committee*. ***Purus's*** management plans for the park and reserve were generated without the presence of a management committee and without stakeholder input. In the case of the two sites that had completed management plans by 2010 in a participatory manner (***Cazumba*** and ***Macaua***), both had developed them with an active management committee.

Table 3.4. Relationship between management committees and management plans

		Areas with participatory PA management plan	**Areas without participatory management plan**	
			Areas with PA management plan that was *not* developed in a participatory manner	**Areas without PA management plan**
Areas with functional management committee (prior to the development of PA management plan)		-	-	Itenez
Areas without functional management committee (prior to the development of the PA management plan)	**Areas with an active (though not yet *functional*) management committee**	Cazumba Macaua	Chico Mendes	Manuripi
	Areas without management committee	-	Purus	-

*Where the PA MPs were generated in a participatory manner (**Cazumba*** and ***Macaua**), the management committee had an important role to play in the process*. The management committee was the space in which the need for a PA management plan was discussed with relevant stakeholders for the PAs and in which those stakeholders agreed to engage in the MP's development, resulting in the MC giving a mandate to proceed. The MC was also the space in which progress on the development of the PA MP was reported on, contentious issues were discussed and the MP was finally approved/validated. It is important to note, however, that not all discussions for the MP's development took place within the MC; the detailed collection of inputs and discussions with PA residents took place in workshops that happened outside of the MC. Having said this, the MC had the important role of promoting, legitimizing and socializing the results of the MP development process with key stakeholders.

However, *the presence of an active management committee does not necessarily guarantee that the PA Management plan will be developed in a participatory way*. While ***Chico Mendes's*** MC was nominally active, it did not weigh in a significant way in the development of the PA management plan, which had limited stakeholder input. Chico Mendes's MC had just met for the first time in 2005, went dormant and then met again in May 2006, and the MP was developed in the meantime, being completed by December 2006. This meant that while the space existed, it was barely getting going at the time and was therefore not yet in place as an established mechanism for participatory discussion and decision-making on PA management matters. While ***Macaua's*** and ***Cazumba's*** management committees were not fully functional during MP development either, they were further along in their road toward functionality, having begun to perform their function as a space for participatory decision-making *before* the development of the MP process got under way. Moreover, interestingly enough, the unrushed development of the MP process itself may in fact have helped consolidate the MCs, because the MC was used as the space to promote, socialize and validate the MP, in the process encouraging the right representation, promoting its regularity, and increasing the capacity of MC members to engage and contribute toward increasing the MCs' functionality.

Moreover, evidence suggests that *the presence of an active – and even functional – management committee will not necessarily lead to the development of an MP in the short term*. ***Itenez***, the other PA with a functional MC by the end of 2010, did not yet have a comprehensive management plan for the PA at the end of the period. The MC was first created in 2005 because there was a strong opposition to the PA by some stakeholders, and it was seen at the time as the space where these conflicts could be addressed in a transparent manner. Back then, discussion of an MP for the PA was out of the question, given that a PA MP was seen as the means by which access to the PA's resources would be restricted.

Instead, Itenez put special emphasis on building the MC as a relevant space for decision-making around PA management issues but without using the MP as the primary means for, or output of, that process. They invested on slowly building the capacity building of MC members by socializing the objectives of the PA, explaining what is or isn't allowed as per the PA category, training them on the role of the MC and their duties as MC members, and beginning to address the most contentious issues in the management of the PA. Significant efforts were made to ensure that all key stakeholders sat at the table, eventually ensuring representation. And resources were invested to ensure that the MC met regularly. In parallel, efforts were under way to support local experiences of natural resource management (Chapter 4) and to improve patrolling efforts (Chapter 2). As the MC gained relevance, it became the space in which local stakeholders brought up the need to manage the resources of the PA; promote the development of management plans for fisheries, caimans and non-timber forest products; create a mandate for that work; review progress; create the impetus to broaden the reach and involve more communities; and validate

those MPs for specific resources once completed. Likewise, the MC became the forum in which key elements of the patrolling plan were discussed, infractions requiring broad discussion were aired, and enforcement responses were given the mandate and legitimacy to occur, often with the participation of MC representatives (see Chapter 2). In the end, after five years of MC implementation, Itenez developed a participatory approach toward management of the PA with the MC as its key forum but through means other than a PA MP (agreements around key issues of concern to key stakeholders, MPs for specific natural resources and a patrolling plan). Interestingly enough, MC members are now agreeing on the need for a PA MP and supporting its development. Itenez's experience suggests that *a protected area can achieve participatory management of the PA by different means, the development of a comprehensive PA management plan being only one of them*.

In sum, evidence from the sites suggests that *investing on building the functionality of the MC over time by developing PA agreements and regulations organically emerged as a more important element for participatory PA management than did putting the emphasis on a single output such as the PA MP as the key means by which to generate stakeholder buy-in to the PA.*

3.3 Do participatory management plans result in fewer infractions?

While data are limited, early observations would suggest that management plans may not need to be participatory for infractions to decrease in situations where local residents do not live in the PA or rely on it for their livelihoods, whereas there might be a positive correlation between participatory management plans and the number of infractions committed by locals in areas where local communities live within or next to the PA and depend on the PA's natural resources for subsistence and income. In addition, experience from our focal sites would suggest that as MCs become increasingly functional, local stakeholders may use the forum to bring up enforcement challenges and lend legitimacy to patrolling operations and in so doing also contribute toward abating infractions in the protected areas as well.

The rationale behind the strategy was that if relevant stakeholders participated in developing the regulations for the PA, they would have a greater sense of ownership of the PA and its regulations and be more likely to endorse their implementation and adopt them. The strategy assumed that this would in turn be reflected in fewer infractions committed by local community members. A declining trend in the number of infractions by community members over time would indicate that there are indeed synergies between the participatory management and on-the-ground enforcement strategies (as shown in the theory of change, Figure 3.1). On the other hand, if the number of infractions by local residents remained stable or increased over time, this would indicate that the key results of this strategy did not result in greater buy-in to and adoption of the PA's rules by local stakeholders.

Unfortunately, our ability to respond to this question is constrained by two main factors. First, some of the PA's regulations were adopted relatively recently, and it is thus quite early to see their effect. Second, we do not have systematized patrolling data across the six sites. For Bolivia and Peru, we have annual patrolling data (see Chapter 2), though it's not always differentiated by type of infractor (internal/external). For Brazil, we have only observations for two of the PAs, provided by the management authority and through key informant interviews with WWF staff.

With those caveats in mind, we can provide the following early observations. First, *in areas where local stakeholders do not live within the PA and are not dependent on the PA for their livelihoods, it is not absolutely necessary for a Management plan to have been developed in a participatory manner for infractions to decrease*. As ***Purus*** revealed in Chapter 2, infractions decreased during the period of analysis, and this occurred despite the fact that the MP was not developed in a participatory way (Figure

3.2a). The main contextual factors to keep in mind in this case are that the main infractions were linked to illegal logging (primarily for mahogany) and carried out by external stakeholders (illegal loggers) rather than local stakeholders (settled indigenous communities). Local infractions were linked to fishing or hunting and were of a smaller scale than were illegal camp operations. The other factor to keep in mind is that permanent indigenous settlements are located outside of the PA, and the residents of those settlements do not rely heavily on the PA's natural resources for their livelihoods. Infraction data from Purus reflect this, with the decline stemming primarily from external stakeholders (Figure 3.2a). This does not mean that engagement of relevant stakeholders in the design and implementation of rules could not be helpful, as reflected by the importance of the support of such actors during the implementation of on-the-ground enforcement actions (Chapter 2), but that at the very least that engagement may not be essential during the design phase.

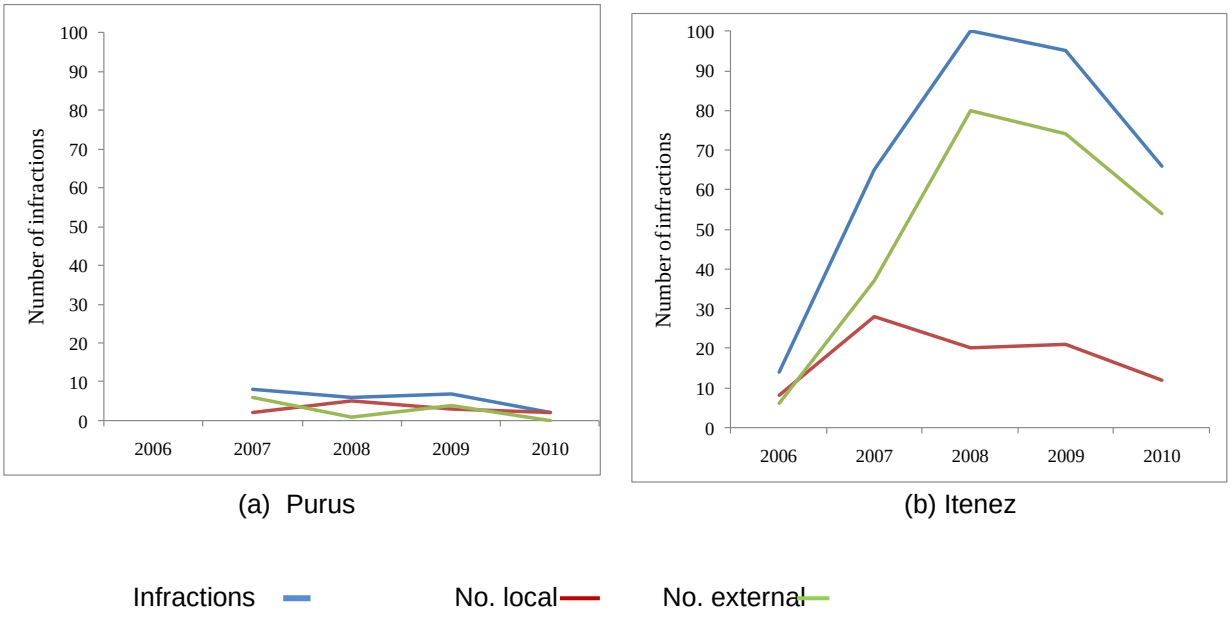


Figure 3.2. Number of infractions committed by external vs. local stakeholders in (a) Purus and (b) Itenez

On the other hand, preliminary evidence suggests that *in areas where local residents do live within or next to the PA and use the PA's natural resources for their livelihoods, participation in the development of the PA's regulations may be a contributing factor toward lowering infraction trends.* Infraction data from Bolivian sites indicate that in the case of ***Itenez***, where significant efforts were made to engage local stakeholders in the development of management rules for key resources extracted from the PA and the patrolling plan, not only had overall infractions decreased by 2010, but so did infractions by local residents specifically (Chapter 2 and Figure 3.2b). Interestingly enough, Itenez was found to be in Phase III in terms of its consolidation of the operational capacity for on-the-ground enforcement (i.e., an increase in patrols did not translate into an increase in registered infractions; rather it resulted in a decrease; see Chapter 2). In addition, as shown in Chapter 2, MC members and local representatives have joined patrolling efforts and even set up community-based patrolling operations to complement those of the park rangers. The trend would suggest not only that patrols were playing a dissuasive role but also that community members were adopting the rules, thereby increasing self-regulation or "social control."

Contrast this with ***Manuripi***, which does not yet have an MP, whose patrolling plan has had limited stakeholder input and where infractions have not yet leveled off (see Chapter 2; unfortunately, patrolling data are not discriminated by stakeholder type). Interestingly enough, engagement of the MC on patrolling is incipient and of community leaders still limited. While it is not possible to discriminate between the impact of patrolling constraints vs. the lack of engagement of local stakeholders on PA management in relation to illegal activities, the number of infractions was still increasing as operational capacity for enforcement improved (Phase I), unlike in Itenez.

Information from key informants from Cazumba and Chico Mendes in Brazil suggests a similar pattern through 2010. In ***Cazumba***, whose plan was developed with local stakeholder participation, the management authority for the PA pointed to a high level of adoption of, and knowledge about, the PA rules, as well as few infractions by local residents. This would suggest a positive correlation between the implementation of a management plan developed with local participation and the number of infractions by locals.

On the other hand, in ***Chico Mendes***, whose Management plan was not developed with significant local input back in 2006, a step-up in enforcement operations in 2008 not only revealed infractions by local residents and external stakeholders in the buffer zone but also resulted in a strong backlash by many local residents who heatedly argued in the MC that they did not know the rules or endorse them. This resulted in a significant follow-up effort to disseminate the rules and elicit feedback, but it was still too early by the end of 2010 for those actions to affect the trends in infractions in the PA.

Lastly, while adoption of regulations by locals was assessed here through the number of infractions by local residents, experience from the focal sites also suggests that as the Management committees gain functionality, *the value of MCs goes beyond being the forum where PA rules are negotiated to becoming the space (i) where new challenges to PA management are brought up and addressed, and (ii) that lends legitimacy to key actions related to PA management (e.g., enforcement).* As the functionality of the MC increased and the context of the PAs changed, the MCs were found to be the fora where new problems could be brought up and resolved collectively. In ***Cazumba***, for example, the MC was the space where the increase in deforestation in the buffer zone as a result of increased access from the road was addressed, with new criteria for deforestation permits being developed as a result, and similarly where the expansion of cattle ranching within the reserve was tackled. In ***Itenez***, the MC was the forum of discussion about the illegal application of entry fees to Brazil nut groves located within the PA by a powerful local stakeholder, resulting in action by the park authority with support from the MC. Likewise, one of the key findings of the on-the-ground enforcement strategy (Chapter 2) was how important it was to engage key stakeholders during implementation, because doing so gave the PA authority the backing that it needed to confront infractors. In ***Manuripi*** and ***Itenez***, we found MC representatives beginning to join park rangers in the conflictive patrolling operations – for example, during Brazil nut harvest season in the case of Manuripi, or to confront an illegal road being built within the PA in Itenez. The degree to which both contentious issues are addressed in the MC and the MC participates in follow-up management actions could serve as an additional indicator of ownership or buy-in to the PA's objectives and regulations.

