CAPACITY FOR TIMBER MANAGEMENT AMONG PRIVATE SMALL-MEDIUM FOREST ENTERPRISES IN MADRE DE DIOS, PERU

By

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To my parents, sister, brother, and nephew, who were always with me, even at the distance, giving me their love and support to reach my goals in life

To the memory of my lovely grandparents, Luisa and Pedro, who will be always with me

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Madre de Dios is one of the few mega-diverse zones in the world, which possesses some of the last intact commercial populations of mahogany (*Swietenia macrophylla*). This Department has been suffering from severe forest degradation in the past several years, due principally to illegal logging of mahogany. The "forest concession system," the heart of the first legal framework to promote sustainability in the use/management of Peruvian forests (the 2000 Forestry and Wildlife Law N° 27308), is being implemented in the department and private small-medium forest enterprises (SMFEs) have become the most important social actors engaged in forest management there. However, the management and conservation of Madre de Dios permanent production forests, while improving the livelihoods of local inhabitants (i.e., small-medium entrepreneurs) is not a simple task since it also involves the interests of several different actors. Drawing from the literature on capital and political ecology, this study explores the capacities of private SMFEs to carry out forest management for timber production and the influence that the main stakeholders of the forest sector have on that capacity.

Data from a census of 29 private SMFEs, and from a purposive sample of 29 representatives of forest organizations (representatives of NGOs, government, and grassroots

organizations), were collected from face-to-face interviews. Multivariate analysis of variance was used to determine whether the population means of the sets of dependable variables (types of capital) vary across levels of province, certification status in the Department, and certification plans in the Tahuamanu province. Qualitative data analysis was used for the purposive sample to evaluate the actions and roles of forest actors in the concession system and how they influence private SMFEs performance for forest management.

Results indicate that: (1) the forest concession system was not set up with adequate state resources for sufficient oversight to ensure legal forest management; (2) NGO support proved crucial, but constituted a patchwork with little coordination and many shifts in priorities and collaborations—due to limited capacity and problematic management of expectations; (3) private SMFEs, while needing assistance from NGOs, received very short-term assistance instead of sustained support over time; (4) private SMFEs vary greatly in their capacity by province and certification status (this especially occurs in terms of their produced and natural capital assets), and while most lack adequate capacity for sustainable forest management certification, those that attained certification received more support for it from NGOs. Important implications of this study include the need for policies that can strengthen the institutional framework to maintain more responsible forest practices in the future and can develop SMFEs' capacities for forest management with mechanisms that secure consistent assistance (technical, financial, access to information).

CHAPTER 1
INTRODUCTION: FOREST MANAGEMENT OF TROPICAL FORESTS

Small-Medium Forest Operators in Peru

The past three decades have witnessed a growing international concern for deforestation. Highlighted in particular during this period was the deforestation of tropical forests, and various international initiatives were subsequently undertaken to address this key issue. As such, several approaches were suggested to stop deforestation, illegal logging, and other forms of forest degradation. For example, some scholars have argued that protected areas are the most effective strategy for conserving biodiversity (Bowles et al. 1998, Bruner et al 2001). Others, however, argue that in places where human populations are already present, sustainable management of forests for environmental services (i.e., carbon sequestration[1]), and timber and non-timber forest products can protect biodiversity while at the same time generate income for local people (Bray 2004, Stern 2007). Thus, forest management by small and medium sized operations (which includes private and community-based enterprises) engaged in commercial timber production has emerged as an alternative to protected areas (e.g. national parks, habitat conservation areas) that ostensibly exclude people, by actually complementing networks of such areas and providing social and economic benefits to different forest users (Bray 2004). In this manner, deforestation is addressed by incorporating local actors into the productive use of forest resources; this assumes that subsequent benefits create an incentive to ensure the sustainability of the resource.

Small-medium forest enterprises (SMFEs) are defined as "forestry business operations with 10 to 100 full-time employees or a yearly turnover of US$10,000 to US$30 million" (Macqueen 2007), and generally include private and community-based enterprises. Private SMFEs hold private rights to the access of forest resources, while community-based enterprises

[1]It is estimated that more than 18% of global greenhouse gas emissions comes from deforestation (Stern 2007).

hold collective rights; also private enterprises are governed by rules that depend on the type of legal business partnership, while community-based enterprises' governance is generally influenced by local/communal rules and practices, customs or traditions. In any case, SMFEs represent a growing and important segment of the forestry sector and contribute significantly to employment and local economic growth. They constitute 80-90% of forest sector operations in many countries, and over 50% of all forest sector employment (Macqueen 2008). Although there is little evidence on poverty reduction by SMFEs, they offer better perspectives than larger forest enterprises because they tend to be embedded in local cultures, which can help in securing resource rights and access to local peoples, and accumulate wealth locally; they have also a greater commitment to operating in a specific area than do large-scale enterprises (Auren & Krassowska, Macqueen & Mayers 2006, Macqueen 2008). Despite their potential role in reconciling sustainable management with poverty alleviation goals is being increasingly recognized by governments and development agencies, SMFEs present certain characteristics that make it difficult for them to compete with larger enterprises in the marketplace. For example, in comparison to large enterprises, many SMFEs are informal in order to avoid administrative costs which affects the possibility of them receiving incentives and support that may be directed towards this sector. Moreover, SMFEs usually harvest on a small scale and use low levels of capital, relying more on labor than machinery. This may result in struggles to produce the volume, uniformity, or environmental sustainability of products necessary to secure markets (Macqueen 2004, 2005).

The informality of many SMFEs has created a gap in the availability of information in many countries with respect to their assets, economic performance, impacts, and how the environmental contexts in which they develop affect their management operations. This is a

hindrance to the better characterization of this important sector and its influence on the development and conservation of tropical forests. In Peru, for example, since 2002 private SMFEs have become the new actors in the management of the permanent production forests of the country following the implementation of the forest concession system (for commercial timber harvesting purposes) as a new legal framework for forest management. However, virtually no information is available on their performance and capacities. This dissertation begins to address this deficit of information about private SMFEs; it is the first such analysis of small-scale logging enterprises in the forest sector in Peru.

Peru is significant in this context because it currently has a large sector of private SMFEs which hold harvesting rights to all the permanent production forests already granted as forest concessions in the country. The new forest concession system is designed around small forest concession contracts intended for private SMFEs. In Peru, private SMFEs are defined as enterprises formed by sole proprietors or groups of individuals with gross capital of less than US$ 3,000,000; furthermore, they employ less than 200 permanent workers engaged in timber management through the holding of forest concessions.

In this study, the Department of Madre de Dios is highlighted in particular because it was the first Department in Peru where the forest concession system was implemented as the new model for forest management, and it is currently being considered as a model for the implementation of this system in the rest of the country. As private SMFEs now dominate the forestry sector in Madre de Dios, this Department serves as a useful case study for researching SMFEs. Moreover, the Department of Madre de Dios is one of the few mega-diverse zones in the world (Myers et al 2000); it is recognized as the biodiversity capital of Peru (INRENA 2004), and it is one of the last regions in the world with intact commercial populations of mahogany

(Grogan & Schulze 2008). However, this department has also been suffering from severe forest degradation in the past several years, due principally to the illegal logging of *Swietenia macrophylla* (mahogany*)*.

The 2000 Forestry and Wildlife Law N° 27308 is the first legal framework to promote sustainability in the use/management of Peruvian forests by granting long-term forest harvesting contracts (renewable for up to 40 years), through a system of forest concessions, to small and medium sized contractors. Since the implementation of this forest concession system several years ago, there have only been a few published studies that focus on the general factors constraining implementation of the forest concession system and the debates surrounding its potential as a conservation and development strategy (Galarza & Serna 2005, Arce 2006, Malleux 2008). Moreover, there have been no systematic attempts to understand changes occurring in private SMFEs with reference to the implications for development and forest conservation; nor has there been an attempt to understand the specific political, social, financial, and technical interests of the main social actors influencing the forest concession system. This research contributes to the understanding of such changes by providing an assessment of the capacities of private SMFEs that operate in the permanent production forests of Madre de Dios, and by analyzing the influence that the main stakeholders of the forest sector have on the capacity of those SMFEs.

Changes in private SMFEs are occurring in the context of alterations in forest harvesting concessions. Such concessions now exist in a legal framework that recognizes forest certification[2] as a very important tool and moreover provides incentives for the management

[2] Certification is the process by which an independent third-party assesses the quality of forest management based on a set of standards. The certifier gives written assurance that a product or process conforms to the requirements specified in the standard (Rametsteiner & Simaula 2003).

operations that attain certification. However, forest certification has proven to be difficult for many forest operations to obtain, which has prompted questions about who can realistically attain certification. Certification imposes daunting requirements not just in terms of the procedures and time involved, but also in terms of the viability of a firm to comply with certification requirements, which raises questions about firm capacity and the ability to achieve certification.

This dissertation addresses private SMFEs in the context of a new concession system in Peru that features forest certification[3] as a means of managing the timber sector. In this first chapter I initially discuss the Peruvian context of current forest management in the Amazon region. This is to introduce Peru, the country of focus for this study, and highlight its relevance as a country with one of the largest areas of natural tropical forests in the world currently being managed by private SMFEs –an increasingly important segment of the forestry sector for its potential to influence employment and local economic growth. I then present the research questions and objectives that guide this research, and later discuss the theoretical framework that supports and guides this research. Finally, I close this chapter with a summary of how the rest of this dissertation is organized.

[3] While the NFWL encourages forest certification, this law does not specify any particular mechanism.

Current Forest Management Details in the Peruvian Amazon

Peru—a country with a natural forest area of 78.8 million hectares (94% of it in the Amazon)—ranks second in South America, and ninth in the world, in terms of natural forest area (INRENA 2008c, Schwartz 2004). The Amazon forests of Peru are characterized by a high degree of biodiversity and have a great potential for uses such as timber and non-timber forest products, ecotourism, and environmental services. Of these, timber production is the economic activity that is most developed and generates the largest earnings and exports (INRENA 2008b). There are approximately 25 million hectares of forest being used for productive purposes in Peru (INRENA 2008a) with a potential volume of 73.7 m^3/ha (Schwartz 2004).

Despite this potential, Peruvian forest resources have not been rationally used, nor have they contributed to the economic development of the country. Estimates suggest that the forest sector only contributes 1% or less of the GDP of Peru (Chirinos & Ruíz 2003, Schwartz 2004).[4] However, the forest sector is an important source of regional employment (Schwartz 2004) and in departments such as Ucayali and Madre de Dios, it is the main economic activity (Chirinos & Ruíz 2003).[5] The sawn timber sector is an important source of foreign exchange, having had a positive balance in the last several years. In 2000 and 2001, sawn timber exports (US$ 52.5 million and US$ 52.2 million, respectively) surpassed imports (US$ 2.1 million and US$ 2.3 million, respectively) (INRENA 2001, INRENA 2002). More recently this gap has expanded, as sawn timber exports in 2006 (US$ 115.3 million) greatly surpassed imports (US$ 7.1 million) (INRENA 2007). The United States is the main market of Peruvian sawn timber exports with

[4] One reason for this low contribution to the economy is the fact that only around 80 species of tree are harvested from the 2,500 timber species that exist in the Peruvian Amazon (Galarza & Serna 2005), and the forest industry is basically concentrated around two species: mahogany (*Swietenia macrophylla*) and cedar (*Cedrela odorata*) (Chirinos 2003).

[5] In Ucayali, 40% of the economically active population is dedicated to this activity; and 65% in Madre de Dios (Chirinos & Ruiz 2003).

52% of the total exports, with mahogany being the product in greatest demand. Mexico is the second-largest market with 31% of the total exports, demanding species such as mahogany, cedar, *Virola sp*., *Aspidosperma macrocarpon*, and *Coumarouna odorata*, among others (INRENA 2007). However, the overall commercial balance of the forest sector has been negative in the last seven years. For example, in 2006, imports of forest products (US$ 464.8 million) were almost twice the value of total exports (US$ 253.2 million) (INRENA 2007).

Traditionally, three main timber species have been harvested through short-term contracts[6]: mahogany, cedar, and *Cedrelinga catenaeformis* (*tornillo*). During the old forest regime (1975-2000), under which there were no clear rules for forest management, these species were over-exploited. However, during the new forest regime (2000-present), which promotes sustainable use[7] of forest resources through a concession system of long-term contracts[8] and encourages certification, new forest areas and timber species have been incorporated into management regimes. As of October 2009, 7,552,807 ha of forests–30.7% of the total permanent production forests of the country—have been granted as forest concessions to 509 private SMFEs in five departments[9]; an average of 14 timber species is being harvested. In addition, a total of 355,524 ha of forests have been adapted to forest concession contracts under the new

[6] Contracts covering areas of 1,000 ha, designed especially to facilitate access to small loggers for a period of 2 to 10 years, with no requirement of presenting a study of technical-economical feasibility. In practice these contracts usually were granted only for a period of 2 years.

[7] According to the new Forestry Law, "sustainable use of timber resources is represented by the group of operations that include pre and post assessment activities related to the harvesting of trees, ensuring the normal yield of the forest through the application of adequate techniques that allow the stability of the ecosystem and the renewal and persistence of the resource" (article 3.2 DS N°014-2001-AG).

[8] Contracts covering areas between 5,000 and 50,000 ha, granted for up to 40 years, with the main obligation of presenting a forest management plan in order to assure a sustainable production and conservation of the forest (Law 27308).

[9] The departments of Madre de Dios, Loreto, Ucayali, San Martín, and Huánuco.

forest regime, favoring 20 private SMFEs. Together, private SMFEs manage 7,908,331 ha of forests (OSINFOR 2009).

Although the new forest regime is a step forward in terms of the management of tropical forests in Peru–especially after decades of forest over-exploitation and degradation, to date its implementation appears to have met with major difficulties. As of October 2009, the achievements of forest certification have been meager: only 13 of the 612 forest concession contracts granted and adapted in five departments have attained certification, representing an area of 412,296 ha (i.e., only 5.2% of the total concession areas). An additional 204,245 ha belonging to indigenous peoples (community lands) have attained certification for timber management, while 45,136 ha belonging to an association of Brazil nut farmers has attained certification for Brazil nut management (OSINFOR 2009). Also during the same period of time, the Timber Forest Resources Supervision Agency has disqualified 59 forest concession contracts (held by 49 private SMFEs) due to illegal actions. The disqualified concessions cover an area of 850,104 ha which represents 10.7% of the country's total area granted and adapted as forests concessions.

Study Objectives

Peru now has a legal framework (the 2000 Forestry and Wildlife Law) to promote sustainability in the management of its tropical forests, by granting long-term forest harvesting concessions that require management plans. These concessions are granted to small and medium sized contractors formally organized as private SMFEs. In the few years since the system of forest concessions has been implemented in the country there have been very few studies focusing on the factors constraining its implementation. In particular, there have been no systematic attempts to understand changes occurring in private SMFEs with reference to the implications for development and forest conservation. This is certainly a gap, especially given

that private SMFEs have become the new actors in the management of the permanent production forests for timber production of the country. Thus, the overall objective of this research is to generate knowledge and understanding of the capacities and capabilities of private SMFEs to carry out forest management and certification compliance in the permanent production forests of Madre de Dios, and knowledge of the influence that the main stakeholders of the forest sector have on that capacity. This is done through the examination of two questions specified below. The first question highlights characteristics of the relationships that private SMFEs have with other social actors that, regardless of enterprises' characteristics, may also affect management outcomes. The second question emphasizes characteristics of private SMFEs themselves which may affect forest management outcomes. Specifically, the two key research questions are:

1. How do the specific agendas of other social actors involved in the forestry sector influence the possibilities for private SMFEs to conduct forest management as proposed by the new Forestry law?

Answering this question requires two specific objectives:

- The description and analysis of the interests and actions of the main stakeholders in the forest sector in Madre de Dios directly involved in the promotion and implementation of the forest concession system.
- Understanding the forest concession system in terms of the wider policy context, constraints, and incentives which govern the behavior of the main stakeholders in the forest sector in Madre de Dios.

2. Given the forest concession system, what combination of different types of capital result in the ability of private SMFEs to follow forest management for timber production, and with what outcomes (e.g., attain certification, implement forest management according to Forestry law)?

To answer this question there are three specific objectives:

- To quantify and evaluate differences among the capital assets of SMFEs in the three provinces of Madre de Dios.

- To quantify and evaluate differences between the capital assets of certified versus uncertified SMFEs in Madre de Dios.
- To quantify and evaluate differences among the capital assets of SMFEs planning to attain certification in the Tahuamanu province.

Theoretical Framework

To fulfill the objectives of this study, a multi-level framework focusing on both the capacities of private SMFEs themselves (through a capital framework) and on their relations with other social actors in the forestry sector (through political ecology) is used as a guiding and supporting theoretical basis. The emphasis on capital (and its various forms) arises because capital scarcity serves as an "internal limiting factor" to the capacity of SMFEs that likely influences forest management and certification potential. Emphasis is placed on an actor-oriented approach from Third-World political ecology, because an assessment of stakeholders' interests will allow an analysis of "external factors" that affect the potential of SMFEs in terms of both forest management and certification. Both frameworks complement each other and allow for an integrated analysis since SMFEs, as the main actors in forest management, do not operate in a vacuum; they operate in business environments determined not only by the capital they hold, but also by government policies and the actions of public and private institutions.

Political Ecology as a Theoretical Framework

Tropical deforestation and degradation is an issue that has raised increased concern worldwide. Some in the forestry sector have embraced the concept of sustainable forest management as the best alternative to this environmental problem; while others, like small forest operations (communities, and private small forest enterprises), have become the actual practitioners of this concept in some countries. Some SMFEs have thus been successful in practicing forest management and some have been successful in attaining forest certification. However, many SMFEs have failed in attaining success in managing their forest operations due

to several external constraints, related to the same social actors in the forestry sector seeking to support sustainable forest management. SMFEs operate in business environments determined not only by the capital they hold (an internal constraint for successful forest management when lacking), but also by the actions and decisions of other stakeholders (external factors for successful SMFEs' forest management).

Stakeholders refer to any group of people, organized or not, sharing a common interest or investment in a particular issue or system. They can be of any size, occupy any position in society, at any level (local, regional, national, and global). Examples of stakeholders in natural resource management include: individuals such as subsistence farmers and other small-scale resource users (e.g., small-medium forest entrepreneurs), the communities they belong to, governmental administrators and policy makers, commercial interests, and administrators in private and/or public organizations. However, the identification of stakeholders, and their study at different institutional levels, depends on the specific needs of individual cases (Grimble & Wellard 1997). For example, in Third-World political ecology, Peluso (1992) and Bryant (1997) (cited in Bryant & Bailey 1997) examine how the struggle between the state and productive actors (i.e., peasants, businesses) has conditioned forest politics in Java and Burma; and Rocheleau et al. (2001) explore the relationships among smallholder farmers, a grassroots organization, and an international NGO in a social forestry experiment in the Dominican Republic. Thus, various actors participate in political-ecological conflicts in the Third World; however, the main stakeholders usually involved in environmental issues and resource management in the Third World are the State, multilateral institutions, businesses, environmental non-governmental organizations (NGOs), and grassroots actors (Bryant & Bailey 1997).

In Peru, several stakeholders operate in the context of the 2000 Forestry Law for sustainable forest management. However, the key stakeholders are the State, environmental NGOs, private SMFEs, and local consultative organizations; which are, as previously mentioned, emphasized in Bryant and Bailey's actor-oriented political ecology approach (1997). Thus, in the context of the Peruvian 2000 Forestry Law, Third World political ecology provides a theoretical framework to consider the interests, characteristics and actions of each of these key stakeholders in their broader political and economic context. A comprehensive analysis of the key stakeholders that support sustainable forest management (i.e., the state, environmental NGOs, and local consultative organizations), through a Stakeholder Analysis, can also be useful for evaluating the performance and potential of private SMFEs in their broader political and economic context. Consequently, I also focus on understanding the interests, actions, and capacities of key stakeholders as a means of seeing how the agenda of these stakeholders has influenced the forest concession system and the capacity of private SMFEs in carrying out forest management and attaining certification.

Since the 1980s, there has been a growing international concern for deforestation of tropical forests in particular. Several stakeholders have been involved in various international initiatives to address this key issue; thus, different interests, priorities and concerns of various social and economic actors have been at stake in different approaches suggested to stop deforestation and forest degradation, and to move towards a more sustainable management and development. However, there have been incompatibilities in the views with respect to the trade-offs of development and more sustainable management objectives (Grimble & Wellard 1997), due to the existence of several different stakeholders involved (e.g., national and local governments, multilateral organizations, NGOs, local organizations, forest users, businesses,

etc.). Stakeholder Analysis is an approach that emerged in response to this challenge of multiple interests. Stakeholder Analysis (SA) is a holistic approach that allows for the understanding of a system and the impacts of changes in that system, through the identification of key actors (or stakeholders) and the assessment of their respective interests in that system (Grimble & Wellard 1997).

Since policies "have consequences that bear differentially on different groups," knowing these differential effects makes it possible to evaluate the value of such policies and their outcomes. SA develops a methodology that identifies the differential consequences for stakeholders given a particular course of action. SA can highlight the needs and interests of people that are either well represented or under-represented, both politically and economically. Thus SA identifies stakeholders and assesses and compares their set of interests, and allows examination of inherent conflicts, compatibilities and trade-offs. Unpacking the different interests and objectives of stakeholders in environmental issues, SA can also assist in getting to the heart of problems, identifying incompatibilities and prioritizing objectives (Grimble & Wellard 1997). The premise of SA is that broad participation of beneficiaries or target groups alone cannot guarantee that projects will work, and a much greater appreciation of the political interests of other stakeholders is required. Thus, for making a project functional, the interests of the whole range of stakeholders who can influence or be influenced by the project or policy need to be taken into account (Grimble & Wellard 1997).

In the case of forest management and forest certification, several stakeholders are involved; however, key stakeholders usually include governments, environmental NGOs, and local actors. Thus, governments around the world have taken different approaches. Some governments have established legislation and have financed activities to promote the better

management of their forests, while others have not done so (Rametsteiner 2002). For example, the Guatemalan Forest Policy explicitly considers forest certification as a political mechanism (Carrera et al. 2004) and the Mexican Forest Law of 2000 promotes and provides support for certification (Cashore et al. 2006). Also, both the Bolivian and Peruvian new Forestry Laws facilitate certification through the granting of a discount in the concession fees for certified operations (Cashore et al. 2006, NFWL 2000). However, newly designed legislation and the granting of incentives to promote forest conservation and social development through sustainable forest practices, have not always had the expected results. For example, although some governments in Latin America such as Mexico, Bolivia, and Guatemala have facilitated the certification process, the weakness of some governmental institutions and their limited technical capacity have in many cases affected the management of forests in a sustainable manner (Cashore et al. 2006). This has allowed the continuation of illegal activities.

In the case of environmental NGOs as key stakeholders in the promotion of responsible forest management, they have been very proactive in the development of the first forest certification scheme to promote sustainable forest management—the Forest Stewardship Council-FSC (Van Kooten et al. 2005), and in its introduction in different countries. This has been done through the building of technical capacity among forest managers in areas such as forest inventories, reduced impact techniques, business management, and through the provision of financial assistance (Cashore et al. 2006). For example, in Guatemala the financial assistance from NGOs has covered not only direct costs of certification (i.e., assessments, audits, membership), but also costs incurred in complying with preconditions and conditions (Carrera et al. 2004). However, environmental NGOs' initiatives in promoting responsible forest management practices through certification have not always produced expected results. This is

because other factors, such as policies, markets, and capacities, have determined in part whether businesses and local peoples certify their forest operations. Timber producers usually expect economic advantages (i.e., premium prices, market access, lower costs of production, or enhancement of market share) to participate in forest certification (Van Kooten et al 2005). For example, in Guatemala, where the role of NGOs has been significant in supporting certification, certified industrial concessions recognize certification as a good investment through gains in security, recognition and market opportunities; community actors perceive forest certification as a requirement to gain access to, or maintain, their concessions; and the majority of private owners are unaware of the certification process (Carrera etal 2004). In Bolivia, although community and indigenous people are interested in certification, the process is largely dominated by industrial forest companies due to the better forest management capacity they possess (Quevedo 2006).

In Peru, sustainable forest management practices and certification are new processes and different stakeholders are working on its promotion and implementation. For example, in Madre de Dios, in 2002 when the State implemented the forest concession system as the mechanism for sustainable forest management, private SMFEs became the most important forest management stakeholders in the new model. However, INRENA and environmental NGOs such as WWF, ProNaturaleza, and CESVI became key actors in the promotion and implementation of the new forest management model, and they have dominated the scene in support of more or less sustainable forest practices. Since the implementation of this new model has required and generated substantial policy and management changes (and as a consequence diverse interests, concerns, and values of stakeholders in the timber forest sector have arisen), it is important to assess the role played by different stakeholders under the concession system and to understand

how it has influenced SMFEs efforts in forest management and conservation in the department. This is especially important given that public policies and market incentives push different stakeholders into potential conflicts with each other, and in the context of the forest concession system in Madre de Dios this may affect the ability to get certified and engage in legal timber management.

Capital as a Theoretical Framework

Throughout the world, measures of success have varied for communities and private small operations that practice forest management as part of different types of projects including conservation and/or development projects. Some communities that are financially and technically supported by governments and non-governmental organizations (NGOs) have been successful both in creating and maintaining community-based forest enterprises, and in attaining forest certification. Meanwhile, many other communities have failed to attain that success due to several internal and external constraints. A significant internal constraint for many SMFEs is a lack of capital; therefore, a comprehensive inventory and analysis of capital can be a useful basis for evaluating the performance and potential of SMFEs. Consequently, I focus on a multifaceted understanding of the concepts of capitals and capabilities as a means of seeing if such assets differentiate among SMFEs who succeed and fail to attain certification.

The term *capital* comes from (neo-classical) economics and refers to the stock of goods that can produce further goods or utilities in the future (Hinterberger et al 1997). Capital, or productive assets[10], are not just resources that people need in order to engage in their livelihoods; they also give people, households, firms, and communities the agency or "capability to be and to act" (Bebbington 1999: 2022). Capital has been referred to as the three production factors from

[10] Assets are various things that yield benefit streams which make future productive processes more efficient, more effective, more innovative, or simply expanded in scale or scope (Uphoff 2000).

which humans derive material wealth and welfare: land, labor, and man-made infrastructure (Hinterberger et al 1997), which are also referred as natural capital, human capital, and manufactured capital (Constanza & Daly 1992). In addition, and due to the development of social, political, and cultural systems over time, socio-organizational capital has emerged as another important form of capital recognized in the literature (De Groot et al 2003).

Capital is extremely important for rural development for at least two reasons: (1) the ability to pursue different livelihood strategies is dependent on the basic material and social assets that people possess (Scoones 1998); and (2) successful rural livelihood activities seem to increase or sustain their access to different assets (Bebbington 1999). Therefore, examining the capital assets held by local actors is important for studying how developing societies reach or enhance their economic and political growth (Ostrom 2000).

Measurement of the capacity of organizations to execute a sustainable development plan can be accomplished through the measurement of various forms of capital that they manage (Serageldin & Steer 1994). Knowing that more responsibilities and options for logging are being devolved to local actors (such as the case of private SMFEs), and the vital role this is playing in the local development and conservation of forests, it is essential to have a clear idea of the most important assets of these local actors. Moreover, developing sustainable forest management practices to improve certification compliance will require the identification of necessary and appropriate capital investments, which itself relies on knowledge of the various influences of capital assets.

There are four different categories of capital in economic analysis: physical[11], natural, human, and social (Coleman 1988, Katz 2000, Ostrom 2000, Serageldin & Steer 1994, Uphoff

[11] This form of capital is also referred as economic or financial according to Scoones (1998).

2000). The Livelihood Framework (Department for International Development 1999) further subdivides the traditional category of physical capital into two distinct categories: physical and financial capital. Thus, five forms of capital have been identified by this Framework: physical, financial, natural, human, and social capital.

Physical capital refers to the materials and human-made resources such as roads, equipment, buildings, tools, vehicles, etc. (Ostrom 2000, Serageldin & Steer 1994, Uphoff 2000) that provide benefits to their owners over time, by helping to produce other goods and services (NRTEE 2003).

Financial capital refers to pecuniary resources used to achieve livelihood strategies. There are two main sources of financial capital: 1) available stocks like savings (cash, bank deposits, or liquid assets such as livestock or jewelry), and 2) regular inflow of money like pensions, other transfers from the state, and remittances. Although financial capital is an extremely important input into a business, by itself it is not sufficient to guarantee success; other resources such as knowledge and adequate structure and processes (markets, policies) are required for an enterprise to make a good use of its financial resources (Department for International Development 1999).

Natural capital is usually defined as any stock of natural resources or environmental assets (soils, forests, water, atmosphere, etc.) which yield a flow of useful goods and services that support most aspects of human life (De Groot et al 2003, MacDonald et al 1999, Ostrom 2000, Scoones 1998, Viederman 1996). Natural capital can be divided into three categories that are essential to preserve economic options: natural resources (e.g., timber volumes), land, and ecosystems. Natural resources provide raw materials for the production of manufactured goods and also provide many services (MacDonald et al 1999). Land is necessary for economic activities to be carried out, and ecosystems provide numerous essential services (NRTEE 2003).

Economists have long known that people are an important part of the wealth of nations (Schultz 1961). Human capital is composed of the skills of individuals and acquired knowledge of activities (e.g., experience in logging and/or business) which are in large part the product of broader investments in education and training (Chhibber 2000, Coleman 1988, NRTEE 2003, Ostrom 2000, Schultz 1961). In the United States (US), differences in formal training have resulted in compensatory differences in levels of earnings among different occupations (Mincer 1958, Schultz 1961). Similar cases are observed for East Asian countries where earnings are found to systematically increase by increasing levels of education. Educational development has contributed significantly, not only to economic growth, but also to improve equitable income distribution and reduction in poverty in the region (Tilak 2001). Thus, in the last three decades there has been an increasing recognition of the importance of human capital formation (Serageldin & Steer 1994).

Social capital "refers to features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995: 67). These features improve the efficiency of society in its economic and social development (Dasgupta 2000, Dasgupta & Serageldin 2000, Grootaert & Bastelaer 2002). Social capital also encompasses the so called "civic-ness" of regional life, including such things as participation in the political life of the community and membership in associations (Viederman 1996: 47).

Given the existence of different dimensions of capital, it is necessary that all of them are considered in an analysis of the viability of SMFEs for forest management. Although SMFEs constitute the majority of firms in many countries and they represent a growing sector, capital assets among these enterprises are not well documented due to their relative informality and

great diversification[12] in many countries (May et al 2003, Saigal & Bose 2003, Thomas et al 2003). For example, many SMFEs in India face raw material shortages due to felling bans and restrictions on timber extraction in several states, and are thus unable to fully utilize their installed capacity (Saigal & Bose 2003). Also, according to Saigal and Bose (2003) many Indian SMFEs are quite inefficient (e.g., the saw timber conversion rate is 45-55%); however, there is no literature that addresses the specific capital assets contributing to this inefficiency. Similarly, in Brazil deficiencies and contradictions of available sources of information has made SMFEs difficult to analyze (May et al 2003). However, May et al (2003) report that the low productivity and efficiency among timber harvesting and primary processing SMFEs in Brazil is due to the ownership of obsolete equipment, and the inadequacy in storing round wood; thus, more training and expertise are necessary. In Guyana, SMFEs have low levels of production efficiency due to a lack of training and skills among their workers and to the lack of adequate technologies (Thomas et al 2003). SMFEs in India, Brazil, and Guayana also lack access to finance (May et al 2003, Saigal & Bose 2003, Thomas et al 2003).

In Peru, there is little documented information regarding the different assets that private SMFEs possess. Preliminary data collected for this study in 2005 of 10 private SMFEs[13] from the Department of Madre de Dios showed that only 50% of the managers of the enterprises surveyed had previous experience in logging (before the formation of their enterprises), and none of them had previous experience in formal business practices. The same analysis identified that these 10 SMFEs are also characterized by a limited level of education of their managers, a

[12] SMFEs have a varied and diversified production process that ranges from the production of logs and sawn wood, to extraction and commercialization of non-timber forest products, ecotourism, and provision of environmental services (Macqueen & Mayers in prep).

[13] These 10 enterprises represent 25% of the total population of SMFEs that participated in the first round of public bidding for concessions in the department.

restriction in financial resources, and obsolete equipment. Thus, capital assets among SMFEs are not well documented, despite their importance as key input in the production process, and there is an increasing urgency to investigate and assess such information, and to understand the variation of capital among SMFEs due to their important role in forest management and conservation. This dissertation draws on the available literature on SMFEs (which involves SMFEs producing a variety of products) and expands the existing account of the capital assets that the literature primarily addresses (i.e., produced assets) among the SMFEs dedicated to timber production. This research also addresses the capital assets of SMFEs that receive less attention in the literature (i.e., human and social assets). Thus, this dissertation intends a deep study of the most important assets of capital that SMFEs for timber production require in order to sustain their forest management activity. Table 3-4 details the operationalization of the capital indicators that this dissertation addresses.

Dissertation Organization

This study consists of six chapters. Chapter 2 begins with an overview of the main international initiatives guiding global management of tropical forests. In particular, the FSC certification scheme is discussed as the most important mechanism to promote responsible forest management in Latin America. This is followed by a detailed description of the historical management of forest resources in Peru, through a legal framework. The final section of Chapter 2 provides an introduction to the Eastern Peruvian state of Madre de Dios. A general description of the biophysical characteristics, history of land use and occupation, and economic context is presented in order to provide the reader with some basic knowledge of the study location, as well as to demonstrate the challenges faced in the study area.

The third chapter describes the development and implementation of the questionnaires that guided the collection of data in this research (i.e., the forest organization questionnaire and the

SMFE questionnaire), and the overall structure and administration of the survey. The first section describes the questionnaires used to interview representatives of the main forest organizations (e.g., personnel from INRENA) in the framework of the concession system, and key people (e.g., managers) from the private SMFEs. The second section examines some important aspects of how the survey was implemented. The third section describes the processing and management of compiled data, while the final section of Chapter 3 discusses the two main components of the analysis addressing the two questions that motivate this study.

Chapter 4 presents an analysis of the organizational roles and dynamics of the main forest actors (or stakeholders) in the forest concession system in Madre de Dios. The first section examines the antecedents, and the beginning of the concession system in the department, followed by a brief description of the current state of the concession system there. This is followed by a detailed analysis of the interests, characteristics, and actions of the main governmental organization, environmental NGOs, and multi-stakeholder organizations in the department.

Chapter 5 presents, discusses, and summarizes the results of the forest management capacity among private SMFEs in the study in terms of their produced, natural, human, and social capital. It presents a detailed discussion and analysis of the forest management capacity among SMFEs by province, the certification status in the department, and the certification status in the Tahuamanu province.

The final chapter summarizes the study results and offers the overall conclusions and implications derived from this research study. Policy recommendations are also provided in this chapter.