3.4 What can we say about protected areas consolidation in relation to participatory management?

Based on the following definition of *consolidation* used by AHI,

AHI understands a consolidated protected area to mean one that (i) has clear legal status; (ii) has operational and management capacity, as well as financial resources that are appropriate to the protected area's characteristics and context; (iii) enjoys the support of its key constituencies; and (iv) achieves its conservation objectives with the resources at its disposal,

The results presented above suggest that, in situations where there are communities living within or right next to the PA and whose livelihoods depend on the PA's resources, this strategy can contribute towards building support for the PA by local stakeholders.

This strategy can contribute toward consolidation through:

i) **Establishment of rules,** by engaging relevant stakeholders in the development of regulations for the PA, be it through a comprehensive PA Management plan or regulations for specific aspects;
ii) **Implementation of those rules,** by engaging stakeholders in the implementation of PA regulations, with the MC mandating, supporting and lending legitimacy to key management actions; and
iii) **Informed and inclusive management,** by creating a permanent space, the Management committee, where stakeholders not only help establish rules but also continue to bring up and address management issues that are critical to the objectives of the PA as they come up.

This strategy does not work overnight, however, because significant time and effort need to be invested to make the Management committee functional over time and to build the regulations with broad participation of key stakeholders. Data from the focal sites suggest that it takes two to four years to reach individual components of MC functionality and an average of five years of sustained support to reach them all. This time frame is logical, however, because it is a *broader experience of participatory PA governance* rather than discrete outputs that is being built. In fact, experience from focal sites suggests that it is does not make sense (nor is it useful in the end) to rush through the participatory development of an overall PA management plan when the broader experience of participatory management is not yet cemented. Rather, investing in building the functionality of the MC over time through the development of specific regulations (or through a staged development of the PA MP) can help develop and consolidate the governance of the PA in a more effective manner.

In fact, in places where the investment was made and sustained over time, early results indicate that participatory management may be creating synergies with on-the-ground enforcement (Chapter 2), leading to lower infractions by local residents, more alerts about infractions and even joint enforcement actions with support of the MC. In places where the investment was not made comprehensively or in a sustained manner, evidence suggests that PA management rules may not have as broad buy-in from and adoption by relevant stakeholders and that reduction of infractions therefore relies solely on park ranger enforcement.

3.5 What have we learned by implementing this strategy in different sites?

Based on the results above, the following key lessons have emerged with regard to the strategy of participatory management:

<u>Lesson learned 1</u>: The engagement of relevant stakeholders during the *design* phase of PA regulations is context-dependent

Participatory management is often assumed as the approach to be taken in all protected area contexts, regardless of the specifics. However, in areas where local stakeholders do not live within the PA and are not dependent on the PA for their livelihoods, and where infractions are committed primarily by external actors, it may not be absolutely necessary to develop the PA's regulations in a participatory manner or to have an active Management committee for infractions to decrease. On the other hand, in areas where there are communities living within and around the PA rely on the natural resources of the protected area for sustenance and infractions are committed by both local and external stakeholders, participatory engagement in the management of the protected area through the definition and implementation of regulations and the creation of a space for participatory decision-making (Management committee) were found to be important to generate buy-in to and adoption of the PA's rules. Having said this, in cases where participatory management may not be essential to reach the PA's objectives, engagement in the design of regulations may contribute to their site specificity and relevance, and engagement in their implementation may lend legitimacy and support for management actions.

<u>Lesson learned 2</u>: Management committees are valuable vehicles to promote participatory management *if* there are sustained investments to increase their functionality over time

Creating a Management committee (MC) and calling stakeholders to the table on a periodic basis will not per se guarantee effective engagement of relevant stakeholders in PA management matters. For an MC to become an effective space for debate and decision-making among relevant stakeholders of a PA, it needs to become functional. This means that it needs to (i) reach stability and representation, (ii) have informed and empowered members, and (iii) be funded to operate effectively.

Sustained support is critical because two to four years *at a minimum* are needed for a Management committee to reach the individual benchmarks of functionality, and even more time is needed to integrate and sustain them all, because MC members rotate with old members leaving and new ones coming onboard. *Stability* in the form of a regular number of meetings per year in accordance with the MC's statutes and at least 65% attendance rates by MC members are important to give the MC a sense of continuity and reliability. *Representation* is a central issue, given that who sits at the table can influence the content and application of regulations of the PA. Legitimacy and the ability to present positions clearly at the MC are critical for representation to work effectively. This can require empowering and supporting local MC representatives, particularly those from local communities and associations, so that they can communicate with their constituencies, develop positions that reflect local concerns, present and argue those positions effectively at the MC, and communicate back with their bases after the MC meetings. *Capacity building* in the form of basic training on the PA objectives and regulations, the role of the MC as a mechanism for management in light of the PA's category, and the roles and responsibilities of MC members is also important for the MC to function in an organized, transparent and respected manner. Lastly, for the MC to operate, *financial support* must encompass not only support for the meetings themselves (venue and food) but for other costs as well, including the costs of participation of MC members (e.g., travel, food and lodging during MC meetings), support for local stakeholder empowerment and legitimacy, and capacity building for all MC members.

<u>Lesson learned 3</u>: The participatory development of protected area regulations can be achieved through different means, the development of a protected area Management plan being *only* one of them

Because protected area management plans are mandated by law, there has often been an emphasis on the document itself as a critical output for management effectiveness. And when seeking to develop it in a participatory manner, the pressure has sometimes been on its design as the sole space where local engagement can occur. However, protected area regulations can be developed through different means, a PA Management plan being only one of them.

In PAs where there is openness toward the concept of a protected area management plan (PA MP), as well as the time and resources to develop the PA MP well, then developing protected area regulations in a participatory manner through joint construction of a PA MP can be a path to follow indeed. In PAs where there is opposition to the idea of a PA MP or if the time and resources are not available to develop it in a comprehensive manner, protected area regulations can be developed more organically over time through the participatory design of individual components that are pertinent to the PA's category, be they regulations for individual resources of high importance in the PA (Chapter 4), the patrolling plan (Chapter 2), the tourism plan, etc. The benefit of the former approach is that it addresses all regulations at once, but unless the conditions are in place, it may result in a process where stakeholder inputs and debate, or the quality of the output itself, are shortchanged for the purposes of completing the document. While the latter may take longer, the benefit of a staged approach is that it gives room for the design of individual components to accommodate the debate that may be generated, to reach meaningful consensus and, in areas where there might be initial opposition to the concept of a PA MP, to spend time building positive experiences around management that may create interest and support in PA regulations in the long haul. Regardless of the approach, putting as much emphasis on the process and quality of the engagement of stakeholders as on the ultimate result (output) itself is essential for buy-in to PA regulations to take hold.

<u>Lesson learned 4</u>: The focus of participatory management needs to be broadened beyond the design of protected area Management plans to the dynamic governance of the PA over time

The focus of promoting participation of relevant stakeholders is often directed to the design of management regulations that will be formally adopted and used to direct actions within the protected area. However, as Management committees gain functionality and the regulations for the PA become known to, and accepted by, relevant stakeholders, the value of this strategy goes further as discussions evolve to address new challenges being faced by the protected area. This is critical because it allows the PA management authority to react to new conflicts (or opportunities) in real time with the input of key stakeholders and to use the MC as a dynamic space where issues can be debated and consensus reached. Likewise, governance of the PA can be strengthened through the support that MC members and stakeholders at large can provide for management actions (such as enforcement operations) and in so doing lend much-needed legitimacy to a PA management authority often operating with few staff members in difficult conditions.

<u>Lesson learned 5</u>: Monitoring is essential to assess the effectiveness of participatory management

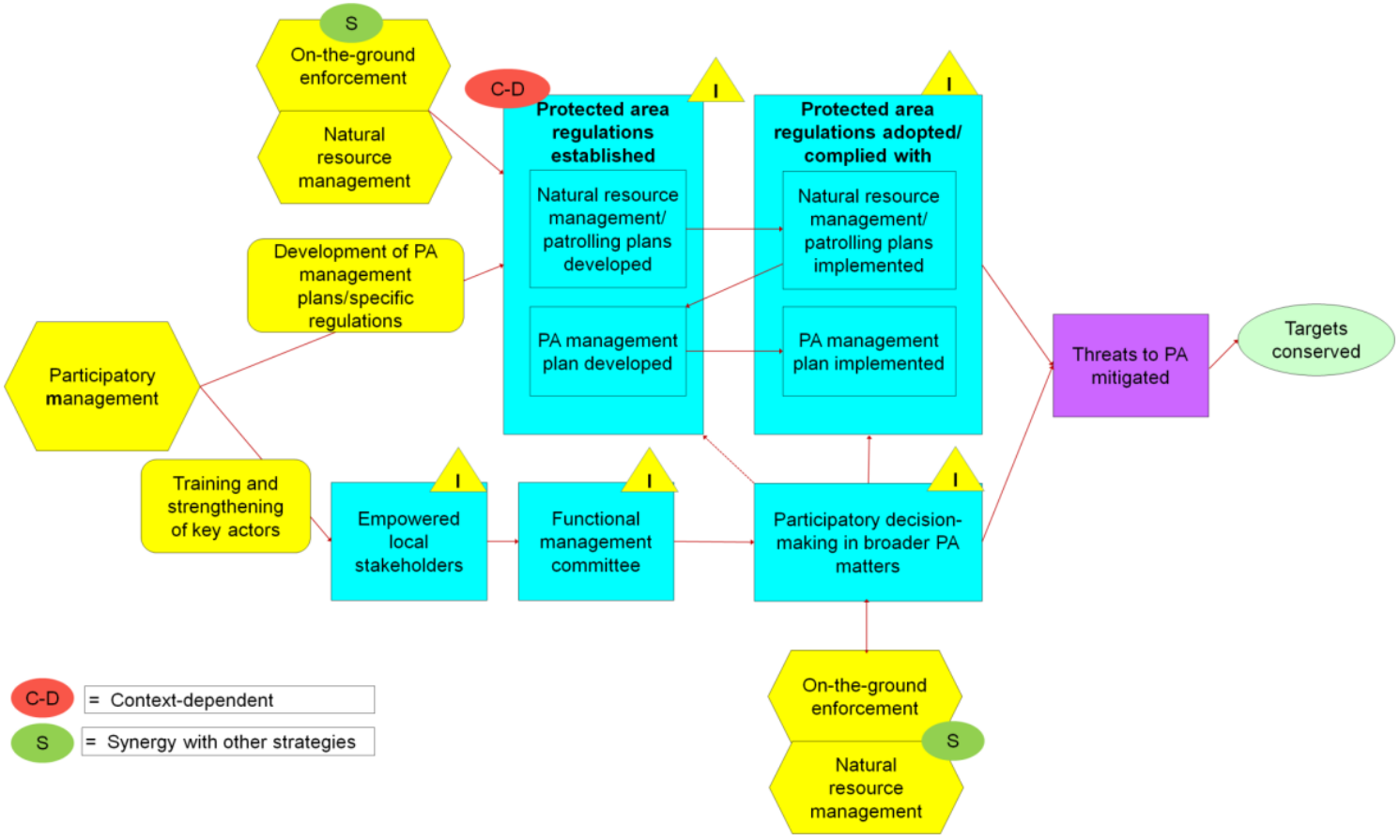
In order to assess the effectiveness of this strategy in a more comprehensive way, monitoring should occur on a regular basis and refocus on, at a minimum, the variables that characterize MC functionality (see above), the type of stakeholder engagement during the design of PA regulations (input, decision, validation and/or approval and by whom), compliance during implementation (infractions by type of stakeholder [internal/external], and level of adoption of regulations) and engagement on broader decision-making (through monitoring of topics and agreements made by MC over time). These indicators should be reported back to the PA management authority and the MC to hone the implementation of this strategy and regulations at large.

3.6 Adjusting the logic of the intervention

Based on our experience, the overall logic of this strategy should be adapted and reflected in the theory of change (see Figure 3.3) as follows:

1. **Engagement of relevant stakeholders during the *design* phase of participatory management needs to be framed as context-dependent**. See "red dot" disclaimer in revised results chain (Figure 3.3).
2. **The Management committee box needs to be rephrased to focus on the MC's *functionality***. See edited box.
3. **The logic of the chain needs to show participatory management reflected in the following intermediate results: (i) the establishment of PA rules (those could be in the form of a PA management plan or plans for specific components), (ii) adoption of/compliance with those rules, and (iii) participatory decision-making on broader PA matters beyond rule-making (with potential synergies with the strategies of on-the-ground enforcement (Chapter 2) and natural resource management (Chapter 4)).** See new/edited boxes.
4. **Monitoring of key variables (see lessons above) must be implemented and inform participatory management efforts on a regular basis**. Infractions and the adoption of regulations were incorporated as indicators of "adoption of/compliance with PA regulations" rather than framed as separate intermediate results (boxes) in the results chain, as in the original results chain. See deletion of boxes to the right, location of indicator triangles and "green dot" disclaimer.

Figure 3.3. Revised theory of change for the participatory management strategy



Local residents rely on the natural resources found within the Protected Areas and their buffer zones for subsistence and/or commercial purposes. One such resource is the brazil nut, *Bertholletia excelsa*, collected by many residents of the Southwest Amazon.

4 Natural Resource Management

In most protected areas of the Amazon region, local residents rely on the natural resources (e.g., terrestrial and aquatic flora and fauna, land and water) found within the PA and its buffer zone for subsistence and/or commercial purposes. Some of these uses may be traditional and go back many generations, while others may have been developed in more recent decades as a means of generating income as part of a monetized economy. Different factors, including population increase (natural or migration), the emergence of new markets for natural resources and/or the loss or lack of knowledge about how to harvest resources in a sustainable manner can lead to overexploitation of the natural resources found within a protected area. This situation can create a conflict between the stated protected area objectives and the actual use by stakeholders on the ground.

What uses are allowed depends on the protected area category,[32] but in the context of the protected areas included in AHI, either extraction for subsistence purposes or harvesting for both subsistence and commercial purposes are allowed. Therefore, sustainable management of natural resources important to local livelihoods is an important component of protected area consolidation, as originally defined in Chapter 1.

[32] See http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories/

Even though the broad guidelines defining access to and the use of natural resources are established in the management plan for the protected area (see Chapter 3), the parameters and management practices to be used when harvesting a given species need to be developed specifically for each. This chapter will present the experience of developing and implementing these resource-specific management plans, with a focus on timber and non-timber forest products (TPs and NTFPs).

Recognizing that there might be multiple interpretations for the term "sustainable natural resource management," in this report we will refer to sustainable management as the application of a set of harvesting practices—when, where, how and how much to harvest —based on the best knowledge available with the aim of ensuring that the local population of the harvested species will continue to be available in the target location (e.g., within the protected area) for future generations. This assumes a dynamic management of the natural resource, as conditions are likely to change over time. Please note that given the focus on timber and non-timber forest products, sustainable natural resource management (SNRM) will be used interchangeably with sustainable forest management (SFM) in this chapter.

4.1 What is the logic behind the intervention?

While the specific natural resource and the conditions for its extraction might differ across protected areas, the underlying approach of this strategy is the same (see Figure 4.1). The strategy is based on the assumption that in order to achieve a change in the way site residents use natural resources, forest[33] users first need to understand the need to make the change (awareness) and then must be provided with the knowledge and tools (training) to do it and with the support (technical assistance) to implement the new practices.

If forest users participate in a capacity-building process, the assumption is that this will in turn generate interest in devoting time to the development of the SFM plan and in adopting its practices once approved. The strategy assumes next that if the participatory SFM plans are implemented effectively, the benefits to be derived from sustainable management will exceed those of conventional (unsustainable) management of the same resource and that these benefits will function as incentives for a greater commitment to sustainable use of forest resources. In this context, commitment is understood both as continued adoption of the SFM practices and as reduced pressure on other forest resources. In this sense, this strategy was conceived to be synergistic with others (on-the-ground enforcement and participatory management) so that the hands-on experience of improving the management of a key resource for the local economy would encourage greater acceptance and interest in the overall management of the protected area's resources (broader PA consolidation).

[33] The management plan includes the identification of ongoing practices that could be causing the activity to be unsustainable as well as modifications to make the resource use more sustainable (best practices). For example, to harvest copaiba oil (one of the resources discussed in this chapter), people currently make perforations in the tree trunk and return year after year to see whether they can harvest more oil. Best practices include not having more than three perforations per tree, closing the perforations after the harvest and not harvesting oil from the same tree for three years after the initial harvest.

In sum, the strategy is based on three basic assumptions:

i) **If forest users participate in capacity-building processes** (broadly stated to include awareness raising, training and follow-up technical assistance for SFM), **they will be more likely to participate in the design of the SFM plan and its subsequent implementation**.

ii) **Participating local users perceive the benefits** (monetary and non-monetary) resulting from the adoption **of SFM practices to be *greater*** than those to be gained using conventional extraction practices.

iii) **The benefits derived from SFM are *sufficient* to generate a commitment to SFM**, expressed as both a continued adoption of the SFM practices and as a reduction of other unsustainable uses of the forest. (While different uses could be considered, we focused on conversion of forests to other land uses, particularly agriculture and livestock grazing.)

Based on the above assumptions and within the context of the AHI, the implementation of sustained natural resource management actions was expected to achieve three key results:

i) Users participate in capacity building, SFM design and SFM implementation.

ii) Users acknowledge the higher benefits of SFM vs. conventional forest management.

iii) Users commit to sustainable forest use.

The results and its corresponding indicators are summarized in Table 4.1.

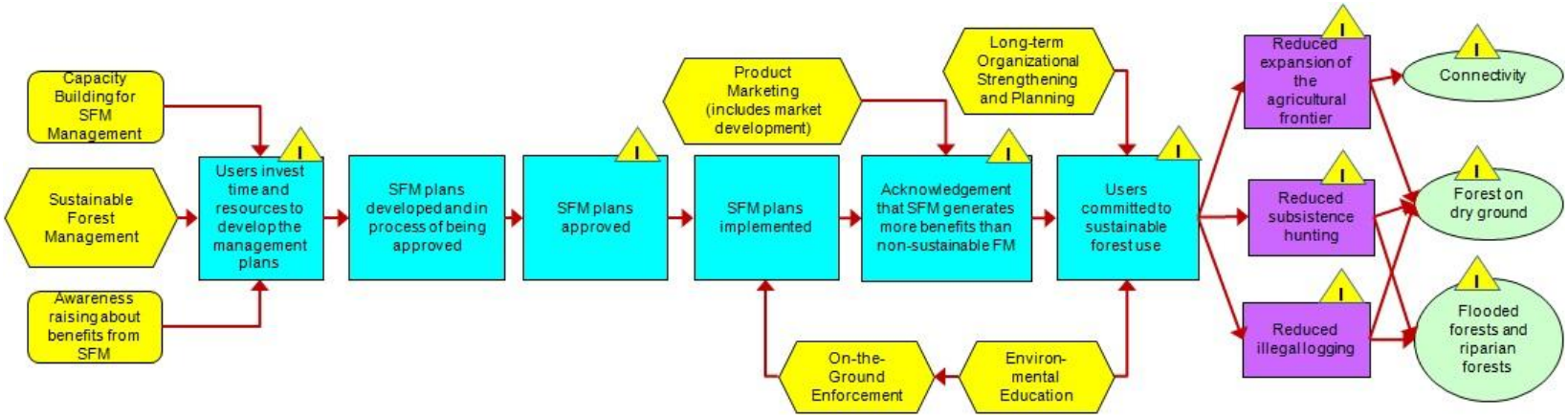
Table 4.1. Key results and indicators

Key results	Indicators
Users participate in capacity building, SFM design and SFM implementation	Percentage of users participating in capacity building, SFM design and SFM implementation in relation to the total number of users approached
Users acknowledge that SFM generates more benefits than non-sustainable management	Percentage of users who recognize that SFM generates benefits
Users commit to sustainable forest use	Percentage of users who continue implementing SFM practices and percentage of income invested in other non-sustainable activities. (e.g., livestock)

The results and lessons learned from participatory management are derived from data from six sites: “Manuripi,” the Manuripi Amazonian National Wildlife Reserve (MNWR), and “Itenez,” the Departmental Park and Natural Area of Integrated Management Itenez (DP NAIM Itenez) in Bolivia; “Chico Mendes ER,” the Chico Mendes Extractive Reserve (CMER); “Chico Mendes BZ,” with a focus on three agricultural settlement projects located in the buffer zone (BZ) of the PA; “Cazumba,” the Cazumba-Iracema Extractive Reserve (CIER); and “Macaua,” the Macaua and San Francisco National Forests, which are adjacent to each other and managed as one unit in

Brazil. Please note that the strategy was not implemented for forest products in the Alto Purus National Park (APNP), where only subsistence use is allowed and occurs to a limited extent, or in the Purus Communal Reserve (PCR), which allows for a broader set of uses but where the beneficiary indigenous communities have chosen not to use its resources.

Figure 4.1. Proposed theory of change for the natural resource management strategy



4.2 How was the strategy implemented at each site?

While the basic rationale behind the strategy was similar across sites, the focal species and its role in the local economy, the spatial scope of the intervention (ha) and the number of user families involved varied across sites. The section below introduces the specific context for the SFM strategy in each of the protected areas included in this analysis with the aim of providing a clearer frame of reference for the sections to come, particularly regarding the scale of the intervention. This is important given that the strategy assumes that the intervention will contribute to overall PA consolidation through improvements in both the management of a specific species and how forests are treated more generally. The magnitude of the impact that the strategy could have in a given context is then directly related to the number of people engaged and the percentage of area under improved management as a result of the intervention.[34]

As shown in Table 4.2, the strategy was implemented to improve the management of two non-timber forest products, Brazil nuts (*Bertholletia excelsa*)[35] and copaiba oil (*Copaifera* spp.),[36] in five sites and close to 40 timber species[37] in one site. The proposed scale of intervention varied widely, from 0.3 percent to 100 percent of the population and from 0.2 percent to 58 percent of the protected area targeted by the intervention.

[34] Because this strategy aims to support not only improved resource management but also overall consolidation, we are looking at what percentage of the PA was targeted by this strategy. Having said this, it is important to keep in mind that in most protected areas only a fraction of the PA allows natural resource management and only a portion of the PA contains the species, so even in the most ambitious scenario, most PAs would never achieve 100 percent of the PA area being supported by this strategy. Most often the same can be said for the target beneficiaries. Not all residents of a PA are current users of a given resource or would ever want to be, although there are exceptions, as in the case of Manuripi.

[35] The Southwestern Amazon is the world's primary region for Brazil nut production. While in some places consumption is primarily local, commercial extraction is significant, with an estimated 20,000 tons of nuts harvested annually (Collinson et al, 2000 http://www.nri.org/projects/nret/brazilnuts.pdf). Since 1996, Bolivia has become the top exporter of Brazil nuts in the world, with 83 percent of the global market as of 2008, followed by Peru (13 percent) and Brazil (4 percent), according to the Bolivian Enterprise for Brazil Nuts (V. Garcia, pers. com. 2012). The state of Pando, where Manuripi is located, has the bulk of Brazil nut trees in Bolivia (12.7 out of 17 million; UNDP, Human Development Report for Bolivia 2007-2008, http://idh.pnud.bo/index.php?option=com_hello&view=vista&categoria=1&Itemid=58), and Manuripi alone produces 15 to 20 percent of the raw material for export in the country (V. Garcia, pers. com. 2012). Harvesting is a seasonal activity—from December to March—and depending on the economic importance of the activity at a given location can attract a significant number of seasonal migrants. Its importance is not only economic but also ecological, as harvesting occurs in natural stands rather than in plantations because Brazil nut trees are dependent on interactions with pollinators, seed dispersers and abiotic conditions provided by natural forests for production. Overexploitation can result from collecting fallen nuts without leaving a minimum for regeneration, humans disturbing seed disperser behavior (not allowing agoutis to feed on and disperse fallen nuts) and hunting the dispersers themselves. Other environmental impacts are related to the degradation of Brazil nut groves as a result of the traffic for the collection of nuts and garbage.

[36] Copaiba oil is produced by several species of the *Copaiba* genus. Its oil is has numerous medicinal properties, including being anti-inflammatory, antiseptic, antibacterial and analgesic. It is used to treat internal and external inflammations, skin disorders, infections, etc. While forest dwellers used to collect the oil primarily for personal consumption, increased knowledge about the properties of the oil has increased commercial demand for the product. Copaiba oil is harvested by drilling the tree, though the technique utilized and the frequency of extraction both have a direct impact on the sustainability of the activity.

[37] The timber species targeted by SFM efforts include: *Planchonella pachycarpa Pires; Pouteria guianensis Aubl; Aspidosperma vargasii; Dripetes variabilis Angelca; Piptadenia sp.; Cavanillesia sp.; Protium apiculatum Swart; Aniba canelilla (H.B.K.) Mez; Licania canescens R. Ben; Cedrela odorata; Torresea acreana Ducke; Dipteryx polyphylla; Dipteryx odorata Willd.; Onychopetalum lucidum R. E.; Acacia Pollyphylla A. DC.; Enterolobium schomburgkii Benth.; Parkia multijuga Benth.; Clarisia racemosa R. et P.; Mezilaurus itauba (Meissn); Heisteria ovata; Zanthoxylum sp.; Ormosia sp.; Hymenaea oblongifolia Hub; Ocotea miriantha; Ocotea sp.; Calycophyllum acreanum; Aspidosperma macrocarpon; Jacaranda copaia (Aubl.) D. Don; Manilkara surinamensis (Miq.); Tabebuia serratifolia (G. Don); Laetia procera (Poepp. & Endl.) Eichl.; Poeppigia procera Presl; Taberna montana; Dialium guianensis (Aubl.) Sandw. ; Minquartia quianensis Aubl.; Ceiba pentandra Gaerth.; Ceiba samauma;* and *Diplotropis purpurea (Rich.) Amsh.*

Table 4.2. Spatial scope, target beneficiaries and focal species of SFM intervention per site

Site	A. Site area (ha)	B. Site population (# families)	C. Target forest product	D. Target area in relation to site area (ha and % of D/A)	E. Target population in relation to site population (# families and % of E/B)
Itenez	1,389,025	432	Brazil nut	2,994 (0.2%)	45 (10.4%)
Manuripi	747,000	374	Brazil nut	430,000 (58%)	374 (100%)
Cazumba	750,795	320	Copaiba oil	21,000 (2.8%)	70 (21.9%)
Macaua	195,075	23	Copaiba oil	6,315 (3.2%)	23 (100%)
Chico Mendes Extractive Reserve (ER)	970,570	1,900	Brazil nut	141,750 (14.6%)	250 (13.2%)
Chico Mendes Buffer Z one (BZ)	771,000	85,000	Timber (38 species)	75,084 (9.7%) (PAEs[38] Sao Luis do Remanso, Equador and Chico Mendes)	240 (0.3%)

Likewise, as explained below, the role of the species in the local economy varied across sites. At one end of the spectrum we have copaiba oil in Cazumba and Macaua harvested by a few families for either consumptive purposes or for small-scale sale but with the potential of being harvested at a larger scale for commercial purposes. At the other end we have Brazil nuts in Manuripi, of primary economic importance to the local economy and with well-established markets.