CHAPTER 2
BACKGROUND INFORMATION ON THE STUDY AREA

Overview

Logging has frequently been the most financially lucrative of all forest uses since timber is abundant and moderately valuable (Dickinson et al 2004). In the tropics, conventional logging, which represents a predatory activity due to the production process[1] (Putz et al 2001), has been a common practice in several developing countries. During the 1990s, as a consequence of the high rates of deforestation in the tropics, several forms of sustainable forest management (SFM)[2] were implemented as solutions for a better style of management (Bawa & Seidler 1998). Concomitant with better management techniques, well designed and well implemented forest policies and sound control mechanisms are key components of sustainability. Thus for almost three decades, several international initiatives have been undertaken to address the issue of tropical deforestation, and to search for practical approaches that promote SFM globally. In 1993, one of these approaches was implemented through the creation of the Forest Stewardship Council (FSC). The FSC was the first forest certification scheme introduced as a market-based tool to promote sound forest management; it currently is the predominant certification scheme in Latin America. Since FSC introduction, new proposals for international policies on SFM have

[1]Logging as conventionally practiced in the tropics is characterized as having a short-term focus with no concern for forest regeneration through management (Pearce et al 2003). As practiced in most tropical areas, conventional logging has caused severe impacts that include depletion of timber stocks and loss of ecological services such as watershed protection, carbon sequestration, harvest of non-timber forest products, and conservation of biological diversity (Holmes et al. 2000).

[2] SFM is defined as "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems" (Ministerial Conference on the Protection of Forests in Europe). However, SFM is a complex concept to be defined in practice; as such in the last several years there have been several attempts to define the elements of SFM through the use of principles, criteria, and indicators (Higman et al. 2000). The application of SFM practices requires compliance with legislations and management plans, among other things. Many tropical countries do not manage their forest in this way because of inadequate funding and human resources for the preparation, implementation and monitoring of forest management plans; and in some cases because of the lack of appropriate forest legislation, regulation, and incentives to promote SFM (FAO 2009).

been produced and some areas in the tropics have witnessed a transition away from predatory forest practices towards more responsible forest management (Putz et al 2001). As a result, some communities and private small operations have become actors of such changes.

In Peru, the first legal framework explicitly promoting SFM has recently been implemented, which is a pertinent response to the high rates of illegal logging that the Peruvian Amazon has been subjected to for years. In this new legal framework that establishes a forest concession system, small-medium entrepreneurs have become the main actors of the move towards a more responsible forest management. Although the forest concession system is relatively new, Peru is currently third in terms of total certified forest area in the nations of South America (INRENA 2008c). Thus in order to understand the context under which the new forest management regime in Peru has emerged, the first section in this chapter will discuss the different approaches to the management of forests by noting their advantages and problems as found in different parts of the world. Specifically, I present an overview of the main international initiatives guiding global management of tropical forests, emphasizing commercial timber production. In particular, the FSC certification scheme is addressed because of its growing importance in promoting responsible forest management now taking root in Peru.

The second section of this chapter describes the historical management of forest resources in Peru, in the context of the legal framework of the country. It starts with the beginning of the Republican era, where the first law was given to regulate the use and exportation of natural resources and almost at the end of this period the first law that attempted to regulate the forest activity in the country was enacted. Then, the first major forest regime designed to properly regulate Peruvian forest activity ("Forestry and Wildlife Law" of 1975) is presented. This forest regime included several legal dispositions that contributed disorder and informality in the sector,

which has detrimental consequences for forest conservation. Next, the discussion turns to the "New Forestry and Wildlife Law" that was enacted in 2000. This legislation departs significantly from the previous one by, for example, making the elaboration of management plans a requirement for harvesting concessions. This section ends with a detailed description of the main principles of the forest concession system in Peru as the new model of forest management.

The third section provides a brief overview of Madre de Dios, the study area, including a general description of its biophysical characteristics as an area of great biodiversity, as well as a discussion of its economic context, and the history of its occupation and resource management, emphasizing the forestry sector.

International Tropical Forest Management Initiatives

Historical Overview

Tropical forests cover around 7% of the Earth's land. Despite the relatively small area that they cover, their productive, environmental, and social functions are very important. For example, they are home to about half the world's species of plants and animals. They are also important in influencing the climate, both locally and globally, by regulating air temperatures, maintaining atmospheric humidity levels, absorbing atmospheric carbon, regulating stream flows, etc. (Whitmore 1998). Moreover, they are home to millions of people who depend on the forests for their way of life; it has been estimated that forests directly contribute to supporting the livelihoods of approximately 90% of the people living in extreme poverty (World Bank 2004).

Several international initiatives address deforestation, illegal logging, and other forms of degradation facing tropical forests as a result of the enormous value they are recognized to possess. For example, during the 1980s, a time of growing international concern about the extent of deforestation of tropical forests, many environmental non-governmental organizations (NGOs) undertook educational campaigns to raise awareness and launched boycotts in an

attempt to reduce pressure on tropical forests (Cashore et al 2004, Nussbaum & Simula 2005). In addition, the possibility of holding an international convention on forests was explored in order to create more political commitment through international action for addressing deforestation (Nussbaum & Simula 2005). With the recognition that commercial timber harvesting for trade was one of the factors contributing to forest degradation, the International Tropical Timber Agreement (ITTA) was established in 1983 to promote cooperation and sustainable use/conservation of tropical forests (Alvarenga et al 2006). The establishment of the International Tropical Timber Organization (ITTO)[3] followed in 1987 (ITTO 2006a). By 1990, the ITTO established one of its most ambitious objectives: the Year 2000 Objective, which mandated that by the year 2000 all tropical timber traded should come from forests managed in a sustainable manner (ITTO 2006b). Although the Year 2000 Objective has not been achieved, it set up a framework for the organization to look for tools and actions that would help reach this goal. One of these tools has been the Criteria and Indicators for Sustainable Management of Natural Tropical Forests[4],while another has been a series of guidelines; together these aim to define sustainable forest management (SFM) at national levels, allowing governments to monitor and report on the state of their forests (ITTO 1998).

In 1992, discussions concerning forests continued at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro; despite agreement on a set of very general forest principles,[5] no framework for action or subsequent efforts were provided

[3] ITTO's task is "to foster a tropical timber trade that simultaneously contributes to development in tropical countries and conserves the tropical forest resource on which it is based," in foreword (ITTO 2001).

[4] It was built upon ITTO's pioneering Criteria for the Measurement of Sustainable Tropical Forest Management published in March 1992 (ITTO 1998).

[5] During the Earth Summit intense negotiations among governments resulted in the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable

(Nussbaum & Simula 2005). Due to the failure to sign a global forest convention at the Rio Conference, international environmental groups led by the World Wide Fund for Nature (WWF) converged to create a private initiative to shape global forest management through the establishment of standards to verify (on the ground) responsible forest management; they thus created the Forest Stewardship Council (FSC) program in 1993 (Cashore et al 2004).[6]

Since the 1992 UNCED, numerous conferences and workshops have been organized in order to develop a consensus on forest policies and practical modalities to promote SFM globally (Nussbaum & Simula 2005). For example, in the mid 1990s, international policy dialogues continued under the Intergovernmental Panel on Forests (IPF) (1995-1997) and its successor, the Intergovernmental Forum on Forests (IFF) (1997-2000). These panels together produced the IPF/IFF Proposals for Action: a set of approximately 270 proposals that provide guidance to governments, international organizations, and major groups on how to further develop, implement, and coordinate national and international policies on SFM (United Nations Forum on Forests 2006a). The United Nations Forum on Forests (UNFF) was established in 2000 to follow up the work of proposals for action by IPF and IFF. However, despite these dialogues and proposals for action that fostered an active debate and strengthened the political commitments to SFM, their contribution to improved forest management on the ground remained limited (Nussbaum & Simula 2005).

Development of all Types of Forests, also known as the "Forest Principles" as well as Chapter 11 of Agenda 21 on combating deforestation (United Nations Forum on Forests 2006a).

[6] Due "partly in response to perceived inappropriateness of FSC's broad-brush, international approach, and/or by the fact that certain stakeholders perceived themselves to be disadvantaged or excluded from the FSC process" (Bass et al. 2001: 5), a number of other schemes began to emerge—often emphasizing the national context of certification (Nusbaum&Simula 2005). The Sustainable Forestry Initiative (SFI) was created in 1993—1994 in the U.S, while the Canadian Standards Association (CSA) was created in Canada. In 1998—1999, the Pan European Forest Certification (PEFC) scheme was created in Europe; in 2003 the PEFC restructured itself and went global, changing its official name to the Programme for the Endorsement of Forest Certification (PEFC) (Auld et al 2008). Other national schemes have emerged in Brazil, Chile, Malaysia, Indonesia, Bolivia, etc.

In 2002, the Earth Summit in Johannesburg was held. At this conference, an agenda was developed asserting that the role of forests should be recognized and enhanced in terms of poverty alleviation, biodiversity conservation, and the conservation of water resources (Nussbaum & Simula 2005). The same year also, due to the significant discussions and controversy generated over forest certification and its different schemes, The Forests Dialogue[7] held its first multi-stakeholder dialogue in Geneva to discuss about the maximization of the future potential of forest certification (Nussbaum & Simula 2004). In 2004, The Forests Dialogue held its second international multi-stakeholder dialogue to discuss about the impacts of forest certification over the last 10 years, in order to contrast the main certification assessment frameworks, and to reflect on the potential ramifications of system proliferation (Nussbaum & Simula 2004).

The Forest Stewardship Council as a Predominant Initiative in Latin America

Several international initiatives, conferences and workshops have been organized in the last three decades with the aim of developing global policies and practical modalities to promote SFM (Nussbaum & Simula 2005). In 1992, ITTO established for its member countries the first set of principles as an international reference for the development of more specific guidelines for sustainable management of natural tropical forests for timber production (ITTO 1992). These principles identify criteria and indicators (C&I) for assessing changes and trends in forest conditions and management systems at the national and forest management unit levels. The indicators assess progress towards sustainable management; however they cannot, by themselves, establish whether management is or is not sustainable (ITTO 1998). Nevertheless, in

[7] The Forest Dialogue (TFD) mission is to provide a forum for leaders from all sectors to discuss the most pressing issues related to achieving SFM and conservation around the world; one of the five key SFM issues that TFD's international dialogues focuses on is forest certification (Nussbaum&Simula 2004).

time these C&I served as a reference in developing the Pan-European Operational Level Guidelines, which are used by the Pan European Forest Certification (PEFC), an international certification scheme, as a reference basis and are related to the Pan-European C&I for SFM. Also, the African Timber Organization (ATO) had matched with the ITTO C&I and has included sub-indicators which are directly applicable to certification audits (Aty-Simula 2002).

In 1993, the Forest Stewardship Council (FSC) developed its own set of principles and criteria (P&C) as another approach, or instrument, to contribute to SFM. This set of P&C was developed independently of any other international set through a consultative process, and relies on a globally applicable generic standard under which verifiers are developed for specific conditions (i.e., national FSC standards)[8] (Atyi & Simula 2002). The FSC, which is the predominant certification scheme in Latin America, emerged as a market-based private initiative, designed to verify fulfillment of required standards by a forest operation. It emerged as a voluntary instrument (Molnar 2003) to link forest conservation with responsible management (Nussbaum & Simula 2005). FSC was the first forest certification system,[9] established in 1993 (Cashore et al 2004), and in the almost sixteen years since its foundation, the FSC has overseen the certification of 115.6 million ha of forests in public, private, and communal properties in 82 countries (FSC 2009a).

The FSC utilizes a set of ten broad performance-based principles and criteria designed to promote economically, socially, and environmentally appropriate and viable practices for the management of forests worldwide (FSC 2003). These principles and criteria include managerial

[8] In comparison, the PEFC relies on a general framework that defines the scope of the SFM elements to be covered by national certification standards and respective general principles, and on common rules for standard setting (Atyi & Simula 2002).

[9] A certification system is the procedure by which an independent body gives written assurance that a product, process, or service conforms to specified requirements (FSC 2009b).

aspects as well as environmental and social requirements[10], and form the basis for third-party certification of forests and act as the basis for more specific national and regional standards, as well (Cashore et al 2004). Once the national standards are accredited by FSC, they can be used for forest evaluations by the FSC accredited certification bodies (FSC 2003).

The process of getting a FSC certificate starts with the interest of a forest landowner or manager in becoming certified, and thus contacting an accredited FSC certifier; in developing countries this process is usually mediated by an NGO promoting certification. Certifiers engage in a contractual relationship with the landowner/manager to assess the forest operation against the FSC national standard.[11] This assessment is carried out by a multi-disciplinary team in the middle of consultations with local stakeholders.[12] At the conclusion of the assessment, a summary report is made public.[13] If the forest management operation assessed by the certifier is deemed qualified for certification, the landowner can choose to sign a certification contract. Thus, this results in the operation being "certified" and the landowner committed to continue practicing forestry in a certifiable manner. Annual audits are required to verify that the terms of the contract are being followed, and also a full reassessment is required every five years (FSC 2009c).

The process of applying for forest certification implies costs (pre-evaluation, assessment, and auditing) which, as explained later, are too high for small operations. This is especially so given the fact that most community enterprises and small private operations have few resources

[10] These principles cover key issues that include compliance with laws; tenure and use rights and responsibilities; indigenous peoples' rights; community relations and workers' rights; use of forest products and services; maintaining biodiversity and high conservation value forests; forestry planning, monitoring, and assessment; and planning and management of plantations.

[11] To check that it passes the internationally agreed FSC principles and criteria of good forest management.

[12] Stakeholders are consulted during the accreditation process and prior to an accreditation decision.

[13] However, the company's proprietary information is kept confidential.

and capacities, resulting in numerous pre-conditions or conditions to qualify for certification (Molnar 2003).

Motivations to attain forest certification

Forest producers have sought forest certification for a variety of reasons. Initial motivations included the avoidance of timber boycotts, and the assurance that it would be a useful marketing tool that would satisfy consumer concerns with respect to the origin of purchased timber (Bass et al 2001). Market expectations among producers with forest certification also included:

- Premium prices: higher prices for certified forest products have been the most expected market benefit; however, they have often been unrealized (Bass et al 2001, Cashore et al 2004, Gerez-Fernandez & Alatorre-Guzman 2005, Klooster 2006, Molnar 2003).
- Market access: some tropical timber producers have been able to enter new markets, others to protect them, and others to maintain or increment their market shares (Atyi & Simula 2002, Bass et al 2001, Klooster 2006, Schulze et al 2008).
- Niche markets: some producers have been looking to differentiate their products in order to access further markets (Bass et al 2001, Gerez-Fernandez & Alatorre-Guzman 2005, Irvine 1999, Markopoulos 2003, Molnar 2003).

In addition to the above motivations, there have also been some non-market motivations such as the desire for forest producers to be recognized as credible and reliable (Bass et al 2001) and for the social and ecological benefits resulting from forest management. For example, almost all of the certified forest operations in the U.S. and Mexico have realized an improvement in management plans, monitoring, inventories, mapping, and conservation planning (Newsom et al 2006, Klooster 2006). In developing countries especially, forest certification has improved or increased awareness for better labor, health, and safety conditions in forest management (Molnar 2003). Forest certification has also allowed communities to gain access to financial and technical support from donor agencies and governments (Markopoulos 2003, Molnar 2003).

Challenges/limitations of forest certification

Despite the benefits of forest certification, which in practice are quite variable for different types of communities, small private operations, and industrial businesses, some limitations associated with FSC certification exist. The following paragraphs discuss in detail the three main limitations identified.

First, the distribution of certification has been limited. The initial intention of the FSC program was to protect tropical forests through certification; however, it has not been uniformly achieved in temperate and tropical countries. Eighty seven percent of the certified management operations are in temperate and boreal areas, with the majority being in Europe; only around 13% of certified forests are located in tropical areas (FSC 2008). One of the constraints for good forestry in the tropics is that tropical forests are generally not managed at all, as timber operations seek least cost approaches to logging. Indeed, the change from conventional logging to certified management is difficult. According to some analysts, this is partly due to the fact that weak law enforcement and corruption are common, and business management, marketing, and technical skills are limited in the forest sector and even more in rural communities (Dickinson et al 2004). For example, none of the *Asociaciones Sociales de Lugar* (Local Social Associations) in Bolivia are certified, which may be the result of their high degree of technical vulnerability and low levels of technical assistance on forest management, to their deficient organization and administration, and to their lack of capacity in business management (Quevedo 2006). In the same way, indigenous communities in Bolivia seem to have difficulties in attaining FSC forest certification because of their difficulties in implementing forest management plans (Quevedo 2006). Thus more knowledge is needed on why forest management via certification is still not common in tropical forests.

A second reason often given for the lack of timber management in tropical areas is that certification has been financially costly. The certification costs for a forest management operation include costs for the evaluations (direct), and costs for the actions required to improve forest management (indirect). Additional costs include expenditures for any promotional or marketing activities related to certification (Markopoulos 2003). Costs for certification vary in different regions, and for different types of operations (Molnar 2003). For example, indirect costs in many temperate forest operations can be relatively small since they already employ good forest management practices before certification. In contrast, in many tropical forest operations the indirect costs become very high since current practices do not meet criteria for good forest management (Atyi & Simula 2002). Also, certification costs (direct and indirect) have been especially significant for small-scale enterprises such as family forest owners, small private forestlands, and rural communities (Irvine 1999, Molnar 2003). This is because, at lower levels of output the total cost per unit of production is higher; thus certification of small-scale operations is likely to be proportionately more expensive than for large operations (Fischer et al 2005, Klooster 2006).

As a consequence of the significant cost to small-scale operations, certification assessments have largely been subsidized in the case of communities, which creates a dependence on donors and governments (Irvine 1999). For example, in countries like Mexico, Guatemala, Bolivia, and Brazil, communities have received constant financial and technical support from environmental NGOs, multilateral organizations, and governments (Bray et al 2003; Gómez 2000; Nebel et al. 2005; Stone 2003; Humphries & Kainer 2006). Specifically, in Mexico, communities have received support from private wood processing businesses (Klooster

2006); and in Brazil, communities received aid from voluntary certifiers and from surcharges to industrial-scale clients (Molnar 2003).

A third concern with certification is that despite the economic emphasis underlying the reasons often given by timber managers for getting certified, certification itself does not guarantee a successful position for competing in international markets. The global market for certified wood is dominated by big retailers with high demand conditions (especially lower purchase prices). Thus, some certified communities, like those in Mexico, have had difficulty meeting certification standards at competitive prices, making certification less worthwhile than initially expected. Only a few of Mexico's largest forest communities have been able to meet the prices and volumes demanded by big retailers in the US and Europe (Klooster 2006). A challenging situation is faced by certified companies and communities in Bolivia, which are characterized by a deep lack of business management and entrepreneurial skills, and are challenged by the distances from forests to processing centers and markets, and by poor transportation infrastructure. Community-based forest management operations suffer from even more fundamental problems (Dickinson et al 2004). The demands for certification on smaller communities and enterprises may thus not only be excessively onerous but also insufficiently worthwhile economically.

The foregoing discussion suggest that although forest certification has proven to be an important market instrument for improvements in forest management, as well as social and environmental changes, its ability to spread broadly and achieve those desired changes in an equitable manner has been limited; this is true especially for small forest operations (Gerez-Fernandez & Alatorre-Guzman 2005, Molnar 2003). Although many communities have been certified, it has been mainly due to subsidies from support organizations: subsequent concern

centers on whether or not those communities will continue with the sustainable commercial management of their forests when external support is terminated (Bass et al 2001). Thus, some analysts raise many questions about the practicality and utility of FSC certification for small forest operations (Markopoulos 2003). While others continue to defend certification, an issue on which many agree is that the main impact of forest certification to date seems to be the promotion of a more holistic concept of SFM for communities, private small forest operations, and large industrial forest operations (Rametsteiner & Simula 2003). This dissertation addresses the existing debate on the practicality of certification by approaching the SFM/certification issue through the examination of the conditions under which certification is viable or not among small forest operators in Peru.

History of Tropical Forest Management in Peru

Although several international initiatives promoting SFM began in the 1980s, in Peru the first legal framework that explicitly promotes SFM has been recently implemented, in 2000. There are almost no documents reporting the situation of natural resources in Peru and their use or management through its history. However, management of resources in Peru has been characterized as being exploitative, and political and economic interests have usually influenced the way natural resources have been used (including tropical timber). In this section I review the historical policies and regulations that have governed the forestry sector in Peru. My goal here is to illustrate the variation through time in policy instruments for timber management in Peru. Appendix A shows a list of the main formal regulations established to regulate forest activity in Peru (throughout December 2007).

From the Republican Era to the 1960s: Uncontrolled Extractivism to Incipient Regulation

At the beginning of the Republican period (1860), the Amazon was still an isolated region in Peru that gained importance due to the harvesting of rubber (Ministerio de Agricultura 2002).

This activity was exploitative and unregulated, and the lack of management resulted in the extinction of rubber trees by the beginning of the 20th century. In 1898 the first *Ley Orgánica de las Tierras de Montaña* (Mountain Lands Organic Law) was promulgated to regulate exploitation and exportation of resources. The *Ley de Primas de Gomales* (Rubber Taxes Law) followed in 1906, and was enacted to tax rubber exportation and create a fund for rubber reforestation. In 1909, the *Ley General de Tierras de Montaña* (General Law of Mountain Lands) established different modalities for land acquisition in the Amazon such as purchase, concession, colonization contract, and free adjudication (CEPES 2005).

In the context of legislation for rubber extraction, Peru also began to enact laws to regulate timber extraction and trade. Law Nº 7643 (enacted in 1932) modified the tariff of customs pertaining to imported timber, and established a tax for all national timbers coming from the Amazon that used national ports and were destined for the consumption of the regions of *Sierra* and *Costa*. It also promoted the creation of a technical institute in the port of Iquitos for researching the commercial and scientific value of timber and other products from the Amazon. A key function of this Institute was to control the technical exploitation, transport, and sale prices of national timbers. In 1939, Law Nº 8928 extended the application of taxes previously established (in Nº 7643) to terrestrial means of penetrating the Amazon. Law Nº 10315 of 1945 was enacted to allow Peruvian colonists (*colonos*) to freely exploit and sell timber from the land they settled.

Until the 1950s, a pattern of predatory extraction of raw materials for export characterized the use of Peruvian forests. But beginning in the 1950s, a process of industrialization occurred that tended to substitute imported products due mainly to an increase in internal demand and to consequences derived from the Second World War. In 1963, the first law that explicitly regulated

forest activity was enacted (Decree Law Nº14552). This Law created the Forestry and Wildlife Service, as the forest administrative entity with power to grant forest harvesting contracts to individuals or enterprises in the State forests.

Period 1975—2000: The First Forestry Law

In 1975, during a period when the military governed Peru, the *Forestry and Wildlife Law*[14] (Legislative Decree N°21147) was promulgated to regulate forestry activity. It was enacted to complement an existing law (with respect to forest resources and wildlife, Legislative Decree N°20653[15]) and abolish another (Decree N°14552[16]). Under the Forestry and Wildlife Law (FWL), forest resources were explicitly declared to be property of the State and their harvesting was granted through permissions, authorizations, and contracts. Natural forests were subdivided into production areas and protection areas. The production areas contained the National Forests and the Forests of Free Availability.[17] Contracts for forest harvesting carried out in Forests of Free Availability had two modalities:

- Contracts in areas up to 100,000 ha, with renewable periods of 10 years, and non-transferable. The obligation of the contractors was to present a study of technical-

[14] This Law contained five regulations: 1) Regulation of Forest Extraction and Transformation (D.S. Nº161-77-AG); 2) Regulation of Conservation Units (D.S. Nº160-77-AG, 3); Regulation of Forest Organization (D.S. Nº159-77-AG); 4) Regulation of Conservation of Flora and Wildlife (D.S. Nº158-77-AG); and 5) Regulation of Forest Harvesting in National Forests (D.S. Nº002-79-AA).

[15] It was referred to as the *Ley de Comunidades Nativas y de Promoción Agropecuaria de las Regiones de la Selva y Ceja de Selva* (Law on Native communities and Agrarian Promotion in the *Selva* and *Ceja de Selva* regions) enacted in 1974.

[16] It was referred as to *Ley de Protección, Conservación, Fomento y Aprovechamiento de Bosques y Terrenos Forestales y de la Vida Silvestres* and enacted on 11 July 1963. This Decree refers to the creation of the Forest and wildlife Service.

[17] National Forests are "natural forests declared to be competent for permanent production of timber, other forest products, and wildlife, which use can only be carried out directly and exclusively by the State". Forests of Free Availability are "those declared to be competent for permanent production of timber, other forest products, and wildlife that can be used by any person properly authorized" (Legislative Decree N°21147).

economic feasibility, the harvesting of no less than 20 species, payment to the State for the harvested timber (or *Canon Forestal*), and payment of the reforestation canon.[18]

- Contracts covering areas of 1,000 ha, designed especially to facilitate access to small loggers for a period of 2—10 years, with no requirement of presenting a study of technical-economical feasibility.

In practice, however, large-scale loggers abused this law by hiring many small loggers to request the 1,000 ha contracts allowed to them, and then harvested much larger tracts of forest without any technical study and without fulfilling other obligations required for larger contracts. This led to overexploitation of the forest, the widespread proliferation of illegal logging, and the emergence of a patronage relationship between the small and large-scale loggers (Caillaux & Chirinos 2003).

Implementation of the FWL was very disorderly; this subsequently led to informality and adverse impacts on forests, and also hampered conservation efforts (Hidalgo 2003). Management plans that would have helped ensure replacement of the forest were rare, which implies that timber exploitation was conducted for short term gain (Ministerio de Agricultura 2002). The National Institute of Natural Resources[19] (INRENA) was responsible for the administration, regulation, and control of the country's natural resources. Unfortunately, most regulations regarding natural resources were poorly enforced due to the poor capacity of this institution.

On the other hand, there were some efforts for research and establishment of forest plantations in the Amazon in the *Bosque Nacional Alexander Von Humbolt*, in Jenaro Herrera, and in the Central Peruvian Amazon (Chanchamayo, Oxapampa, Villarica) (Lombardi & Llerena

[18] Initially the FWL established that contractors should execute reforestation programs, but in 1979 this obligation was replaced with the creation of the Reforestation Canon, a fee paid for cubic meter of round wood harvested. These fees were administered by the Reforestation Committees to fund reforestation programs. In practice, however, reforestation fees were deviated to other uses (e.g., administrative uses) and thus the reforestation process was a failure under this system (Hidalgo 2003).

[19] It was created in 1992, to replace the *Dirección General Forestal y de Fauna Silvestre.*

1993). In the *Bosque Nacional Alexander Von Humbolt*, surveys and detailed studies were carried out for utilization of this forest during the 1970s (with FAO assistance). Subsequently in the early 1980s, Japan's development assistance agency (JICA) conducted further studies on natural and plantation forest regeneration there (Linares Bensimon 1995).

Development of the Concession System: The New Forestry Law

In 1990, after an already existing current of thought for a better use of natural resources (Ojeda, pers. comm. 2009), Legislative Decree N°613[20] mentioned for the first time the issue of sustainability in the use of the nation's natural renewable resources, as well as the issue of public participation in the formulation of policies related to the environment and natural resources. This new legislation also established, in one of its transitory dispositions, the need to update the 1975 FWL to be in harmony with this Decree; as such, it was important because it set the stage to change the regime of forest over-exploitation and the proliferation of illegal logging that the country had faced in the previous 15 years. Thus from 1990 until July 2000, the State, environmental NGOs, and timber entrepreneurs separately debated the politics of the forest sector and ways to reform it (Soria 2003) while working on proposals that advocated for what the new Forestry Law ought to contain. Finally, after 10 years of debate, a new *Forestry and Wildlife Law* (Legislative Decree N°27308, referred as to the New Forestry and Wildlife Law or NFWL) was promulgated on July 16, 2000.[21]

[20] Referred as to *Código del Medio Ambiente y los Recursos Naturales.*

[21] The need to have a new forestry law was also due to the state of emergency declared in the regions of Madre de Dios and Tahuamanu in 1999 because of the rampant illegal logging (Ministerial Resolution 951-99-AG). During this period, a US-financed sawmill was charged with illegal logging and the building of approximately 100 km of illegal logging roads (Supreme Decree 047-99-A). This joint venture between Newman Lumber of Mississippi, USA and IMT of Perú processed approximately 59,000 m^3 between 1998 and 1999, worth approximately $44 million (AIDA 2002).

The approval of the NFWL by the Peruvian Congress was not, however, a smooth process. This was a more or less closed process of comments and proposals, because during the 1990s all attempts to produce a new forestry law were boycotted by some representatives of the timber sector. These representatives refused to recognize other actors interested in the forest policy of the country (i.e., indigenous peoples, local communities, and environmental NGOs), arguing that since the forest was timber, they were the only ones who had the right to give opinions about the forest sector. Despite this problem, the NFWL was finally promulgated in 2000 because of the government's desire to move the forest sector of the country towards a sustainable solution (Soria 2003). Thus the NFWL introduced a series of basic concepts for sustainable forest management (see Table 2-1) that aimed to modify the chaotic situation of overexploitation, informality and illegality that Peruvian forests were subjected to during the old forest regime (Hidalgo 2003).

Table 2-1. Comparison of Decrees N° 21147 and N° 27308

Decree N° 21147-Old forest regime	**Decree N° 27308-New forest regime**
*Production focus: timber	*Production focus: all the forest, its diversity of products, and the diversity of uses and users
*Forest access: direct adjudication, which promoted corruption because of the internal process	*Forest access: through public biddings and auctions, promoting transparency in the process due to the competition
*Harvesting: short term (2—10 years) through 1,000 ha contracts; disorganized; no management plans	*Harvesting: long term (40 years) through forest concessions; organized in permanent production forests; obligation to use management plans
*Harvesting activities: in practice by large-scale loggers	*Harvesting activities: by small and medium entrepreneurs either individually or through the formation of enterprises (SMFEs)
*Administration: centralized; little public participation	*Administration: decentralized; participatory focus
*Forest certification: not promoted at all	*Forest certification: legal framework promoting it
*Harvesting fee: payment only for the harvested timber	*Harvesting fee: payment for the total area under concession
*Reforestation: payment of fee to fund reforestation programs	*Reforestation: obligation to protect and promote natural regeneration

In the framework of the new forest management regime established by the NFWL, the forests of the country were organized into several categories: production forests (including permanent production forests, and production forests in reserves), forests for future harvesting, forests in protected areas, forests in rural and indigenous communities, local forests, and protected natural areas. The harvesting of forest resources is granted through permissions, authorizations, and forest concessions.[22] Forest production, especially harvesting of timber for commercial purposes, was concentrated into the category of Permanent Production Forests.[23] This category of primary natural forests comprises the harvesting units that are offered for 40 years as a forest concession contract through two modalities:

- Public auctions, for harvesting units of 10,000 to 40,000 ha.
- Public biddings, for harvesting units of 5,000 to 10,000 ha that are intended for small and medium entrepreneurs either individually or through the formation of forest enterprises. According to the *Bases del Concurso*, small entrepreneurs are those with a gross capital of less than US $350,000 and less than 50 permanent workers; medium entrepreneurs are those with a gross capital of US$ 350,000 to 3,000,000 and 50 to 200 permanent workers.

The main obligation of the new contractors, which departs significantly from the previous forest regime (FWL), is the presentation of a forest management plan.[24] Such plans must be elaborated by professionals registered with, and approved by, INRENA. Such management plan has two levels of planning:

[22] There are two types of forest concessions: (1) forest concessions for timber purposes, and (2) forest concessions for non-timber purposes (i.e., concessions for non-timber forest products, and concessions for ecotourism, conservation and environmental services). This study entirely refers to the first type of concessions: forest concessions for timber purposes.

[23] The organization of the forests allows for an understanding that forest management should be a permanent and a long-term activity. In the old forest regime, this was not possible due to the short-term of the 1,000 ha contracts and their wide-spread dispersal throughout the department.

[24] The forest management plan comprises the activities of characterization, evaluation, planning, harvesting, regeneration, reposition, protection, and control of the forest in order to assure a sustainable production and conservation of the forest (Law 27308).

- The General Forest Management Plan (GFMP), which provides the general framework of planning for the 40 years of the concession contract. It has to be updated every five years.
- The Annual Operating Plan (AOP), which provides details of activities to be developed during a given year. The AOP requires the realization of a forest census of commercial species for all trees with diameter superior to the minimum cut diameter established (*diámetro mínimo de corta*).

Additional obligations for the new contractors includes the payment of an annual harvesting fee (in US$) for the total area in the concession. Once a forest concession is granted, the contractor (i.e., the title holder of the contract, or representative) is the only person responsible for it. However, they can also make contracts with third parties for harvesting other resources (e.g., Brazil nut or *castaña*) in the concession; such additional resource is allowed under a complementary management plan that must be approved by INRENA. The contractor can also transfer all his rights and obligations in the concession to a third party if previous authorization is obtained from INRENA. Also, in the framework of the new forest management regime, there is a discount of 25% in the payment of the harvesting fee as an incentive for concessionaires who attain forest certification and/or develop value-added capabilities (i.e., transformation of timber).

The NFWL also established a new organization system for public institutions in charge of the forest administration. INRENA retains its technical and executive functions as the administrator of forest and fauna resources in the country, subscribing and approving management plans for forest concessions. The Timber Forest Resources Supervision Agency (*Organismo Supervisor de los Recursos Forestales* or OSINFOR) was created to supervise and verify periodically the fulfillment of the forest management plans of forest concession contracts. The Forest Management Committees (*Comités de Gestión de Bosques*) were created to strengthen citizen participation in forest administration through the collaboration of, or participation in, forest supervision and control activities of forest concessions.

From the inception of the concession program in 2002 through the end of 2003, 24,586,458 ha of permanent production forests were created in the country, distributed among 10 departments (Table 2-2). To date, two rounds of public bidding have been carried out for the implementation of the concession system in Peru. In 2002, a first round was carried out in the departments of Madre de Dios, Ucayali, San Martin, and Huanuco; following this, in 2003, a second round to grant forest concessions was carried out in the departments of Madre de Dios and Ucayali, with a first round in the department of Loreto (INRENA 2008a).

Table 2-2. Peruvian permanent production forests

Department	Department area (ha)	% Permanent production forests respect to total area	Permanent production forest area (ha)	% of PPF area
Loreto	38,685,195	38.21	14,782,302	60.12
Ucayali	10,183,064	40.16	4,089,926	16.63
Madre de Dios	8,530,054	29.57	2,522,141	10.26
San Martin	5,125,331	29.29	1,501,291	6.11
Huanuco	3,684,885	23.90	880,846	3.58
Junin	3,766,699	6.65	250,555	1.02
Pasco	2,531,959	6.84	173,068	0.70
Cusco	7,198,650	2.38	171,644	0.70
Ayacucho	4,381,480	3.34	146.298	0.60
Puno	6,699,712	1.02	68.387	0.28
Total			24,586,458	100.00

Source: INRENA-Ministerial Resolutions: N° 1349-2001-AG, N° 026-2002-AG, N° 1351-2001-AG, N° 549-2002-AG

Following the bidding processes, as of October 2009, a total area of 7,552,807 ha of forests (30.7% of the total permanent production forests of the country) has been granted as forest concessions in five departments (Table 2-3). These concessions consist of 588 contracts held by

509 private SMFEs (263 *personas jurídicas* and 246 *personas naturales*).[25] In addition, 355,524 ha of forests have been adapted (*adecuados*) from the previous forest regime (FWL) to the new forest regime,[26] favoring 20 private SMFEs (14 *personas jurídicas* and 6 *personas naturales*). Together these operations manage 7,908,331 ha of forests (OSINFOR 2009). During the same period of time, OSINFOR has disqualified 59 forest concession contracts (held by 49 private SMFEs) due to illegal actions (e.g., presentation of false documentation with respect to the existence and characteristics of tree species declared in the management plan, and/or use of transportation permits so third parties could transport timber from illegal sources). The disqualified concessions cover an area of 850,104 ha, which represents 10.7% of the total area granted and adapted as forests concessions in the country. Also, three concession contracts covering an area of 68,699 ha (belonging to 2 private SMFEs) have been returned to the State due to impossibilities in managing the forest concession for productive purposes.