With regard to the rationale for the selection of target beneficiaries and location, it was based either on the number of current (or potential) users of the resource and/or whether there were

[38] PAE: Extractive Settlement Program.

sections of the protected area or its buffer zone under significant pressure from resource extraction and/or conversion to other land uses.

In ***Itenez***, families rely upon agriculture, fishing and harvesting of forest resources for their livelihoods. While harvesting of timber and non-timber forest products is mainly used to fulfill local consumption needs, harvesting of Brazil nuts is done for commercial purposes when there is a buyer interested in purchasing nuts. It is not the primary contributor to family income in this PA, although according to key informants it plays an important economic role given that the end of harvesting coincides with the start of the new school year, a time of increased financial need for local families.[39] The SFM strategy in Itenez focused on a sector of the protected area considered to be vulnerable because of increased incidence of infractors crossing the border from Brazil and because the communities living in that section of the PA opposed the concept of a protected area altogether. Because 45 of the 78 families living in those communities relied on Brazil nut harvesting and had never received technical support for the activity, it was seen as an opportunity to engage them in improving the management of a valuable natural resource and through this experience to involve them in the broader management of the PA.

In ***Manuripi,*** families[40] rely primarily on agriculture and natural resource extraction to fulfill their subsistence needs. Unlike in Itenez, Brazil nut harvesting is the primary income-generating activity in the PA, generating approximately 70 percent[41] of the annual income of families living in the northern portion of the Bolivian Amazon. The activity involves not only resident families but also more than 1,200 seasonal migrants who flock to the PA during the harvesting period from January to March (V. Garcia, pers.com. 2012). The scope of the intervention for this strategy was all the users, both *barraqueros* and peasant communities. During the implementation of the strategy there were other institutions with initiatives targeting the same goal; therefore, our intervention focused on managing the Brazil nut in specific areas to complement those other efforts.

In ***Cazumba***, farming is the primary economic activity among resident families for subsistence and income-generating purposes, supplemented by harvesting of natural resources, particularly natural rubber (*Hevea brasiliensis*), copaiba oil and Brazil nuts. Prior to implementing the strategy, copaiba oil was harvested by only eight families in the PA, primarily for personal consumption or as a means of supplementing their income; they had no technical support. The purpose of the SFM strategy here was to introduce more families to the sustainable extraction of copaiba oil as a means of increasing and diversifying their income and in so doing bolstering the concept of a forest-based economy as opposed to one based on agriculture and livestock-raising as primary economic activities.

The same logic was applied in ***Macaua***, where only a subset of resident families were harvesting copaiba oil prior to the intervention, and for subsistence and income families relied primarily on agriculture and secondarily on the extraction of forest products.

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39 In Iténez, Brazil nuts are marketed by intermediaries who provide basic household products, medicines, school supplies, etc., in exchange for Brazil nuts. The prices for the Brazil nuts and the products are set by the intermediary, which tends to be to the disadvantage of the harvester.

40 Brazil nut collection takes place in peasant communities (10 within the PA with 306 families) and barracas (a term introduced in Chapter 3; 34 with 68 families).

41 UNDP, Human Development Report for Bolivia 2007-2008, http://idh.pnud.bo/index.php?option=com_hello&view=vista&categoria=1&Itemid=58.

Even though the concept of extractive reserves emerged out of the clash of two economic models—one based on forest conversion for cattle raising and another based on sustainable extraction of forest products—the economic system of families living in the ***Chico Mendes Extractive Reserve*** has melded the two, with agriculture and cattle grazing playing an increasingly important role and the harvesting of forest products varying in intensity, depending on the location within the protected area. Agriculture and cattle ranching dominate closer to urban areas, while forest-based activities play a more important role in more remote locations. The purpose of the SFM strategy in Chico Mendes was to increase the profitability and sustainability of Brazil nut harvesting in order to compete with livestock expansion within the PA.

In the extractive settlement projects (PAEs) of Chico Mendes, Equator and San Luis de Remanso located in the ***Chico Mendes Buffer Zone***, prior to the implementation of the SFM strategy families relied primarily on agriculture and small-scale livestock raising for subsistence and income, with supplemental harvesting of non-timber forest products (e.g., Brazil nuts, copaiba and/or natural rubber) and timber (e.g., construction material for homes and fences) primarily for household consumption and/or small-scale sales.

The purpose of the SFM strategy in the PAEs was to increase and diversify the income in the families of the buffer zone through sustainable timber harvesting and in so doing to complement NTFP extraction and compete with the advance of conversion for raising livestock. The reason for the selection of these three PAEs is that deforestation in the buffer zone of the Chico Mendes ER is most advanced in the south, where these PAEs are located. In addition, SFM plans had been already developed for two of the PAEs (though implementation required support), while the third PAE did not have one yet.

As stated previously, the rationale and approach varied across sites, but the underlying logic of the strategy is the same (Section 4.1). With this in mind, we can now analyze under which conditions these strategic assumptions were validated during implementation.

4.3 Is it true that if users engage in SFM capacity-building processes, they will be more likely to participate in the design of SFM plans and their subsequent implementation?

Yes, there was a positive correlation between the degree of engagement in awareness raising and training on SFM practices and subsequent participation in both the design and implementation of SFM plans.

4.3.1 Design

Forest user engagement during capacity building and SFM plan design was characterized qualitatively as low, medium or high based on the number of forest users who participated relative to the targeted population,[42] with low representing less than 10 percent of the targeted population, medium representing between 10 percent and 50 percent of the targeted population, and high representing more than 50 percent of the targeted population.

Information provided by WWF technical teams suggests that with the exception of the ***Chico Mendes ER and BZ***, forest user involvement in capacity-building processes was medium to high

[42] The targeted population represents the total number of users of the specific resource under consideration (thereby referred to as forest users) within the target area in which the project decided to focus its intervention. As mentioned in the previous section, in some sites the project focused on just one or a few communities, whereas in others the project reached out to most of the communities in the area.

(Table 4.3)*. In areas where users participated in the awareness and training actions, users were also involved in developing the management plans. In areas where there was limited awareness and training on SFM practices* (particularly Chico Mendes ER and BF), *relatively few users were significantly involved in the development of the management plans* (Table 4.3).

Table 4.3. Level of participation of forest resource users in capacity building and development of management plans in target areas

	Itenez	Manuripi	Cazumba	Macaua	Chico Mendes ER	Chico Mendes BZ (PAEs)[43]
Awareness raising	High	High	Medium	High	Low	N/A [44]
Training	High	High	High	High	Low	Medium
Design of management plans	High	High	High	Medium	Low	Medium[45]

Interviews of the technical teams in ***Itenez***, ***Manuripi*** and ***Cazumba*** suggest that *capacity-building processes were instrumental in generating a commitment to the development of SFM plans*. Creating that initial space allowed users to learn about the potential (biological and economic) of the resource, understand the impacts of conventional practices and the benefits of more sustainable ones, share their questions and concerns in the process, and learn the technical basis for the practices being recommended. *It also provided a space to contextualize this strategy (SFM) in the context of the management of the PA as a whole, thereby creating a synergy with the other strategies* (Chapters 2 and 3). An early investment in capacity building helped maintain the level of participation (Itenez and Manuripi) or increase it (Cazumba) during the early stages and contributed to a significant participation in the design of SFM plans.

4.3.2 Implementation

The level of participation of forest users during implementation of the SFM plans was characterized as the percentage of forest users relative to the target population in the intervention sites who adopted SFM.

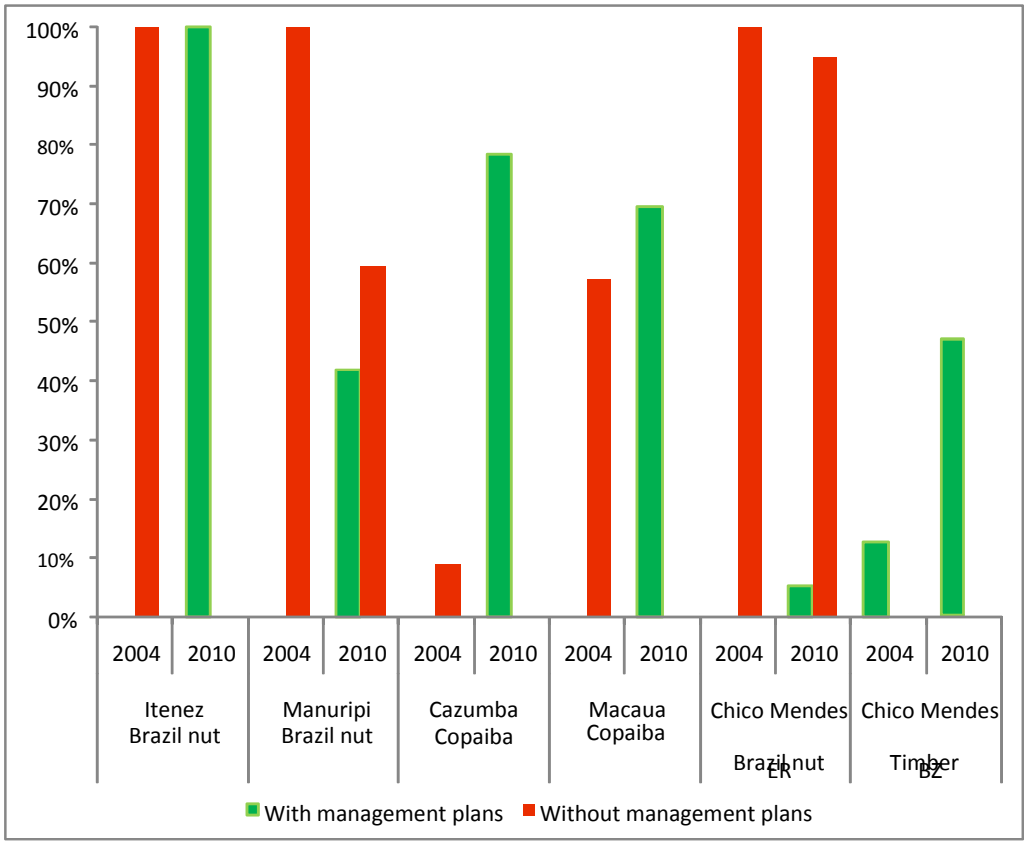
Figure 4.2 shows that *in the four sites where participation in capacity building and design was significant, so was the level of implementation of SFM plans*, with a range of 5 percent to 100 percent of the target users adopting improved practices. However*, in the two areas where participation in capacity building and design was lower, there was a correlation with relatively lower levels of adoption later on*, despite the efforts to promote it.

[43] Sao Luis do Remanso, Equador and Chico Mendes.

[44] There were other initiatives promoting natural resource management that included awareness raising related to social development objectives, but the intervention itself did not involve a deliberate awareness raising process.

[45] Estimated from the participation of three PAEs: Chico Mendes (high), Remanso (low) and Equador (medium).

Figure 4.2. Percentage of users with and without management plans in intervention sites before AHI (2004) and after (2010)



4.4 *Is it true that users who adopt best-management practices perceive the benefits of SFM to be greater than those to be gained through conventional extraction practices?*

Based on this sample, we found that the answer often was *yes, but not always*. Based on interviews of key informants, participating forest users identified a wide range of monetary and non-monetary benefits that they found to be *greater* when resources were harvested using SFM practices than when resources were harvested using conventional methods. However, the number of monetary and non-monetary benefits perceived by users varied across sites, with the sites where users described the greatest array of benefits being correlated with higher levels of adoption of SFM practices and vice versa. Moreover, preliminary data suggests that while there may be an increased *gross* revenue, the *net* revenue might not always be positive, highlighting the importance of assessing the costs as much as the benefits of adopting SFM practices, how those compare relatively when the resource is being harvested in a conventional way, and how they stack up against the costs and benefits of alternative economic activities that might be more predominant.

As shown in Table 4.4, benefits described by participating forest users were classified in two main categories: monetary and non-monetary.

Table 4.4. Perception of benefits derived from adoption of SFM practices relative to benefits obtained through conventional extraction practices by participating forest users at target sites

Site	Itenez	Manuripi	Cazumba	Macaua	Chico Mendes ER	Chico Mendes BZ (PAEs)[46]
Resource	Brazil nuts	Brazil nuts	Copaiba oil	Copaiba oil	Brazil nuts	Timber
Capacity building	High	High	High	High	Low	Medium
Design of management plans	High	High	High	Medium	Low	Medium
Level of adoption of SFM practices	100%	41%	74.3%	69%	5%	47%
Monetary benefits	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Higher gross revenue	Yes	Yes	Yes (Table)	Yes (Table)	Yes (Table)	Yes (Table)
Increased productivity/yield	Yes	Yes	No	No	Yes	No
Better price due to better product quality	Yes	Yes	Yes	Yes	Yes	Yes
Better price because product harvested under SFM plan or certification seal	Yes (certif.)	Yes (certif.)	Yes (SFM)	Yes (SFM)	N/A	Yes (certif.)
Better price due to improved bargaining power	Yes	No	Yes	Yes	No	No
External support to cover cost of certification	Yes	Yes	No	No	No	Yes
Non-Monetary Benefits	**High**	**High**	**Medium**	**Medium**	**Low**	**Medium**
Technical assistance during implementation	Yes	Yes	Yes	Yes	Yes	Yes
Physical capital (equipment; collection and storage facilities)	Yes	Yes	Yes	Yes	Yes 33% (government)/ No 66%	Yes
Planning instruments (georeferencing	Yes	Yes	Yes	Yes	No	Yes

[46] Sao Luis do Remanso, Equador and Chico Mendes.