Table 2-3. Peruvian forest concessions granted (as of October 2009)

Department	**Total area granted (ha)**	**Total number concession contracts**	**Total number private SMFEs**
Ucayali	2,871,925	171	151
Loreto	2,640,846	250	214
Madre de Dios	1,267,111	85	73
San Martín	494,668	34	29
Huánuco	284,343	48	42
Total	7,558,893	588	509

Source: OSINFOR (2009)

[25] In Peru, *personas naturales* is the legal term for a sole proprietor while *personas jurídicas* indicates a legal business partnership.

[26] This refers to contracts for other forest products existing during the previous forest regime (NFL-21147) that their contractors wanted to be renewed at the enactment of the Amendment of the New Forestry Law (NFWL-N°27308) for which they needed to adapt (or in Spanish *adecuarse*) to the conditions of the NFWL through the presentation of the solicitude and supporting documents (DS 014-2001-AG).

Development of the Forest Certification Initiative: the Peruvian Council for Voluntary Forest Certification

During the 1990s, different groups (i.e., the State, environmental NGOs, timber entrepreneurs) were separately debating and discussing the politics of the forest sector in the country and the ways to reform it through the promulgation of a New Forestry and Wildlife Law N° 27308. For example, environmental NGOs were looking for ways to disseminate information to promote sustainable practices in the country. Because of this period of "separate debates," however, a separate section covering NGOs is presented here beginning in the 1990s and moving forward. As the previous section discussed what the state was doing in the early 2000s, it is now important to review what the NGOs did during the same time period of time.

While different NGOs were working on proposals that advocated what the new Forestry Law ought to contain, in order to reform the chaotic situation of forest over-exploitation and the proliferation of illegal logging that the country was facing during the previous forest regime, parallel to this the environmental NGOs WWF-Peru and ProNaturaleza (together with FSC representatives) carried out a series of workshops to promote the benefits of the FSC forest certification scheme. One of the missions of WWF is to ensure the sustainability in the use of renewable natural resources, for which it supports forest certification.[27] Thus, workshops on promoting FSC certification were carried out in the cities of Lima, Pucallpa, Puerto Maldonado and Iquitos in November 1997, which constituted an important element of WWF's proposal for the new Forestry Law in promoting SFM. Thus, the idea of forest certification was welcomed by several representatives of ecological, production, and social organizations who formed a group of volunteers to develop a national initiative.

[27] WWF acknowledges that several certification schemes may contribute to improve forest management; however WWF focus its efforts "on improving the FSC system, on adapting FSC certification to different scales and national contexts, and on promoting the FSC logo as an internationally recognized hallmark of responsible forest management" (WWF 2007: 2).

In 1998, WWF-Peru and ProNaturaleza carried out a project for the establishment and strengthening of a national initiative for voluntary forest certification in Peru. Subsequently, the National Initiative (NI) was formed based on four Regional Working Groups located in Madre de Dios, Lima, Ucayali, and Loreto; it was responsible for promotion of forest certification and developing regional standards for good forest management based on the FSC Principles and Criteria. In November 2000, after the new Forestry and Wildlife Law was already promulgated, representatives of the industrial timber sector, forest producers, social groups, professionals in the forest sector, and environmental NGOs got together to define the first Directive for the NI. In June 2001, the Peruvian Council for Voluntary Forest Certification (CP-CFV) was formed; in October of that year the FSC recognized the CP-CFV as a FSC Working Group in Peru. On July 20, 2001 the forest management certification standards for wood products from forests in the Peruvian Amazon were approved by the CP-CFV and endorsed by FSC in May 2002 (Consejo Peruano de Certificación Forestal Voluntaria 2002).

Thus, given that the most important feature of the new Forestry and Wildlife Law is the requirement of management plans (which are based on detailed exploratory forest inventories) and that this Law also provides incentives for voluntary forest certification, environmental NGOs sought to support the elaboration of management plans and the attainment of certification as essential elements for long-term planning and promotion of sustainability. Environmental NGOs have provided technical and financial support to the SMFEs and indigenous communities that attained forest certification in Peru. From the endorsement of the CP-CFV, 13 of the 612 forest concession contracts granted in five departments have attained FSC forest certification—

representing an area of 412,296 ha (5.2% of total concession area already granted).[28] This can be observed in Table 2-4 below. In addition, another 204,245 ha belonging to indigenous peoples (community lands) have attained FSC certification for timber management, while 45,136 ha belonging to an association of Brazil nut farmers has attained FSC certification for Brazil nut management. Although forest certification is a relatively new process in the country, Peru is already third in South America (after Brazil and Bolivia) in terms of amount of certified forest area. This dissertation will focus on the department of Madre de Dios, where the forest concession system was first implemented in Peru mainly as a response to the high rate of timber harvest (both legal and illegal) that the forests of that region was suffering. Another consideration, however, was that the people of the region were generally receptive to having a new forest management regime; in contrast to people in other departments that did not want to accept (at least initially) the forest concession system.

Table 2-4. Peruvian certified areas by harvesting modality (as of September 2008)

Modality of harvesting	**Department**	**Area (ha)**
Forest concession (timber)	Madre de Dios	205,593
	Ucayali	201,532
	Huanuco	5,171
Total forest concessions		412,296
Permits in communal land (timber)	Ucayali	159,334
	Pasco	34,344
	Huanuco	10,567
Total permits		204,245
Brazil nut concession	Madre de Dios	45,136
Total Brazil nut concession		45,136
TOTAL AREA		661,677

Source: INRENA, September 2008

[28] In 2008 two forest contracts had their FSC certificate suspended because of unresolved corrective action requests-CARs (WWF 2008). In one case, due to economic problems the SMFE in question has not being able to resolve their CARs to keep its certificate (WWF-MDD representative, pers. comm. 2009).

Study Region: Madre de Dios

Location and Population

Madre de Dios is a key Peruvian department in which new timber concessions were created and in which NGOs were operating in the context of the new forestry law. This department is situated in the Eastern Peruvian Amazon (Figure 2-1), and was the first department where the forest concession system was implemented. It is the third largest Department in Peru in terms of area (85,300.54 sq. km) comprising 6.6% of the total national territory. The 2007 population of Madre de Dios is 109,555, of which 73% (80,309) are urban inhabitants settled mainly in Puerto Maldonado (56,382), the capital of the Department. Although Madre de Dios is the least densely populated department in the country (1.3 inhabitants/sq. km) and has the smallest departmental population (with only 0.4% of the total population of Peru), it has experienced the largest proportional increase in population among all departments in the country since 1993 (63.5%) (INEI 2008).

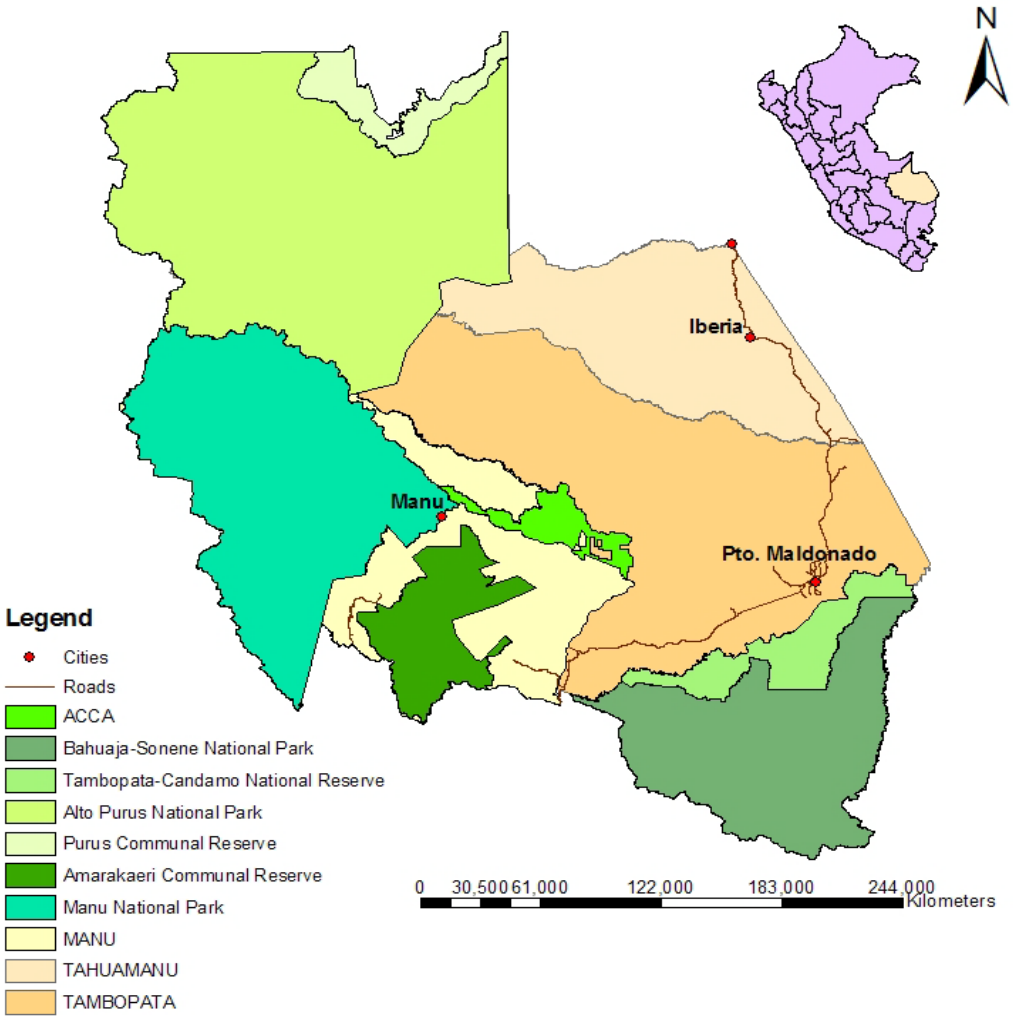

Figure 2-1. Map of Madre de Dios protected areas. It shows protected areas that fall partly or entirely within Madre de Dios

The rural non-indigenous population is settled in small, mixed subsistence communities along rivers and roads, with producers engaged in a blend of agricultural and extractive activities, including Brazil-nut harvesting, gold mining, fishing and logging (Chirinos & Ruíz 2003, INRENA 2003, SPDA 2003). Logging is one of the most important economic activities, employing 65% of the economically active population. The main tree species harvested are *Swietenia macrophylla* King (mahogany), *Cedrella odorata* M. Roemer (cedar), and *Cedrelinga catenaeformis* Ducke (*tornillo*); together they represent almost 60% of the total volume

harvested in the region (Chirinos & Ruíz 2003). Another 40 species of lower value are also extracted in the region in small volumes, although the so-called hard-wood timbers have been increasing in demand in recent years (Gobierno Regional de Madre de Dios 2006).

Biophysical Characteristics

Madre de Dios comprises the provinces of Tahuamanu, Tambopata, and Manu, which cover two biophysical units: a) the *Cordillera Oriental Faja Subandina* (500—3,967 masl) in the southwest of the department, a ruggedly mountainous region comprised of shallow soils of low natural fertility, and b) the *Llanura de Madre de Dios*, (176—500 masl) which is the more extensive of the two units, with a soft and undulating relief where floodplains and low hills are predominant. In that zone, the soils are deep, being floodplains of high fertility (INEI 2004). Rainfall in the department averages 2,260 mm yr^{-1} concentrated in a rainy season from October to April. The annual average temperature in Puerto Maldonado is 26°C (INEI 2004).

The department has 12 life zones, and according to the State zoning plan based on most appropriate land use, the distribution of lands in the region is: 66.75% ecological protection zones (protected areas and special treatment zones), 29.57% permanent production forests, 1.26% agricultural zones, 1.67% fisheries production, and 0.72% other use zones (Ministerio de Agricultura 2008).

Madre de Dios is one of the few mega-diverse zones identified in the world (Myers 2000), with world records for bird, insect, and mammal biodiversity (Huertas Castillo 2004). This high biodiversity has merited the creation of various protected areas, including: the Manu National Park (1,544,665.7 ha), the Bahuaja-Sonene National Park (200,000 ha approximately), the Alto Purus National Park (1,250,000 ha), the Purus National Reserve (202,033.21 ha), the Tambopata-Candamo National Reserve (274,690ha), the Amarakaeri Communal Reserve (402,335.62ha), and the Territorial Reserve for indigenous people in voluntary isolation (829,000 ha) (Felix 2007

personal communication). Together these areas comprise 4.7 million hectares of protected rainforest ecosystems (55.1% of the department area) and concentrate 50% of the Peruvian diversity and endemism, making it "the biodiversity capital of Peru" (CTAR-Madre de Dios & IIAP 2000). The region is also home to 9 different ethnic groups of Amazon Indians (Huertas Castillo 2004).

History of Land Use and Occupation

Madre de Dios started its insertion into the international economy with the rubber boom (1890—1920). Rubber extraction started in 1894 after the discovery of large concentrations of rubber in the north (Manu, Los Amigos, Las Piedras, and Tahuamanu rivers) and south (around the Tambopata river) of the department (Huertas Castillo 2004). This boom generated the first period of intense immigration, and rubber tappers sought access to rubber trees and the clearing of agricultural fields for food, which began the alteration of forests along the rivers (Alvarez & Naughton-Treves 2003). However, due to the global crash in rubber prices and the decline of the rubber economy in the Amazon in the early 1900s, the few rubber companies remaining in Madre de Dios diversified their production by pursuing gold mining, selective logging, and collection of Brazil nuts (Alvarez & Naughton-Treves 2003).

In the mid-1960s, the construction of a new road connecting Puerto Maldonado to Cusco opened a new wave of immigration. For the next 20 years newcomers from the Andes settled mainly along the new road or in Puerto Maldonado (Alvarez & Naughton-Treves 2003); they came initially to work in the extraction of *Hevea brasiliensis* (wild rubber) and *Bertholettia excelsa* (Brazil nut), and later (late 1970s) in timber and mining (Lawrence et al 2005). During the 1970s and 80s, however, mining of gold became an important activity for the department's economy even as logging and Brazil nut extraction continued (Huertas Castillo 2004). Furthermore, improvements to bridges and highways in Tahuamanu caused an increase in

logging during the second half of the 1980s, as well. Thus, President Alan García's economic policies of access to agricultural credit and land titles led to the expansion of the agricultural frontier in the Department (Coomes 1996).

However, when Alberto Fujimori was elected as the new President in 1990, the new agrarian and economic policies drastically changed primary productive activities. This resulted in the decline of agricultural production and forest extraction due to the implementation of a program of austerity that removed agricultural credit and imposed taxes (Alvarez & Naughton-Treves 2003). Despite the decline in economic activities, an influx of Andean migrants continued and the population of the department has continued to grow (INEI 2008).

Contemporary Economic Activities in Madre de Dios

There are three main forms of economic activity in Madre de Dios: extraction (gold mining, Brazil nut, logging), farming (agriculture and livestock), and conservation-oriented tourism. Of all of these, logging is increasingly expanding and has become an important economic activity in the Department due to the amount of employment it generates.

Extractive Activities

Gold mining was the department's most dynamic economic activity during the end of the 1970s and the 80s, due to the high concentration of this metal in the alluvial areas of the Madre de Dios and Inambari rivers (covering approximately 500,000 ha). Diverse environmental impacts are associated with this activity (including water pollution by mercury, soil erosion, and vegetation degradation), although profits reported are significant. It is estimated that the annual production of alluvial gold is between 8—10 tons, and the financial flows generated by this activity contribute between 15 and 30% of the department's GDP (IIAP & CTAR-Madre de Dios 2001).

Brazil nut harvesting is an environmentally sustainable activity that covers an area of 1,600,000 ha (19% of the department's area). A significant source of employment in the region, this activity is facing difficulty due to the lack of competitiveness among the few companies trading this resource and the relatively low value of the nut, which is sold shelled and unshelled (Huertas Castillo 2004).

Logging has increased in the department since 1992, and is primarily selective of the most valuable timber species: mahogany, cedar, and *Cedrelinga catenaeformis* (*tornillo*). Together these three species represent 63% of the total volume harvested in the department. This activity was initially undertaken in an intensive way in Manu and Tambopata provinces where mahogany and cedar are now already exhausted, and since the 1990s, logging has focused on the Tahuamanu province where mahogany can still be found (Huertas Castillo 2004, IIAP & CTAR-Madre de Dios 2001). Since 2002 when the forest concession system was implemented in the Department, private SMFEs started managing the permanent production forest for timber production. Most of these private SMFEs derived from associations (i.e., small loggers and neighbors) already existing in the three provinces of the Department, few enterprises were formed with family members only, and few enterprises also were formed by an individual only. Also, most of the private SMFEs in the Department (78%) are formed by immigrants coming mainly from Cusco (the neighboring Department) who have been settled in Madre de Dios for an average of twenty six years. These new entrepreneurs harvest in average seven commercial timber species per year, and although mahogany and cedar are still the two most valuable and harvested timber species in the Department (particularly in Tahuamanu and Tambopata), more commercial species have been harvested since 2002 including species such as *Cedrelinga catenaeformis*, *Amburana cearensis*, *Aspidosperma macrocarpon*, *Dipteryx alata*, *Tabebuia sp*,

among others. This has been mainly due to increasing prices and demand for less traditional timber species.

Farming

Although characterized by low productivity and as having difficulties for commercialization, agriculture is a widespread activity mainly carried out in areas along the Madre de Dios and Tambopata rivers, and in areas adjacent to roads (IIAP & CTAR-Madre de Dios 2001). It is calculated that 6% of the total area of the department is allocated to farming purposes (Huertas Castillo 2004); the main crops cultivated are rice, plantain, corn, and manioc.

Livestock management consists mainly of families raising poultry and pigs, although there is extensive cattle ranching developed mainly along the Iñapari-Puerto Maldonado-Puente Inambari road (IIAP & CTAR-Madre de Dios 2001), which became more widespread in the late 1980s (Varese 1999). Sheep raising has also developed along the Quincemil-Puerto Maldonado and Pilcopata-Shintuya roads (IIAP & CTAR-Madre de Dios 2001).

Conservation

Since 1973, several protected areas (covering 55% of the department) were created in Madre de Dios with the main objective of protecting the great biodiversity this Department shelters and controlling the use of natural resources. Conservation is also associated with ecotourism, which in the department is concentrated in the provinces of Tambopata and Manu. It is undertaken mainly through travel companies that take their clients to tourist lodges located along the Tambopata and Madre de Dios rivers (IIAP & CTAR-Madre de Dios 2001, Lee 2000).

Summary

A key issue concerning SFM and certification involves the constraints and limitations that forest operators may face when applying these practices, particularly in the tropics. Initially, this

chapter presented a discussion of the main international initiatives guiding global management of forests, emphasizing the discussion of the FSC certification scheme as one of the most important mechanisms to promote responsible forest management in Latin America and the constraints that have been faced in its application. This chapter also discussed the legal framework for forest management in the Peruvian Amazon where forestry regulations have changed considerably over time. Peru's long-standing forestry regime was basically a situation of open access that predictably led to predatory extraction. The new Forestry and Wildlife Law of 2000, which established a forest concession system for timber harvesting, sought to change that chaotic situation by requiring management plans; this, however, raises questions about the viability of the new concession system.

Madre de Dios is a key arena for studying the viability of the new concession system given the size of the department and the large forested area it contains. It is also an important area because it was the first Department where this new concession system was first implemented in the country, and because of its importance as a center of biodiversity where logging is one of the most important economic activities with a long history. Thus, these characteristics make Madre de Dios a useful study case for an evaluation of Peru's new forest regime. Furthermore, given the goals of the new Peruvian forestry legislation, Madre de Dios is also a useful study case to evaluate SFM and certification and their constraints and limitations. The last section of this chapter presented the main biophysical characteristics, history of land use and occupation, and the economic context of Madre de Dios in order to introduce the study area. The next chapter will develop the methods and components of the analysis used in this research study to address how the characteristics of private SMFEs influence their management viability and on how SMFEs relate to other organizations.

CHAPTER 3
QUESTIONNAIRE DEVELOPMENT, SURVEY ADMINISTRATION, AND DATA ANALYSIS

Introduction

Given the lack of data on forest management among private SMFEs in the concession system in Madre de Dios, it was necessary to design questionnaires and administer a survey of the main forest stakeholders and SMFEs in the department. This chapter begins with brief descriptions of the questionnaire for forest stakeholders (i.e., the 'forest organization questionnaire') and the questionnaire for SMFEs. The 'forest organization questionnaire' is used to address the first research question of this study: namely, how SMFEs relate to other social actors. The 'SMFE questionnaire' is used to address the second research question: how the characteristics of SMFEs (in terms of their capital assets) influence their management viability. In particular, I focus on some important aspects of the development, structure, and formatting of the SMFE questionnaire and the implementation of both the forest organization and the SMFE surveys. In the section that follows, I present a description of how the data were compiled and reviewed for accuracy and completeness. The chapter then concludes with a description of the components of the analysis of the data.

Survey Questionnaires

Forest Organization Questionnaire

Analysis of the main stakeholders or key actors in the forest sector in the department, which have directly influenced or emerged in the course of the concession system, is an important aspect of this study. Therefore, the development of the 'forest organization questionnaire', which characterizes the interests and actions of key actors, was based upon literature describing the main actors participating in Third World environmental issues (Bryant & Bailey 1997, Grimble & Wellard 1997) in order to understand how the agenda of these actors

influences environmental problems. While this literature provided the structural foundation of the questionnaire, the content in terms of specific questions was mainly derived from unstructured interviews carried out during the first stage of this research study (May-September 2005) with representatives of some forest organizations influencing the concession system in the cities of Lima and Puerto Maldonado, Peru. These initial interviews were important; they provided an opportunity to understand the main stakeholders in Madre de Dios and helped to ensure the practicality of the survey instrument.

The 'forest organization questionnaire', which is used to address the first research question on how SMFEs relate to other social actors, was designed to elicit the following information from the main forest organizations in Madre de Dios: the nature of their relationships amongst each other; length of time they have worked in Madre de Dios and with what purpose; their main functions/roles in the process of the concession system in the region; their capacities/limitations to fulfill their specific roles; the specific actions of support they provide to SMFEs and the factors favoring/constraining this support; the status of their relationships with SMFEs and other actors in the region (in terms of negotiation or conflict). Questions 1—19 of the survey instrument cover these aspects. It also includes (in Questions 20—30) items related to the opinions that these forest organizations have of the performance and main problems faced by the SMFEs in the region, and perspectives of forest management and certification in Madre de Dios. The forest organization questionnaire is mainly comprised of open-ended questions and was written entirely in Spanish; it has been translated into English and placed in Appendix B.

Small-Medium Forest Enterprise Questionnaire

SMFEs in Peru comprise those businesses with gross capital of less than US$ 3,000,000 and less than 200 permanent workers. The 'SMFE questionnaire', which is used to address the second research question on how the characteristics of private SMFEs influence their

management viability, was designed based on a literature review of various types of capitals and capabilities possessed by households and small enterprises in developing regions. Specifically, I drew on the DFID livelihood framework that uses the five forms of capital—physical, financial, natural, human, and social capital (Department for International Development 1999). These forms of capitals define the productive assets that households and small enterprises need to strategize, pursue, and secure their livelihoods. For purposes of this study, they constitute the main components of SMFE capacity. Specific concepts of social capital were drawn from the Social Capital Assessment Tool (SOCAT), an instrument of the Social Capital Initiative by the World Bank (Grootaert & Bastelaer 2002). The development of the SMFE questionnaire was also derived from field interviews administered during the first stage of this research study (May-September 2005) to managers of the private 10 SMFEs receiving support from WWF in Madre de Dios. These initial interviews were important to the understanding of the functioning of private SMFEs in Madre de Dios, and facilitated the overall construction of the survey instrument.

The SMFE questionnaire was also designed to elicit information about the capitals and capabilities that SMFEs have for forest management, which is measured in terms of capital accumulated since 2002 (formation of the enterprise) through the 2006 harvest (last completed harvest year previous to the interview period). This period of time is important because it represents the five year grace period that the State granted to private SMFEs to manage their forests without the elaboration of a current forest inventory of their areas (but using only a governmental study[1]), and within a promotional regime of discounts in the payment of their harvesting fees.

[1] The intention of this was for the SMFEs to avoid initial expenses during this initial state of management where they were capitalizing themselves.

The SMFE questionnaire contains eight sections; Table 3-1 presents the contents of this instrument with a brief description of each section. The sections are arranged in a logical sequence in which they are administered, beginning with more general questions to build rapport with those interviewed.

Table 3-1. Composition of the SMFE questionnaire

Section	Item/Section	Description
--	Introduction	Introduction of the researcher; SMFE name, location
1	Respondent's data	Demographic information
2	History and Organization	Formation, structure, problems
3	Physical Capital	Assets and investments
4	Financial Capital	Financial information
5	Natural Capital	Timber related data
6	Human Capital	Training, practical experience information
7	Social Capital	Organizations, networks, participation, trust, conflict
8	Other Enterprise Aspects	Forest management, certification

Section one of this questionnaire includes demographic characteristics of respondents (mainly SMFEs managers or *Gerentes*[2]) such as age, education, income, and time of settlement in the area. Sections two to eight cover various characteristics of the SMFE. For example, Section two includes questions regarding: the formation of the SMFE (e.g., how it was formed, if there was external support to form it/ -from whom/ -what type of support); specificities of support received (e.g., what type of support, who provided support, what were the benefits/limitations of the support); and the structure of the enterprise (e.g., number of current members and changes over time, changes in number of managers over time, problems inside the enterprise). Section three includes questions regarding assets and investments of the SMFE (e.g., type and purchase costs of equipment held; amounts invested in road construction, supplies, construction of camps or other infrastructure, harvesting fees, and the elaboration of forest censuses). Section four includes questions about finances (e.g., amounts received as loans,

[2] In most of the private SMFEs surveyed, the manager has had this position since formation of the enterprise and was the most knowledgeable person about the functioning of its enterprise.

amounts held as savings, the economic contribution of the enterprise's members). Section five includes questions about the size of the concession area granted, and the amount of timber approved and harvested per year. Section six includes questions about the practical experience of the enterprise's members in logging and business, and the training they have received (e.g., how frequently, type, and who provided the training). Section seven includes questions regarding organizational density, networks and support organizations, participation of the enterprise's members and problems among them, trust and cooperation and resolution of conflicts. Finally, section eight includes questions about forest management constraints in Madre de Dios, certification issues, and constraints in operational management for SMFEs. A copy of the SMFE questionnaire (translated into English) used in this research study is presented in Appendix C.

Survey Implementation

Small-Medium Forest Enterprise Questionnaire Testing and Revision

Field testing of the survey instrument was important to ensure that all necessary information was being collected, that the wording of individual questions was clear, and to make sure there was no ambiguity in responses to a given question (Grosh et al 2000). It also helps in determining the approximate time to complete a survey (Fowler 2002). For this study, the SMFE questionnaire was tested in Puerto Maldonado during the second week of June 2007. The main finding of the testing was that the questionnaire was somewhat long if written notes were going to be taken to record the answers and some redactions were necessary. Changes included rewriting questions with a simpler wording, and shortening them in order to clarify the intent and meaning. This especially occurred with questions related to the History and Organization and the Other Enterprise Aspects sections (sections 2 and 8, respectively). Also, the testing revealed that for some questions it would be difficult, if not impossible, to get certain information required,

due to the lack of records of this information and/or lack of knowledge by the interviewee. Examples of these questions include: information on members of each enterprise (age, education, and forest activity experience), investments made by the SMFE, approved and harvested timber volumes for the period under study, and forest training (e.g., workshops) received by enterprise members. Despite observing some difficulty with such questions, it was decided to keep them as part of the survey because of the importance of the information (even if some of it is incomplete) and the novelty of this study.

Sample Size

This research study was initially designed to obtain a sample of private SMFEs from each of the three provinces of Madre de Dios, where forest concessions were granted in the first round of public bidding. However, due to the small population of SMFEs and differences in characteristics among them observed during field work in 2005, I decided to carry out a census to examine the entire population. The emphasis on concessions from the first round is important because they represent 85.4% of the total area of the permanent production forests currently granted in the Department. Thus, at this point in time, these enterprises are the main players of the forests of the Department and they will determine the outcome of most forest management there.

Twenty nine SMFEs[3] (Figure 3-1), representing 76.3% of the entire population (from a total of 38 private SMFEs still active as of August 2007) participated in this study from June 15 to August 28, 2007 (Table 3-2). A list of the SMFEs participating in this study is presented in Appendix D. Non-participating SMFEs include: five enterprises whose administrator, although accepting participation in the study, never delivered the information required; three enterprises

[3] The 29 SMFEs in this study represent 27 units of analysis, since in the Tahuamanu province there are two groups of two enterprises each that are working together.

whose managers and/or members could not be located during the period of the study; and one enterprise that was in an evaluative process to be returned to the state, because it had just presented its GFMP and had not harvested at all.

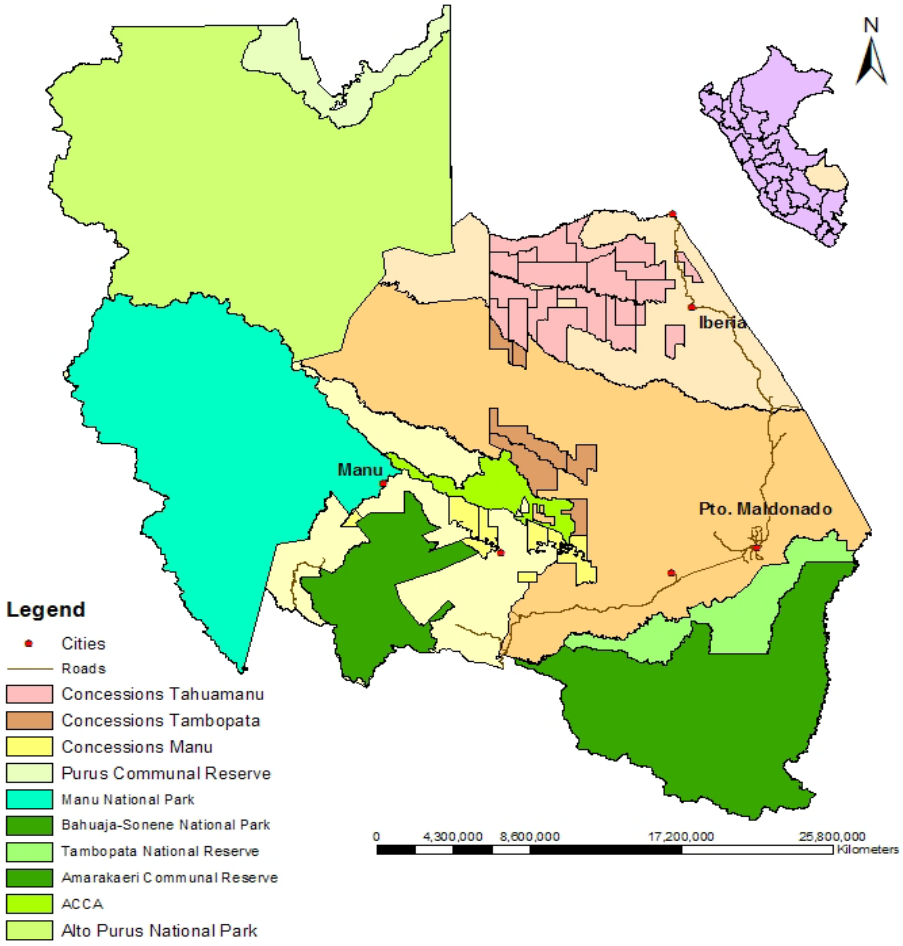

Figure 3-1. Forest concession areas of participating SMFEs

Table 3-2. Distribution of active private SMFEs - 1st round (As to August 2007)

Province	Total SMFEs	SMFEs in the study
Tahuamanu	21	14
Tambopata	6	6
Manu	11	9
Total	38	29

This research was also designed to obtain a purposive sample (Bernard 2002) of the main forest organizations involved in the concession system whose interactions and/or decisions have influenced SMFEs performance. Thus, 29 experts on the subject of forest concessions representing 72.5% of the entire population (from a total of 40 experts) participated in this study from May 25 to September 30, 2005, and from June 15 to August 28, 2007 (Table 3-3). Nineteen experts were interviewed during the 1st stage of the study in 2005, while 16 experts (including some previously interviewed during the 1st stage) were interviewed during the 2nd stage of research in 2007. These experts included government officials, representatives of key environmental NGOs, forest consultants, and grassroots representatives. A list of the experts participating in this study is presented in Appendix E. Non-participating experts represent those who could not be located during the period of study.

Table 3-3. Forest experts on the forest concession system (2005-2007)

Organization	Total experts	Experts in the study
The National Institute of Natural Resources-Madre de Dios	4	4
The Regional Government of Madre de Dios	1	1
The Promotional Fund for Forest Development-Madre de Dios	2	2
The Timber Forest Resources Supervision Agency-Lima	2	1
The National Forestry Chamber-MDD	1	1
The World Wide Fund for Nature (Lima and Madre de Dios)	6	4
Cooperazione e Sviluppo	2	2
The Peruvian Fund for Nature Conservation-Madre de Dios	2	1
The Association for Conservation of the Amazon Basin-Madre de Dios	2	2
The Roundtable for Dialogue and Forestry Consensus-Madre de Dios	2	2
Tahuamanu's Concessionaires Association	1	1
Madre de Dios' Concessionaire Association	1	1
Forest Extractors's Federation	1	1
Tahuamanu's Ecology Association	1	1
Association of Small Loggers of Tahuamanu	2	1
Rio Las Piedras' Forest Management Committee	1	1
Forest consultants	6	2
Madre de Dios' National University	3	1
Total	40	29

Implementation of the SMFE and Forest Organization Surveys

This research study was carried out in two stages: the first in 2005, and the second in 2007. ***During the first stage of fieldwork***, carried out in Lima and Puerto Maldonado from May 25 to September 30, 2005, the main goal was to obtain general knowledge of the functioning of the concession system in Madre de Dios, and to identify and compile initial information acquired from the main forest organizations. Thus, with help from Forestry Engineer Roberto Kometter, Director of Development of Forest Management Plans (at that time) of the CEDEFOR/WWF Project in Lima, the first names of representatives of the main forest organizations in Madre de Dios were compiled, as well as the list of the SMFEs receiving technical support from WWF in

the Department. Later, snowball sampling was used to identify further representatives of these forest organizations.

Thus, unstructured interviews were carried out with 19 representatives of forest organizations (representatives of NGOs, government, and grassroots organizations) to investigate the overarching political context, functioning and problems of the concession system, and these organizations' participation and role. Semi-structured interviews were carried out with the managers (*Gerentes*) of the 10 private SMFEs receiving support from WWF in Madre de Dios[4] and covered the formation, capacities and limitations of forest management practiced by these enterprises. All interviews lasted between 30—50 minutes and were tape recorded; all interviews were later transcribed for compilation and analysis.

During the second stage of this study, carried out in Puerto Maldonado from June 11 to August 28, 2007, the main objective was the implementation of the SMFE and forest organization questionnaires. Prior to the actual implementation of the survey, preparatory work included presentation of letters to INRENA's *Intendente Forestal y de Fauna Silvestre* (in Lima) which introduced the researcher and the research topic, and requested information on names and addresses of all private SMFEs managers from the first round of bidding in Madre de Dios. These preparations occurred in May 2007.

In June at my arrival in Puerto Maldonado, the information requested from INRENA-Lima was not delivered,[5] thus in the middle of June I requested the same information from INRENA's *Administración Técnica Tambopata-Manu*. As the list of SMFEs they provided me was not

[4] These enterprises represented the entire population of SMFEs receiving technical support from the CEDEFOR/WWF Project during 2005. They composed 25% of the total population of SMFEs from the first round of bidding.