Site	Itenez	Manuripi	Cazumba	Macaua	Chico Mendes ER	Chico Mendes BZ (PAEs)[46]
of resources, collection routes, etc.)						
Clarification of tenure rights	Yes	Yes	No	No	No	Yes
Organizational (joint certification, access to bank loans, bargaining power, new buyers)	Yes	Yes	No	No	No	No
Social (breaking bondage with intermediary "habilitador")	Yes	Yes	No	No	No	No

4.4.1 Monetary Benefits

Forest users in all six sites said that gross revenue was higher when using SFM practices than when using conventional harvesting methods. How much larger gross revenue was varied across sites, but in the case of copaiba oil in ***Cazumba*** and ***Macaua*** and Brazil nuts in ***Chico Mendes ER***, gross revenue could be almost double under SFM plans vs. conventional extraction practices (Tables 4.5 and 4.6). In the case of the ***Chico Mendes BZ,*** where commercial logging was not common before the intervention (therefore making it not feasible to compare revenues of conventional vs. SFM logging), the gross revenue was significant and assumed to increase the average income of a family by 20 percent (M. Araujo Silva, pers. com. 2012) (Table 4.7).

Table 4.5. Comparison of copaiba oil production and gross revenue under SFM vs. conventional extraction practices in Cazumba and Macaua in 2009

Site	Copaiba oil production	Amount (KG)	Gross revenue using SFM practices (R$)	Gross revenue using conventional practices (R$)
Cazumba	Minimum production per producer	3.68	43.72	23.92
	Maximum production per producer	45.02	534.84	292.63
	Total production in the PA	400.00	4752.00	2600.00

Macaua	Minimum production per producer	2.90	34.45	18.80
	Maximum production per producer	79.60	945.65	517.40
	Total production in the PA	600.00	7128.00	3900.00

Table 4.6. Comparison of gross revenue per kilogram of Brazil nuts harvested under SFM vs. conventional extraction practices in Chico Mendes ER in 2009

Brazil nut harvest	Under SFM practices	Under conventional practices
Price/kg	R$0.9	R$0.5
Productivity (proportion of marketable nut per kg harvested)	0.4	0.33
Gross revenue per kg of nut harvested	R$0.36	R$0.165

Table 4.7. Average gross revenue per forest user from timber sales using FSC-certified practices in Chico Mendes Buffer Zone

Chico Mendes BZ	Years from which data derived	Gross revenue per forest user using SFM practices
Sao Luis do Remanso PAE	2004, 2009	R$13,800-13,900
Equador PAE	2004, 2007, 2009	R$10,000 – R$17,533
Chico Mendes PAE	2004, 2007	R$10,000

There was a range of factors that resulted in this increase in gross revenue. Likewise, participants in all six sites cited *improvements in product quality* as an important driver of improvements in the unit price of the NTFP. For example, in the case of Brazil nuts, improvements in the efficiency of collection efforts (e.g., planning routes and constructing infrastructure to dry nuts while in the field) and subsequent storage of nuts (e.g., in facilities held by a cooperative) increased the quality of those nuts, resulting in a better price. Similarly, the application of better practices to

collect and store copaiba oil improved the quality of the oil significantly, again resulting in a better price. In the case of Brazil nuts, the improvements described above also resulted in an increase in *productivity* (percentage of marketable nuts), which further increased the price per kilogram of nuts harvested.

In the case of some products, either being able to *show that the product is being harvested using sustainable management practices and is coming from a protected area* (copaiba oil in ***Cazumba*** and ***Macaua***) or going one step further and *obtaining organic and/or fair trade certification* (Brazil nuts in ***Manuripi*** and ***Itenez***) or FSC certification (***Chico Mendes BZ***) were other factors that contributed to increasing the unit price as well. AHI itself directly contributed to this monetary benefit by covering the costs of the development of SFM plans in all cases and the costs of obtaining certification in the case of Brazil nuts and timber. Some forest users also mentioned that the *ability to negotiate better prices* with buyers by virtue of belonging to a cooperative that adopted SFM practices was another reason unit prices improved.

While gross revenue may be higher for SFM-harvested products than for those harvested using conventional methods, feedback from participating forest users suggests that greater attention needs to be focused on net revenue rather than on gross revenue alone. Net revenue should compare not only the income to be obtained from the sale of the product using SFM vs. conventional practices but also the costs (time, equipment, physical capital, etc.) incurred in harvesting, processing and marketing using SFM vs. conventional practices. While we have uneven data across sites and across resources for net revenue, feedback from some users points to the *importance of considering costs as part of this analysis and of doing so in the context of each site, as perceptions regarding costs and benefits can vary significantly across sites, and thus what may act as a limiting factor or barrier in one place might not be the same in another*.

Costs of infrastructure—In the case of Brazil nuts in the Chico Mendes Extractive Reserve, support for improved forest management was to be provided by a group of stakeholders that included not only WWF but also the state and local governments and research institutions. One important commitment made by the government to participating forest users was that they would donate the infrastructure to be built in order to store and dry nuts in the field. Local authorities fulfilled their pledge in one community but did not do so in the other two. As a result, practices were adopted by some forest users in the community that received that infrastructure, but forest users did not implement the SFM plan in the communities that did not receive the infrastructure as promised. In Bolivia, where the government does not provide that type of support, it was the forest users themselves who built the infrastructure. In Brazil, lack of support to cover the construction of infrastructure was perceived to be a cost high enough to tip the equation from net gain to net loss in the eyes of forest users, whereas in Bolivia this was not the case, the costs being in fact assumed by the forest users themselves.

Costs of collective organizing—In the case of copaiba oil, some forest users expressed concern about the costs of participating in a cooperative to sell SFM-harvested oil. In order for the cooperative to negotiate better bulk prices and ensure oil quality, it needs a basic infrastructure to function, and this comes at a cost to participating producers. While some see the benefits of such participation, others put greater emphasis on the cost and the resulting lower net profit accruing to them. A better understanding of those perceptions could contribute to a better understanding of the perceived net gain of implementing SFM practices.

Reliability of benefits vs. costs—An additional factor that was mentioned as tipping the scale toward a net loss for some harvesters of copaiba oil was the fact that production of copaiba oil fluctuates significantly from one year to the next. For reasons that are yet to be understood, trees can produce a significant number of nuts one year and few to none the next. Users have not found a way to predict these fluctuations, and because of this they still incur the same production costs (time spent in the forest tapping trees for oil). While this lack of reliability may be worse in trees that have been overtapped than in those that have not, the fact that SFM practices dictate that a tree should be allowed to rest for three years once tapped means that copaiba oil harvesters may need to walk even farther in a poor year, increasing overall costs of harvesting when production is low. This uncertainty was found to have a strong effect on the perception that forest users have of the net benefit of this activity.

4.4.2 Non-Monetary Benefits

When asked about benefits of harvesting forest products using SFM practices, *participating forest users expressed that there were non-monetary benefits that were of significant importance to them. The range of non-monetary benefits varied across sites*, with some mentioned across locations more often than others.

In general, *technical support during implementation* was cited as a valuable benefit across the six sites. In some of these areas where there is little support for producers using conventional practices, technical assistance is seen as a plus of SFM practices that improved the sustainability and quality of harvesting processes and increased efficiency in the processes being utilized.

In addition, *physical capital (in the form of equipment and infrastructure)* was cited by forest users in five of the six sites. Interestingly enough, in the Brazilian sites this was provided in the form of donations (e.g., equipment for copaiba oil extraction, infrastructure to dry and store Brazil nuts or roads to pull the timber out), while in the Bolivian sites the infrastructure was built collectively by the participants themselves in peasant communities.[47] However, in those cases participants mentioned as a valuable benefit the fact that they ended up with infrastructure or equipment that they would not have had individually had they not joined the intervention.

Another benefit mentioned by participants in five sites was the *planning instruments* that they gained as a result of adopting SFM practices. These included, for example, the georeferencing of trees so that copaiba oil producers could map out the location of their resource and track which one they have tapped when, as well as the design and mapping of collection routes to minimize collection effort. These contributed to the efficiency of their harvesting efforts and indirectly to the increase in yields mentioned above.

In the Bolivian sites where Brazil nuts are harvested and in the Chico Mendes BZ, additional non-monetary benefits brought up by participants included the *clarification of their resource rights* by mapping and/or specifying the boundaries of their concessions, with the direct impact of reducing conflicts with other users of the same resource.

In the Bolivian sites, participants also mentioned specifically the benefits of *operating as part of an association or cooperative*, including the ability to apply for joint certification, access to bank loans, increased bargaining power and access to new buyers (though access to financial capital

[47] In the barracas, infrastructure was built individually by each barraquero.

by many associations often remains a constraint and trust in the power of associations is a work in progress). Last, and partly related to the previous benefit, an additional advantage of adopting SFM practices as part of a cooperative effort is that it enabled forest users to sell to the association, which acted as an intermediary. Given that intermediary buyers often set the price they pay for the forest product and of the basic goods that they will sell to forest users in return, the relationship is often economically disadvantageous to forest producers, who often live in debt to intermediaries. Being able to sell for a better price and being paid in cash were valuable benefits cited by participants in the two Bolivian sites where Brazil nuts were being harvested.

4.4.3 Overall perception of benefits

When looking at the perception of the overall benefits provided by SFM practices across sites, we found a *correlation between the number of benefits valued by participating forest users and the level of engagement during capacity building, design and implementation* (see Table 4.4). In places including ***Itenez, Manuripi, Cazumba*** and ***Macaua***, the array of benefits was significant and so was the level of participation, whereas in the case of the ***Chico Mendes ER*** and ***BZ,*** where the *number* of benefits and the *net* benefit were perceived to be lower, so was the engagement of forest users.

We know that capacity building and SMF plan design created the space to discuss the benefits of SFM practices, thereby creating greater recognition and focus on those benefits later and even a tailoring of the strategy to support the manifestation of those benefits. However, it is unclear whether some perceptions, such as that production costs are too high relative to the benefits, emerged as barriers during implementation or whether they acted as early deterrents for participation, contributing to a lower engagement to begin with.

In addition, as shown in the case of ***Chico Mendes ER*** relative to ***Manuripi*** and ***Itenez*** (all Brazil nut-producing case studies), *gross monetary benefits alone are not necessarily enough of a benefit to promote high levels of engagement; in fact, the presence of non-monetary benefits of value to forest users might be as important or more important to sustain engagement*.

One last point to consider is that the *overall perception of costs vs. benefits may be influenced not only by a comparison between conventional and SFM practices for harvesting the resource but also by the relative economic importance of the forest resource under consideration*. In the case of the Chico Mendes ER and BZ, where cattle ranching and agriculture are the dominant economic activities, SFM of Brazil nuts and timber is not competing just with unsustainable extraction of those resources. It is competing with cattle ranching and agriculture as well. In this context, the ultimate perception of costs and benefits needs to be compared against those same variables for cattle ranching and agriculture, because time spent in the forest means less time potentially allocated to livestock raising or agriculture. In places like Manuripi where Brazil nut extraction is the dominant source of income (even if the activity is seasonal), that comparison may not be as prescient.

These findings suggest the *importance of incorporating the following components as critical for the strategy's design: assessing the perception of benefits and costs; the relative importance of monetary vs. non-monetary benefits (ranking); how these variables compare between SFM and conventional extraction; and in places where forest use is competing with other dominant forms of land use, comparison of costs and benefits between SFM and the dominant economic activity as well.*

4.5 Is it true that the increased benefits obtained from sustainable management are sufficient to generate a commitment to SFM?

While it is still quite early to assess the impact of SFM on the long-term attitude of participating residents toward forests, early indications suggest that *in sites where benefits were perceived to be significant, participating users were more likely to demonstrate commitment to the activity than in places where the benefits were not as sizeable in the eyes of the users.*

For the purposes of this analysis, a commitment to SFM was assessed based on whether there was (i) evidence of continued investment in the activity (expressed as a continued adoption of the SFM practices, additional commitments beyond the implementation of the SFM plan and/or reinvestment of the benefits obtained from SFM into the activity) and (ii) a reduction of other unsustainable uses of the forest. While different uses could be considered, we focused on conversion of forests to other land uses, particularly agriculture and livestock grazing.

Preliminary information provided by key informants (participating forest users themselves and technical teams) indicates that by the end of 2010 participating forest users remained engaged in the adoption of SFM practices in target sites.

In addition, all the participating forest users in ***Itenez*** and 65 percent of the users in ***Manuripi*** had moved beyond the implementation of SFM plans and applied for organic certification, in the case of Itenez, and organic plus fair trade certification, in the case of Manuripi. This suggests a longer-term commitment to the application of SFM practices.

Likewise, in ***Cazumba*** and ***Macaua*** forest users reported reinvesting some of the resources into the activity after meeting family needs, again showing an interest in pursuing the activity further down the line. Unfortunately, as of 2010 we lacked information on reinvestment from other sites.

With regard to their commitment to forest management as reflected by whether participants converted more or less after adopting SFM practices, as of 2010 we have information from two sites: Itenez and the Chico Mendes BZ. In ***Itenez***, deforestation had not increased in areas involved in the implementation of SFM practices.[48] In one of the PAEs (Sao Luis do Remanso) of the ***Chico Mendes Buffer Zone***, field observations suggest that there was an increase in clearings for new grazing areas but that it occurred primarily among families who are *not* involved in SFM management (M. Araujo Silva, pers. com. 2012). While these early indications are promising, we cannot assume that forest users will automatically extend their behavior regarding the management of one species to the stewardship of the broader forests. *This points to the need for an explicit approach to intervention during the process of capacity building and beyond—one that provides not only tools to approach the management of the target species more sustainably but also to manage the forest more broadly in the context of a basket of economic activities that support local residents' livelihoods*.

[48] Based on hotspot analysis (see Chapter 5).

4.6 What can we say about protected area consolidation in relation to SFM?

The definition of consolidation used by AHI:

AHI understands a consolidated protected area to mean one that (a) has clear legal status, (b) has operational and management capacity as well as financial resources that are appropriate to the protected area's characteristics and context, (c) enjoys the support of its key constituencies and (d) achieves its conservation objectives with the resources at its disposal.

Based on that definition, the results presented above suggest that whether this strategy creates a key constituency for the PA and supports the PA's objectives is influenced by the degree to which users are engaged in capacity building, design and subsequent adoption of SFM practices; the array of benefits and net revenue to be accrued through the activity; as well as the degree to which the activity is explicitly placed within the broader context of a long-term stewardship of the forest (i.e., management beyond the individual species).

Moreover, the strategy's impact on the conservation of the protected area as a whole (broad PA consolidation) is directly related to the *original scope* of the intervention (the human and spatial scales that the strategy aimed to achieve) as well as its *ultimate success in achieving that scope* (i.e., the actual number of users involved and the area under SFM in relation to the protected area), the latter being related to the factors mentioned above.

Table 4.8 summarizes the results in relation to the human and spatial scope of the strategy in each of the sites, which portray a broad array of situations.

Table 4.8. Spatial and human scope of SFM strategy in focal sites

Sites	Target area in relation to site (original scope)		Results achieved in relation to target area		Result achieved in relation to site (actual scope)	
	% families	% area	% families	% area	% families	% area
Itenez	10.4	0.22	100	100	10.4	0.2
Manuripi	100	58	41	65	41	37.5
Cazumba	21.9	2.8	74.3	74.3	16.3	2.0
Macaua	100	3.5	69	71	69	2.5
Chico Mendes ER	14	14.6	5	3.4	0.7	0.5
Chico Mendes BZ	0.3	9.7	47	25	0.1	2.4

In the case of sustainable management of Brazil nuts in ***Manuripi***, the management of the resource reached a significant portion of the population (41 percent) and the protected area (37.5 percent). If sustained over time, implemented based on the lessons summarized above and deliberately used in conjunction with the other strategies (e.g., using the experience of SFM as a means of engaging the population in participatory management of the PA, Chapter 3), this strategy has the potential to change the attitude and behavior of a significant part of the resident population and directly improve the management of a significant part of the protected area, both key contributors to overall PA consolidation.

In the case of sustainable harvesting of copaiba oil in ***Macaua*** and ***Cazumba***, while the actual area under management was small (2.5 percent and 2.0 percent, respectively), the strategy reached 69 percent and 16.3 percent of the population of the two PAs. While it must be noted that the resident population of Macaua is smaller than that of Cazumba, in either case their voices are still essential in the long-term management of the protected area, so working with a significant portion of the population to develop effective SFM has the potential to percolate to the overall management of the PA, especially if implemented in conjunction with the other strategies.

In the case of Brazil nut management in ***Itenez***, we have a situation in which the strategy reached a relatively small percentage of the population in the PA (10.4 percent) and a tiny section of the PA (0.2 percent). However, as explained earlier in the chapter, this portion of the PA is critical from an enforcement perspective, and before the intervention this segment of the resident population was opposed to the concept of having a PA at all. While the human and spatial scopes were limited, the fact that the strategy was implemented successfully resulted not just in 0.22 percent of the PA having improved management for one species, but it also resulted in that part of the protected area being effectively incorporated into the PA's management, with that population then engaging proactively in participatory management (Chapter 3) and supporting enforcement efforts (Chapter 2). It was the hands-on experience of on-the-ground management of a resource, the regular interaction of park and NGO staff providing technical support, and the perception that these stakeholders helped them access benefits that were hitherto inaccessible that changed their overall perception of what SFM and living in a PA mean. In sum, while the scope of the SFM intervention was limited, because it was implemented in a strategic area it had a positive contribution toward overall consolidation of the PA.

Last, in the case of Brazil nut and timber management in the ***Chico Mendes ER*** and ***BZ***, we had situations in which we reached a small percentage of the population (0.7 and 0.1, respectively) and a small percentage of the sites (0.6 and 2.4, respectively). While it must be kept in mind that these areas are heavily populated relative to other sites where the strategy was implemented, the actual scope of the intervention (human and spatial) was small. While the experience may have had a positive impact on the management of the resource in the target area and helped engage the participating users in a positive experience of SFM, the scale of the intervention meant that it did not contribute to the consolidation of the protected area as a whole.

In light of these results, what can be said is that *defining the expected scope and approach of this strategy from the start is essential to whether this strategy becomes a pilot example of good stewardship of a resource or a broader contribution to improving the overall management of the protected area*. *For the SFM strategy to have a significant impact on the consolidation of the protected area, it should focus on a forest resource that helps achieve one of the following results: reaching a significant portion of the resident population, placing a significant portion of the PA's area under improved management, doing the previous two in conjunction, and/or resolving*

conflict in a strategic location or population of the PA. While these findings may seem obvious, it is common for conservation projects to promote sustainable management of resources that does not meet these criteria, and therefore the contribution of this strategy to the consolidation of the areas they are intended to protect ends up being very low.

4.7 What have we learned from the implementation of sustainable management strategies?

Based on the results above, the following key lessons have emerged with regard to the strategy of natural resource management.

<u>Lesson 1</u>: To ensure forest user engagement in SFM plan design and subsequent implementation, it is important to invest in awareness raising, training and follow-up technical support.

Capacity-building processes are instrumental in generating interest in the development of SFM plans and commitment to their implementation. Investment in capacity building allows users to learn about the potential (biological and economic) of the resource, understand the negative impacts of conventional practices and the benefits of more sustainable ones, share their questions and concerns in the process, and learn the technical basis for the practices being recommended, all of which contribute to generating interest in the development of SFM plans and commitment to their implementation. In addition, capacity building can also provide a space to place this strategy in the context of the management of the PA as a whole, thereby setting the stage for discussing the broader stewardship of forest resources within the PA and creating synergies between this strategy and others (e.g., participatory management and on-the-ground enforcement).

<u>Lesson 2:</u> While the benefits of SFM can exceed those of extraction using conventional practices, it is essential to assess the context-specific costs and benefits under both forms of extraction to design an effective strategy.

Given that the degree to which the strategy can generate benefits for forest users influences their engagement in the process and their commitment to sustaining SFM practices in the long run, the key to this strategy is understanding what benefits are more valuable to forest users from the outset. The analysis should consider both monetary and non-monetary benefits and the users' ranking of these aspects, as monetary benefits alone may not be enough of a driver or the ultimate driver for adoption of SFM practices. The assessment should also consider the costs of adopting SFM practices, given that the ultimate perception of net return may decide whether or not forest users take on SFM practices. Costs and benefits should be compared not only against each other in the context of SFM but also relative to conventional forms of extraction, and if the strategy is seeking to compete with alternative economic activities, it should be compared to that activity as well. It is important to ground these analyses in the specific context where the intervention will be implemented, given that costs and benefits can be perceived differently across locations; in some cases a variable becomes a barrier to participation, while in others it becomes a reason for joining the effort and adopting SFM practices.

Lesson 3: SFM strategies seeking to compete with conventional forms of extraction of a forest resource may have a better chance of succeeding than those seeking to replace an alternative form of land use with SFM.

In places where the dominant economic activity in the region requires converting the forest to other land uses (e.g., cattle grazing), SFM is less likely to succeed than in places where the dominant economic activity is based on forest extraction, unless the net benefits of adopting SFM practices are so attractive that people are willing to change the way in which they earn their livelihood. This is as much a cultural issue as an economic one, and it underscores the need to understand costs and benefits as well as cultural barriers and conditions enabling implementation of the strategy. Even if the SFM strategy were found to be viable in a context where it seeks to compete with an alternative economic activity, it is important to keep in mind that participating residents may choose to reinvest part of the income earned through SFM in the dominant economic activity. This requires discussing the goal of the strategy explicitly with participants (i.e., replace rather than complement economic activities) so that it is clear that one of the expected results is to reduce forest conversion as a result of the dominant activity. In addition, this requires broadening the intervention to address how forests will be managed beyond the extraction of a single species to support the design of effective ways to accommodate various economic activities while maintaining good stewardship of the forest.

Lesson 4: For SFM to have an impact on the consolidation of the protected area as a whole, it must have a significant human or spatial reach or be targeted at a highly strategic sector of the PA.

For the SFM strategy to have a significant impact in the consolidation of the protected area, it should focus on a forest resource that helps achieve one of the following results: reaching a significant portion of the resident population, placing a significant portion of the PA's area under improved management, doing the previous two in conjunction, and/or resolving conflict in a strategic location or population of the PA. Otherwise, the contribution of this strategy will be circumscribed to being a pilot example of good SFM in a small part of the PA.

Lesson 5: The assumptions of this strategy need to be checked periodically through monitoring.

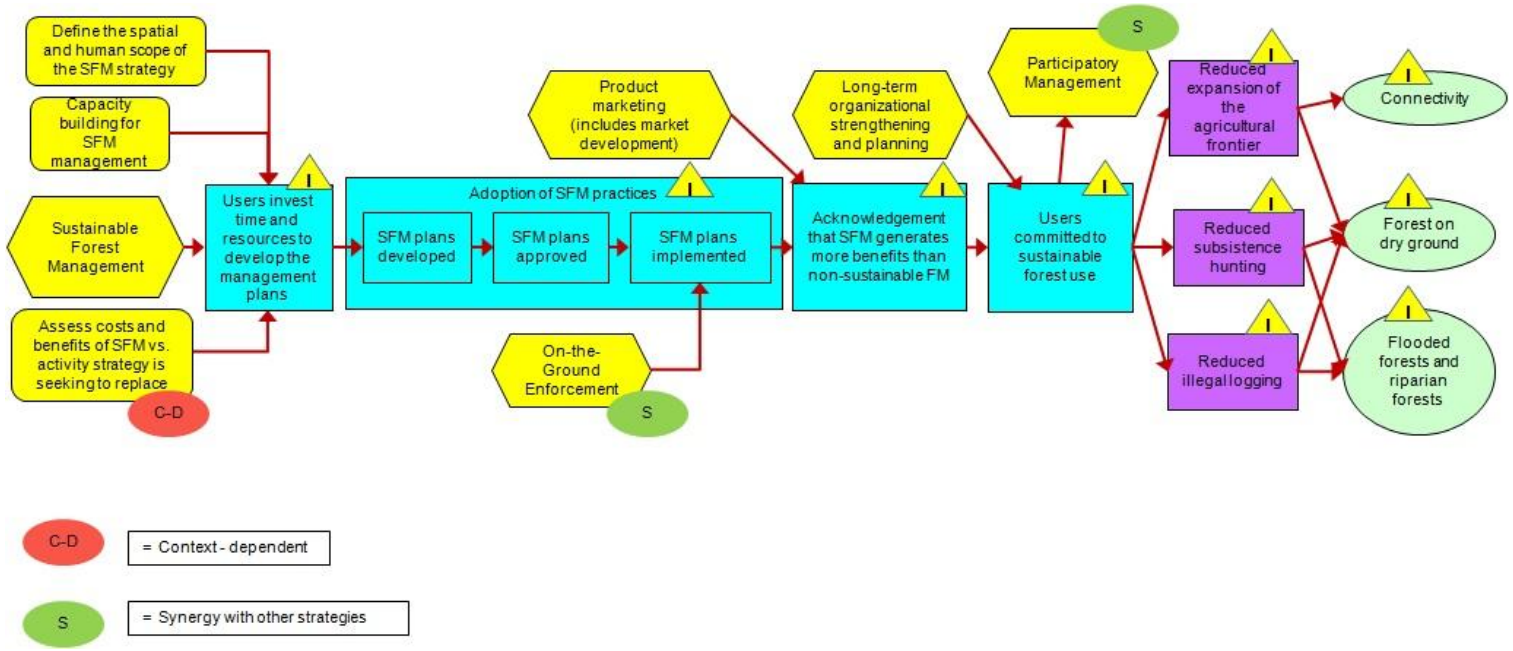
It is important to monitor the strategy, in particular to determine whether the costs and benefits are sufficient to maintain interest in the adoption of SFM practices, whether the interest in SFM translates into behavioral changes when it comes to continued adoption of SFM practices and not converting forests to other land uses, and whether the actual scope of the intervention is contributing to the overall consolidation of the PA.