[5] I actually got this information (with no current data) by the end of July when I already had located or knew about the location of most SMFEs managers.

complete I started the application of the forest organization questionnaire with representatives I visited in 2005. Also, the first application of the SMFE questionnaire was done with a SMFE manager I interviewed in 2005, with the objective of requesting the location of other SMFEs managers missing from my list.

The application of both questionnaires depended on the availability and/or location of the interviewees. For example, I started interviews in Puerto Maldonado where most SMFEs managers and forest organization representatives are located. Then, I moved to Iberia and Iñapari cities for a week to interview mainly SMFEs managers from the Tahuamanu province. Later, I moved to San Juan Grande and Boca Colorada towns for four days to interview SMFEs managers from the Manu province. And finally, I went back to Puerto Maldonado to locate SMFEs managers that I could not locate in their residencies at first, due to travel reasons.

The first task undertaken during the interview is the introduction of the researcher and research topic to the respondent. This is followed by the reading of the informed consent and obtaining oral acceptance[6] from the respondent before beginning the main part of the interview. When meeting a SMFE manager for the first time, an appointment was requested to interview that person at a later, more convenient time. However, only in a few cases was it necessary to schedule an appointment for a later date.

During the initial application of the SMFE questionnaire it was impossible to get complete information about the enterprise's members (age, education, and forest activity experience) and on their approved and harvested timber volumes for the period under study. This was mainly due

[6] In 2005, during first stage of field work very few people, although approving participation in the study and reading the informed consent, accepted to sign it. With that experience, in 2007 only oral consents were requested, previously showing a hard copy of the consent.

to the lack of knowledge and lack of records kept by most interviewees. Nevertheless, this situation was rectified later using secondary information obtained from INRENA.

Information about approved and harvested timber volumes of the enterprises were requested from each of the two INRENA Technical Administration offices in Madre de Dios. Thus, INRENA's database for the Harvests 2002—2006 (updated to September 2007) was initially used to complete this information as input for the master file. After reviewing this information, however, I found some mistakes in INRENA's volume database—particularly on annual harvested areas and approved and harvested timber volumes.[7] Also, after reviewing data from the SMFE questionnaires already entered in the SPSS template, I realized that a lack of consistent information for SMFEs under study existed.[8] Therefore, due to these findings, I carried out a couple of additional trips to the study area (March and June 2008) to verify the volume database supplied by INRENA and to compile information to fill gaps found in the SMFE questionnaires (and verify some of this information). As a result, I obtained a newer version of INRENA's database for the Harvests 2002—2006 (updated to April 2008) and then compiled hard copies of official documents such as the *Resoluciones de Intendencia y Administrativas*, annual harvesting fees summaries, and sections of the Annual Operating Plans (AOPs) and the General Forest Management Plans (GFMPs).

This new information was used mainly to verify the approved and harvested timber volumes, size of concession areas, annual harvested areas, and harvesting fees of the SMFEs surveyed for this study. Specifically, the *Resoluciones de Intendencia y Administrativas* were

[7] Previous experience (gained during the first stage of field work in 2005) in reviewing annual operating plans from SMFEs assisted by WWF-MDD helped me to recognize these mistakes, because usually the mistaken values were far off from the regular values for most SMFEs.

[8] This lack of consistent information is due largely to the lack of a systematic organization inside SMFEs. Most SMFEs in the area have not kept recorded data of their operations and expenses. Only in 2006, did SMFEs applying for forest certification start a process of recording and organizing data from their operations.

used to verify the approved and harvested timber volumes and the annual harvested areas. In addition, a variety of other sources were utilized when compiling incomplete and/or missing data. For example: (1) AOPs were used to cross check and complete information on roads because these documents contain records of the length of roads built by a SMFE during the previous management year; (2) management plan costs were calculated using the value of 5 US$/ha obtained by Pattie et al. (2003) in a study of forest management in Bolivia, because this cost information from AOPs was incomplete for many SMFEs surveyed, and no information on cost per hectare for AOPs exists in Peru; (3) expertise from Forestry Engineer Alejandro De La Cruz, a forest concession consultant in Madre de Dios, helped to verify the equipment for harvesting operations held by enterprises and their associated costs. Data from the FONDEBOSQUE database on small loans provided to SMFEs in Madre de Dios were also used to verify loans received by the SMFEs under study.

Each SMFE interview generally took between 40—50 minutes to complete, while interviews of the forest organizations usually took between 30—40 minutes to complete. This was a manageable overall length as suggested by Grosh et al (2000), who points out that a respondent should not be interviewed for more than one hour on any given day. The total number of interviews, in this second stage of the study, includes 16 representatives of forest organizations (government, NGOs, forest consultants, and multi-stakeholder organizations)—some of which were previously interviewed in 2005—and the managers and/or members of 29 SMFEs.

Data Compilation and Management

Parallel to the application of the questionnaires, qualitative data from the interviews were transcribed into individual Word documents. After the completion of the interviews, a template file was created using the Statistical Package for the Social Sciences (SPSS 16.0 for Windows) to

basically transcribe quantitative data from the SMFE questionnaire. This allowed data from each SMFE to be easily transcribed into this format using numerical codes for many variables.

It is important to mention that in the SMFE structured interview, although several variables were considered for each one of the initial five capital types (see Appendix C), fewer variables than expected were considered for analysis due to the lack of consistent information for all SMFEs under study. This was the case for physical and financial capital variables; as a consequence, this study presents an analysis of both of these capitals combined. This decision is not problematic since physical and financial capital are often combined in livelihood frameworks and referred to as produced capital (see Scoones 1998, Serageldin & Steer 1994). Also, it is important to point out that data on roads value have to be taken with caution since these were based mainly on estimations given by the interviewee, and data from AOPs is not very reliable according to the aforementioned expert Sr. De La Cruz. Table 3-4 shows the final group of variables (henceforth "indicators") that were considered for analysis from the SMFE questionnaire after a series of factors analyses were carried out for each group of capital indicators to identify and to understand the interrelations of the indicators that better represent each fundamental construct; namely produced, natural, human, and social capital (see Appendix F).[9] In this study, it is acknowledged that some indicators for produced capital can be liabilities also and not just assets (e.g., roads, harvesting fee, and management plans); so caution must be taken when considering these indicators.

[9] It was also originally intended to use factor analysis to replace the original set of indicators with a new and smaller set of variables created from factors scores (resulting from the series of factor analyses) in order to understand the relationship between forest management performance (as dependent variable) and the capacity of private SMFEs (in terms of their types of capital serving as independent variables); however, the variables from factor analysis exhibited insignificant relationships, so I focus on individual indicators. Results from factor analysis appear in Appendix F. I did not use multi-regression analysis because the sample is too small and the results were insignificant; those findings appear in Appendix G.

Table 3-4. Group of indicators from the SMFE questionnaire

Indicators	Definition
Produced capital	
Equipment	Actual value in US$ of useful equipment owned by the SMFE during Harvest 2006, considering annual depreciation and inflation
Roads	Value in US$ of roads constructed by the SMFE until Harvest 2006
Harvesting fee	Value in US$ of accumulated annual harvesting fee that SMFEs must have paid for the total area of the concession until Harvest 2006
Loan	Amount in US$ received as credit until Harvest 2006
Management plans	Value in US$ of all annual operating plans approved to SMFEs until Harvest 2006
Area	Total concession area in hectares
Natural capital	
Approved timber volume	Total volume of timber in m^3/ha approved by INRENA during the Harvest 2002—2006
A category	Total approved volume (m^3/ha) of mahogany (Highly valuable)
B category	Total approved volume (m^3/ha) of cedar (Valuable)
C category	Total approved volume (m^3/ha) of timber species belonging to category C (e.g., *Cedrelinga catenaeformis, Amburana cearensis, Chorisia sp., Aniba sp., Virola sp.*) (Intermediate value)
D category	Total approved volume (m^3/ha) of timber species belonging to category D (e.g., *Coumarouna odorata, Aspidosperma subincanum, Tabebuia sp., Copaifera officinalis*) (Potential)
E category	Total approved volume (m^3/ha) of timber species belonging to category E (e.g., *Hymenaea spp., Myroxylon balsamun, Manilkara bidentata, Couratari guianensis*) (Other species)
Species per AOP	Average number of timber species approved per harvesting
Harvested timber volume	Total volume of timber in m^3/ha that has been harvested by SMFEs during the Harvest 2002—2006
A category	Total harvested volume (m^3/ha) of mahogany
B category	Total harvested volume (m^3/ha) of cedar
C category	Total harvested volume (m^3/ha) of timber species belonging to category C (e.g., *Cedrelinga catenaeformis, Amburana cearensis, Chorisia sp., Aniba sp., Virola sp.*)
D category	Total harvested volume (m^3/ha) of timber species belonging to category D (e.g., *Coumarouna odorata, Aspidosperma subincanum, Tabebuia sp., Copaifera officinalis*)
E category	Total harvested volume (m^3/ha) of timber species belonging to category E (e.g., *Hymenaea spp., Myroxylon balsamun, Manilkara bidentata, Couratari guianensis*)
Species per AOP	Average number of timber species harvested per harvesting
Human capital	
Enterprise members	Total number of members in SMFEs during Harvest 2006
Logging experience	Total number of members in a SMFE during Harvest 2006 with previous experience in logging (before SMFE formation)
Business experience	Total number of members during Harvest 2006 with previous experience in business (before SMFE formation)
Education	Manager's education; measured as the number of completed schooling years
Members' performance	Degree of members' performance in different tasks in a SMFE. It is measured as percentage of the qualification of performance as low, medium and high

Table 3-4. Continued

Social capital	
Density of membership	Number of forest associations a SMFE belongs to. It is the percentage of SMFEs belonging to none, 1, and 2+ associations
Networks	Percentage of the existence of people outside the enterprise and/or institutions assisting a SMFE for financial and commercial purposes. 100 is the highest possible value.
Exclusion	Percentage of the existence of exclusion among enterprise members due to characteristics such as education, wealth, and political ideas. 100 is the highest possible value
Trust	Percentage of the extent of trust among enterprise members overall. 100 is the highest possible value
Participation	Percentage of membership participation in meetings and in general in enterprise activities. 100 is the highest possible value
Conflict	Percentage of the existence of internal conflict in the SMFE

Data for most of these indicators were compiled from interviews. The following indicators, however, were compiled from INRENA's documents: harvesting fee, management plans for produced capital; and, for natural capital, approved timber volume and harvested timber volume. Data on harvesting fee came from INRENA's annual harvesting fees summary documents, while data on management plans came from a calculation using the annual harvested areas data from the *Resoluciones de Intendencia y Administrativas* and the value of 5 US$/ha obtained by Pattie et al. (2003) for annual harvested areas in Bolivia. Data on approved and harvested timber volumes came from INRENA's database for the Harvests 2002—2006 updated to April 2008. Data on the latter two indicators were sub-divided in terms of the five categories of timber species according to their commercial value established by Ministerial Resolution (R.M. N° 0245-2000-AG).

Data Analysis: Components of the Analysis

Under the previous forestry code, logging in Madre de Dios became a predatory activity. However, with the implementation of the concession system in 2002, when private SMFEs became the new actors of forest management, this activity took a new direction at least in policy terms. Although there is no literature or other documents to provide specific information on the resources and capacities of these new forest actors to carry out forest management under the new

model, it can be inferred that differences exist among them. Thus, there are two main components of the analysis that address the two key questions that motivate this study.

The first component evaluates the interests and actions of the main forest stakeholders in Madre de Dios influencing the implementation of the concession system during the first five years (2002—2006): (1) INRENA, representing the State; (2) WWF, CESVI, ProNaturaleza and ACCA among environmental NGOs; and (3) the Roundtable for Dialogue and Forestry Consensus and the forest management committees among multi-stakeholder consultative organizations. INRENA is the actor that has traditionally conditioned the access of different actors to the forest resources of Madre de Dios; its role in the governance of forest resources has generated substantial policy and management changes that have often contributed to more forest degradation and to an increase of illegal logging. The role of environmental NGOs in Madre de Dios has mainly been related to support the various biodiversity conservation projects; however since the implementation of the concession system, their conservation role has been extended to support and promote sustainable forest management. Multi-stakeholder consultative organizations, which in this dissertation are defined as entities formed by an array of organizations whose members together consider and deliberate on issues related to the forestry sector, emerged during the implementation of the new Forestry Law in Madre de Dios as suitable forums for dialogue and participation to address issues related to the implementation of the forest concession system in the Department.

The second component compares indicators of forest management capacity among private SMFEs for their first five years (corresponding to Harvest period 2002—2006), and makes three distinctions. First, it is important to recognize that Madre de Dios is a department with three distinct provinces: Tahuamanu, Tambopata, and Manu. Of these three provinces, Tahuamanu is

the least logged in the department; in comparison Tambopata and Manu have experienced more years of logging activity (especially Manu). Thus, a distinction of SMFEs among the three provinces will allow a more informed view of historic, economic, and geographic differences among them in the department, rather than simply speaking of the SMFEs in the department as a whole. Second, as some SMFEs in the department have attained forest certification, it is important to distinguish between these SMFEs and the ones that do not hold forest certification. For example, Irvine (1999) points out that forest certification implies significant costs for small operations. Thus, we should expect to find greater forest management capacities among certified SMFEs than among non-certified, because greater resources are needed to comply with the demands of certification. A third and final distinction is made among SMFEs in the Tahuamanu province since this province has been the least logged in the Department and all SMFEs with certified forest concessions in Madre de Dios are located in this province; thus it is of interest to evaluate differences among SMFEs in this region: (1) those already certified, (2) those which are planning to apply for certification (next 2—4 years), and (3) those which are not planning to get certified in the short term (within 2—4 years).

Summary

A common characteristic among private SMFEs that hold forest concessions in Madre de Dios is the lack of data on forest management. This chapter presented the methods used in this research study to gather data to address the two research questions: how SMFEs relate to other stakeholders and how the characteristics of SMFEs influence their management viability. Each research question is addressed with a set of data from interviews derived from the ‘forest organization questionnaire’ and the ‘SMFE questionnaire’, whose development, structure, formatting and implementation have been explained in this chapter.

The analysis of these data has two components. The first component evaluates the interests and actions of the main forest stakeholders in Madre de Dios influencing the implementation of the concession system during the first five years (2002—2006). This component provides the general context of the concession system. The second component compares indicators of forest management capacity among private SMFEs for their first five years (corresponding to the Harvest period 2002—2006). The following two chapters pursue the analysis of these two components.

CHAPTER 4
THE NEW FOREST CONCESSION SYSTEM: A STAKEHOLDER APPROACH

Introduction

Around the world, sustainable management of forests has become a continuation of already existing management practices in some developed countries, and the beginning of a transition toward better management practices in some developing countries. The Republic of Peru is not unaware of this transition process, and its new forest concession system, as a system for responsible forest management and social development, is still in the beginning phase of development. For example, since the onset of this system's implementation in Madre de Dios in 2002, there have been changes and evolution in the official legislation, in the function and number of the administrative institutions, and in the roles and actions of the forest management actors. There was initial opposition to the implementation of the forest concession system by some groups; however, the system continued its implementation and different actors have played distinct roles in the concession process. For example, small-medium entrepreneurs are the most important actors in the new model in terms of forest management since they are the actual holders of all concession contracts granted in the Department. However, the government and environmental NGOs also play an important role because their actions (e.g., promotion, implementation, and support) have dominated the implementation of the new concession system. This became clear from observations made during the fieldwork phase of this study. In terms of moving forward into the future, the challenge of this new model is to ensure that the efforts of private SMFEs to carry out responsible management are successful. But that success, and thus the viability of the new model in the long-term, depends also on the ability of other forest actors that have an influence on the actions of SMFEs and the management decisions they undertake.

In Madre de Dios, there is little information on the role played by different social actors involved in the concession system. Thus, there is a need to assess those roles and to understand how they have influenced the efforts undertaken by private SMFEs in terms of forest management and conservation in the department. As such, this chapter addresses the following question: how do the specific agendas (actions/roles and capacities) of other social actors influence private SMFEs' efforts to conduct forest management under the forest concession system in Madre de Dios? One of the important elements of this research is to examine these roles and dynamics through a stakeholder analysis.

Stakeholder analysis (SA) is an approach that facilitates the understanding of a system through the identification of key actors or stakeholders and the assessment of their respective interests in that system (Grimble & Wellard 1997). This approach is employed because it specifically focuses on the interests, characteristics, and actions of stakeholders, which is important in terms of delineating problems and identifying incompatibilities in a system. Thus, the use of this approach is helpful to understand the forest concession system in Madre de Dios, which involves multiple stakeholders. Moreover, because the concession system is new, it is undergoing a process of continuous transformation, with the consequence that the interests and actions of different actors are also evolving. The stakeholder analysis will focus on three types of actors, the State, environmental NGOs, and multi-stakeholder consultative organizations. Preliminary fieldwork indicated that the first two types of actors play a central role in the new concession system, and the third may play a potential role as well. The application of stakeholder analysis provides a way to understand the roles of these actors in influencing the outcomes of the new concession system.

This chapter first discusses the process of implementation of the new forest concession system in Madre de Dios, which provides the context for the analysis of the actions and dynamics of key social actors involved in that implementation. Then an analysis of the three main groups of stakeholders in the forest concession system in Madre de Dios is presented: the state (through INRENA and FONDEBOSQUE), environmental NGOs (i.e., ACCA, CESVI, ProNaturaleza, and WWF), and multi-stakeholder consultative organizations (i.e., the Roundtable for Dialogue and Forestry Consensus, and forest management committees). The organizations in the three main groups of stakeholders are analyzed by examining the mandate/interests of the organization in question, the support to SMFEs, and the discussion of what has actually happened.

Qualitative data analysis

The research design of this component was based on a purposive sample of the main forest organizations that influence the implementation of the concession system (and directly support SMFEs) in order to obtain qualitative data. As such, the analysis for this component follows the steps recommended by Taylor & Renner (2003) and Auerbach & Silverstein (2003) for analyzing qualitative data. Prior to the initial coding (a procedure used to organize the text of the transcripts and discover patterns) additional files were created to organize the data collected. An individual file was created for every organization, and each file contains answers from the 1or 2 representatives interviewed per organization. These files cover Questions 1—19. This was done because these questions are specifically oriented to the characteristics of individual organizations (roles, relationships, capacities, etc.). In addition, for Questions 20—30, an individual file for each of these questions was created to contain the answers from the 16 respondents from 2007.

The same procedure was done for the unstructured interviews obtained from the preliminary research undertaken in 2005.

In order to understand respondents' views and actions, and actually translate that into effective and meaningful codes, the initial coding consisted of carefully reading the responses from every answer of a given question and highlighting the *relevant text.*[1] Later, only the highlighted passages were copied into separate files (by question) and numbered. After selecting the relevant text, similar ideas expressed (in relevant text) by two or more research participants were identified: the *repeating ideas*. This was done in the following way (example for Q20):

- The file that contains the list of relevant text for Q20 was opened. A new file was created that became the list of repeating ideas from Q20.
- The first selection of relevant text from the relevant text file was highlighted and copied to the repeating ideas file. This first selection is the *starter text*. After reading through the entire list of relevant text selections, keeping the starter text in mind, every time an idea that seemed related to the starter text was encountered, it was highlighted and copied into the repeating idea file. This was done until all the relevant text related to the starter text was highlighted and moved into a group. After returning to the original list of relevant text, the first selection of the text that was not grouped with the original starter text was highlighted and moved. This new selection became the next starter idea. After reading down the list of relevant text all the selections that relate to this starter were highlighted and moved. This procedure was repeated until as many of the relevant text selections were grouped together into the repeating idea file for Q20.

After working through the list of relevant text for each individual question, there was some relevant text that did not get repeated. Thus, this text (i.e., "orphan text") was compared among all orphan texts of all files for other questions and compiled together when possible into repeating ideas. In cases when the "orphan text" did not match any other text, the orphan text was kept in order to reflect differences in experience as well as commonalities since this will add information and knowledge to the analysis.

[1] Text that is related to my specific research concerns.

Once identified, the repeating ideas in each separate transcript (each question) were combined (when possible) from all of the transcripts into a composite list for the entire research sample and named with a short quote that captured the essence of each repeating idea. Specific themes that the repeating ideas focus on include: the role of the organization (of the interviewee) with respect to the forest concession system, the current support of this organization to SMFEs, and the capacities of that organization to provide such support. Thus, at this stage, making connections of the different repeating ideas (i.e., having something in common) and comparing them was fundamental, and notes were taken in order to facilitate this process.

Beginning of the Forest Concession System in Madre de Dios

Prior to the implementation of the forest concession system in Madre de Dios, factors existed that constrained advances in the forest sector for decades, and the transition from a long-standing predatory system of conventional logging to a new system of forest concessions based on more sustainable practices has not been easy. Despite changes in the forest policy to improve forest management in the Department, some factors constraining better management have remained from the previous forest regime, while others have emerged during the first five years of the concession system implementation. The following is a list of factors that constrained forest management during the previous forest regime, and have subsequently persisted over time:

- Informality of the forest sector. For 25 years (1975-2000) there were neither management plan requirements nor any labor or tributary (tax) obligations; today several SMFEs still have not implemented many of the labor requirements.

- Lack of experience in sustainable forest management. There was no previous experience with, or even any knowledge of, SFM practices. Thus the implementation of the system itself has been an experience of learning by doing.

- Deficient cadastral information. Some forest concession areas overlapped the acquired rights of third parties (i.e., miners, farmers, and indigenous communities).

- No updated information on forestry inventories. The only available data was the Peruvian Forest Map of 1995; thus there has been an overestimation of the real forest potential of forest concession areas offered.

- Illegal logging. This activity has persisted, but new modalities have been used to carry it out (e.g., forgery of transportation permits, presentation of false information in management plans on tree volumes).

As mentioned previously, new factors have emerged in the early stages of the implementation of the forest concession system that have affected the implementation itself; in addition they have constrained better management practices in the Department. Such factors include:

- Misinformation with regard to the content of the NFWL and the forest concession system itself. There was a lack of dissemination of this information to all forest actors in the department, creating confusion and misinformation among small loggers.

- Opposition to the system. Some political authorities, large loggers, and some small loggers have been openly against the forest concession system from the beginning, and wanted to keep the *status quo*.

- Short time deadlines to participate in the first bidding. Many SMFEs were formed hastily in order to participate. Also, most petitioners did not visit the areas subject to bidding.

- Centralized administrative functions. INRENA's office in Lima centralized most of the administrative functions until 2005, which resulted in delays in AOP approvals.

- Late implementation of the supervisory agency. Only in 2005, OSINFOR was finally implemented. In the meantime INRENA was also supervising fulfillment of concession contracts.

- Third party invasions. Some SMFEs have had their concession areas invaded by illegal loggers, in locations where the concessionaires were not yet working.

- Lack of an institution that effectively regulates professional activities. Although professionals signing GFMPs and AOPs must be members of a professional association, and be registered in INRENA's registry, some bad "professionals" have deceived concessionaires when providing assistance for the development of GFMPs and AOPs. However, some of these actions have been carried out in cooperation with the concessionaire.

As can been seen enumerated in the lists above, several factors have constrained the implementation of the concession system in Madre de Dios. These factors have been the product

of the direct and/or indirect actions of different social actors. The following section presents the history of the implementation of the new concession system in the Department, and introduces some of the key actors of this process that are analyzed later in more detail.

Implementation of the Forest Concession System

Since promulgation of the NFWL, two divergent positions arose among Madre de Dios interest groups: those who favored implementation of the forest concession system and those against it. Environmental NGOs supported the system because they believe in a system of sustainable forest management in order to avoid the disorganization, informality, and unsustainability of the previous forest regime. Thus they promoted these beliefs to several small loggers who also supported this system in the hope of having better market opportunities and continuing with the activity that supports their livelihoods. In opposition, some local political authorities were against the NFWL from the moment it was enacted because of their agreements with regional timber elites[2] to keep the *status quo* of the previous forest regime of exploitation of large forest areas without management plans. The lack of widespread information about this new system and its benefits was used by these local authorities to misinform some small loggers about the NFWL and the concession system,[3] in order to oppose it and to defend the continuation of the old forest regime. Nevertheless, implementation continued, and on 11 March 2002 the *Comisión Ad hoc*,[4] a commission formed by law exclusively to carry out the promotion process

[2] These elites, consisted mainly of large loggers and timber buyers (or *habilitadores*), used small loggers as *testaferros* (i.e., small operators fronting for large entities who remain behind the legal scenes) so as to access many 1,000ha contracts.

[3] Groups opposed to this new system undertook a campaign of misinformation that included statements like: 1) the new system was going to favor foreign companies; thus small loggers would not be able to have access to the forest and 2) this new system was supported by conservationist NGOs to prevent forest production.

[4] The *Comisión Ad hoc* was constituted through an INRENA Resolution (R.J. N 032-2002 INRENA) with the purpose of carrying out the promotion process and delivery in concession of the harvesting units of the permanent production forests of the country. In 2002 this Commission was composed of Marco Romero Pastor (President), Jessica Hidalgo Floríndez, and Rafael Galván Landavere.

and the delivery of the forest concessions, called for the first round of public bidding. After realizing that this forest concession system was going to continue its course, and that the State was not going to relent in its implementation, some of the small loggers who were initially opposed decided to participate in the first round of bidding because they realized this was the only option to harvest the forests of the Department in a legal manner.

Once the official announcement for the first round was given, there was a time limit of 30 days (subsequently expanded to 41 days) for petitioners to read the *Bases del Concurso*[5] to verify the species and volumes of the harvesting units required for their application, and to prepare the economic and technical proposal.[6] Many loggers did not participate in this round due to the short time limit, and because of misinformation about the forest concession system that was disseminated by some political authorities. In addition, the short time limit resulted in most petitioners not visiting the areas subject to bidding to observe actual field conditions.[7]

The first round of public bidding resulted in 56 contracts to 44 private SMFEs (40 *personas jurídicas* and 4 *personas naturales*[8]) for concessions covering a total area of 1,119,937 ha. This meant that a total of just 337 people (INRENA database, October 2003) were authorized to harvest the Madre de Dios permanent production forests, which excluded many small loggers

[5] Document containing principles and regulations of the public bidding contest, including documentation necessary to participate in the contest, as well as documentation to subscribe the concession contract. Also in the Appendix, it includes a very general description of the type of forests contained in the harvesting units under contest and their extensions, mentioning the main forest species in those areas.

[6] Each interested participant could present 3 offers (economic proposals), indicating his priority for each one. The second offer would have only proceeded when the first offer had already been adjudicated to another participant. A similar case would occur with the third offer. The deadline to present these proposals was April 22.

[7] These petitioners simply based their proposals on estimations done using data from a study by INRENA of Madre de Dios forests using the Peruvian Forest Map of 1995, which resulted in over-estimation of the real potential of those areas. Thus, many petitioners made very high economic offers in order to gain a concession.

[8] *Personas naturales* is the legal term for a sole proprietor while *personas jurídicas* indicates a legal business partnership.

from harvesting the forests in a "legal manner".[9] This result led, in part, to a strike which followed less than two months later. Due mainly to the widespread opposition to the concession system, but also because the expiration deadline for 1,000 ha contracts signed under the old regime was nearing (on June 30),[10] small loggers from the *Asociación de Extractores Forestales de Servicios y Comercialización de Madre de Dios* started an indefinite forest strike ("*paro maderero*") on June 25. The strike began when these loggers initiated a protest and committed vandalism in Puerto Maldonado[11] in an effort to bring back the former forest management regime. The old regime had created a system of forest overexploitation where large-scale loggers hired many small loggers to request the 1,000 ha contracts allowed to them, and then harvested much larger tracts of forest without a technical study and without fulfilling other obligations required for larger contracts. Also, this regime contributed to the proliferation of illegal logging since many contracts were used to justify logging done in non-authorized areas.

Despite these misfortunes, on 16 May 2003, a new *Comisión Ad hoc*[12] called for a second round of public bidding. With experience from the previous round, and realizing that the forest concession system was going to continue, the majority of small loggers who had been initially

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[9] It has been pointed out that before the implementation of the concession system in the department there were approximately 2,000 illegal loggers, most of whom were *testaferros* of big loggers who exploited timber in an illegal manner (Mateluna 2003). *Testaferros* are small operators fronting for large entities who remain behind the legal scenes.

[10] Due to political pressure to modify the forest concession system, a temporary extension of the 1,000 ha logging contracts occurred to allow a smoother transition to the new system.

[11] These people believed that through force they were going to bring back the former forest regime of 1,000 ha contracts. The strike lasted for a week and the offices of INRENA, the Ministry of Agriculture, and the NGO ProNaturaleza were burnt down with a consequent loss of documents and equipment. Mr. Rafael Ríos López, the President of the *Asociación de Extractores Forestales de Servicios y Comercialización de Madre de Dios* (a group that opposed the concession system from the beginning), directly was blamed for these acts. An expert in Amazon issues, Roger Rumrrill, affirmed that although small loggers were responsible for the vandalism, in reality they were pressured by large timber exporters who buy their mahogany (Lama, 2002).

[12] On 11 April 2003 a new Commission Ad hoc was exclusively set up for the concession process in Madre de Dios. It was composed by Norma Revoredo (President), Jessica Hidalgo, Libertad Velásquez, Alfredo Vracko, and Rafael Otero.

opposed to this system applied this time around. The *Bases de Concurso* had some modifications in the second round:

- Applications were limited only to small entrepreneurs and not to medium entrepreneurs as previously.[13]
- Petitioners could apply for only one harvesting unit (5,000—10,000 ha) and not for several as was previously the case.
- The technical proposal was given more weight than the price bid in the final evaluation score.

After the second round was announced, there was a time limit of 60 days for petitioners to present the proposal to the *Comisión Ad hoc* in a public act on July 16. The results of this round were announced two weeks later (July 30): 29 concession contracts (covering a total area of 191,768 ha) were awarded to 29 private SMFEs (26 *personas jurídicas* and 3 *personas naturales*), consisting of a total of 89 people (INRENA database, October 2003) who were given the right to harvest the Madre de Dios permanent production forests. This round was carried out with fewer problems than the first because there was more knowledge of the concession system and more participation of organized civil society in its implementation. Table 4-1 shows the original distribution of the areas granted, by province, during the two rounds of public bidding in the department.

[13] Small entrepreneurs are those with a gross capital of less than US$ 350,000 and less than 50 permanent workers; while medium entrepreneurs are those with a gross capital of US$ 350,000 - 3,000,000 and with 50-200 permanent workers.

Table 4-1. Original distribution of concession areas by province within Madre de Dios (2002-2003)

Province	**Concession area (ha)**	**% of Total area**	***# persona jurídica***	***# persona natural***
Tahuamanu	706,717	53.9	30	2
Tambopata	315,056	24.0	25	3
Manu	289,932	22.1	11	2
Total	1,311,705	100	66	7

Source of data: INRENA, 2004.
http://www.inrena.gob.pe/iffs/manejo/conc_forest_mader/iffs_manejo_conc_forestales.htm

After the completion of the two rounds of public bidding in Madre de Dios, new modifications have occurred in the total area granted. In 2004 and 2008, two contracts (24,008 ha) from the previous forest regime were adapted to the new forest regime. Also in some forest concessions, particularly the ones located in the Manu province, there have been modifications in area granted due to overlapping with other uses. Disqualification of concession contracts due to demonstrated illegal activities in some forest concessions have occurred as well.[14] In addition, three concession contracts (33,830 ha) have been devolved to the State due to the alleged impossibility of managing the area for production purposes. Thus, as of October 2009, 74 active contracts (held by 63 SMFEs) have remained in the Department from the original 85 granted (held by 73 private SMFEs); an area of 1,114,340 Ha is under management. Table 4-2 shows the current distribution of active concession areas in the Department.

[14] As of October 2009, the area covered by disqualified contracts was 112,855 ha (i.e., 9 contracts held by 9 SMFEs), representing 8.6% of the area granted in the department.

Table 4-2. Distribution of active concession areas by province (October 2009)

Province	**Concession area (ha)**	**% of Total area**	***# persona jurídica***	***# persona natural***
Tahuamanu	684,383	58.5	31	1
Tambopata	244,838	21.8	18	3
Manu	185,119	19.7	8	2
Total	1,114,340	100	57	6

Source of data: OSINFOR database, October 2009

Also, five SMFEs, corresponding to seven concession contracts, have achieved forest certification during 2006 and 2007. From them, the certification certificate for the SMFE Forestal Rio Huascar has been suspended because of unresolved CARs[15] due to economic problems. Table 4-3 shows the list of original contracts that attained forest certification in the Department.

Table 4-3. Certified Area in Madre de Dios (As to September 2008)

Initiative	**Private SMFE**	**Forest Contract**	**# Forest Certificate**	**Area (ha)**
M&M	MADERYJA SAC.	17-TAH/C-J-004-02	SW/FM/COC-2175	49,556
	MADERACRE SAC.	17-TAH/C-J-001-02	SW/FM/COC-2176	49,376
Forestal Río Huáscar SRL.	Forestal Río Huáscar SRL.	17-TAH/C-J-022-02	CU/FM/COC-805366	25,533
Aserradero Espinoza	Aserradero Espinoza SA.	17-TAH/C-J-026-02	SW/FM/COC-002327	81,128
	COCAMA EIRL.	17-TAH/C-J-024-02		
	COCAMA EIRL.	17-TAH/C-J-025-02		
	COCAMA EIRL.	17-TAH/C-J-036-02		
Total				205,593

Stakeholders and the Evolution of the Forest Concession System in Madre de Dios

As highlighted in the previous sections, the implementation of the forest concession system in Madre de Dios has been constrained by several factors that have persisted over time due to the lack of interest shown by the State in a sector that does not contribute much to the GDP of Peru. Since the adoption of the forest concession system as the new model of forest management,

[15] CARs or corrective action requests are raised by the assessment team if any areas have been identified where current forest management does not meet certification requirements (Higman et al. 2000).

additional factors have emerged that affected its implementation and the forest sector as well (e.g., opposition to the new system, bureaucracy). However, there also exist some factors that have favored and facilitated the change towards a model of better forest management practices. Such aspects include participation in debates and bringing up ideas in the formulation of the NFWL, diffusion of the new model of forest management, and financial and technical support to implement the new model. As such, different social actors have been the force behind those factors; the most important are: governmental organizations, environmental NGOs, private SMFEs, and multi-stakeholder consultative organizations. These actors have played different roles and actions in promoting and helping to implement the forest concession system.

Due to the holding of concession contracts, private SMFEs are the most important stakeholders in the concession system in terms of forest management. Therefore, they are the focus of this dissertation, and a detailed evaluation of their characteristics is presented in Chapter 5. The following sections of this chapter, however, focus on the ties of other important stakeholders to SMFEs. In particular, these sections focus on a systematic analysis of the interests, capacities, and actual support to SMFEs by the selected stakeholders: governmental organizations, environmental NGOs, and multi-stakeholder consultative organizations. This analysis then forms a basis for comparisons among these stakeholders and a basis for a broader evaluation of which organization(s) actually provides effective support. This is because these stakeholders have specifically influenced the management decisions undertaken by SMFEs, and as a result the implementation process of the forest concession system in Madre de Dios. Discussing the contributions of governmental organizations, environmental NGOs, and multi-stakeholder consultative organizations reveals that their interests do not necessarily correspond to those of SMFEs, and by discussing the capacity of these three stakeholders one observes how

well (or how poorly) these social actors pursue their interests, which most definitely has implications for forest management and resolution of conflicts. Table 4-4 shows the list of stakeholders in Madre de Dios, and a summary of their main interests, as an introduction to their analysis.