4.8 How can the logic of the intervention be adjusted?

Based on our experience, the overall logic of this strategy should be adapted and reflected in the theory of change (see Figure 4.3) as follows:

1. Add an activity to the left of the result chain to indicate the need to **"define the spatial and human scope of the SFM strategy."** See the added box and "red dot" disclaimer about its context-specificity.
2. Add an activity box to the left of the result chain to indicate the need to **"assess costs and benefits of SFM vs. the activity strategy it is seeking to replace"** (conventional form of harvesting forest product or alternative economic activity). See the added box.
3. **Show the synergy with the participatory management strategy** in relation to encouraging the commitment to SFM. See the additional box next to that intermediate result and "green dot" disclaimer.
4. **Monitoring of key variables (see lessons above) must be implemented and inform SFM efforts on a regular basis**. See the location of indicator triangles under participatory design of SFM plans, adoption of SFM practices, acknowledgement that SFM generates more benefits than competing activity and commitment to sustainable forest stewardship.

Figure 4.3. Revised Theory of Change for Natural Resource Management



Threats within the target protected areas are measured by assessing the changes in forest cover in satellite images, where deforestation and degradation is evident. Due to the large scale of the protected areas, hotspots were identified in order to conduct the analysis using a higher resolution.

5 Correlation between Deforestation and Degradation and Strategy Implementation

AHI's main assumption was that the implementation of the strategies analyzed in the previous chapter—on-the-ground enforcement, participatory management[49] and natural resource management—would result in an abatement or prevention of the main threats to the protected areas supported by the initiative, thereby helping them fulfill their conservation function and achieve consolidation.[50] When the threats to each PA (ranked for each site based on their respective area, intensity and urgency) were compared across PAs, two of the top threats shared among sites were the advance of the agricultural and cattle ranching frontier and of illegal logging.

[49] Participatory management strategy is defined in this report as the establishment and implementation of PA regulations and a functional space for informed and inclusive management (Management Committee); see Chapter 3.

[50] See definition of PA consolidation provided in previous chapters.

The purpose of this chapter is to assess how these priority threats have changed in the focal protected areas over the course of implementation of AHI and to assess the correlation between those changes and implementation of the three strategies analyzed in this report. It is important to note that this chapter does not intend to attribute causality to AHI, given that there are other factors beyond the initiative's control that may have also contributed to accelerating or slowing forest conversion and that their relative contributions cannot be teased apart. Having said this, the intent of this chapter is to assess, based on the threat trend data, whether there is at the very least a correlation between the results achieved by the various strategies (strategy status) and the trend of these major threats (stable or subsiding vs. increasing) in order to address the overarching question of *under which conditions these strategies contribute to protected area consolidation*.

5.1 Methodology for assessing deforestation and degradation

Changes in the status of these threats in the target protected areas were measured by assessing satellite images to gauge the changes (partial or complete) in forest cover (deforestation and degradation). Because these areas are large and the threats tend to focus on specific portions of the PAs (resulting in forest conversion at significantly smaller scales on an annual basis), we focused the analysis on specific areas in each PA that were more vulnerable to deforestation and degradation in order to conduct the analysis at a better resolution. These areas, referred to as "hotspots," were identified by the technical teams based on their knowledge of field conditions. Table 5.1 below summarizes hotspot information for each protected area, and Figure 5.1 provides a map for one of the PAs (Itenez) as a visual example of the location of the hotspots.

Table 5.1. Size and number of hotspots and hotspot area relative to total protected area size across focal protected areas

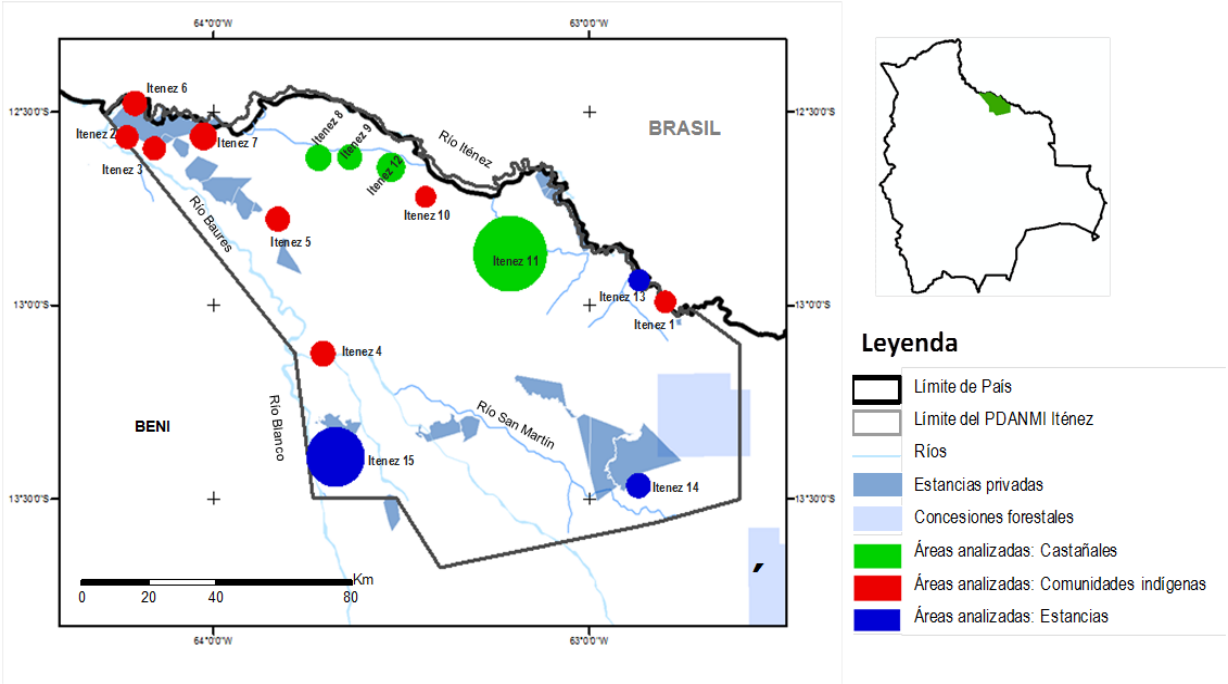
Site	Size (ha)	Number of hotspots	Total hotspot area (ha)	Hotspot area relative to size of PA (%)
Purus[51]	4,024,228	19	214,482	5.3
Itenez	1,389,025	15	109,930	7.9
Manuripi	747,000	4	68,214	9.1
Cazumba	750,795	4	76,544	10.2
Macaua	195,075	2	195,075	100.0
Chico Mendes	970,570	14	164,949	17.0
Total	8,076,693	58	829,194	

For each protected area, change to hotspot forest cover was analyzed interannually from 2003 until 2010 with ClasLite and Envi software based on satellite images from the Lansat TM5 sensor. Special attention was paid to characterizing the forest type correctly, given that certain plant

[51] Purus includes the Alto Purus National Park (2,510,694 ha), the Purus Communal Reserve (202,033 ha) and two Territorial Reserves for Uncontacted Indigenous People (Murunahua, 481,560 ha, and Madre de Dios, 829,941 ha) that are adjacent to the national park, given that these areas were managed as one conservation block for the purposes of strategy implementation.

formations can be confused with “false” degradation (e.g., bamboo forests or grasslands) or false deforestation (flooded or riparian forests). Likewise, the analysis paid close attention to topography, given that a slanted terrain can be mischaracterized by the software as a different plan formation.

Figure 5.1. Hotspots selected for Itenez



5.2 Trends in deforestation and degradation across PAs

As shown in Figures 5.2 and 5.3, *four of the six sites—Purus, Macaua, Itenez and Cazumba—had either marginal or no changes in the forest cover of their vulnerable hotspots during the time frame of analysis*. It is important to note that not only were the changes minimal from year to year, but also if we keep in mind that these hotspots were (a) selected for being the most vulnerable in the protected areas to begin with, (b) that they represent only a portion of the PAs in most cases (see Table 5.1) and (c) that most of these areas have people living in them who make use of the forests for their livelihoods, the changes were indeed small in those areas. For example, in Purus we analyzed more than 200,000 ha that were supposed to represent the most vulnerable spots within the PA and found that only 400+ ha were deforested or degraded in 2010, representing only 0.2 percent of the hotspots and 0.01 percent of the total PA. In addition, more than 300 ha of the hotspots were already either deforested or degraded at the beginning of the project back in 2003, thus suggesting that the change in deforestation and degradation is indeed marginal (Figures 5.2 and 5.3).

The two sites where we saw a more noticeable change to the forest cover of their vulnerable hotspots were Chico Mendes and Manuripi—deforestation in the case of Chico Mendes and degradation in the case of Manuripi. Chico Mendes was the site showing the highest amount of annual deforestation in its vulnerable hotspots and the protected area showing the sharpest

increase in its deforestation numbers, from 1,948 ha deforested in 2003 to 3,697 ha deforested in 2009 (Figure 5.2). Degradation was not as large in Chico Mendes, though it did show an initial decrease from 1,658 ha in 2003 to 1,048 ha in 2007, only to increase yet again to 1,400 ha in 2009 (Figure 5.3). On the other hand, Manuripi shows the highest annual degradation numbers within its hotspots across protected areas for all years except for 2003 (when Chico Mendes was slightly higher) and a growing trend from 1,414 ha degraded in 2003 to 2,055 ha degraded in 2010 (Figure 5.3). Deforestation in the Manuripi hotspots rose slightly from 1,168 ha in 2003 to 1,534 ha in 2009 to decline again to 1,234 ha in 2010 (Figure 5.2).

Figure 5.2. Total area (ha) deforested in selected hotspots across focal sites from 2003 to 2010

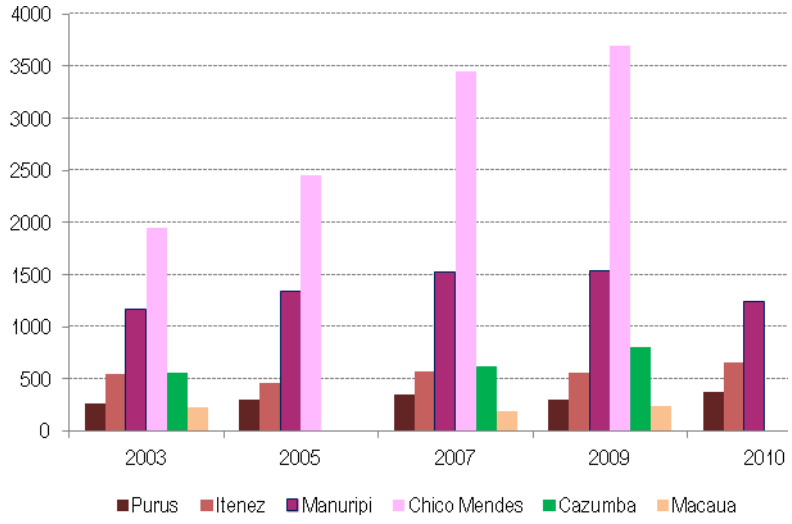
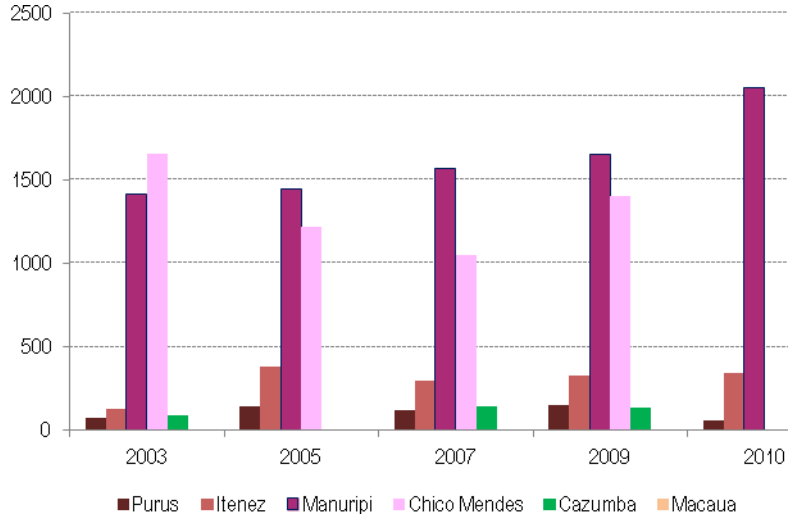


Figure 5.3. Total area (ha) degraded in selected hotspots across focal sites from 2003 to 2010



5.3 Relationship between deforestation and degradation and strategy implementation

When comparing deforestation and degradation trends, the status of strategy implementation and some key context variables across the sample of PAs included in this analysis (Table 5.2), some preliminary trends emerge.

Table 5.2. Context, strategy implementation status and threat trend in focal protected areas (synthesis table based on data from previous chapters and deforestation/degradation trends presented above)

	Focal Protected Areas					
	Purus	**Macaua**	**Itenez**	**Cazumba**	**Manuripi**	**Chico Mendes**
PA context						
Accessibility	Low	Low	Medium	Medium	High	High
Population	Low	Low	Medium	Medium	High	Highest
Strategy status						
Enforcement's effectiveness relative to infractions[52]	High	Medium	High	Medium	Low	Low
Participatory management functionality[53]	Incipient	Medium	High	High	Low	Low
Natural resource management's reach[54]	N/A	Broad	Small but strategic	Medium	Broad	Small
Threat trend						
Deforestation	Marginal change	Marginal change	Marginal change	Marginal change	Marginal change	Rising
Degradation	Marginal change	Marginal change	Marginal change	Marginal change	Rising	Marginal change

[52] Based on data from Chapter 2, enforcement effectiveness was characterized as low, medium or high based on the trend of infractions relative to patrol and operational capacity where quantitative data were available or based on key informant data included in that chapter, equating the adjective in the table with the phases described in Chapter 2: phase I = patrols and capacity not enough equated with low; phase II = patrols and capacity concordant with infraction pressure equated to medium, and phase III = patrols and capacity dissuade infractors equated to high.