Table 4-4. Stakeholders in the forest concession system in Madre de Dios and their interests

Stakeholder	Interests to the project*	Effect of project on interests of stakeholder	Importance of stakeholder for success of project	Degree of influence of stakeholder over the project
INRENA	Promote and ensure sustainability in the use of forest and wildlife resources	+	Critical player	Very influential
FONDEBOSQUE	Finance projects oriented to promote sustainable forest development	+	Moderate importance	Moderate influence
ACCA	Support SMFEs surrounding its conservation concession	+/-	Some importance	Some influence
ProNaturaleza	Provide technical support to SMFEs for forest management, diffusion of information for the 2nd round of public bidding, and strengthening of the Roundtable for Dialogue	+	Very important	Influential
CESVI	Provide technical support to SMFEs for forest management and strengthening of the Roundtable for Dialogue	+	Very important	Influential
WWF-MDD	Provide technical and financial support to SMFEs for forest management, strengthening of the Roundtable for Dialogue, establishment of the of the Peruvian Council for Voluntary Forest Certification and promotion of FSC certification	+	Critical player	Very influential
Roundtable for Dialogue and Forestry Consensus	Facilitate implementation of the concession system	+	Moderate importance	Some influence
Forest Management Committees	Help in the implementation of forest management practices	+	Some importance	Some influence

*Project: Forest concession system implementation in Madre de Dios

Governmental Organizations

The NFWL, which authorizes the forest concession system, establishes an institutional system for several governmental organizations that are responsible for the administration and management of forest resources in Peru. The Ministry of Agriculture (MINAG) has political and regulatory functions in promoting sustainable use and conservation of forest and wildlife resources. The National Institute of Natural Resources (*Instituto Nacional de Recursos Naturales* or INRENA)[16] is a decentralized branch of the MINAG, and the Peruvian designated authority responsible for the administration of forest and wildlife resources. INRENA is organized into four administrative divisions: forestry and wildlife, protected areas, environmental issues, and water and soils. The *Intendencia Forestal* is INRENA's technical forestry and wildlife division, and its functions with respect to forest concessions include: monitoring, evaluation, and control of sustainable management, and periodic supervision of forest concessions, permits, and authorizations. The *Intendencia Forestal* is represented at the local level through *Administraciones Técnicas* which maintain continued coordination with the regional INRENA representative.

The NFWL also called for the creation of the Timber Forest Resources Supervision Agency (*Organismo Supervisor de los Recursos Forestales Maderables* or OSINFOR) as a decentralized branch of the Presidency of Ministry Council (*Presidencia del Consejo de Ministros*), in order to supervise and control fulfillment of the concession contracts (for timber purposes), supervise and verify periodically the fulfillment of the forest management plans of concession contracts, and supervise (annually, or if solicited) the fulfillment of AOPs. However,

[16] INRENA was created on November 27, 1992 (Decreto Ley N°25902). Its Function and Organization Regulation (*Reglamento de Organización y funciones*) was first established on December 1992 (Decreto Supremo N°055-92-AG); Later it was modified on September 2000 (Decreto Supremo N°052-2000-EF), and on July 2001 (Decreto Supremo N°046-2001-AG).

OSINFOR was only recently created (in 2005); but because of a decision of the Presidency of Ministry Council it was placed as an office inside INRENA (DS N°036-2004-AG), which defeats the purpose of its creation as an autonomous organism (Hugo Che Piu, personal communication 2009). Before the establishment of OSINFOR, INRENA was responsible for fulfilling OSINFOR's functions (disposition 17 of DS N°014-2001-AG).

The NFWL also provided for the creation of the National Consultation Council for Forestry Policy (*Consejo Nacional Consultivo de Política Forestal* or CONAFOR) as "the consultation agency of the highest level", in order to assist the MINAG in the formulation and implementation of forest policies in the country and to provide opinions about the proposal for the National Plan of Forest Development (elaborated by INRENA), and opinions about diverse forestry issues.[17] However, this entity was never actually established because the Ministry of Agriculture at that time did not convoke to its formation. This was due, in part, to the contemporaneous existence of an organization that in some way fulfilled some of the functions that CONAFOR was intended to fulfill: the Roundtable for Dialogue and Forestry Consensus (*Mesa Nacional de Diálogo y Concertación Forestal*), a participatory forum for dialogue that emerged to legitimize the process of implementation of forest concessions. As the Roundtable functioned well during 2001—2003, and more or less during 2004—2005, there was neither a need nor interest in creating a consultation space such as CONAFOR (Hugo Che Piu, pers. comm. 2009). The NFWL also oversaw the creation of the Forest Management Committees (*Comités de Gestión de Bosques*) as an element for citizen participation in forest administration.

[17] CONAFOR was to be led by the Ministry of Agriculture to include representatives from the forestry public and private sectors (i.e., representatives from the Ministries of *Industria, Turismo, Integración y Negociaciones Comerciales Internacionales, Transportes, Comunicaciones, Vivienda y Construcción, Economía y Finanzas,* as well as representatives from research centers, logging companies, indigenous communities, universities, NGOs, and local governments.

The 2001 amendment of the NFWL led to the creation of the Promotional Fund for Forest Development (FONDEBOSQUE) as an institution responsible for contributing to and facilitating the development and financing of projects oriented to promote sustainable forest management (DS 014-2001-AG).

The following section presents the analysis of the two governmental organizations with a base of operation in Madre de Dios: INRENA, and FONDEBOSQUE. In particular, it is focused on the interests, capacity, and current support to SMFEs of these two organizations.

1. The National Institute of Natural Resources (INRENA)

In Madre de Dios, INRENA is the national authority responsible for the administration of forest and wildlife resources. It is represented by two technical administrations that were established in October 2001 (RJ-226-2001-INRENA): the *Administración Técnica Tambopata-Manu*, located in Puerto Maldonado, and the *Administración Técnica Tahuamanu*, located in Iberia. Each has an administrator (*Administrador Técnico Forestal y de Fauna Silvestre*) whose main responsibility is the administration and control of the use and conservation of forest and wildlife resources in his administrative area.[18] Through time these administrations have had additional responsibilities conferred upon them, such as

- Approval of forest management plans to concede permits or authorizations over 500ha areas, emitting guides for forest transportation, imposing sanctions to violators of the NFWL (RJ-228-2001-INRENA);
- Approval of GFMPs and AOPs on concession areas over 3,000ha for reforestation purposes (RI-068-2004-INRENA-IFFS);
- Approval of Brazil nut concession contracts (RJ-012-2005-INRENA), approval of GFMPs and AOPs for Brazil nut concession contracts (RI-072-2005-INRENA-IFFS), approval of AOPs for forest concessions with timber purposes (RI-233-2005-INRENA-IFFS), publishing opinions regarding overlap of uncultivated lands (*tierras eriazas*) with

[18] The *Administración Técnica Tambopata-Manu* covers the provinces of Tambopata and Manu, and the *Administración Técnica Tahuamanu* covers the province of Tahuamanu.

permanent production forests (RI-234-2005-INRENA-IFFS); coordination, organization and follow up activities referred to the *Comité de Gestión de Bosques* (RI-369-2005-INRENA-IFFS);

- Registration of the titles (i.e., deeds) of forest concession contracts, and provision of mortgage contracts aimed to guarantee the debt for harvesting fee from holders of forest concession contracts for timber purposes that agree with the regime of Refinancing Debt for Harvesting Fee (RJ-192-2006-INRENA).

Each technical administration has an office responsible only for forest concession contracts for timber purposes: the Tambopata-Manu Technical Administration administers all forest concession contracts in the jurisdiction of the Tambopata and Manu provinces, and the Tahuamanu Technical Administration administers all forest concession contracts in the jurisdiction of the Tahuamanu province. These administrations also have offices along the main roads of the department to control the transportation of legally harvested timber. These control offices are located in El Triunfo, La Pastora, Laberinto, Mazuco, Mavila, and Alerta.

Since 2002 the specific functions of INRENA-MDD, as related to forest concession contracts for timber purposes, have mainly involved evaluating GFMPs and AOPs, conducting registration of concession contracts, and enforcing forest legislation. It also handled OSINFOR's supervisory functions until June 2005, when OSINFOR was finally implemented. Additionally, in 2005, authorization to approve the AOPs was conferred on the technical administrations (which since 2002 had been carried out by INRENA-Lima).

INRENA-MDD also works in collaboration with OSINFOR for the periodic supervision of the fulfillment of the forest management plans of concession contracts, and with the Ecological Police as the entity providing support in aspects related to the control of illegal logging in the Department. INRENA has also had agreements with environmental NGOs in order to develop collaborative projects for conservation and development. For example, INRENA works with ACCA in some research projects related to ACCA's conservation concession; with CESVI in an

agreement to receive financial support for the hiring of personnel to help in the office of non-timber forest products; with ProNaturaleza in different collaborative projects for the conservation of natural resources in Madre de Dios; and with WWF-MDD in a project to develop the exploratory forest inventory of the Department in order to provide base information for SMFEs' elaboration of their management plans for their first five years.

Support to SMFEs

According to the NFWL, INRENA's main function with respect to the forest concession system has been its promotion during initial implementation and support for private SMFEs that were granted forest concessions. However, in practice this support to SMFEs has not been realized as had been expected:

> "There has not been the monitoring [*acompañamiento*] that the State should have given; if someone receives a concession the only thing INRENA does is prosecute, but there is not the work of *acompañamiento*, consultancy, and technical assistance that allows them to improve" (ProNaturaleza's representative, pers. comm. 2007).

> "In the NFWL, it is stipulated that we should support concessionaires; we only carry out meetings to communicate with them about the procedures to follow for the AOPs' approval. But more than that, we have not been able to do…there is no support for training or elaboration of AOPs; the consultants do that" (INRENA's representative, pers. comm. 2007).

In order to support the concession system and provide SMFEs with an incentive for agreeing to manage their forest concessions, in 2003 INRENA established a promotional program of discounts in the payment of the harvesting fee for the first five years[19] of a concession contract, and a regime of annual fractioning in the payment of the harvesting fee (DS-012-2003-AG, RJ-128-2003-INRENA). Also, INRENA has established rules for compensating forest concession areas that are subject to overlapping with other uses (RJ-082-2003-INRENA).

[19] For the first two years the discount was of 40% in the payment of the harvesting fee, for the third year the discount was 30%, for the fourth year it was 20%, and for the fifth year the discount was 10%.

Capacity

INRENA's capacity to fulfill its functions has been very limited with respect to personnel, funding, and infrastructure. For example, at the Tambopata-Manu Technical Administration, the personnel responsible to oversee the forest concession contracts held by 40 initial SMFEs comprises a Forest Engineer (responsible for the area), a Forest Bachelor (responsible for field inspections), and a technician (responsible for the administrative aspect). At the Tahuamanu Technical Administration, the personnel responsible for the forest concession area, which supervised 33 initial SMFEs, is composed of only a Forest Bachelor (responsible for the area), although that person receives some support from a Forest Engineer from the *Programa Paralelo* Project.[20]

The limited personnel for oversight of forest concessions has limited the supervisory capacity of INRENA. It has been impossible for these two Technical Administrations to approve, prior to field inspection, AOPs that consider lesser known species (unlike the case of mahogany and cedar). In the case of mahogany, ocular inspections have been carried out despite the limited personnel—due to the economic importance of that species to the export market. For the most part, however, SMFEs have assumed expenses related to these inspections due to delays stemming from the limited budget and staff of INRENA, as pointed out by a governmental representative:

> "…priority number one is mahogany; an AOP with mahogany has to have an ocular inspection even though personnel are limited. The ideal would be to do the inspection without the concessionaires assuming the cost of it; however, it is not possible because we do not have [a sufficient] budget to go with our own resources to the concession area, to do the inspection, and to verify it; we cannot do it. We have to ask the concessionaire's support who sometimes does not want to do it; however most of them have to accept it because at the end this is attached to the export quota. If this AOP cannot be verified, then

[20] *Programa Paralelo* is a project carried out by INRENA, with funding from the *Corporación Andina de Fomento*-CAF, to prevent possible indirect impacts for the construction of the Inter-Oceanic Highway.

> in practical terms this mahogany cannot be exported, so this is not convenient for them" (INRENA's representative, pers. comm. 2007)

Thus the necessity of some SMFEs to export their mahogany volumes, which is only possible if previous ocular inspection has been conducted to assure the approval of their AOPs, has forced them to assume expenses related to these inspections. In general, there had been delays in AOPs approvals before the beginning of the harvesting period as a result of both the limited personnel capacity and the centralization of functions at INRENA-Lima. This mainly occurred before 2006 when AOPs were approved by INRENA-Lima, which meant a delay of at least 6 months until its final approval. These delays occurred because the procedure to approve an AOP was to be reviewed first in the Madre de Dios offices. Their observations were sent to the Lima office. It usually took 3 to 4 months for the Lima office to emit an answer. Then these observations were given to the SMFE to correct them. After this the AOP was reviewed again by the Madre de Dios offices and comments were sent again to the Lima office. After another 3 months the AOP was approved. This situation has also been common in the approval of AOPs in the Department of Ucayali (Arce 2006), which has affected all of the activities that SMFEs engage in there (e.g., period of harvesting, time to transport timber, and selling it, etc).

INRENA's budget is constrained, and this limits the fulfillment of all its functions. This problem has grown because over time, more legislation has been passed with more mandates concerning the forest concession process, with the result that more responsibilities have been laid upon INRENA Technical Administrations. At the same time, however, INRENA has suffered budget cuts which have restricted the institution's capacity to consistently and effectively facilitate forest management. Although there was an apparent budget increase from 2006 to 2007

for Tambopata-Manu and Tahuamanu Technical Administrations[21], the number of actions carried out by these Technical Administrations was much higher in 2006 than in 2007 in order to fulfill their operative objectives for those years. INRENA's budgetary shortfall is also reflected in personnel that are underpaid and overworked:

> "Our work is from 8AM to 8PM, and when there were AOPs to review…you had to stay until 10PM, including Saturdays and Sundays" (INRENA's representative, pers. comm. 2007).

> "The monthly salary of the technician in the control office is $250 (S/. 800), and he does not have employment stability…" (Forest consultant, pers. comm., 2005).

As a result of low budgets and salaries in INRENA, there is little stability among technical staff. Usually the Technical Administrators are hired for a period of 3 months, which is renewed in some cases; the same occurs for the other personnel inside INRENA. During the first six years of the forest concession system (until December 2007), there were six different Technical Administrators in Tambopata-Manu and six in Tahuamanu, with two additional people temporarily acting as administrators for a one month period. Changes in personnel have also been a reflection of political issues in the institution. Labor instability inside INRENA has been a problem also, such that not all planned activities have been fulfilled on time for a given period. This is because new personnel often needed to educate themselves about the situation of forest concessions in the Department, as well as learn about the regulations framing the concession system. Thus, inadequate financial resources, lack of manpower, and changes in personnel have resulted in the ineffective administration, control and monitoring of forest management activities in Madre de Dios—which has facilitated the continuation of illegal logging in the Department.

[21] In 2006, the budget was US$ 187,764 and US$ 97,723 for Tambopata-Manu and Tahuamanu, respectively; in 2007, the respective budgets were US$ 218,221 and US$ 119,036. The data were taken from INRENA's Plan Operativo Institucional 2006, 2007; only data for these two years was available.

However, INRENA's inefficiencies have also been attributed to the corruption of some of its personnel. Concessionaires, representatives of NGOs and grassroots organizations, and some people from within INRENA mentioned different acts of corruption such as the forgery and sale of permits for transporting timber (*guías de transporte*), personnel receiving bribes for faster approval of AOPs or for allowing transportation of timber without the required paperwork, and changes in volumes in INRENA's database to authorize harvesting of more high-value species for certain concessionaires. Thus, corruption has had both positive and negative effects on the profitability, sustainability, and returns of SMFEs (Auren & Krassowska 2004). Several SMFEs in Madre de Dios have benefited from the corruption of some of INRENA's personnel since they have been allowed to: (1) harvest more volumes of valuable species than what they really had in their forest concession, or (2) harvest timber from unauthorized areas. However, several SMFEs have also been negatively affected because illegal timber is sold at prices lower than timber produced by SMFEs that have to pay several types of fees. This results in unfair competition for certain SMFEs. Corruption of some of INRENA's personnel not only has affected the reputation of the institution, increasing distrust among users toward this institution, but is a factor that has also allowed the continuation of illegal logging in the Department. Some interviewees expressed the following:

> "Here there is no control; you can buy the Engineer [referring to the engineer who evaluates the management plans], the policemen, the engineers or technicians in the control offices [INRENA's *garitas de control*]. There is no control. The people from La Pampa that have their reforestation concessions canceled continue harvesting; where do they go? They go through the control offices; what does INRENA do? They pretend to be blind" (Concessionaire, pers. comm. 2007).

> "I tell you, INRENA is an institution that has earned colossal discredit in Madre de Dios, in the light of many scandals; here there has occurred fabrication of transportation permits, the valuable timber is transported below and covered by less valuable timber [*madera corriente*], and a series of things that we have denounced, including with documents" (Grassroots leader, pers. comm. 2005).

> "Some pseudo-consultants act in collusion with the INRENA employees and they do the work [referring to the elaboration of AOPs in laboratory without actual field data]; work that is surprising or deceptive to concessionaires, because the link they have is the person inside INRENA who facilitates and hurries the process of approval" (Forest consultant, pers. comm. 2007).

There has been little in the way of formal denunciation of these acts because of the involvement of several people and different actors (i.e., INRENA personnel, concessionaires, timber buyers), because the costs involved in making a denunciation and the time it takes, and also because these acts are based mostly on oral agreements so there is no formal proof about them. The only criticized act was in November 2007, when the Tambopata-Manu Technical Administrator Humberto Labarthe was fired from his position and prosecuted due to the illicit authorization to transport approximately 70,000 bf of illegal mahogany from the indigenous community of Monte Salvado, in favor of a forest concessionaire (RJ-265-2007-INRENA). Figure 4-1 illustrates specific functions of INRENA-MDD as related to forest concession contracts for timber purposes (in dark green), and the limitations in fulfilling those functions (in light green) due to limited capacity (in orange).

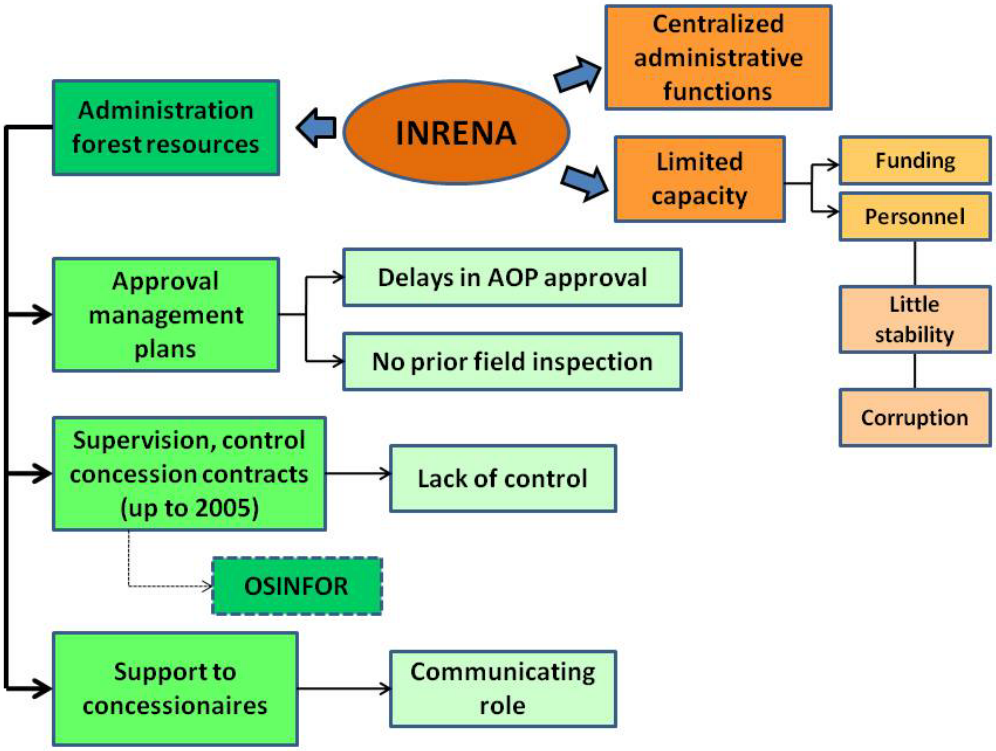

Figure 4-1. INRENA's main functions with respect to the forest concession system in Madre de Dios

2. The Promotional Fund for Forest Development (FONDEBOSQUE)

The *Fondo de Promoción del Desarrollo Forestal* (FONDEBOSQUE) is an institution with mixed legal partnership (private and public). It is a public institution because it was created by law (DS N° 014-2001-AG, art. 344°) and the members of its Directive Council belonging to the public sector are named by Ministerial Resolution. It is also a private institution because of the norms of its functioning (private rights) in order to have more flexibility in the hiring of its personnel for example, and the members of its Directive Council belonging to the private sector are named by the organizations they represent. FONDEBOSQUE is authorized by law to finance projects and activities oriented to promote sustainable forest development (DS-014-2001-AG), and thus make the forest concession system viable. In Madre de Dios, it was established in

December 2002, and its main function related to the forest concession system is to strengthen its implementation. This has been carried out through the development of two main programs:

- A credit program for working capital. Initiated in February 2003, in cooperation with the *Caja Municipal de Tacna* (a financial institution), this program provides small loans to SMFEs to be paid over a period of 3-8 months with an annual interest rate of 18%.[22] Logging is a risky activity and small forest operators do not normally have access to credit in formal financial institutions. Thus, this program aimed to build a credit history for SMFEs, so they could secure credit lines from the *Caja Municipal de Tacna* or another financial institution.

- A program of funding for SMFEs. This program was initiated in May 2003 to promote the use of appropriate intermediate technologies in forest concessions. Three projects resulted: two projects granting portable sawmills (Peterson) to eleven SMFEs through a public bidding process, and a project for lumber processing for carpenters. These projects sought to provide intermediate technology, of low impact and production cost, in order to increase productivity in the primary transformation of timber through the manufacture of a product with superior quality.

Due to the nature of FONDEBOSQUE, this organization has several agreements with different public and private institutions in the forest sector including environmental NGOs, local organizations, and governmental institutions, in order to promote forestry development through the funding of projects from the private sector in the Department and provision of credits. For example, FONDEBOSQUE had agreements with the NGOs ACCA, WWF, and CESVI in order to exchange information and provide technical assistance to SMFEs, carpenters, and indigenous communities, and agreements with some financial entities (e.g., Caja Municipal de Maynas and Caja Municipal de Tacna) to provide financial assistance to SMFEs.

Support to SMFEs

The main support that FONDEBOSQUE-MDD provides is financial credit and portable sawmills to SMFEs in the department. Specifically, as of April 2007, 85 small loans were granted to 36 SMFEs from the two bidding rounds for a total amount of credit equaling US$

[22] Most of the loans were US$ 2,890 (i.e., exactly 10,000 Peruvian soles). However, some SMFEs took loans that ranged from US$ 1,400 to $16,504.

288,719. Moreover, in 2004, a total of 11 portable sawmills were granted to 11 SMFEs[23] through agreements with other organizations such as ACCA and WWF. FONDEBOSQUE-MDD has also provided technical assistance and training to some SMFEs. Technical assistance was provided on formulation of management plans, forest inventories, and forest harvesting methods; and training consisted of workshops on issues related to reduced-impact logging, use of intermediate technologies, and business plans. This assistance and training was possible through an agreement signed with CIFOR and INRENA.

Capacity

FONDEBOSQUE's financial capacity should have been one of its main strengths. According to the NFWL, FONDEBOSQUE must receive funding from the government (i.e., 25% of the harvesting fee from forest concessions, 25% of fines from forest/wildlife infractions, and a percentage from external debt reconversion for conservation) and from other sources. For example, from its beginning through 2006, it has received funding from the Netherlands Embassy, ITTO, and the *Fondo Peru-Canada/MEF* to develop their projects. Other sources of funding have been the World Bank, Inter-American Institute for Cooperation on Agriculture (IICA), and the Belgium Technical Cooperation. Despite this funding, FONDEBOSQUE's financial capacity has not been sufficient to push the forestry sector as it was planned when established:

> "The idea of FONDEBOSQUE is to be a fund to promote the forestry sector. FONDEBOSQUE never had access to economic resources from the State, and effectively the budget never covered the needs of the sector" (FONDEBOSQUE-MDD's representative, pers. comm. 2007).

[23] SMFEs that were granted portable sawmills were: SHIHUAHUACO TIMBER, MADEBOL, MADEFOL, MAPROIN, EMFORPORTILLO, EMINI, EMETCI, CORPOFOREST, PURUS, SKY and CHATERIA.

In 2007, FONDEBOSQUE's budget was approximately US$ 3 million, with approximately 10% destined for the Madre de Dios office. In terms of budget specifics for the forest concession component, for the first five years the total was approximately US$ 640,000 for the Madre de Dios office. With respect to personnel, in 2007, FONDEBOSQUE-MDD had a coordinator, two project managers, five field technicians, one forestry specialist, one administrator, and one driver.

FONDEBOSQUE-MDD's budget did not help to fulfill its planned objectives, and as a consequence, its role in facilitating and financing projects to promote sustainable forest management has been criticized by several forest users:

> "The organizations that emerged to support the concession process have done so to some degree [*a media tinta*], or some have done so with a drop of ink [i.e., a token amount] such as FONDEBOSQUE (Grassroots leader, pers. comm. 2007).

> "FONDEBOSQUE had the money to support forest concessionaires in the process; it was supposed to provide loans to them. To give S/. 10,000 [approximately $2,890] as a loan to a concessionaire to go to his area was seen by them [FONDEBOSQUE's people] as a lot of money [*como un mundo de plata*], but those people did not know how to do an assessment. You give S/. 10,000 to a Brazil nut harvester to go collect Brazil nuts, but giving such an amount to concessionaires is like telling them to go to the corner to drink with their friends [*anda a la esquina y chupa con tu gente*]" (Grassroots leader, pers. comm. 2007).

Also, concessionaires argue that not all SMFEs had the same opportunities to access the small loans provided by FONDEBOSQUE. Some of them mentioned that these loans were mainly given to SMFEs receiving assistance from WWF-MDD:

> "We are not beneficiaries from FONDEBOSQUE; very rarely does this institution give something to our associates. To be honest, from the 100% of a non returnable fund, from the $800,000 that they provided, 90% was for enterprises assisted by NGOs [i.e., WWF] that are formed by small loggers" (Concessionaire, pers. comm. 2004).

Also, it has been criticized that FONDEBOSQUE allocated important funding to activities not relevant for people in Madre de Dios, instead of providing more funding to logging which is one of the main activities in the Department:

> "What has FONDEBOSQUE mainly done? It has dedicated its time to a beekeeping project here in the region; I really do not know where it can be incorporated into the management plan. They have poured more money into that, than into really supporting forest concessions" (Grassroots leader, pers. comm. 2007).

Environmental NGOs

Whereas the previous section focused on the participation of governmental organizations in the new concession system in Madre de Dios and elsewhere in Peru, non-governmental organizations (NGOs) have also sought to provide support for sustainable forest management under the new regime. Participation of environmental NGOs in the public bidding process, and previous discussions regarding the elaboration of the NFWL, were very important for the viability of the whole process. They openly supported the process of forest concessions by disseminating information, helping organize interested people in forming a SMFE, and elaborating technical proposals for SMFEs wishing to participate in the auctioning of forest concessions. Four environmental NGOs have been directly involved in the concession system in Madre de Dios: ACCA, CESVI, ProNaturaleza, and WWF. The last three have had a major influence, with WWF being the most influential due to its large budget and its scope of activities. Thus, the following section presents the analysis of these non-governmental organizations focusing on their interests, capacity, and the actual support they provided to SMFEs in the Department.

1. **The Association for Conservation of the Amazon Basin (ACCA)**

The *Asociación para la Conservación de la Cuenca Amazónica* (ACCA) is a non-profit organization whose main objective is the conservation of biodiversity in the Peruvian Amazon. In 1999, its founding program provided support for Brazil nut harvesters in Peru as an incentive to protect the forest. In July 2001, ACCA was granted the first conservation concession in Peru for 40 years; it is referred to as Los Amigos Conservation Concession (LACC). LACC has an

extension of 145,965 ha and is located between the confluence of the Los Amigos and Madre de Dios rivers in the Tambopata region. Because it is also located between the borders of some forest concessions for timber extraction, and within 50 kilometers of other concessions for reforestation, gold mining, and Brazil nut (*castaña*) extraction, in 2002 ACCA started negotiations with forest concessionaires (especially) due to the possibility of conflicts arising from their logging activities close to its conservation area. This is how ACCA became involved in the concession process.

ACCA has four specific objectives:

- Biodiversity conservation through LACC
- Research, through the Center for Research and Training-CICRA
- Management of natural resources through the project *Conservando Castañales*, which works with Brazil nut harvesters
- Training

Due to the nature of its concession area (i.e., Peru's first conservation concession), ACCA "has a direct relationship with INRENA" (ACCA representative, pers. comm. 2007) in order to help in the preservation of the natural resources of this high biodiversity area, and to carry out research. Also, because of its main role in the Department in promoting the conservation of Brazil nut areas (*castañales*) through sustainable management, ACCA has also signed agreements with WWF-MDD and FONDEBOSQUE to work in projects related to this issue.

Support to SMFEs

ACCA is basically an organization with a conservation focus; however, since LACC is surrounded by forest concessions, ACCA started negotiations with some of their managers in order to assure its conservation objectives. In 2002, ACCA signed an agreement with four SMFEs located at the north border of LACC. These SMFEs agreed with LACC to establish in

their adjacent areas a buffer zone to assure the conservation work done by ACCA was successful. Moreover, ACCA signed an agreement in 2003 with the SMFE *Empresa Maderera San Juan Grande* (EMAVISJUG); this accord granted LACC an area of approximately 500 ha from this enterprise's forest concession (for a period of five years). When EMAVISJUG was granted its forest concession, some of its area overlapped ACCA's research center (CICRA). Thus, ACCA had to remove its research center. However, there was also some research ongoing in the overlapped area, thus people from EMAVISJUG started pressing for the initiation of extraction of timber in this area in order to receive some compensation from ACCA. ACCA therefore signed an agreement in which it promised to pay EMAVISJUG's harvesting fee for the whole area of its forest concession for five years in order to exclude such area from its forest management plan during the first years. Under this agreement it was also stipulated that EMASVIJUG concessionaires would avoid killing animals in ACCA study areas.

ACCA allied themselves with FONDEBOSQUE-MDD in 2004 in order to support the implementation of the use of appropriate intermediate technologies in forest harvesting through the granting of portable sawmills to the three SMFEs with forest concessions adjacent to the north border of LACC (i.e., Shihuahuaco, Madebol, Madefol). Additionally, another SMFE (i.e., Tawari) was also benefited with this project. Technical support and training (e.g., in directed felling, and use of portable sawmills) was also provided to these SMFEs. In addition, ACCA has provided some indirect support for the four SMFEs (Empefomsba, Inbaco, Epefomsg, and Empefoc-Dos) whose forest concessions are located at the south border of LACC; however, this support has not been very significant.

Capacity

The Moore Foundation has been ACCA's principal source of funding; its budget is approximately US$ 800,000 to US$ 1 million per year. ACCA personnel in Madre de Dios consist of both professionals (among them several Forest Engineers) and technicians, and number between 50 and 60 people. Since ACCA's involvement in the concession system has been minimal, in comparison to the other NGOs, seeking mainly to avoid possible conflicts with their neighboring forest concessionaires, its budget and personnel have been more than sufficient to provide some technical support and training to the four SMFEs surrounding its conservation concession, and to pay the harvesting fee of one SMFE for five years:

> "There is an agreement with EMAVISJUG because ACCA's concession has its center in that forest concession area, and part of the current research is overlapping a small space of the EMAVISJUG's forest concession. That is why we made the agreement with that enterprise so they can give us the use rights of that area where our research parcels are located for some years and avoid harvesting timber there…ACCA supports this SMFE with the payment of all its harvesting fee only for the first five years as compensation…" (ACCA's representative, pers. comm. 2005).

> "FONDEBOSQUE held a competition and ACCA participated with four SMFEs whose forest concessions surround ACCA's conservation concession. We supported these SMFEs so that in time there would not be pressure over our concession; that is why there was the need to guide them for good management. The project ended and these SMFEs continue with WWF's assistance" (ACCA's representative, pers. comm. 2005).

2. Cooperazione e Sviluppo (CESVI)

CESVI, an Italian NGO which focuses mainly on poverty eradication through sustainable development plans, started operation in Madre de Dios in 1999. Due to the new context of the concession system in the area, in 2002, it modified its initial social objectives to emphasize a more managerial and technical scope. In partnership with the NGO *Pronaturaleza*, CESVI obtained funding from the European Union to implement the project "Sustainable Management of Forest Resources in the Tahuamanu Province" (*Manejo sostenible de los recursos forestales en la provincia de Tahuamanu, Madre de Dios, Perú*) for a period of 5 years (up to November

2007). The main objective of this project has been to strengthen the NFWL through four sub-objectives:

- Promotion of adequate techniques and methodologies for forest management with the objective of SMFEs attaining the ability to obtain forest certification.
- Promotion of effective schemes of business administration.
- Facilitate strengthening of the Roundtable for Dialogue and Forestry Consensus.
- Promote diversification of markets for forest products.

CESVI has been developing a project to support the sustainable management of timber and Brazil nut in five indigenous communities in Madre de Dios. CESVI has also developed, in partnership with other institutions, different projects in order to support sustainable management of natural resources in the Department such as: 1) a project in Alerta for a more entrepreneurial vision of Brazil nut management, in partnership with ACCA; 2) an agreement with WWF-MDD to provide more specific assistance in the forest certification process to specific SMFEs; and 3) an agreement with INRENA's Technical Administration in Tahuamanu to pay a Forest Bachelor to assist this office in the work related to non-timber forest products.

Support to SMFEs

CESVI's initial goal, in terms of support for its project related to sustainable management in the Tahuamanu province, was to cover an area of 25,000 ha among five producer associations. When this project was presented to the European Union and later approved in 2000, they proposed to work with producer associations because in the context of Tahuamanu at the time there were these types of associations. However, in 2000 when the NFWL was promulgated, it established the access to forests through forest concessions granted to SMFEs and not to producer associations. Thus, as CESVI was already assisting two associations in Tahuamanu (the Iñapari and Iberia associations), and as the NFWL proposed the formation of SMFEs, these two

associations were divided into SMFEs. Thus CESVI started working with only three of the SMFEs formed inside the two associations due to its assigned budget for this project. Therefore, these assisted SMFEs were granted larger areas than initially thought, so CESVI ended up covering an area of approximately 120,000 ha—which represented 10% of the forest concession area granted during the first round of bidding in Madre de Dios. Until 2007, CESVI had provided serious technical assistance mainly to four SMFEs from the Tahuamanu province. In 2002, they began supporting three SMFEs (Maderacre, Maderyja, and Amatec), while in 2004 one SMFE was incorporated to this support (Forestal Río Huascar). However, in May 2007, another SMFE (CATAHUA) was also added to their sponsorship.

In general, the assistance from CESVI to these SMFEs has consisted in the elaboration of technical proposals to participate in the first bidding, elaboration of the GFMP and AOPs, training in forest management techniques, and institutional strengthening. Thus, the main focus of CESVI's personnel, according to one of its project objectives, has been "to promote awareness of the real meaning of good forest management through training and technical assistance in forest management" (CESVI's representative, pers. comm. 2005):

> "It means training people involved in SMFEs, regardless of whether they are technicians or not, so that everyone knows what forest management means, for what purpose forest management is done, what goals forest management has, and how forest management is done" (CESVI's representative, pers. comm. 2005).

This awareness is reached through a permanent process of training, and demonstrations in the field on how the application of the right techniques of forest management (e.g., mapping trees, design of roads, and use of reduced impact logging) can result in a more organized and more efficient management of a forest concession:

> "We were demonstrating little by little that working using a minimum methodology, one could achieve better results; this was demonstrated in the field and at the end they adopted it completely, such is the case that now they are going through the first pre-evaluation for certification" (CESVI's representative, pers. comm. 2005).

Thus, during the first year of support (2002—2003), CESVI covered 100% of expenses for the realization of the forest census, and provided a Forest Engineer and a technician to the SMFEs. In 2004, they covered 50% of the expenses for the realization of the forest census, and in 2005 the amount covered was decreased to 20% of the expenses. By 2006, the SMFEs themselves began to cover all of their forest census expenses; in the following year, CESVI's work consisted only of monitoring these SMFEs. In addition to this support, CESVI signed an agreement in March 2005 with WWF-MDD and the newly formed M&M consortium (between the SMFEs Maderyja and Maderacre) to carry out an exploratory forest inventory[24] of the concessions of the consortium.

Capacity

CESVI's capacity in terms of personnel and funding has been sufficient to fulfill its functions. They have five projects in Madre de Dios (as of 2007), each one having a Forest Engineer as the manager of the project, and some technicians as support personnel. The main financial source for the first five years for these projects came from the European Union, and totaled 798,888 Euros. Specifically for the Project related to the support of SMFEs, its capacity in terms of personnel and funding has been sufficient since the decision to support a small number of SMFEs was based on such capacity. Thus, the personnel assigned to support SMFEs includes a Forest Engineer as the manager responsible for the Project, four forestry technicians for field work, a specialist in GIS, and a technician in GIS.

[24] This was the first exploratory inventory carried out in Madre de Dios (between July and August 2005), and it was directed by WWF-MDD personnel. Until that date, only forest censuses of the commercial tree species of interest had been carried out in the department. An exploratory inventory is done over large areas (10,000-500,000 ha) with a margin of error of 15-20%; it is done over all the concession area. A forest census is done over small areas (100-1,000 ha, and exceptionally over 5,000 ha) and there is theoretically no margin of error since all the population is measured; it is done over the annual harvested area.

CESVI's capacity and institutional commitment has allowed the development of a trust relationship with its assisted SMFEs, and a close coordination of their demands with CESVI's project. Their work of strengthening its assisted SMFEs' capacities in the production process, the *acompañamiento* in phases of the productive chain, and their support in business strengthening have been recognized as the most important support from this institution to its assisted SMFEs (CESVI 2005).

3. The Peruvian Fund for Nature Conservation (ProNaturaleza)

The *Fundación Peruana para la Conservación de la Naturaleza* (ProNaturaleza) is a Peruvian NGO affiliated with The Nature Conservancy. It was founded in 1984 with the objective of conserving Peruvian natural resources—especially its biodiversity—and promoting sustainable development. It has three lines of action to fulfill its main objective:

- Biodiversity conservation, through supportive actions in the administration of protected areas.
- Sustainable development, through the development of integrated projects of conservation, development, and research in buffer zones of protected areas.
- Promotion of conservation culture, through implementation of environmental education programs, promoting the strengthening of local capacities, and promoting the improvement of environmental laws.

ProNaturaleza started operating in Madre de Dios in 1998. ProNaturaleza has carried out two main projects: (1) the Tambopata-Inambari Project, in which ProNaturaleza was part of a consortium with CESVI, which has involved activities related to the gathering of information about the biodiversity and conservation of the Tambopata-Inambari watershed (an area that forms part of the Bahuaja-Sonene National Park and the Tambopata National Reserve) and in non-formal environmental education to local population; and (2) the Implementation of Conservation Planning Tools and Forest Management Project in Madre de Dios, with one conservation component for elaborating the management plans of the Bahuaja-Sonene National

Park and the Tambopata National Reserve, and with one development component for supporting the forest concession process.

ProNaturaleza began supporting the process of forest concessions through its support in the establishment and strengthening of the Madre de Dios Roundtable for Dialogue and Forestry Consensus (*Mesa de Diálogo y Concertación Forestal-MDD*) as a forum for discussion of proposals from all forest actors in the department, and by providing support to the *Comisión Ad hoc* (which held the second round of public bidding). Also, ProNaturaleza signed an agreement with INRENA to be responsible for the diffusion component for the second round of public bidding. Thus, ProNaturaleza carried out several diffusion events in Puerto Maldonado and along the Inter-Oceanic Highway in order to inform people about the concession system and to promote major participation in the second round of public bidding. Also, informational brochures were distributed in these events.

ProNaturaleza has also signed different agreements with: 1) INRENA for carrying out projects in cooperation related to the conservation of natural resources in Madre de Dios; and 2) with the Regional Government to establish collaboration mechanisms in activities related to the promotion of biodiversity conservation and sustainable development in the Region.

Support to SMFEs

In 2003, ProNaturaleza started providing technical assistance to five SMFEs in the elaboration of proposals to help them to participate in the second round of public bidding. These five SMFEs were selected through a process of evaluation that included certain criteria:

- Enterprise organization
- Capitalization
- Ownership of equipment and machinery
- Logging experience
- Access to the forest concession area for which they were applying
- Participation in information meetings

Although the five enterprises were granted forest concession contracts, two of them later abandoned assistance from ProNaturaleza because they wanted to legalize timber harvested from unauthorized areas and ProNaturaleza did not support that action. Thus, ProNaturaleza continued assistance to the other three SMFEs (Forestal Shay Jame, Empresa Ecoforestal Camanejo and Empresa Forestal Pumaquiro) from the Tahuamanu province during 2003. In 2004, they terminated assistance to Empresa Ecoforestal Camanejo due to the forgery of documentation by this enterprise.[25] During the period 2004 to 2006, Pronaturaleza assisted the two remaining SMFEs.

The support that ProNaturaleza provided to SMFEs consisted mainly of technical assistance in the realization of their forest census, elaboration of GFMPs and AOPs, and training in good forest management techniques. To help a given concessionaire realize their forest census, ProNaturaleza contributed its professional personnel (Forest Engineer and Bachelor, *matero*), all materials and equipment (GPS, compasses, radio), and some meals for the professionals. They also processed information, elaborated the management plans, and monitored them until they were approved by INRENA. ProNaturaleza has also developed training workshops on the importance and implications of doing forest inventories, applying reduced impact logging, and constructing forest roads (*viales de extracción*).

For the first two years of the sustainable development project (2003—2004), they also covered 100% of concessionaire expenses for the realization of the forest census. In addition,

[25] In May 2004, this enterprise's legal representative informed INRENA about the forgery of one of its transportation permits (that was subscribed by one unauthorized enterprise member). In July, after INRENA started an investigation, all activities from this enterprise were stopped. After INRENA's inspection of the management plan document in December, field supervision was carried out on this enterprise's concession. Following this, a sanctioning procedure was initiated on this enterprise due to irregularities in the management plan. By April 2006 the concession contract for this SMFE was cancelled because its management plan had not been fulfilled (R.G. N°024-2006-INRENA-OSINFOR).

since the second year of assistance, ProNaturaleza has conducted a small field evaluation of the previous year activities of the SMFEs that they assist in order to verify if the clients are functioning in an orderly manner.

Capacity

ProNaturaleza had sufficient personnel and funding capacity to fulfill its goals for the three years of its project related to sustainable forest development in Madre de Dios (2003—2005). This project had a budget of US$ 300,000; the source of this funding was the MacArthur Foundation. Personnel responsible for the forest concessions were a Forest Engineer, a Forest Bachelor, a *matero* (tree hunter), and a GIS assistant:

> "During the period of the Project, we had the capacity (in personnel and financial) to fulfill our objectives without any type of problem" (ProNaturaleza's representative, pers. comm. 2007).

ProNaturaleza's small project scope and its capacity allowed it to work closely with its assisted SMFEs to monitor SMFEs' activities in the field and to provide a closer training opportunity. This experience allowed these SMFEs to gradually understand that certain required management activities are useful to them in better planning their management operations:

> "We are trying to get them (concessionaires) to understand more, little by little. We know that they are not going to change from one day to the next…but we are working with them in training workshops about why to do a forest census, why to do the extraction roads (*viales de extraccion*) fulfilling certain norms, so in time they realize that it is useful for them to plan their time better, to use equipment for fewer hours, to save fuel" (ProNaturaleza's representative, pers. comm. 2004).

4. The World Wide Fund for Nature (WWF)

WWF is an international environmental NGO that promotes and supports biodiversity conservation and sustainable use of renewable natural resources. WWF began working in Peru during the 1960s; they were initially involved in the conservation of the vicuña (*Vicugna vicugna*). WWF established a Program office in Peru in 1998 (Program-Peru). Since then WWF-

Peru has collaborated with Peruvian NGOs on diverse projects related to biodiversity conservation and sustainable use of Peruvian resources. Specifically in the forest sector, WWF-Peru and other NGOs established the vision of sustainable forest management as a proposal for change in the forest sector (Soria 2003). Thus, WWF-Peru supported the formulation of the NFWL and the implementation of the forest concession system. This support started through the establishment of a program of meetings with diverse organizations[26] in the forest sector to coordinate actions in favor of the forest concession system. WWF-Peru also helped in the establishment of the Peruvian Council for Voluntary Forest Certification (CP-CFV) in 2001, and in the development and endorsement by FSC of the "Forest management certification standards for wood products from forests in the Peruvian Amazon" and the "Forest management certification standards for Brazil nut production in Peru" (in 2002).

In 2002, WWF-Peru began support of the concession system in the Departments of Ucayali and Madre de Dios through a small project—in Madre de Dios specifically, WWF-Peru hired a lawyer to look for interested people there that wanted to form enterprises to participate in the first round of public bidding. However, the following year WWF-Peru started a large-scale project called the CEDEFOR project (*Centro de Desarrollo Forestal*) which had as its goal the forest certification of one million hectares of forests in the country, under the FSC scheme. The lifespan of this project was originally 5 years (2003—2007), and its operational plan was initially designed for three regions where the first round of public bidding for forest concessions was completed: Madre de Dios[27], Ucayali, and San Martin. Later this project was extended to cover

[26] Organizations such as INRENA, DEVIDA, the *Mesa Nacional de Diálogo y Concertación Forestal*, *Mesas Regionales*, Regional Governments, forest organizations, the *Federación de Nativos de Madre de Dios* (FENAMAD) and NGOs.

[27] In January 2003, WWF-Peru set up an office in Puerto Maldonado, and in May of that year a Forest Engineer was named as the Director of that office (i.e., WWF-MDD).

also the departments of Loreto and Huanuco. CEDEFOR's operational plan considered three components: (1) sustainable forest management and forest certification, (2) business administration, and (3) institutional strengthening.

Among the environmental NGOs, WWF was much more integrally and proactively involved in supporting the implementation of the NFWL. This may be because of its size and its nature as a recognized international NGO supporting biodiversity conservation and the sustainable use of renewable natural resources. Thus WWF's support to SMFEs, particularly in Madre de Dios, was much broader than the other environmental NGOs in the Department.

Support to SMFEs

Technical assistance provided by CEDEFOR to SMFEs in Madre de Dios was oriented mainly to carrying out forest censuses, the elaboration of management plans (GFMPs and AOPs), training on forest management practices and business management and marketing (by convening workshops and seminars covering these topics), and the development of educational and informative material. Also, some financial support was provided to some SMFEs:

> "There was a loan that was given in cooperation with the *Caja Municipal Rural de San Martin* (a financial institution), so financial support was provided to some SMFEs, but we did not assist all SMFEs; some of them applied, and at the end some of them returned the loan" (WWF-MDD's representative, pers. comm. 2007).

Specifically in the case of each SMFE assisted by the CEDEFOR Project, 100% of the expenses for the GFMPs and 50% of the expenses for the AOPs were covered at the beginning. Later, the amount of AOP expenses covered was reduced "in order to encourage the SMFEs to become more independent" (WWF-MDD representative, pers. comm. 2007).

During the first round of public bidding in Madre de Dios, WWF helped in the formation of 26 SMFEs by grouping interested people together and helping them to develop technical

proposals in order to submit bids. Twenty three of these SMFEs obtained the *Buena-Pro*[28] to be granted 32 forest concession contracts. One SMFE, however, did not sign the contract and another later refused assistance from WWF. Thus, by 2002 WWF-Peru was supporting 21 SMFEs with a total of 29 forest contracts.

Following the announcement of the second round of public bidding in 2003, WWF-MDD called for people interested in getting its support. Contrary to the first round, at this point WWF-MDD developed an evaluation format for the selection of people to support and that would comprise the new enterprises participating in this round. This evaluation format included criteria such as experience in logging activities or timber commercialization, physical capacity (i.e., ownership of equipment and machinery), and family ties to the area where participants were applying for a concession. Thus, during the second round, WWF-MDD helped in the formation of ten new SMFEs and in the elaboration of their technical proposals; all of these SMFEs were granted forest concession contracts. However, only two SMFEs continued with WWF-MDD assistance:

> "The others [i.e., 8 SMFEs] simply used us in order to obtain a contract, and once they knew they got a contract, they did not want to elaborate the management plan [at that time it was a document of progress to harvest timber] with us; they did not want to sign with us [the agreement of technical assistance]" (WWF-MDD's representative, pers. comm. 2005).

Of the 23 SMFEs (from the 1st and 2nd round) receiving support from WWF-MDD in 2003, three more later refused assistance. As such, in 2004 WWF-MDD was assisting a total of 20 SMFEs (consisting of 25 forest contracts). Because illegal activities were detected in some SMFEs, and because several SMFEs did not fulfill requirements to reach forest certification—

[28] This basically means that the *Comisión Ad-hoc* declares it to be the winning offer in the bid. A forest concession is only granted after the winner of the bid signs the contract, accepting the terms. In Madre de Dios, the timeline to sign contracts was 30 days from obtaining the *Buena-Pro*.

which was the CEDEFOR project's main goal—by June 2005 WWF-MDD was continuing with assistance to only 10 SMFEs (13 forest contracts) from the 1st round:

> "From all SMFEs that WWF-MDD was assisting, now we are only supporting the ones that are working through the process of forest management planning. Definitely, the great majority of SMFEs have only been interested in getting their AOP, to have a plan that they can give to INRENA, but they have not been interested at all in the forest; so now there are also many that do not know the forest and have only been dedicated to selling their transportation permits [*guias*], so we cannot continue working in this way" (WWF-MDD's representative, pers. comm. 2005).

Also during April 2005, WWF-MDD initiated coordination with CESVI and the consortium M&M (formed by the SMFEs Maderyja and Maderacre) to provide assistance to the consortium for the certification process. This assistance included carrying out an exploratory forest inventory in the concessions of the consortium (a total area of 98,932 ha) as the first step in the certification process[29]; as well as training to strengthen personnel with respect to directed felling, reduced impact logging, redesign and improvement of forest roads, and safety issues.

In a meeting in WWF's Lima office in July 2005, an analysis of the advances of SMFEs being supported in Madre de Dios was developed. As part of this analysis a priority list of SMFEs having the best possibilities to get certification was developed. Few SMFEs were part of this list: three SMFEs from the Tahuamanu province (Emetci, and the consortium M&M), which were going to receive full assistance; while two from the Tambopata region (Madebol and Madefol) were going to receive only partial support. However, in September 2005 there was an internal reformulation of the CEDEFOR project. This development was largely due to WWF's budget cuts and included changing its strategy to one of concentrating technical assistance on "a few key forest concessions with good prospects for achieving forest certification" (WWF 2005).

[29] This was the first forest inventory carried out in a large area in the department. The goal of this inventory was to obtain general data of all tree species (e.g., their volumes and distribution) in the consortium concessions, in order to employ better planning and execution of a good forest management, and to start the certification process.

As part of these new changes, WWF-MDD terminated support to the SMFEs Madebol and Madefol, made the agreement of support with the consortium M&M ironclad, and initiated a conversation with two SMFEs (Grupo Espinoza and Forestal Rio Huascar) in order to provide assistance for the certification process. Agreements with these last two SMFEs were officially validated in December 2005 and January 2006, respectively. Thus by 2006, WWF-MDD also terminated its support to Emetci due to internal issues with this enterprise, and then concentrated its efforts only on the five SMFEs from the Tahuamanu region (the consortium M&M, Grupo Espinoza: Aserradero Espinoza&Cocama, and Forestal Río Huáscar) that were applying for forest certification. These five needed to fulfill the necessary requirements for the evaluation process.

Capacity

The CEDEFOR project had an initial budget of US$ 10.4 million, which came from funding from USAID (US$ 9.4 million), and WWF (US$ 1 million). This budget was later cut, due to an overall budget reduction of USAID projects in Peru (WWF 2005), and during the lifespan of the project approximately US$ 5 million was spent. For the Madre de Dios office, the initial budget for this project was approximately US$ 1.5 million; however, after budget cuts only around US$ 700,000 was actually spent in developing the project's actions.

At the beginning of the project, WWF-Peru sought groups interested in participating in the first round of public bidding. WWF's goal was to help these groups organize, form enterprises, and prepare their technical proposals for the public auction. It appears in retrospect that the main goal of WWF was to recruit as many people as possible who were interested in the concession system and in forming SMFEs, in order to have a large representation of SMFEs in the department under its support. This became evident because there was only one person

responsible for the identification of potential groups and nobody was evaluating the human and financial capacity of these groups to carry out forest management activity:

> "There were no criteria because we did not have an office well established here in Maldonado and the person responsible to form these enterprises was a lawyer that was hired for consultancy services [*servicios no personales*] from Lima. This person was told to go and form enterprises in all Madre de Dios, so this person went to Boca Colorada: 'we have to form two enterprises', in Puerto Carlos: we have to form three enterprises, Maldonado: five enterprises, Iberia: ten enterprises; so the greatest number of enterprises this person could have generated with only one template [*con una sola plancha*]…this person was paid more because certainly the objective of that consultancy was to form more enterprises" (WWF-MDD's representative, pers. comm. 2005).

In addition, WWF personnel promised grants of equipment and machinery to those SMFEs under its assistance, a promise that went unfulfilled:

> "When I came to this office I was told: we need to give technical assistance to this person, to this other, but what is going on? Many of these loggers were told before [by the person responsible to form these enterprises] that we were going to give them sawmills, that we were going to give them a boat, that we were going to give them money, that we were going to give them everything; so these people asked us: when are you going to give us these things?" (WWF-MDD's representative, pers. comm. 2005).

Most enterprises were formed in a hasty manner due to the short time notice given in advance of the announcement for the first public bidding for forest concession contracts. Also, most enterprises were formed as *Sociedades Anónimas Cerradas-SAC* (allowing for a membership up to 20 members) with people with diverse interests and backgrounds (e.g., not all of them had experience in logging). Thus, the non existence of a screening process (to select members to form these enterprises) according to certain qualification criteria for the capacity to carry out forest management, and the formation of enterprises as SAC societies have been among the main criticisms leveled towards WWF. Many interviewees (i.e., environmental NGOs, INRENA, concessionaires, and grassroots organizations) consider these as the main factors underlying the disagreements, divisions, and conflicts generated inside many SMFEs, and the failure of several SMFEs to properly manage their enterprises and forest concessions.

When the WWF office was established in Puerto Maldonado (i.e., WWF-MDD) in 2003, the personnel for the CEDEFOR project included a Regional Director (Forest Engineer), four forest specialists (three Forest Engineers and a Forest Bachelor, each one responsible for SMFEs from a different part of the Department), a GIS specialist, an economist, an administrator, and a specialist for the forest management committees. Also, there was some supporting personnel (i.e., temporary hires) including three forest specialists, an economist, and a lawyer. These personnel were still not enough to manage the large number of SMFEs under WWF sponsorship; for example each forest specialist was initially responsible for 5—6 SMFEs and due to the great burden of work, these specialists mainly spent their time in the office processing information from forest inventories in order to elaborate management plans. Thus, there was a lack of verification of SMFEs in regard to performance in their forest concessions.

Limited personnel did not allow WWF-MDD to work closely with each of its assisted SMFEs, thus there was not a consistent and continuous technical assistance, nor close attention paid to the needs and/or advancements of its assisted enterprises to provide a more efficient assistance. This created not only dissatisfaction among some SMFEs, due to the many expectations WWF assistance created among them, but they were not successful in strengthening the capacities of SMFEs, which was one of WWF's objectives. When SMFEs were formed, the new entrepreneurs did not have any knowledge about the concept of forest management and its technical implications and demands. Furthermore, they did not possess any business experience or knowledge of how to properly manage a business. Thus, SMFEs needed constant technical support and monitoring (*acompañamiento*), especially during the first years when the new entrepreneurs were acquiring knowledge about the new concepts and techniques for forest and business management.

Because of limited personnel, technicians had to be hired on a temporary basis to carry out forest censuses and to collect data in the field that later was used by the forest specialists to elaborate management plans for their assisted enterprises. Due to no field supervision from WWF-MDD personnel, hiring temporary workers (who did not identify with WWF-MDD and its work) created an environment in which some of them accepted bribes from some SMFEs in order to report more volumes of certain species (particularly mahogany) than what really existed in their concession area. This eventually created a serious problem for WWF-MDD in March 2005. After a CITES commission conducted a field inspection in a sample of forest concessions to verify the status of mahogany in Peru during 2004, it was observed that non-existent mahogany trees were reported in the AOPs of five forest concessions (5 SMFEs) from Madre de Dios—two of which were supported by WWF-MDD. Thus, in March 2005 these contracts were cancelled by OSINFOR.

This situation created an environment of tension and distrust towards WWF-MDD because WWF was "among the first in defending legality in forest management" (WWF's representative, pers. comm. 2005); however, these two cases revealed a significant mistake by WWF-MDD's Forest Engineers in signing AOPs without verification in the field of their real contents. Because this problem was a result of the lack of verification of AOPs, due mainly to the great burden of work of WWF-MDD personnel, the WWF-MDD's Director decided that from that moment on all AOPs elaborated by WWF personnel had to be ground tested before signature. But this new decision implied an increased budget. WWF-MDD "depends totally on the Lima's office for its budget" (WWF's representative, pers. comm. 2005), which makes the work of timely ground testing more difficult because of the bureaucratic process.[30]

[30] Besides the fact that personnel from WWF-Peru's Lima office were responsible for the administration of CEDEFOR funding, there were "some differences in vision to carry out the project's activities and a lack of

This problem also brought to light the issue of illegal activities (i.e., harvesting of timber from unauthorized areas,[31] and the sale of transportation permits) being carried out by some SMFEs. Thus in order to avoid problems of illegal activities and ensure a good forest management of its assisted SMFEs, WWF-MDD saw the need to focus their technical assistance only on a group of SMFEs that—"despite their difficulties in doing forest management—were trying to work according to the parameters of the NFWL" (WWF's representative, pers. comm. 2005). This decision implied the reduction in the number of assisted SMFEs in Madre de Dios.

By July 2005, in an 'annual meeting' at WWF-Peru's Lima office, and after an evaluation and revision of the CEDEFOR project, a process of reformulation of this project's objectives and strategies began. Thus a new proposal for the CEDEFOR project was elaborated for implementation during August-September of that year. One of the strategies of this proposal included "focusing technical assistance in forest certification to a group of viable concessions" (WWF 2005). As a result of these new changes, by October 2005 WWF-MDD terminated its support to their remaining original SMFEs and started assistance to just a few SMFEs that were intending to apply for forest certification. There were also changes in personnel, including the hiring of a new Director and reduction of personnel. This produced not only disappointment among SMFEs that until that moment received assistance from WWF-MDD, due to the expectations generated under this stewardship, but also criticism from other organizations in the region because WWF was abandoning some SMFEs that still needed help, while assisting other SMFEs that were better off and planning forest certification:

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knowledge about the reality of Madre de Dios concessionaires" by this staff. This resulted in disagreements about the time and amount of funds necessary to carry out certain activities in the field in Madre de Dios.

[31] Timber harvested from areas outside a forest concession in an illegal manner is "legalized" (or *Blanqueada* in Spanish) using transportation permits (*guías de transporte*) from a concession.

> "WWF abandoned its assisted enterprises in an irresponsible manner…but soon WWF abandoned them, why? because they realized that it was not what they [WWF people] though it to be, because they want it or not from the 100% they assisted I think 1% could be referred as reduced impact management; later they [WWF] realized they could not continue and abandoned their assisted enterprises so anyone could say that they are inciting illegality" (Forest consulter, pers. comm. 2007).

Figure 4-2 illustrates specific tasks carried out by WWF-MDD in supporting private SMFEs (in dark green), and the limitations in fulfilling those tasks (in light green) due to limitation in its capacity (orange).

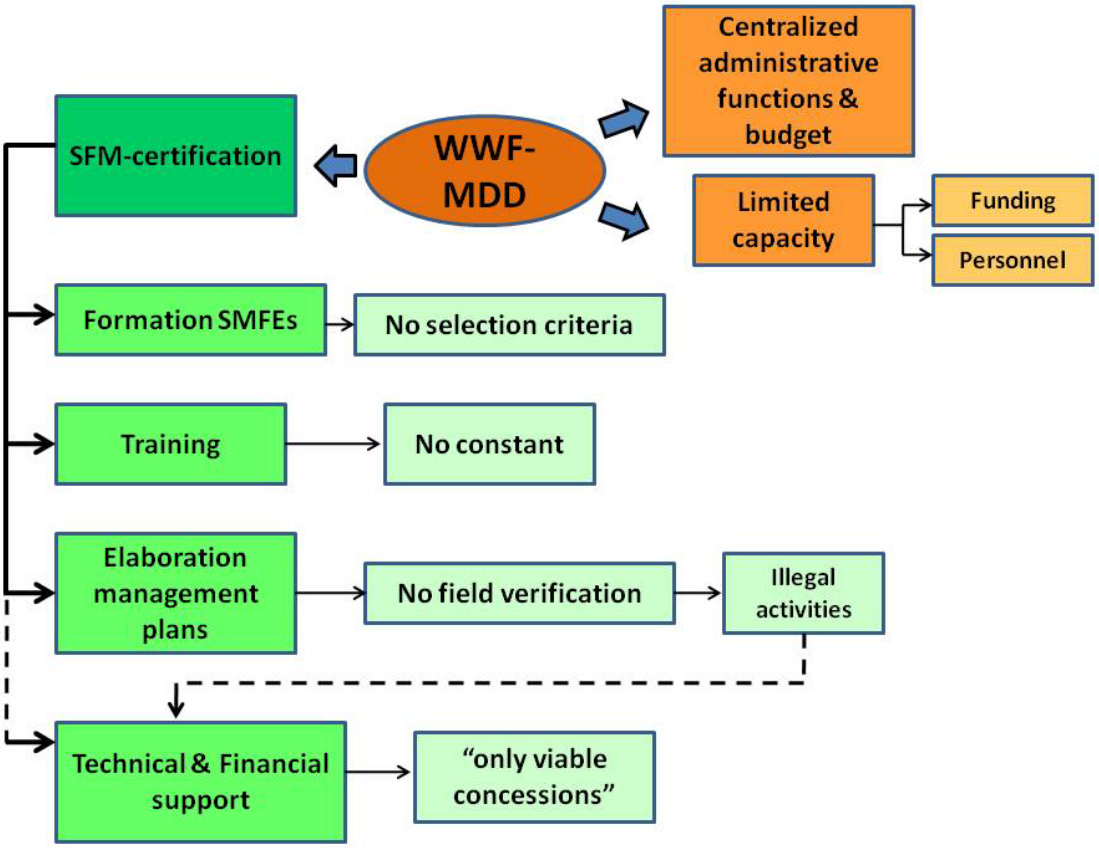

Figure 4-2. WWF's main tasks in supporting private SMFEs in Madre de Dios

Multi-stakeholder consultative organizations

The participation of environmental NGOs has been influential in the formulation of the NFWL and in the technical and financial assistance to SMFEs for the implementation of sustainable forest management practices under the new concession system and attainment of forest certification in Madre de Dios. Multi-stakeholder consultative organizations, an array of organizations that serve as a dialogue body for its members to consider and deliberate on issues related to the forestry sector, have also sought to provide support for the implementation of sustainable forest management practices in the Department. They emerged due to their potential for effective consensus-building, sharing of knowledge and expertise, and interest representation (Fransen & Kolk 2007), and as a response to actions of governmental agencies and environmental NGOs. Two multi-stakeholder consultative organizations emerged in Madre de Dios to help in the implementation of the forest concession system: the Roundtable for Dialogue and Forestry Consensus of Madre de Dios (MDCF-MDD), and the Forest Management Committees (CGB). The MDCF-MDD essentially accomplished its objectives of being a forum for dialogue of forest issues during the first years of conflicts in the implementation of the concession system, and therefore in time it became practically inactive. The forest management committees were created recently in 2004 and are still active; however, their functions as entities in helping the forest administration of specific watersheds are constrained because they depend on INRENA's budget to function. The following section presents the analysis of the interests, support to SMFEs, and actual practice and outcomes of the two multi-stakeholder consultative organizations in Madre de Dios.

1. The Roundtable for Dialogue and Forestry Consensus (MDCF)

In September 2001, the Agriculture Ministry called together the most important organizations in the productive forest sector of the country[32] with the purpose of initiating a dialogue about the implementation of the NFWL and the reactivation of productive forest activity. Different actors from the civil society (local and international NGOs, small logging associations, large timber companies) subsequently participated in proposals and debates about the modification of the new Forestry Law while preparing a joint agenda on relevant topics in the forestry sector (DAR 2008). This dialogue resulted in the formalization of the Roundtable for Dialogue and Forestry Consensus (*Mesa Nacional de Diálogo y Concertación Forestal* or MNDCF), in January 2002, as a suitable forum to address forestry issues.[33]As a counterpart of the MNDCF, Regional Roundtables (*Mesas Regionales*) emerged in Ucayali, Madre de Dios, Tingo María, San Martín, Huancayo, Lambayeque, and other important regions (DAR 2008).

The *Mesa de Diálogo y Concertación Forestal de Madre de Dios* (MDCF-MDD) is a regional group for discussion of issues related to the forest sector in the department. It is made up of different actors, and was initiated in 2001 as a forum to discuss and propose modifications to the NFWL; it was recognized by INRENA in 2002. In July 2005, 62 representatives of 41 organizations were part of the MDCF-MDD. These organizations include governmental institutions, cooperation organizations, NGOs, independent cooperatives, independent consultants and grassroots organizations.

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[32] These organizations were the *Cámara Nacional Forestal* (CNF), *Corporación Nacional de la Madera* (CORMADERA), INRENA, *Asesoría Legal del Ministerio de Agricultura*, and the *Proyecto Apoyo a la Estrategia Nacional para el Desarrollo Forestal* (ENDF).

[33] On January 2, 2002 an agreement was signed by entrepreneurs, NGOs, indigenous groups, and the government in order to move forward with the implementation of the New Forestry and Wildlife Law through public bidding for concession areas between 5,000 to 10,000 ha, oriented mainly for small loggers (Soria 2003).

Support to SMFEs

During the first round of public bidding (2002), the MDCF-MDD did not play a leading role because the organizations composing it did not reach consensus on concrete proposals. Therefore, the proposals presented by individual institutions were not taken into account. During the second round of bidding (2003), however, the MDCF-MDD played a leading role as two of its members were part of the *Comisión Ad hoc* to conduct this bidding round. One of the main attainments of the MDCF-MDD was to establish a major priority for the technical proposal in the second round of public bidding instead of the economic proposal as it was in the first round.

On 7 July 2004, an initiative to carry out the supervision of the forest concessions in Madre de Dios was presented to the Commission of Environment and Amazonia in the National Congress, to the Agriculture Ministry, and to the chief of INRENA. However, the MDCF-MDD never got an answer from any of these Commissions, nor from INRENA's chief. It was not until August 2005 that personnel from the newly created OSINFOR carried out inspections in the forest concessions of the Department. At that time they also collected some indicators that provided a basic idea of the degree of fulfillment of the concessionaires GFMP.

Returning to September 2004, the MDCF-MDD also presented to the INRENA chief an action plan to fight against illegal logging in the department. As there was no answer from INRENA, in the following September the MDCF-MDD presented this action plan to the Regional Government of Madre de Dios to discuss the formation of the Regional Commission to fight against illegal logging (*Comisión Regional de lucha contra la tala illegal*).

Capacity

The capacity of the MDCF-MDD, as a regional group for discussion and composed of different actors, has depended more on the individual interest of the organizations that constitute

it. Members of the MDCF-MDD met on a regular basis during 2002 and 2003 (i.e., between the first and second rounds of bidding), which was a time of uncertainty regarding the implementation of the forest concession system due to the problems generated in Madre de Dios by small loggers and local authorities that were widely opposed to it (i.e., the "*paro maderero*"). However, participation in the MDCF-MDD waned after the second round of public bidding as the situation became more or less stable with respect to the implementation of the forest concession system.

Despite less frequent participation of all its members, the MDCF-MDD presented some proposals in 2004 and 2005. However, in recent years (2006 and 2007) the MDCF-MDD has practically been inactive, due mainly to the lack of interest of some of the actors participating in this board which started previous years. After the second round of public bidding, some grassroots organizations lost interest in participating in this board's meetings because they saw that there was usually a consensus to have the meetings only when governmental organizations (particularly INRENA) had some interest at stake. Soria (2003: 13) mentions that "several NGOs have the impression that INRENA utilizes the MDCF only when it is convenient for it that the MDCF help deflate problems that INRENA has allowed to grow".

2. Forest Management Committees (CGB)

The *Comités de Gestión de Bosques* (CGB) are private civil organizations recognized under the NFWL, and consist of the local INRENA representative, representatives of forest concessions and forest authorizations, local government representatives, indigenous communities, NGOs, academic institutions, all of which are located within the limits of a forest administration unit or watershed (DS N°006-2003-AG). The main functions of the CGB are (DS N°014-2001-AG):

- To control that the use of forest resources is carried out according to the NFWL

- To coordinate monitoring services in the respective forest administration unit
- To promote conflict resolutions in their designated areas
- To propose actions to improve forest management and local development
- To collaborate or participate in forest supervision and control activities

The CGBs have an internal regulatory document developed by the Committee itself to regulate its own organization and administration. In Madre de Dios, the *Comité de Gestión de Bosque Río Las Piedras* has been the most active CGB. It was constituted on 7 March 2005 by representatives of public, private, and civil organizations from the Fitzcarrald, Iñapari, Laberinto, Las Piedras, Manu, and Tambopata districts, and was formally recognized by INRENA on 22 August 2005 (RI N°336-2005-INRENA-IFFS) within the limits of Las Piedras watershed. It comprises an area of 2,183,435.13 ha.

Other CGBs in the department already recognized by INRENA are:

- *Comité de Gestión de Bosque del Río Acre*, recognized on 3 May 2004 (RI N°056-2004-INRENA-IFFS), covering an area of 221,451 ha
- *Comité de Gestión de Bosque del Río Tahuamanu*, recognized on 12 March 2004 (RI N°027-2004-INRENA-IFFS), covering an area of 1,269,534 ha
- *Comité de Gestión de Bosque del Río Muymanu-Manuripe*, recognized on 30 April 2004 (RI N°046-2004-INRENA-IFFS), covering an area of 701,708 ha

Support to SMFEs

However, as of the date of the interviews conducted in August 2007, the CGB Río Las Piedras is the only active CGB in Madre de Dios. In alliance with the MDCF-MDD, the CGB Río Las Piedras presented an action plan to the Regional Government of Madre de Dios (in the same year of its recognition) to form the Regional Commission to fight against illegal logging.