[53] The status of the participatory management strategy was summarized here for the purpose of this analysis in terms of the level of functionality of the PAs' Management Committee (MC) as described in Chapter 3, with the MC just getting started (incipient) or having a low, medium or high level of functionality based on the functionality components described in Chapter 3.

[54] The status of the natural resource management strategy was summarized here for the purpose of this analysis in terms of either the spatial or human scope of the intervention during implementation, with a small, medium or high reach representing the percentage of either the area or the population of the PA encompassed by the intervention. Small but strategic reflects the situation in which, while the reach is small, the location/population was explicitly selected because of a disproportionate pressure on the PA (see Chapter 4).

In areas with low population and low accessibility (Purus and Macaua), the focus of the intervention was to establish a management presence where there was none, maintaining the conservation status of the areas as best as possible and preparing the terrain for changes that are likely to come into the future as the context changes and accessibility/population increase. The relative weight of strategies to achieve this depended on the characteristics of the individual PA, with emphasis in ***Purus*** on on-the-ground enforcement and in ***Macaua*** on participatory management and natural resource management, but the *result in both cases was increased awareness and support for the PA, and as of 2010 threats remained stable and low in both areas* (Table 5.2).

Purus' priority was to establish enough on-the-ground enforcement to abate illegal logging, and as of 2010 there were indications that the enforcement capacity was strong enough to play a dissuasive role, as shown by the declining trend in infractions relative to the level of operational capacity and the number of patrols (see Chapter 2; Table 5.2). Because the area is so isolated and the number of PA staff small relative to the size of the area, the key to the long-term success of these efforts was garnering social support for the PAs' management. This was promoted particularly through the engagement of local residents in enforcement efforts (see Chapter 2) and more recently through the establishment of a management committee and a participatory updating process of management plans for the park and the communal reserve, both of which had been generated as desk exercises by government-hired consultants back in 2005 (Chapter 3). Participatory management efforts, however, were in their initial stages in 2010 (Table 5.2). While Purus remains remote relative to other PAs in this sample, recurrent pressures to build a road to access the main town northeast of the park, a growing population northeast of the park, and deforestation encroachment outside of the PAs in Madre de Dios and Ucayali suggest that the context may change eventually, so these early efforts to establish a management presence and participatory governance of the PAs may prove key for the PAs' integrity in the long run.

Because the abutting national forests of Macaua and Sao Francisco (referred to in this report as ***Macaua***) are in the short list to be concessioned out to private logging companies, the priority in Macaua was to set up an effective management model that could manage the activity once it is approved and could involve the local resident population in the process. This was promoted through the establishment of a management committee and the development of a management plan for Macaua with strong engagement of local residents. The results were a plan tailored to the reality of Macaua that reflected some of the key priorities and concerns of local families and a management committee that, while still working toward functionality, strived to involve local residents as key overseers of how the area will be managed once a concession is approved (Chapter 3; Table 5.2). Likewise, a natural resource management strategy was implemented to support residents' continued reliance on forests for their income through the adoption of sustainable forest management (SFM) practices, with a broad outreach to all families residing in the PA (Chapter 4; Table 5.2). Enforcement efforts were largely dependent on the resources provided by the government for that strategy, the approach being to share limited staff and resources among nearby protected areas (Chapter 2; Table 5.2). Having said this, the project supported efforts to use those enforcement resources as best as possible, and as of now threats to the area have remained stable. It remains to be seen whether that level of management capacity will be enough once the context changes and a concession is approved for the PA.

In areas with higher accessibility and population (Itenez, Cazumba, Manuripi and Chico Mendes), we found that *in those areas that were able to set up relatively effective enforcement efforts and systems of participatory management* (***Itenez, Cazumba***), *deforestation and degradation did not increase as much as in those that did not* (***Manuripi, Chico Mendes***), *and this occurred regardless of the reach and effectiveness of natural resource management efforts.* In other words, *enforcement and participatory management were found to be foundational strategies for effective on-the-ground management of PAs with a resident population and multiple access points*, *with some site evidence that these strategies reinforced each other and functioned synergistically*. This does not mean that natural resource management was not important and valuable in PAs with users dependent upon its natural resources for their livelihoods but rather that *the relevance, scope and approach of the natural resource management strategy may be context-dependent, contributing to overall PA consolidation only in some cases* (Table 5.2 and Chapter 4).

In ***Itenez***, an area with significant opposition at the beginning of the intervention, the priorities were to implement on-the-ground enforcement efforts and a participatory management approach that increased understanding about the PA's objectives and built local support for the PA. Significant efforts were made to increase enforcement capacity and to engage local stakeholders and other institutions in the design and implementation of enforcement efforts. The result was that as of 2010, enforcement capacity was able to deploy patrols that were effective enough to play a dissuasive role with infractors, as shown by the decline in the number of infractions (Chapter 2; Table 5.2). Likewise, Itenez invested heavily in the establishment, training and implementation of a management committee that as of the end of 2010 had stability, broad representation, informed members and enough financial resources to perform its function with regularity (Chapter 3; Table 5.2). Unlike other sites, because of initial opposition to the idea of a PA management plan (MP), Itenez established PA rules for different components rather than an overall MP, with the result being that as of 2010 there were clearer regulations for activities within the PA *and* demand for a comprehensive management plan by local stakeholders (Chapter 3). Sustainable forest management efforts were small but targeted at a section of the PA and a segment of its population that were strongly opposed to the PA, with the result being that these communities not only adopted SFM practices but also eventually joined the Management Committee and supported on-the-ground enforcement efforts to conserve the PA (Chapter 4; Table 5.2). Evidence suggests that the strategies functioned synergistically, participatory management and natural resource management bolstered support for on-the-ground management efforts, and on-the-ground management efforts in turn bolstered the role of the Management Committee as overseer of the PA and built the case for the need for comprehensive regulations for the PA management plan. Despite significant economic activity in and around the PA, these results were correlated with stable deforestation and degradation numbers during the period of analysis.

In ***Cazumba***, the priority was to promote a strong participatory management strategy, enforcement efforts being primarily dependent upon the resources that the government had available (as mentioned under Macaua, staff and resources are shared across PAs). As with Itenez, significant energy was poured into supporting the establishment, training and implementation of a management committee, which as of 2010 was functional, with broad representation, stability, trained members and resources (Chapter 3; Table 5.2). The PA management plan was built following an approach based on strong involvement of local stakeholders and a close interaction with the fledgling Management Committee at the time, which emerged stronger from the process as a result (Chapter 3). Natural resource management efforts

aimed to complement this by supporting adoption of SFM practices, which reached out to a sizeable portion of the resident population (Chapter 4; Table 5.2). While enforcement resources were limited for Cazumba, a strong investment in participatory management resulted in high knowledge of and compliance with the rules of the PA (Chapter 2), again showing synergies between enforcement and participatory management. While these results were positive, there were initial signs that enforcement efforts may not be enough in the long run given the changes beginning to occur around the PA, with the paving of a road that increased the area's accessibility and early indications of increased incidence of infractions by outsiders (Chapter 2; Table 5.2). This highlighted the importance of an adaptive approach to enforcement, one that assessed operational capacity and number of patrols relative to infractions, as described in Chapter 2.

In ***Manuripi***, while efforts have been made to bolster enforcement capacity, evidence suggested that as of 2010 the level of operational capacity and number of patrols was not yet high enough to curb infractions, as shown by the fact that as the number of patrols increased, so did the number of infractions (Chapter 2; Table 5.2). The participatory management approach was constrained by conflicts among key stakeholders, which in turn affected the representation, stability, capacity and overall functionality of the Management Committee (Chapter 3; Table 5.2). As of 2010, there were signs of improvement, including incipient synergies between the enforcement and participatory management strategies with the engagement of the Management Committee in enforcement actions during the Brazil nut harvesting period as well as some early forward movement in discussing the zoning of different land uses to update the management plan (Chapter 3). The natural resource management strategy achieved a broad scope both in terms of population and area covered and was aimed at the primary forest resource generating income in this area, Brazil nuts (Chapter 4; Table 5.2). While adoption of SFM practices and interest in continuing that adoption are encouraging, degradation data suggests that for the natural resource management strategy to be effective in Manuripi in the long term, self-regulation alone is unlikely to ensure sustainable use. The natural resource management strategy does need the complement of enforcement and participatory management strategies to contribute to the consolidation of the protected area. This will only become more important and prescient as pressure on the PA's resources grows. With the paving of the Inter-Oceanic Highway in Peru and the Corredor Norte in Bolivia, pressure to access the resources is likely only to increase. Given this evolution in the context, bolstering the enforcement and participatory management strategies while tying them closely with natural resource management efforts will be essential to ensure the integrity of Manuripi in the long run.

Out of the sample of PAs included in this analysis, ***Chico Mendes*** is the most complex area, with the highest number of families living within the PA (and many more around it) and high accessibility in certain portions of the PA, particularly the east and the south. In light of this, evidence suggests that as of 2010 the staff and resources available for enforcement were not sufficient to curb infractions (Chapter 2; Table 5.2). While significant effort was made to revive and strengthen the Management Committee, the stakeholder complexity in Chico Mendes (the many families living in the PA, the presence of several associations meant to represent them with limited capacity to do so, the many governmental and nongovernmental institutions working in the PA) slowed down efforts to improve the functionality of the Management Committee. Important progress had been made by 2010 with conversations about key uses being allowed in the PA beginning to take place, but it was clear that more remained to be done to ensure sufficient stability, genuine representation, capacity and resources for the Chico Mendes Management Committee to function effectively (Chapter 3; Table 5.2). While the PA had a management plan,

its original design did not involve a broad suite of stakeholders, the result being a lack of knowledge about and support for its regulations by local stakeholders. This was acknowledged by 2010, but the process of updating the management plan had not begun yet (Chapter 3). In light of this context, it is not surprising to see that a small-scale effort to improve sustainable forest management, while valuable on a local scale, was not sufficient to make a sizeable difference in the consolidation of the PA (Chapter 4; Table 5.2) and that despite all these efforts, deforestation has continued to increase in the PA during the period of analysis.

Chico Mendes sheds light on the essential role that enforcement and participatory management play as consolidation strategies. They cannot be considered *alternatives* to natural resource management under the premise that effective natural resource management alone will lead to self-regulation by the resident population (i.e., seeing benefits from natural resource management, they will adopt sustainable practices and not commit any infractions). Rather, on-the-ground enforcement, participatory management and natural resource management need to be conceived as *strong complements* if areas like Chico Mendes, which aim to support sustainable natural resource management, are to do so effectively without compromising the long-term integrity of the protected area. Chico Mendes also highlights the importance of investing in these strategies in a time frame that is long and on a scale that is large enough to accommodate its complexity. It is not enough to support the meetings of a management committee; that alone will not lead to effective long-term governance of the protected area (the goal of participatory management). Improving the governance of this PA means becoming involved in the workings of the Management Committee itself in order to improve its functionality. This includes, for example, understanding how local associations represent their members and working to improve their relationship with their base and their role in the committee. These improvements do not happen overnight, but if they are not made, real improvements to the governance of the protected area will not materialize in the long run.

5.4 Implications for protected area consolidation

While this report is based on a limited sample of protected areas and many results are still preliminary, the wealth of experience generated sheds a light on some of the basic strategies used to support the consolidation of protected areas and how they work under different conditions. While the previous chapters delve deeper into the lessons for each strategy and these are essential for these strategies to deliver their proposed objectives effectively (please see Chapters 2, 3 and 4), some key overarching lessons emerge from the analysis of the status of these strategies in the focal PAs and their correlation with deforestation, degradation and key contextual variables.

1. *In areas with low population and low accessibility, the focus needs to be on setting the stage for long-term effective governance of the PA*. *Both on-the-ground enforcement and participatory management* (understood as the establishment of PA regulations and a functional space for informed and inclusive management) *were found to be important in those contexts, but how these are implemented and their relative priority is context-specific.*
2. *In areas with high population and accessibility, on-the-ground enforcement and participatory management were found to be critical strategies to support protected area consolidation.* It is important to note that previous chapters generated *important lessons* about what it takes for these strategies to be truly effective (see Chapters 2 and 3).

Neither strategy is a quick win, but if conceived clearly, implemented with enough resources, given enough time to reap lasting results and managed to work synergistically, they can make important contributions to the overall consolidation of protected areas. It is important to note, though, that the more accessible a protected area is and the higher its population, the more resources and time are likely to be required to implement these strategies effectively in order to achieve consolidation in light of the complexity of the protected area's context.

3. *The role of the natural resource management strategy in areas with high accessibility and population was found to be context-dependent and that the strategy contributed to overall PA consolidation only when certain conditions were met regarding spatial and human scopes.* Even in areas where the main purpose is to support sustainable resource management by its resident population, the strategies of on-the-ground enforcement and participatory management were found to be essential in order for protected areas to fulfill their objectives. In those cases, *natural resource management has an important role to play, but we found that it needed to be conceived as complementary rather than alternative to those strategies.* In other words, if natural resource management is not implemented with strong complementary measures related to participatory management (as defined in this document) and on-the-ground enforcement, it may not help abate key threats to the PA. In addition, while the approach to be taken by the natural resource management strategy may need to be context-specific, *it is important to think up front about the spatial and human scopes of the intervention if natural resource management is to support the consolidation of the protected area as a whole. Otherwise, the impact of the strategy will remain small*, being at best a pilot example of good resource stewardship.

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