Capacity

By law the CGBs must receive budgetary transfers from INRENA (10% from harvesting fees collected from a specific forest administration unit), and they must elaborate and present to INRENA an annual work plan and/or quarterly reports on the status of their annual work plan

(Directiva N 030-2007-INRENA-IFFS). Thus, the capacity of the CGBs depends on funds transferred from INRENA to implement their work plans for their respective watersheds. However, the CGB Río Las Piedras had not received any funding from INRENA (as of the date of the survey interview), which has obviously constrained their CGB functioning.

Influence of key actors in the forest concession system

During the implementation of the forest concession system in Madre de Dios, the different political interests and motivations of some social actors, and the actions they undertook, made some of these actors more influential than others in terms of being agents of the new changes. SMFEs became the central social actors in the management of the natural tropical forests located in Madre de Dios, since they hold the total area granted as forest concessions. In addition, the State, environmental NGOs, and multi-stakeholder consultative organizations have played an important role in this process –particularly in the development and capacity of SMFEs for carrying out forest management. The examination of the interests, actions, and capacities of these three groups of social actors or stakeholders, which was presented in the previous sections, has been important for understanding and appreciating the specific role of these local actors in promoting and implementing the new forest concession system. But also, the interactions (or lack thereof) among these actors have been important.

For example, for many decades the state forest administration in Peru has been characterized as being centralized and with weak institutional capacity. This generated an environment where disorganization, informality, and unsustainability prevailed in the forest sector. However, in 1990 the Legislative Decree N°613 mentioned for the first time the issue of sustainability in the use of the nation's natural resources. One of its transitory dispositions established the need to update the 1975 FWL in order to be in agreement with this Decree. Thus from 1990 until July 2000, when the *New Forestry and Wildlife Law*-NFWL (as the new

framework for SFM through the granting of long-term concessions) was finally promulgated, the State, environmental NGOs, and timber entrepreneurs separately debated ways to reform the forest sector while working on proposals that advocated for what the new Forestry Law ought to contain. These separate debates and proposals occurred because there was a lack of transparency among these actors, who prepared proposals according to their own interests. These separate debates also occurred because the State did not implement any mechanism for public participation in the administration of forest resources (Soria 2003). During this period, the strategy of the main exporter of timber in Peru was to delay the implementation of the new model for SFM without divulging clearly the reason for its opposition, and without proposing a concrete technical alternative (Soria 2003).

Since promulgation of the NFWL, two divergent positions arose in Madre de Dios, among the various interest groups: 1) groups such as environmental NGOs, some political authorities, and some small loggers who favored implementation of the forest concession system; and 2) groups such as some local political authorities, timber elites, and some small loggers who were against it. Some political authorities, such as INRENA, supported the implementation of the forest concession system as the new framework for forest management because of the recognized need to modify the situation of over-exploitation and degradation of forest resources in the Department. These political authorities had the support from environmental NGOs, who openly supported this system, and initially disseminated information related to this new system in workshops. Also, several small loggers attending NGOs' workshops became informed about the new system and supported this system to continue with the activity that supports their livelihoods; they also had hope that better market opportunities would emerge. In opposition, some political authorities, such as the Regional Government, were against the NFWL

implementation from the moment it was enacted because of their agreements with large loggers to keep the *status quo* of the previous forest regime. Some of them undertook a campaign of misinformation about the new system. Some misinformed small loggers were against it, as well as some small loggers who were *testaferros* of large loggers during the previous forest regime.

Despite opposition, the implementation of the concession system continued its course. The role of environmental NGOs in organizing interested parties in forming SMFEs, and elaborating their technical proposals to participate in the auctioning of forest concessions, was very important for the implementation of this new system. Such support was important, especially since this was a new process and the new concessionaires did not have much (if any) expertise in the procedures to be implemented (Malleux 2008, Arce 2006). However, this support has also been criticized because of the formation of SMFEs without considering any criteria of their capacities to carry out forest management activity, and because of the formation of SMFEs using the same type of society for most of them without considering the specific characteristic of each group.

Support from environmental NGOs (providing mainly technical assistance and in a few cases financial assistance) was also crucial for the foundation of these enterprises, especially given the limited capacity of INRENA. Although INRENA secured forest access to small-medium loggers through the granting of forest concessions, it did not possess the proper mechanisms, personnel, and financial capacity to control that access and to enable their administration to secure a more sustainable management. Thus environmental NGOs support proved crucial, but constituted a patchwork with little coordination and many shifts in priorities and collaborations due to problematic management of expectations.

There have been some agreements between INRENA and environmental NGOs during the first five years of the implementation of the forest concession system in Madre de Dios, as well as agreements among environmental NGOs themselves, in order to develop some collaborative projects for conservation and development in the Department. Most of these agreements have been conservation oriented (e.g., research projects related to ACCA's conservation concession, projects between ProNaturaleza and ACCA for the conservation of natural resources in areas surrounding protected areas, projects among ACCA, WWF-MDD, and FONDEBOSQUE for conservation of Brazil nut areas). Some have been related to supporting the concession system (e.g., CESVI's financial support to hire a person to work in the INRENA's office of non-timber forest products, WWF-MDD's assistance in developing the Department's exploratory forest inventory). In general, however, environmental NGOs have worked mainly according to their own agenda and interests, and in short-term alliances with limited agreements.

In the case of multi-stakeholder consultative organizations, which emerged as institutions for dialogue and consensus-building for the effective implementation of the forest concession system, their role could have been crucial all through the process of implementation. This would particularly have been the case for the Roundtable for Dialogue and Forestry Consensus of Madre de Dios (MDCF-MDD). As an organization that grouped representatives of governmental organizations, NGOs, SMFEs, and grassroots organizations, its potential for consensus agreements could have helped to move the system forward by helping to fulfill certain gaps (e.g., information, dialogue) that were appearing during the implementation of the concession system. However, the lack of interest in participating in this board over time (particularly after the second round of bidding) from INRENA and some grassroots organizations, eroded the impetus for which this group was formed. Over time it became practically inactive.

Thus, there has not been much interaction among the key stakeholders in the concession system in Madre de Dios, at least not in terms of a permanent, collaborative, and coordinated work group designed to implement this new system for the benefit of better management and conservation of the forests of the Department—as the project objectives of the key stakeholder organizations established. In general, while particular agendas of each of the different actors have prevailed, there has not been a joint effort of capacities to move the concession system forward. Therefore, in addition to greater resources, more coordination and consensus is still needed for a better implementation of this new system.

Summary

The implementation of the forest concession system in Madre de Dios, as the new model for forest management, is still a work in progress. Since its inception, it has been influenced by social actors and factors that have facilitated and/or constrained it. Although the new forest regime is a step forward in terms of the management of tropical forests in Peru–especially after decades of forest over-exploitation and degradation—to date its implementation has been met with considerable difficulties in Madre de Dios. There was initial opposition to this new system by certain political authorities, and large loggers, as well as some small loggers who wanted to keep the *status quo*. Also, there has not been adequate state resources and capacity for sufficient oversight to ensure legal forest management. And although NGO support proved crucial for the initial implementation of this system, it constituted a patchwork with little coordination and much shifting in priorities and collaborations. This was due to limited capacity and problems with the management of expectations.

The interests and actions of INRENA and environmental NGOs, particularly WWF-MDD, have shaped this system's implementation. This chapter presented an analysis of the actions and dynamics of these key stakeholders, and their influences in the capacity of private SMFEs. This

chapter also presented the analysis of multi-stakeholder consultative organizations that emerged in Madre de Dios as alternative entities searching for solutions to problems which surfaced during the implementation of this system, and that have also impacted SMFEs performances. As the main stakeholders, the behaviors and capacities of SMFEs have definitely shaped this system. The following chapter discusses the capacities of private SMFEs through the analysis of the variation of their capital assets, which they needed to plan, pursue, and secure their livelihoods (and their sustainable forest management practices).

CHAPTER 5
CAPITAL AND CAPABILITIES AMONG PRIVATE SMALL-MEDIUM FOREST ENTERPRISES

Introduction

Around the world, small forest operations (i.e., communities, private associations, families) have reached different levels of success in their forest management practices. Communities in Mexico, Bolivia, Guatemala, among other countries, have been successful in creating and maintaining enterprises for the commercial production of timber, while others have not. Some of them have attained forest certification, as well. Several factors that favor such success include policies/laws for access to forests, incentives for forest management and certification, and technical and financial support from governments, NGOs, and other entities. Nevertheless, several factors have also worked to constrain success. In particular, limited capital has been a significant constraint for many SMFEs (May et al 2003, Thomas et al 2003).

Examining the capital assets held by SMFEs is important for understanding whether and how they attain their economic goals. Further, capitals of various types are likely also relevant to the capacity of SMFEs to develop sustainable forest management practices and to achieve certification compliance. The present chapter therefore develops a comparative analysis to address the question: What is the capacity for forest management of private SMFEs in Madre de Dios under the forest concession system? To answer this question, forest management capacity is measured in terms of the various forms of capital that SMFEs command, and there are three specific comparisons that are evaluated: (1) differences in the capital assets of private SMFEs in the three provinces of the Department, (2) differences between the capital assets of private SMFEs that hold forest certification vs. the ones that do not, and (3) differences among the capital assets of private SMFEs in the Tahuamanu province in terms of their short-term plans to

apply for forest certification (i.e., private SMFEs already certified, those planning to apply for certification in the next 2 to 4 years, and those not planning to get certified within 2 to 4 years).

Capital theory is useful for purposes of this chapter because it specifically focuses on the productive assets needed by SMFEs to plan, pursue, and secure their livelihoods and their sustainable forest management practices. I employ capital theory to organize the analysis around various types of capital. Capital theory identifies five types of capital[1]: (1) physical (i.e., material and human-made resources), (2) financial (i.e., pecuniary resources), (3) natural (i.e., stock of natural resources), (4) human (i.e., individuals skills and acquired knowledge), and (5) social (i.e., features of social organization. This allows for comparisons of various capitals among private SMFEs in different parts of Madre de Dios and among those with and without certification.

This chapter pursues a comparative analysis to evaluate variation in the capitals of private SMFEs by provinces of Madre de Dios, certification status in the Department, and certification planning in the Tahuamanu province.

Dimensions of Capitals

This chapter evaluates 29 private SMFEs in Madre de Dios in terms of their capacity for forest management.[2] I measured four different types of capital that these SMFEs command: produced, natural, human, and social capital. Produced capital is comprised of the material and financial resources held by SMFEs; natural capital is the timber resources that SMFEs have in their forest concessions; human capital consists of the training and practical experience the members of SMFEs possess in terms of logging and business management; and social capital is

[1] Often in livelihood frameworks, physical and financial capitals are combined and referred as produced capital (Scoones 1998, Serageldin & Steer 1994).

[2] Of the 29 SMFEs, there are actually only 27 units of analysis since two groups of two SMFEs work together as a consortium.

comprised of the social organization and network in which SMFEs participate. The various indicators used to measure these different forms of capital are shown in Table 5-1[3]; they were identified after a series of factor analyses. An exploratory factor analysis was applied as the first step in the SMFE capital analysis in order to reduce the number of indicators by identifying underlying common factors that represent each fundamental construct; namely produced, natural, human, and social capital. The results from that analysis yielded indexes that proved insignificant in models, so individual factor analyses were carried out for each group of capital indicators (see Appendix F). Table 5-1 therefore summarizes the main descriptive statistics for all of the indicators for the 27 units of analysis.

Table 5-1. Comparable indicators of capital for private SMFEs in Madre de Dios, 2002-2006

Indicators	**Mean**	**Median**	**Std. deviation**	**Max.**	**Min.**
Produced capital					
Equipment ($)	56,124	15,706	97,895	341,001	0
Roads ($)	81,100	15,948	286,307	1,500,000	0
Harvesting fee ($)	90,473	66,574	92,233	427,838	6,350
Loan ($)	29,265	6,503	87,654	433,378	0
Management plans ($)	26,847	22,467	26,026	122,354	3,400
Area (ha)	29,729	23,534	22,476	98,932	4,229
Natural capital					
Approved timber volume (m^3/ha)	32.96	30.42	16.87	62.09	7.02
A category	1.25	0.78	1.46	4.66	0
B category	1.05	0.92	0.86	3.52	0.04
C category	12.86	7.31	11.11	44.44	0.65
D category	8.04	4.35	7.62	25.94	0.14
E category	9.75	8.78	7.01	30.13	0.91
Species per POA (N°)	13.96	13.00	5.58	25.50	6.00
Harvested timber volume (m^3/ha)	13.98	9.41	14.80	61.20	0
A category	1.08	0.71	1.19	3.84	0
B category	0.64	0.26	0.82	3.52	0
C category	7.69	1.83	11.08	44.17	0
D category	1.99	1.28	2.32	6.79	0
E category	2.58	0.83	4.11	15.87	0
Species per POA (N°)	7.23	6.30	5.68	23.80	0

[3] It is acknowledge that the indicators: road, harvesting fee, and management plans can be assets as well as liabilities for SMFEs, so caution must be taken when considering these indicators since they may modify the interpretation of the analysis.

Table 5-1. Continued

Human capital					
Enterprise members (N°)	7.81	6.00	5.81	23.00	1.00
Logging experience (N° members)	5.41	4.00	5.34	23.00	0
Business experience (N° members)	5.48	4.00	5.32	23.00	0
Education (schooling years)	11.52	11.00	3.60	17.00	6.00
Members' performance (%)	67.92	66.70	21.65	33.30	100.00
% SMFEs with low performance	18.50				
% SMFEs with medium performance	59.30				
% SMFEs with high performance	22.20				
Social capital					
Density of membership (N°)	0.56	0	0.75	2.00	0
% SMFEs with < 1 association	48.15				
% SMFEs with 1 to <2 associations	33.33				
% SMFEs with 2+ associations	18.52				
Participation (%)	78.33	76.90	14.49	100.00	53.80
Networks (% of diversity of people assisting SMFE)	55.37	57.10	19.16	85.70	19.00
Exclusion (% existence of member exclusion)	28.57	0	32.43	85.70	0
Trust (% extent of trust among members)	75.00	87.50	24.16	100.00	33.30
Conflict: % SMFEs in conflict	11.11				
% SMFEs in peace	88.89				

These indicators consider information on SMFEs' capital assets accumulated from 2002 (formation of the enterprise) through the 2006 harvest (the last completed harvest year previous to the interview period). This period of time is important because it represents the five year grace period that the State granted to private SMFEs to manage their forests without the elaboration of a current forest inventory of their areas (but using only a governmental study), and within a promotional regime that offered discounts in the payment of their harvesting fees. Therefore, Table 5-1shows the group of indicators that are considered for analysis of SMFEs' capacities for forest management. In the specific case of natural capital, the two indicators considered for analysis (i.e., approved timber volume and harvested timber volume) are further sub-divided in terms of the five categories of timber species, according to their commercial value established by Ministerial Resolution N° 0245-2000-AG.

Forest Management Capacity of SMFEs

After determining the group of indicators that best represent and consistently measure each type of capital under study, the second step in the analysis of the capacity of SMFEs consisted of comparisons of indicators among private SMFEs in different contexts in Madre de Dios. As such, multivariate analysis of variance (MANOVA) was used to examine three distinctions: (1) geographic differences, by comparing indicators among SMFEs located in the three provinces of Madre de Dios, (2) certification status differences, by comparing indicators among SMFEs that currently hold forest certification vs. the ones that do not hold certification in the Department, and (3) certification planning differences, by comparing indicators among SMFEs in the Tahuamanu province that already hold certification status, that are planning to attain forest certification in the short-term, and that are not planning certification in the short-term.

Multivariate analysis of variance

MANOVA is the solution to the multiple comparison problems when there are two or more groups (Harris 2001). Due to the non-normality of the indicators under study, these were transformed to their square roots (instead of natural logs, for example) because of the existence of several zero values among them. In this research MANOVA was used to evaluate whether the population means of the sets of dependable variables (types of capital: produced, natural, human, and social) vary across levels of the three factors under study (province, certification status, and planning certification). Because two of the factors contain more than two levels, additional follow-up tests were performed to determine if significant differences exist among pairs of population means. Those tests involved ‘post-hoc pairwise comparisons’ among levels of the factor, using the method of least-significant differences (LSD) with a significance level of $\alpha = 0.05$. The post-hoc procedure has the following property: the probability of any false rejection of a null hypothesis is at most α (the chosen significance level), no matter how many of the infinite

number of possible contrasts are computed (Harris 2001). Thus, MANOVA helps to assess the question of what combination of different types of capital result in the ability of SMFEs to follow forest management for timber production. This is through the evaluation of the differences among the capital assets of SMFEs in the three provinces of Madre de Dios, between certified SMFEs versus the ones that do not hold certification in Madre de Dios, and among SMFEs planning to attain certification in the Tahuamanu province.

The following sections present the results of the comparisons for each specific distinction (i.e., geographic differences, certification status differences, and certification planning differences in Tahuamanu).

Forest Management Capacity in the Tahuamanu, Tambopata and Manu Provinces

Madre de Dios is a department with three geographic provinces: Tahuamanu, Tambopata, and Manu. Of these three provinces, Tahuamanu is the smallest, the least populated, and the least logged in the department. In comparison Tambopata and Manu are larger and more populated provinces that have experienced more years of logging activity (especially Manu) because the history of land use and occupation of the Department, that was favored by the building of roads and colonization, was initiated in these provinces. Tahuamanu is also characterized as having better terrestrial access to its forests through the Inter-Oceanic Highway, while Tambopata and Manu mainly have only fluvial access to their forests. These characteristics particularly make these three provinces distinct.

This section discusses the results of the comparison of the forest management capacity of SMFEs in the provinces of Tahuamanu, Tambopata, and Manu in terms of their produced, natural, human, and social capital. Because of different characteristics among these three provinces, it is expected that the forest management capacity of SMFEs in these provinces will also differ. For example, one would expect to find more forest management capacity, in terms of

produced, human, and social capital, among SMFEs in Tambopata and Manu because they have experienced more years of logging activity (especially Manu). Also, because Tahuamanu presents a more recent history of logging in the Department, it is the a priori expectation to find more, and more valuable, timber resources (or natural capital) there than in the other provinces. Table 5-2 presents the respective means of the indicators of forest management capacity for the three provinces which covers the period 2002 to 2006.[4]

Table 5-2. Indicators of forest management capacity for private SMFEs in the Tahuamanu, Tambopata, and Manu provinces, Madre de Dios, 2002—2006

Indicators	**Tahuamanu n=12**	**Tambopata n=6**	**Manu n=9**	**Total n=27**
Produced capital				
Equipment ($)	113,940 [a, b]	14,237 [a]	6,960 [b]	56,124
Roads ($)	169,083 [b]	22,906	2,587 [b]	81,100
Harvesting fee ($)	122,892 [b]	88,631	48,477 [b]	90,473
Loan ($)	55,953	7,504	8,189	29,265
Management plans ($)	42,222 [b]	20,380	10,657 [b]	26,847
Area (ha)	40,595 [b]	24,242	18,899 [b]	29,729
Natural capital				
Approved timber volume (m^3/ha)	34.54	26.35	35.25	32.96
A category	2.26 [a, b]	0.79 [a, c]	0.22 [b, c]	1.25
B category	0.76 [a]	1.87 [a, c]	0.88 [c]	1.05
C category	5.35 [a, b]	16.24 [a]	20.63 [b]	12.86
D category	14.10 [a, b]	2.94 [a]	3.38 [b]	8.04
E category	12.08 [a]	4.51 [a]	10.14	9.75
Species per POA (N°)	14.67	12.30	14.12	13.96
Harvested timber volume (m^3/ha)	6.34 [b]	13.29	24.63 [b]	13.98
A category	1.87 [b]	0.79 [c]	0.22 [b, c]	1.08
B category	0.23 [a]	1.54 [a, c]	0.60 [c]	0.64
C category	0.56 [a, b]	8.72 [a]	16.51 [b]	7.69
D category	2.77	0.85	1.71	1.99
E category	0.92 [b]	1.41 [c]	5.58 [b, c]	2.58
Species per POA (N°)	4.40 [b]	7.10	11.10 [b]	7.23

[4] Because there are three pairs of comparisons among provinces, Appendix H presents the p (F) values for each pair.

Table 5-2. Continued

Human capital				
Enterprise members (N°)	7.42	4.83	10.33	7.81
Logging experience (N° members)	7.00	3.83	4.33	5.41
Business experience (N° members)	7.00	4.17	4.33	5.48
Education (schooling years)	12.50	11.00	10.56	11.52
Members' performance (%)	66.68	72.25	66.68	67.92
% SMFEs with low performance	25.00	0	22.20	
% SMFEs with medium performance	50.00	83.30	55.60	
% SMFEs with high performance	25.00	16.70	22.20	
Social capital				
Density of membership (N°)	0.58	1.17 [c]	0.11 [c]	0.56
% SMFEs with no association	58.33	16.67	88.89	
% SMFEs with 1 association	25.00	50.00	11.11	
% SMFEs with 2 associations	16.67	33.33	0	
Participation (%)	80.75	79.47	74.33	78.33
Networks (% of diversity of people assisting SMFE)	53.96	60.32	53.94	55.37
Exclusion (% existence of exclusion among members)	36.90	16.67	25.40	28.57
Trust (% extent of trust among members)	73.61	79.87	73.61	75.00
Conflict: % SMFEs in conflict	16.70	0	11.11	
% SMFEs in peace	83.30	100.00	88.89	

Significance level of 0.05

[a] denotes significance between Tahuamanu and Tambopata

[b] denotes significance between Tahuamanu and Manu

[c] denotes significance between Tambopata and Manu

Produced Capital

Assets of produced capital are crucial to actually implementing forest management because material and financial resources are necessary for the activity itself (e.g., to access the forest, the harvesting itself, the transportation of timber). Comparing produced capital among SMFEs across the three provinces of Madre de Dios, we find in Table 5-2 that most of the indicators exhibit significant differences. Equipment, roads, harvesting fee, management plans, and concession area are often significantly higher/larger in Tahuamanu than in Tambopata and/or Manu; however, there are not significant differences in produced capital among SMFEs in Tambopata and Manu. While it shows a similar differential, the loan indicator was not however

significant. Nonetheless, the value of the equipment possessed in Tahuamanu was approximately eight times larger than in Tambopata, and sixteen times larger than in Manu. This large difference is due to the heavy forest equipment owned by several SMFEs in Tahuamanu (tractors, band-sawmills, front loaders, etc.) in comparison with the light, less expensive, and less durable forest equipment (portable sawmills, chainsaws, *peque-peques*) mostly owned by the SMFEs in Tambopata and Manu. In Manu, in particular, the small numbers are also due to the existence of 22% SMFEs that never bought any equipment for their enterprises. There, enterprise members worked their respective assigned areas with their own equipment or rented it to their enterprises. Also, 22% of the SMFEs in Manu have obsolete equipment (thus not having any residual value). Although SMFEs in Tahuamanu possess more valuable and durable equipment in comparison to SMFEs in the other two provinces, it is important to point that most of the equipment was also obsolete; thus most of the equipment in the area only has a low residual value. This situation has been a generalized characteristic among small-medium loggers in the Peruvian Amazon for several decades (Chirinos & Ruiz 2003), and also is a common characteristic in some countries like Guyana, Uganda, and South Africa where financial barriers of small-medium forest operators and difficulties in accessing credit reduce the opportunities to invest in new and more equipment (Auren & Krassowska 2004, Lewis et al 2004, Thomas et al 2003).

With respect to cost of roads, in Tahuamanu the cost of SMFEs' constructed roads was sixty five times the cost in Manu, where 33% of SMFEs have not constructed any road at all for the period of study. Although the value of SMFEs' constructed roads in Tahuamanu was seven times larger than in Tambopata, the difference among the means was not significant. The higher cost of constructed roads in Tahuamanu is due to the fact that many SMFEs there (67%) have

terrestrial access to their concessions, thus they had to built and /or maintain their roads in order to access their forest concessions; while in Tambopata and Manu these costs are smaller because all SMFEs in Tambopata and many in Manu (78%) are restricted to fluvial transportation. The higher costs of constructed roads in Tahuamanu are also related to the ownership of more heavy equipment among SMFEs there, for which it was necessary to built and/or maintain roads in order to use this type of equipment (i.e., tractors, front loaders). The cost of constructed roads is mainly related to the opening of secondary roads (i.e., inside forest concessions) for harvesting, and in some cases to the maintenance of existing primary roads (i.e., for accessing forest concession area); only in a few cases have stretches of primary roads been constructed to access forest concessions of SMFEs from Tahuamanu. Also, it is important to mention that SMFEs in Tahuamanu mainly had hired contractors to construct their roads, while, in Manu especially, enterprise members were involved in the labor of constructing their roads and, thus, the cost of construction was lower.

Concerning the cost of the harvesting fee,[5] SMFEs in Tahuamanu exhibit a larger accumulated harvesting fee value than the other two provinces; however the difference was only significant with respect to the cost in Manu. The average harvesting fees offered at the bidding process were 0.87 $/ha, 0.76 $/ha, and 0.93 $/ha for Tahuamanu, Tambopata, and Manu SMFEs respectively. These harvesting fees were decided by the participants without having a detailed forest inventory of species and physiographic characteristics conditioning their access; only practical experience was the key. In Tahuamanu the offers were higher than in Tambopata due to the knowledge of the existence of mahogany in the area, thus SMFEs offered a higher fee in

[5] Fee in US$ per hectare fixed by the winning offer during the public bidding, and that has to be paid for every hectare granted to the concessionaire every year. This mechanism forces the new concessionaires to intensify the use of their lands and their capital.

order to get those areas. In Manu, bids were the highest among the three provinces because people in the area wanted to preserve their use rights to the land and the forest that they had been living on for their subsistence; they did not have a commercial purpose in mind when they bid for a concession area.

The baseline harvesting fee established for the bidding process was 0.40 $/ha; however the harvesting fee offered by SMFEs in the three provinces was, on average, almost double the baseline fee. This was because in the *Bases de Concurso*[6] for the first round of public bidding, the economic proposal—where the harvesting fee is the main component—had an important weight (30%) in the total qualification to grant a forest concession. As a result, 58% of the SMFEs in Tahuamanu offered a harvesting fee of $1/ha or more, and in Manu 44% of the SMFEs offered harvesting fees of $1/ha or more. In Tambopata, only one SMFE offered a harvesting fee of $2/ha, which was the highest offer in the department; the rest offered harvesting fees below $1/ha. Although harvesting fee offers were high in the three provinces, Tahuamanu presented a larger accumulated harvesting fee value. This is mainly due to the larger extension of concession areas granted to enterprises in this province, which is directly related to the harvesting fee value. It is important to note that although the letter with the economic offer presented by all SMFEs specifies that the harvesting fee is an amount in US$ per hectare per year, most SMFEs members had expressed they were not aware they had to do this payment every year. Concessionaires thought this was a one time payment only, and this has resulted in many SMFEs having problems in paying their annual harvesting fees. Thus, until the harvest of 2006, only 57% of SMFEs had paid their total harvesting fees: 67% of the SMFEs paid their total harvesting fees in Tahuamanu, 50% in Tambopata, and 56% in Manu. Since payment of the

[6] Document containing principles and regulations for the public bidding contest.

harvesting fee is a requirement to transport harvested timber from forest concessions, this finding indicates that only some SMFEs were able to commercialize their harvested timber for the 2006 harvesting period. In Bolivia, initially in the case of forest concessions, their operators paid also a harvesting fee (US $ 1/ha) for all the productive hectares in their concession area every year (usually 70% of the area) while ASLs paid a harvesting fee only for the annual harvesting area. However, a new legislation modified this regime and since May 2003 all forest operators pay the annual harvesting fee only for the annual harvesting area (Decreto Supremo 27024). This decision was mainly due to the great concern of different organizations in the sooner reversion to the State of forest concessions due to the inability of many enterprises in the payment of this fee. For example in 2001 there was a debt of 60% in the payment of the harvesting fee (Carden 2003).

Logging is considered a risky activity, thus most small loggers do not obtain credit through a formal financial institution. Most members of SMFEs have no credit history since most of them were working under short-term contracts (i.e., 1 to 2 years) or informally prior to the concession system. As of 2003, FONDEBOSQUE (through an agreement with the financial institution *Caja Municipal de Tacna*) was the only institution providing small loans[7] to SMFEs as seed money for working capital (i.e., equipment, food, fuel). Banks have also provided some loans to a few of the SMFEs in the years that followed. As such, 68% of all SMFEs have received some type of loan. In Tambopata, 83% of the SMFEs have received loans; as compared to 67% in Tahuamanu, and 56% in Manu. Despite lower numbers of loans received in Tahuamanu, the total value of the loans received there is seven times greater than in Tambopata and Manu; however, no statistical

[7] Initial credits were up to $2,890 (S./ 10,000).

differences at $p < 0.05$ exist among the three provinces (Table 5-2). This is because 25% of the SMFEs in Tahuamanu received large loans (> than US$ 300,000 in average) from creditors.

The main sources of loans for these SMFEs are: 78% only from FONDEBOSQUE, 5.5% only from a third party (e.g., timber buyers), 11% from FONDEBOSQUE and a financial institution, and 5.5% from FONDEBOSQUE, a financial institution, and a third party. Although most loans have been small and were used mainly to finance harvesting activities, some SMFEs from Tahuamanu received larger loans that have been used in the purchase of equipment and the construction of roads. However, loans received by most SMFEs have not been sufficient for their operations. Thus almost all SMFEs have relied on the informal system of *habilito* to finance their harvesting activities; and some still do, as well. In the *habilito* system the *habilitador* (i.e., timber buyer) gives some money in advance to the *habilitado* (in this case the concessionaire) for a determined volume of timber. Once the timber is harvested, the *habilitado* has to sell all the harvested timber to the *habilitador* for a price determined by the *habilitador*. Usually this mechanism is a disadvantage to the *habilitado* (i.e., concessionaire) since sale prices are "points"[8] below market prices and the *habilitador* usually finds "defects" in the timber in order to devalue the timber extracted and pay less (which is denominated "*castigo*"). However, concessionaires do not have another option than accept the *habilitador* conditions since there are no formal financial mechanisms that usually provide credit to small forest entrepreneurs.

The cost of management plans in Tahuamanu is twice as great as in Tambopata, and four times as great as in Manu (Table 5-2); however, only the latter difference is statistically significant. The difference in the value of management plans among the three provinces results from the average annual harvested area in Tahuamanu (1,205 ha) being larger than in both

[8] Each point refers to S/. 0.10/bf which is equivalent to US$ 0.03.

Tambopata (856 ha) and Manu (477 ha), and also because there are more concession contracts and, as a consequence, more AOPs were presented in Tahuamanu than in the other provinces. In Tahuamanu as well as in Tambopata, one SMFE did not present the 2006 AOP because of non-total payment of the harvesting fee for the previous period, resulting in the immobilization of their timber. In Manu, only one SMFE had the 2002-2003 AOP approved. Due to internal problems among members, this SMFE did not present its AOPs during the period established and is now under investigation by INRENA with the possibility of the concession being returned to the government. A second SMFE in Manu only had two AOPs presented and approved (2004, 2006). This is because it had problems from the beginning in the formulation of its GFMP, which had several observations that were finally fulfilled on November 2007. Another two SMFEs in Manu had presented their AOPs after the established deadline, so their approvals and the mobilization of timber were pending until October 2008.

Finally, SMFEs from Tahuamanu exceeded the other two provinces with respect to forest concession areas. Areas in Tahuamanu's SMFEs were approximately twice as large as in Tambopata and Manu; however they were significantly different only when compared to Manu. Differences in concession area size were already noticeable right from the beginning of the bidding process in Madre de Dios, due to the major availability of harvesting units[9] in Tahuamanu (92 units) as compared to Tambopata (32 units) and Manu (43 units).

In summary, the produced capital assets of SMFEs (equipment, roads, harvesting fee, management plans, and concession area) are significantly higher/larger in Tahumanu than in Manu; only the value of equipment is significantly larger in Tahumanu than in Tambopata. There are not significant differences in produced capital among SMFEs in Tambopata and Manu.

[9] Harvesting units are the units in which the permanent production forests were divided. Each unit comprises areas between 5,000—10,000 ha.

Although no statistical differences at $p < 0.05$, the loan indicator tends to be higher among SMFEs in Tahuamanu than in the other two provinces.

Natural Capital

Timber, which in this study represents the natural capital of SMFEs, is essential since it is the raw material needed to carry out forest management. Moreover, the type of timber species — and their volumes present in forest concessions— will determine the scale and productivity of a SMFE. Therefore, in this sub-section there are two indicators of natural capital (in terms of five categories of timber species according to their commercial value[10]) that are evaluated and compared among the three provinces: approved timber volume and harvested timber volume. Appendix I presents a list of the species harvested by SMFEs in Madre de Dios. The results show that significant differences exist among categories of timber species for SMFEs in the three provinces. These data are presented in Table 5-2. The SMFEs in Tahuamanu exceed the other two provinces with respect to valuable timber resources. Nevertheless, total timber volumes and number of species approved for the SMFEs in Tahuamanu and Manu were similar, and somewhat larger than for the SMFEs in Tambopata (but with no significant differences). However, there were significant differences among SMFEs in the three provinces in the approved volumes for mahogany (A category), the most valuable timber species in the country, as well as for some differences for cedar (B category), and for timber species in the C, D, and E categories. In the case of mahogany, its presence among SMFEs in Tahuamanu was three times greater than among SMFEs in Tambopata, and ten times greater than among SMFEs in Manu. This is a reflection of historical timber activity in the Department, where Tahuamanu has been

[10] The A category is represented by mahogany; B category by cedar; C category by intermediate value species such as *Cedrelinga catenaeformis*, *Amburana cearensis*, *Chorisia integrifolia*, *Aniba sp*., *Virola sp*.; D category by potential value species such as *Coumarouna odorata*, *Dipteryx micrantha*, *Aspidosperma subincanum*, *Tabebuia sp*., *Copaifera reticulata*; and E category by other species such as *Hymenaea sp*., *Myroxylon balsamun*, *Manilkara bidentata*, *Couratari guianensis*.

the least harvested region due to the more recent construction of roads and the migration process of people into the region.

With respect to the presence of cedar (B category), the second most valuable species in the country, SMFEs in Tambopata have almost double the approved volume of cedar than SMFEs in the other two provinces; these differences are statistically significant. The Tambopata region had previously been selectively exploiting both mahogany and cedar; however, in the medium and high sector of the *Río Las Piedras*, there are still some volumes of cedar (IIAP & CTAR-Madre de Dios 2001). Regarding approved volumes of less valuable commercial timber species, SMFEs in Manu and Tambopata present larger volumes of species of C category than in Tahuamanu that are also statistically significant. In contrast, however, the volumes of D category species in Tahuamanu's SMFEs were larger than in the other two provinces' SMFEs, as were the volumes of E category species with regard to the SMFEs in Tambopata. All three of these differences are statistically significant. The Manu province has been characterized by scarcity of valuable commercial tree species due to exhaustion of such species in all areas of this province (IIAP & CTAR-Madre de Dios 2001). Thus, the forest concessions in this area were characterized by the presence of lower priced and lesser-known timber species, which also explains the larger volumes of timber harvested by SMFEs there (see Table 5-2).

Total timber volumes and number of species harvested by SMFEs were significantly different only between SMFEs in Tahuamanu and Manu; although volumes harvested in Manu were almost double those in Tambopata, the difference is not statistically significant. For mahogany and the species of E category, significant differences in harvested volumes were found between Manu and the other two provinces. This means that Manu is the province where the least mahogany was harvested due to its lesser abundance, and the largest volumes of species

of E category were harvested there. Although species of E category are the least valuable in comparison to the other categories, in 2006 several of these species started having demand in the market, including *Hymenaea sp*., *Myroxylon balsamun*, and *Aspidosperma macrocarpon*. However, their approved volumes in SMFEs from Tambopata and Manu were not totally harvested. This is mainly due to the fact that most of these species are hardwoods, which makes them difficult to transport by river because their high densities does not allow them to float very well; this problem is common to these two provinces. Significant differences were found in harvested volumes of cedar between Tambopata and the other two provinces, because of the large volumes of this species in Tambopata. Significant differences were also found in C category harvested volumes between Tahuamanu and the other two provinces, which mean that Tahuamanu was the province with the least harvested volumes of species of C category in the Department.

In Manu, SMFEs harvested 70% of their total approved volume for the period under study. From this volume, 67% correspond to timber species of C category (which have intermediate commercial value and are the most abundant in the province), and 23% to species of E category. In Tahuamanu the situation is completely different. There, SMFEs only harvested 18% of their total approved volume; this is because of the presence of the valuable mahogany which made up to 29% of the total volume harvested. In addition, species of D category (especially *Coumarouna odorata*, which has seen an increase in demand since 2004) made up to 43% of the total volume harvested there. Half (50%) of the total approved volume has been harvested in Tambopata: cedar (11.5%) and timber species of C category comprise up to 65.6% of the total volume actually harvested. In average SMFEs in Madre de Dios harvested 7 timber commercial species per year during the first five years of operation, and they have basically sold round and saw

timber due to the lack of transformation equipment among most SMFEs. This situation is different among forest concessions in Bolivia, where operators used many more commercial species (e.g., an average of 20 commercial spp. in 2001) (Guzman 2002) than in Peru, and have diversified its industry adding value to its products (Guevara et al 2004).

It is important to mention that most SMFEs (89%) in Madre de Dios received forest concession areas that had already been logged to some degree. Only 7% of SMFEs received forest concession areas with little logging and just 3.7% received forest concession areas with no previous logging. This is a result of the more difficult access to these forest concession areas.

In summary, SMFEs in the Tahuamanu province have significantly larger volumes of mahogany than SMFEs in Tambopata and Manu, and SMFEs in Tambopata have significantly larger volumes of cedar than SMFEs in Tahumanu and Manu. Volume of species of C category is significantly smaller among SMFEs in Tahuamanu than among SMFEs in Tambopata and Manu, and volume of species of D category is significantly larger among SMFEs in Tahuamanu than among SMFEs in Tambopata and Manu. There are also significantly larger volumes of species of E category among SMFEs in Tahuamanu than among SMFEs in Tambopata. With respect to harvested volumes, SMFEs in Manu harvested significantly smaller volumes of mahogany than SMFEs in Tahuamanu and Tambopata due to the smaller amounts of this species in that province, which is characterized by the presence of lower priced commercial species. In the same way, SMFEs in Tambopata have significantly harvested larger volumes of cedar because of the larger volumes of this species in that province. Smaller volumes of species of C category have significantly been harvested among SMFEs in Tahuamanu than among SMFEs in Tambopata and Manu, and larger volumes of species of E category have significantly been harvested among SMFEs in Manu than among SMFEs in Tambopata and Tahuamanu.

Human Capital

Concessionaires are the social actors carrying out forest management; thus their experience with logging, and their skills and knowledge, are very important —and indeed necessary— in the actual implementation of management plans. I therefore compare each indicator of human capital shown in Table 5-2 among the three provinces to look for differences in human capital variables as indicators of management capacity. Results indicate that no significant differences at $p < 0.05$ were found among pairs of province means for the indicators under study; however, these indicators merit discussion for a better characterization of SMFEs in Madre de Dios. All SMFEs in this study were constituted in 2002 in order to participate in the first public bidding for concessions. In their initial state, 16 members (range of 11—20) comprised the average membership of 78% of the SMFEs in Manu; whereas 92% of the SMFEs in Tahuamanu consisted of an average of 10 members (ranging from 2—14), and 83% of the SMFEs in Tambopata had an average of 6 members (ranging from 2—11). In 2006, however, five years after their constitution there was a reduction in the number of members per enterprise. Thus in 42% of the Tahuamanu SMFEs, the number of members decreased by 50%, while in Tambopata only 17% of the SMFEs have experienced a 33% decrease in their initial membership. In Manu, 44% SMFEs have experienced a reduction of 37% in their initial membership; however, the SMFEs there still were formed by a larger number of members than in the other two provinces. In general, the decline in membership has been a result of personal differences and other internal problems among members. Examples include disagreements and divisions in managing the enterprise and the forest concession, and bad enterprise management by some managers.

Most SMFEs in the study were formed as *Sociedades Anónimas Cerradas* (SAC) (67% in Tahuamanu and Tambopata, and 78% in Manu). As mentioned in a previous chapter, a SAC

allows up to 20 members and divides the capital of the enterprise by shares; it is an advantageous way for small loggers to join their small amounts of capital to form a more solid enterprise (Ley N° 26887). However, this type of social organization also became a disadvantage for several SMFEs due to disagreements and misunderstandings among a large number of members involved in making decisions, which finally affected the operations and management of concessions and enterprises:

> "Enterprises composed by a major number of members have been enterprises that had less advancement, due to issues of interest and personal conflicts, and almost never could reach consensus. This has caused that every one works individually to his responsibility in its assigned area; this has been one of the main weaknesses" (WWF-MDD's representative, pers. comm. 2007).

From interviews with enterprise managers during the harvest of 2006, responses show that a vast majority of SMFEs members in Tahuamanu and Tambopata had some previous experience in logging activities (91% and 85%, respectively) before 2002 (i.e., before the formation of the enterprise). In Manu, SMFE members had less previous logging experience than the other two provinces, and there is variation in this experience among the different SMFEs members there. In 22% of the SMFEs, the members did not have any previous logging experience; in 33% of the SMFEs, only 26% of their members had some previous logging experience; in 11% SMFEs, 75% of their members had some previous logging experience. Only in 33% of the SMFEs did all members possess some type of previous logging experience. After the announcement of a public bidding for forest concessions in Madre de Dios, one of the mayors of Manu (from the district of Madre de Dios) asked the inhabitants there to organize themselves in order to form enterprises to participate in the public bidding. This was to avoid allowing people from other places outside Manu to occupy the forest of the province. Thus some people in Manu that applied for a forest concession were loggers, but most of them had other occupations (i.e., miners, merchants, among others); most of them mainly formed associations and applied to the public bidding in order to

preserve their use rights to the land (and the forest) that they had been living on for their subsistence.

Experience in logging activities has been obtained in some cases from the holding of 1,000ha forest contracts during the previous forest regime (before 2002), but mainly from informal logging activities carried out by most loggers. In these cases most loggers' knowledge was limited to the selective extraction of the most valuable commercial timber species (mahogany and cedar). Only recently with the new forest regime, and the formation of SMFEs, have concessionaires been exposed to the concept of forest management with its greater technical demands. With assistance from environmental NGOs (i.e. WWF-MDD, ProNaturaleza, and CESVI), these concessionaires started learning new terminology and the basics of forest management. This included how to conduct a forest census and how to harvest species using reduced impact techniques.

A wide majority of SMFEs members in Tahuamanu and Tambopata also had some business experience prior to 2002 (91% and 93%, respectively). In Manu, previous experience in business had the same relative frequencies as shown before for previous experience in logging (i.e., members of 22% of the SMFEs did not have any previous business experience; in 33% of the SMFEs, only 26% of their members had some previous experience; in 11% of the SMFEs, 75% of their members had some previous experience; and in 33% of the SMFEs, all members possessed some previous business experience). Respondents expressed that their only business experience had been in the sale of small amounts of timber to intermediaries. Recently after enterprise formation, environmental NGOs in Madre de Dios have conducted workshops and seminars on business management and marketing topics in order to increase the business skills of SMFE members.

With respect to education among SMFEs members, a common characteristic is their limited level of education. SMFEs managers in Tahuamanu have, on average, 2 years of post-secondary technical studies, while in Tambopata and Manu the SMFEs managers only completed four years of secondary schooling, on average (from a total of five years of secondary schooling). In these enterprises, the manager usually is the person with the highest level of education among all the members. Another issue is the low level of education and technical skills of many workers, which are usually temporarily hired within SMFEs. Thus the limited level of education among SMFEs in the three provinces and the low levels of technical capacities of their workers have constituted one of the factors complicating the successful management of the enterprise, since it requires knowledge and understanding of both forest management and business skills to make an enterprise profitable and to meet all legal responsibilities. Also, 63% of SMFE managers among the three provinces expressed a medium performance rating for their members in different tasks concerning management of the enterprise and its concession area; 16% assigned a low performance rating to their members.

In summary, although human capital assets among SMFEs in the three provinces is not statistical different at $p < 0.05$, there is a tendency that SMFEs in Tahuamanu are formed by a larger number of members with previous experience in logging and business, that have higher education level than SMFEs in Tambopata and Manu. Also, there is a tendency that SMFEs in Manu are formed by a larger number of members than SMFEs in Tahuamanu and Tambopata.

Social Capital

Social assets are important because they have the potential to contribute to better development of forest management and enterprise performance since they facilitate transactions, coordination, and cooperation among people. In this sub-section, the six indicators of social capital shown in Table 5-2 are evaluated and compared among the three provinces. The results

show that no significant differences at $p < 0.05$ among pairs of province means were found for the majority of the indicators examined; however, a discussion of these indicators follows for a better characterization of SMFEs in Madre de Dios. Only statistical difference in 'density of membership' to forest associations/organizations was found among SMFEs in Tambopata and Manu. In Tambopata, 83% of the SMFEs belong to 1 or 2 associations/organizations, while 17% do not belong to any association/organization. The main forest association in the province is the *Asociación de Concesionarios de Madre de Dios* (ACOMAD), which was formed in 2002 after the granting of forest concessions as a way for the new concessionaires to have representation and to look for solutions to common problems. The other association/organization is the *Comité de Gestión de Bosques del Río Las Piedras*, a multi-stakeholder organization formed in 2005 with the goal of monitoring and promoting forest management activities in the watershed of the *Las Piedras* River.

In the SMFEs of Tahuamanu, 58% do not belong to any forest association, while 42% belong to one or two forest associations. There, the main forest association is the *Asociación de Concesionarios Forestales de Tahuamanu* which emerged in 2004 as a way for SMFEs from the Tahuamanu province to have their own representation (especially, given the fact that the ecological, economic, and social reality of Tahumanu is different from that of the other two regions of the department) and with the goal of finding solutions to their problems. The other association/organization is the *Comité de Gestión de Bosques del Río Tahuamanu*, a multi-stakeholder organization for monitoring and promoting forest management activities in the watershed of the Tahuamanu River. In Manu, 89% of the SMFEs do not belong to any association, while 11% of them belong to the ACOMAD. There, SMFEs initially formed a forest association (in 2003) with the objective of addressing specific problems faced by SMFEs in the

area; however this association did not last more than a year. As a consequence, some SMFEs from Manu became members of the ACOMAD; however, distance and costs in transportation from Manu to Puerto Maldonado, where the ACOMAD holds its meetings, have kept more SMFEs in Manu from associating with this association.

Concerning participation of enterprise members with respect to meetings and (in general) enterprise activities, SMFEs in the three provinces report a relatively high percentage; however Tahuamanu and Tambopata report a slightly higher level of participation than those in Manu. SMFEs in Tambopata exhibit a higher percentage, with respect to the 'Networks' indicator, than do Tahuamanu and Manu (which have a similar value). This means that SMFES in Tambopata obtained assistance from relatively more people outside the enterprise, and/or by institutions for financial and commercial need, than did the SMFEs in the other two provinces. In the case of financial assistance, people that usually had supported SMFEs have been: a) *habilitadores* (timber buyers), who had provided money in advance (denominated *habilito*) to concessionaires in exchange for timber usually sold for lower prices than the market; b) contractors, who enter into a SMFE forest concession to harvest timber with its own equipment and personnel in exchange for giving the SMFE a percentage of the harvested timber; and c) banks, although in fewer cases. In terms of commercial assistance, usually the *habilitadores* have supported the SMFEs.

For the 'Exclusion' indicator, 37% of the SMFEs in Tahuamanu reported that differences in education, wealth, and political ideas among enterprise members had created exclusion inside the enterprise. In Tambopata, 17% of the SMFEs expressed such exclusion of members, and in Manu 25% of SMFEs reported it. Exclusion —especially among SMFEs in Tahuamanu and Manu— has restricted a limited number of members from accessing resources and from

opportunities for harvesting and commercialization, thus originating the detachment of the excluded members from the enterprise and from the rights and obligations that being part of the enterprise implies (Room 1995). In the end, this has resulted in several excluded members dropping enterprise membership through the selling of their shares.

Trust is an important component of social capital. Among the studied enterprises, the value for the 'trust' indicator represents generalized trust (i.e., the extent to which members in a SMFE trust each other). Reported values of trust were quite similar and relatively high for all of the SMFEs (> 70%). Confidence in, and/or reliance on the performance and behavior of, SMFE members is important and necessary for carrying out forest management activities such as planning and implementing harvesting, sale of timber, and administration of the enterprise. It is also crucial for the development of the enterprise, and in the case of these SMFEs that reliance started with the creation and implementation of rules or *estatutos*. With respect to conflicts inside SMFEs, only a low percentage of the enterprises reported any internal dissension: the vast majority of them (90% on average) reported a stable social situation (i.e., peace and harmony) within their enterprises.

In summary, SMFEs in the three provinces have very similar characteristics with respect to their members' participation in enterprise activities, extent to which enterprise members trust each other, relatively low level of conflicts inside enterprises, and exclusion among enterprise members (i.e., there is not statistical difference at $p < 0.05$ for most social capital assets). However, there is significantly larger density of membership among SMFEs in the Tambopata province than among SMFEs in Manu. Table 5-3 shows a summary of the main characteristics among SMFEs in the three provinces.

Table 5-3. Characteristics of private SMFEs in the three provinces of Madre de Dios

Capital types	Characteristics	Tahuamanu	Tambopata	Manu
	Main purpose to apply for a forest concession	commercial	commercial	preserve use rights for subsistence
Produced	*Equipment	larger quantity; heavy forest equipment	mainly light, less durable forest equipment	mainly light, less durable forest equipment
	*Roads	>value; 67% terrestrial access	small value; 100% fluvial access	very small value; 78% fluvial access
	*Harvesting fee	>value; 67% paid total fee	medium value; 50% paid total fee	lower value; 56% paid total fee
	*Loan	> value; 67% received loans; large loans from banks, large entrepreneurs, and small loans from *Fondebosque*	low value; 83% received it; small loans from *Fondebosque* mainly	low value; 56% received it; small loans from *Fondebosque* mainly
	*Management plans	> value; average annual area 1,205 ha	medium value; average annual area 856 ha	low value; average annual area 477 ha
	*Area	> area	medium size	medium size
Natural	*Approved volume	> mahogany, D & E category species volumes	> cedar volume	> C category species volume
	*Harvested volume	smaller: 18% of approved volume; 4 spp. per year.	medium: 50% of approved volume; 7 spp. per year	larger: 70% of approved volume; 11 spp. per year
Human	*Members reduction	in 42% SMFEs	in 17% SMFEs	in 44% SMFEs
	*Logging & business experience among all members	91% SMFEs	85% SMFEs	44% SMFEs
	*Education	some post-secondary	incomplete secondary	incomplete secondary
Social	*Associations membership	42% SMFEs	83% SMFEs	11% SMFEs

Forest Management Capacity in Certified and Non-certified SMFEs

Madre de Dios is the Department in Peru with the greatest area of certified forests under the modality of forest concessions (205,593 ha, which represents 31% of the total area certified in Peru). There, five SMFEs from the first round of bidding attained forest certification in 2007.[11] Research has shown that forest certification is financially costly —especially for small

[11] From a total of 36 SMFEs (from the first bidding) that are still active as to October 2009.

forest operations— due in part to the costs of the evaluations themselves, but mainly because of the intensive costs of the actions required to improve forest management (Irvine 1999, Molnar 2003). Thus, one expects to find greater forest management capacity among certified SMFEs than among the non-certified, particularly with respect to produced capital, because greater resources and investments are needed to comply with the demands of certification. This section discusses the results of the comparison of the forest management capacity for both certified and non-certified SMFEs in Madre de Dios in terms of their produced, natural, human, and social capital. Table 5-4 presents the respective indicators of forest management capacity for the two groups (certified and non-certified) for the period of 2002-2006 harvests.

Table 5-4. Indicators of forest management capacity for certified and non-certified private SMFEs, Madre de Dios, 2002—2006

Indicators	**Certified n=3**	**Non-certified n=24**	**P (F)**	**Total n=27**
Produced capital				
Equipment ($)	300,229	25,611	<**0.0001**	56,124
Roads ($)	593,333	17,071	<**0.0001**	81,100
Harvesting fee ($)	204,141	76,265	**0.0423**	90,473
Loan ($)	210,989	6,550	<**0.0001**	29,265
Management plans ($)	76,640	20,623	**0.0007**	26,847
Area (ha)	68,531	24,878	**0.0040**	29,729
Natural capital				
Approved timber volume (m^3/ha)	49.15	30.93	0.0998	32.96
A category	3.47	0.98	**0.0086**	1.25
B category	1.05	1.04	0.9169	1.05
C category	8.57	13.40	0.6135	12.86
D category	20.27	6.51	**0.0042**	8.04
E category	15.78	9.00	0.0941	9.75
Species per POA (N°)	18.27	13.42	0.1639	13.96
Harvested timber volume (m^3/ha)	10.38	14.43	0.9004	13.98
A category	2.91	0.85	**0.0095**	1.08
B category	0.24	0.70	0.4655	0.64
C category	1.03	8.52	0.3344	7.69
D category	4.04	1.73	0.2707	1.99
E category	2.17	2.63	0.6844	2.58
Species per POA (N°)	5.80	7.41	0.8785	7.23

Table 5-4. Continued

Human capital				
Enterprise members (N°)	10.00	7.54	0.7080	7.81
Logging experience (N° members)	10.00	4.83	0.2163	5.41
Business experience (N° members)	10.00	4.92	0.2276	5.48
Education (schooling years)	13.67	11.25	0.2697	11.52
Members' performance (%)	66.70	68.07	0.9710	67.92
% SMFEs with low performance	0	20.83		
% SMFEs with medium performance	100.00	54.17		
% SMFEs with high performance	0	25.00		
Social capital				
Density of membership (N°)	0	0.63	0.1479	0.56
% SMFEs with no association	100.00	50.00		
% SMFEs with 1 association	0	29.17		
% SMFEs with 2+ associations	0	20.83		
Participation (%)	84.60	77.54	0.4318	78.33
Networks (% of diversity of people assisting SMFE)	79.37	52.37	**0.0271**	55.37
Exclusion (% existence of exclusion among members)	28.60	28.57	0.7258	28.57
Trust (% extent of trust among members)	97.23	72.22	0.1098	75.00
Conflict: % SMFEs in conflict	0	12.50	0.5344	
% SMFEs in peace	100.00	87.50		

Produced Capital

Produced capital is particularly necessary to comply with the demands of certification, including the actions required to improve forest management. Certified SMFEs report greater produced capital assets than non-certified SMFEs, with statistically significant differences between the means for all variables defining this type of capital (see Table 5-4). For example, the value of the equipment owned by certified SMFEs was approximately twelve times larger than the non-certified enterprises. This difference is due to the larger quantity of heavy forest equipment and trucks owned by certified enterprises in 2006, as compared with the smaller quantity and mostly light and less expensive forest equipment owned by non-certified enterprises. Among the certified enterprises, two of them (which comprise only one unit of analysis) are managed by a family which has been in the logging business in the Department for over 20 years and which owns two processing facilities in Puerto Maldonado. They have

therefore accumulated a large amount of heavy equipment for harvesting, processing, and also a fleet of trucks for transportation –which makes a large difference in comparison to the other SMFEs in the Department and in the study. The other three certified SMFEs (which comprise 2 units of analysis) have recently accumulated heavy equipment since the formation of their enterprises in 2002.

Certified SMFEs have mainly terrestrial access to their forest concessions (67%), while for the non-certified SMFEs their access varies. For example, 42% of them have both terrestrial as well as fluvial transportation, 37% have only fluvial transportation, and 21% have only terrestrial transportation. Thus, the amount of constructed roadways is variable. However, the value of roads for certified enterprises is thirty-five times that of the non-certified enterprises. The large difference in roads value between these two groups is mainly because of the amount of money invested in road construction and maintenance by the certified SMFEs during 2006 as a pre-condition to the certification process.

Although the average harvesting fees offered by certified SMFEs was 0.86 $/ha, very similar to the 0.92 $/ha for the non-certified concessionaires, certified SMFEs report a larger accumulated harvesting fee value due to their larger concession areas. As of the harvest of 2006, all certified SMFEs had paid their total harvesting fees; however, not all non-certified SMFEs had fulfilled this obligation. Only 54% of non-certified SMFEs had paid their total harvesting fee; the rest (46%) had paid different percentages of it (ranging from 10% to 94%). The payment of the harvesting fee is a requirement for the mobilization of harvested timber, thus those non-certified SMFEs that did not pay their total harvesting fee (according to their payment schedule) subsequently incurred losses. Although a discount of 25% in the harvesting fee is offered by law

to SMFEs as an incentive for attaining certification, at the time of the interview none of the certified SMFEs had received this discount, due mainly to INRENA's bureaucratic issues.

With respect to loans to finance enterprise operations, there is a large difference between the two groups. This difference is mainly because certified enterprises (67%) received mostly large loans from banks and large private enterprises, and only small loans from FONDEBOSQUE, while 62% of non-certified SMFEs received only small loans from FONDEBOSQUE (the other 38% did not receive any loans). As explained previously, logging is considered a risky activity with few formal lines of credit available from banks for small enterprises. However, three of the certified enterprises had accessed bank loans because they had some fixed capital in properties as a guarantee for the loans, as well as several years of experience in the activity (through the holding of 1,000 ha contracts during the previous forest regime).

The cost of management plans is also larger among certified enterprises; it is almost four times the cost reported by non-certified enterprises. This difference is because the average annual harvested area, on which the management plans are based, is larger among certified enterprises (1,488 ha), in comparison with the non-certified (809 ha). Recently, in 2005 two certified SMFEs (1 unit of analysis), and in 2006 three certified SMFEs (2 units of analysis), were the first SMFEs in the Department to produce their general forest management plans (GFMPs) by conducting an exploratory forest inventory.[12] The average concession area among certified SMFEs is almost three times larger (i.e., 68,531 ha) than among non-certified enterprises (Table 5-7). The reason for this is that two certified units of analysis possess the largest areas in the

[12] The GFMP presented and approved by INRENA during the first year of SMFEs operation was based on secondary information with the condition that at the fifth year of SMFEs operation the GFMP should be reformulated based on an exploratory inventory.

Department (90,000 ha on average) as a result of grouping two distinct enterprises into one in each case.

Natural Capital

The results of the comparative analysis between certified and non-certified SMFEs are presented in Table 5-4. Statistically significant differences between certified and non-certified enterprises were found for some categories of timber species. For example, there are significant differences in approved volumes for mahogany (A category), and for timber species of D category. In the case of mahogany, its presence among certified SMFEs is three and a half times larger than in non-certified enterprises. Certified enterprises are only located in the mahogany-rich Tahuamanu province. With respect to the presence of species of D category, or 'potential species', certified enterprises also report three times more volumes than the non-certified ones.

Although no statistical differences in total volume harvested between certified and non-certified enterprises at $p < 0.05$ exist, total volumes harvested tend to be larger among non-certified enterprises. The reason why non-certified SMFEs harvested more timber in comparison to the certified ones is because of the smaller volumes of the valuable mahogany these enterprises possess. Thus, they need to harvest more volumes of less valuable species in order to make a profit and continue their operations. Certified enterprises had harvested 21% of their total approved volume for the period under study. From this volume, 39% corresponds to species of D category, 28% to mahogany, and 21% to species of E category. Although the species belonging to D and E categories are characterized as being of lower commercial value (in comparison to A, B, and C categories), in recent years there has been increased demand for certain species of D and E categories. Included in this trend are species such as *Coumarouna odorata* and *Dipteryx micrantha* (D category) since 2004, and in 2006 species such as *Hymenaea sp*., *Myroxylon balsamun*, and *Aspidosperma macrocarpon* (E category). This has resulted in increased prices

for these species and, of course, they have subsequently been harvested in larger amounts. In particular *Coumarouna odorata* and *Dipteryx micrantha* (category D), a hardwood species, has increased greatly its exports to the Chinese market since 2004 (Putzel 2009). Non-certified enterprises harvested 47% of their total approved volume, from which 59% corresponds to species of C category (species that have intermediate commercial value), and 18% to species of E category. Although species of E category increased in demand since 2005, the lower percentage harvested with respect to their approved volumes (only 29%) among non-certified SMFEs is because these species are hardwood species; its transportation is mainly done through terrestrial ways, and among the non-certified SMFEs only 21% of them have terrestrial access, thus those SMFEs are the ones which can harvest these species.

Human Capital

Although the results of the analysis show no significant differences between the two groups in terms of human capital assets at $p < 0.05$ (see Table 5-4), it is important to exhibit the characteristics of these assets. For example, as of the harvesting 2006, certified SMFEs have maintained the same number of members that they had at the formation of their enterprises. Certified SMFEs are mainly family businesses; this is most likely why their members have kept together. In contrast, non-certified enterprises have experienced reductions in membership during the first five years of their operation. For example, 42% non-certified SMFEs had experienced a reduction in membership that varied from 17% to 67%. This has been mainly a result of disagreements and divisions among members in these SMFEs with regard to managing the enterprise and the forest concession, and due to mismanagement by some managers that generated losses to the enterprise for which some members later quit.

All members in certified SMFEs had previous experience (i.e., before the formation of the enterprise) in logging and business activities, due mainly to the holding of 1,000 ha contracts

or permits for forest harvesting during the previous forest regime. Among non-certified enterprises previous experience in logging and in business varies, as follows. All members in 46% SMFEs report having previous logging experience, while 33% of the SMFEs have more than half of their members reporting previous experience. In 12.5% of the SMFEs, between 16% and 36% of their members had previous experience and no members had any previous experience in 8% of the SMFEs. With respect to previous business experience, 54% of SMFEs report that all members had it, while 25% of SMFEs report that more than half of their members had previous experience. In 12.5% of the SMFEs, between 16% and 36% of the members had previous business experience, and 8% of SMFEs report no members with any previous business experience.

Most members of SMFEs in Madre de Dios gained logging experience through on-the-job training during the previous forest regime; no formal training in forest management had occurred. Only recently with the new forest regime and the formation of SMFEs have concessionaires started to learn new terminology and the basics of forest and business management. This formal training has been received by some SMFEs, mainly during their first three years of operation, through the assistance of environmental NGOs (i.e. WWF-MDD, ProNaturaleza, and CESVI). However, in the specific case of certified SMFEs, through a formal agreement of technical and financial assistance by WWF-MDD, formal training has been provided (previous to the evaluation process for certification) on how to implement: an exploratory forest inventory, reduced impact techniques, road planning, industrial security, and first aid. Thus, in the five years since SMFEs have emerged as viable concessionaires, they have therefore acquired some practical training and have become accustomed to the new terminology of forest management. Nevertheless, it is not possible to say how effective this training has been

in terms of performing better forest management; as such a relationship remains to be examined. However, in the case of certified SMFEs, INRENA's specialists indicated that these SMFEs were already implementing better forest management practices (i.e., in terms of what the new forestry law demands) for which they were later awarded the certification certificate.

The level of education among managers (usually the person with the highest level of education in a SMFE) in certified and non-certified SMFEs is variable. Among certified enterprises, all managers completed secondary education: in two SMFEs (one unit of analysis) the manager has some undergraduate education, and in two other SMFEs (one unit of analysis) the manager completed undergraduate education. In the case of the managers of non-certified enterprises, 17% of them completed undergraduate education, 25% of them have incomplete undergraduate education, 42% of them completed or have some secondary studies, and 17% have only primary studies. Education gives people an increased ability to process information and knowledge in order to make decisions. The higher level of education among managers of certified SMFEs has definitely influenced enterprises' management, and negotiations with other social actors. For example, these enterprises have better organized their forest management and administrative tasks, fulfilled their responsibilities with the State, capitalized their enterprises, and were able to get better deals in selling their timber (when dealing with *habilitadores* or contractors) in comparison with the non-certified enterprises.

In the case of certified SMFEs, their managers —although by the time of the interview they already had attained certification and were considered in the Department as model enterprises in forest management— acknowledged that they still needed to improve several aspects of their enterprises in order to do 'real' sustainable forest management. In the case of non-certified enterprises whose managers expressed high performance, this was referred to as

fulfilling the main requirements from INRENA (i.e., presenting AOPs and paying harvesting fees on time).

Social Capital

Social capital assets between certified and non-certified SMFEs presented no significant differences at $p < 0.05$, with the exception of the Networks variable as shown in Table 5-4. Nevertheless, the characteristics of these assets are shown below. Certified enterprises did not belong to any forest association in Madre de Dios. Half of the non-certified enterprises did not belong to any forest association and the other half belonged to either the *Asociación de Concesionarios Forestales de Tahuamanu*, the *Asociación de Concesionarios de Madre de Dios (ACOMAD)*, and the *Comité de Gestión de Bosques* (*del Río Las Piedras* or *del Río Tahuamanu*). Certified SMFEs do not belong to any of these forest associations because they "have not been welcome to participate in them" (SMFE representative, personal comm. 2007). This is because, according to one interviewee: "from the moment we received the concession contract we had a firm position on fulfilling the contract we signed with the State, the requirements of the new forestry law, and achieving the forest management standards for certification; the other concessionaires did not have the same position" (SMFE representative, personal comm. 2007). For example, "the other concessionaires opted for: 1) forest managements made in the office, 2) studies made superficially and conducted by NGOs that were only interested in statistics and in fulfilling certain goals, 3) exigency with pressure (*medidas de lucha*) and exoneration of pending debts with the State, 4) sale of transportation permits without having the timber mentioned on them, and 5) flexibility in the sanctions due to bad management practices. These associations are still being led by SMFEs that still present resistance to adopt the new form of management" (SMFE representative, pers. comm. 2009).

The aforementioned forest associations emerged mainly to represent forest users' interests and to look for solutions to common problems faced by these users. However, these associations mostly exist in name only, and their members get together sporadically a few times a year usually when there are new regulations concerning the interests of concessionaires (in the case of the *Asociaciones de Concesionarios*) or the interests of other forest users (in the case of the *Comité de Gestión de Bosques*).

Concerning participation of enterprise members with respect to meetings and enterprise activities in general, certified SMFEs exhibit a higher level of participation from their members (84.6%) than do the non-certified enterprises (77.5%). As mentioned previously, this is because they are mainly family businesses; thus their members are in closer contact and there is more interest among them for the activities and management of the business, which does not happen with non-certified SMFEs.

With respect to networks, certified SMFEs show a significantly higher percentage in comparison to the non-certified concessionaires. This is because certified enterprises had received assistance by relatively more people outside the enterprise for financial or commercial purposes (especially by banks and larger enterprises), than the non-certified SMFEs. However, even though certified enterprises may have relied on banks for acquiring larger loans, still the main source of financial support for their operations has been through *habilitadores*. In the case of non-certified enterprises, 71% of them relied basically on *habilitadores* for financial support, while 21% of them relied only on the financial support of their own members. In terms of commercial assistance, *habilitadores* have been the ones mainly supporting the SMFEs.

Regarding exclusion, both groups reported that differences in education, wealth, and political ideas among enterprise members had created some divisions among members inside the

enterprise. However, in the case of certified SMFEs these differences have been resolved, which has allowed these enterprises to move forward. This has not been the case for non-certified enterprises, where differences among members resulted in declining membership in several cases. Although some internal differences exist among members, the extent to which members in a SMFE trust each other was reported to be much higher in certified SMFEs than among the non-certified ones that were interviewed. Again, this is mainly due to the family ties among members of certified enterprises. When asked about conflicts inside the enterprise, a low percentage of non-certified enterprises had reported it (12.5%). Generally, and regardless of certification status, a wide majority of SMFEs report a harmonious situation inside their enterprises.

In summary, certified SMFEs in Madre de Dios have significantly larger/higher produced capital assets (equipment, roads, harvesting fee, loan, management plans, and concession area) than non-certified SMFEs, and significantly larger volumes of mahogany and species of D category than non-certified enterprises. Although no statistical differences exist in the total amount of timber harvested among SMFEs in both groups, there is a tendency that non-certified enterprises harvested larger volumes than certified enterprises because of the less volumes of valuable species in their forest concessions. With respect to human and social capital assets, SMFEs in both groups have very similar characteristics (there is not statistical different at $p < 0.05$ for most indicators) with the exception of the networks indicators which is significantly larger among certified enterprises than among non-certified. However the tendency is that certified SMFEs are formed by larger number of members with previous experience in logging and business that have higher education level, and are enterprises with higher levels of trust among their members than non-certified SMFEs. Table 5-5 shows a summary of the main characteristics between certified and non-certified SMFEs in Madre de Dios.

Table 5-5. Characteristics of certified and non-certified private SMFEs in Madre de Dios

Capital types	Characteristics	Certified	Non-Certified
Produced	*Equipment	larger quantity; heavy forest equipment	mainly light, less durable forest equipment
	*Roads	>value; 67% terrestrial access	small value; access: 37% fluvial, 21% terrestrial, 42% both
	*Harvesting fee	>value; all paid total fee	smaller value; 54% paid total fee
	*Loan	> value; 67% received large loans from banks, large entrepreneurs, and all received small loans from *Fondebosque*	small value; 62% received only small loans from *Fondebosque*
	*Management plans	> value; average annual area 1,488 ha	smaller value; average annual area 809 ha
	*Area	> area	smaller size
Natural	*Approved volume	> mahogany and D category volume	> C category volume
	*Harvested volume	smaller: 21% of approved volume; 6 spp. per year	larger: 47% of approved vol.; 7 spp. per year
Human	*Members reduction	no reduction	in 42% SMFEs
	*Logging & business experience among all members	all SMFEs	46% SMFEs all members, 33% SMFEs more than half members
	*Education	67% post-secondary	42% secondary
Social	*Associations membership	no SMFE	50% SMFEs

Forest Management Capacity and Certification Status in the Tahuamanu Province

As was shown in the previous section, forest management capacity of certified SMFEs and non-certified SMFEs differs especially with respect to their produced capital assets and existence of mahogany (natural asset). All SMFEs with certified forest concessions in Madre de Dios are located in the Tahuamanu province, which is the least harvested province in the Department. Since Tahuamanu is the province with largest volumes of valuable timber resources (especially mahogany), and only a few SMFEs from that province have attained certification, it is of great interest to evaluate differences among SMFEs in Tahuamanu. This section therefore compares the forest management capacity for SMFEs that are: already certified, planning to apply for certification (next 2 to 4 years), and not planning to get certified in the short term (within 2 to 4

years). These comparisons provide a more conservative test of differences among SMFEs since they are all located in the same province, reducing the variation observed by setting aside the other two provinces, which were shown to be very different in the first part of the comparative analysis in this chapter. Table 5-6 presents the respective means of the indicators of forest management capacity for the three groups in Tahuamanu for the period of harvest 2002 to 2006.[13]

Table 5-6. Indicators of forest management capacity for private SMFEs already certified, planning certification and non-planning certification in Tahuamanu, Madre de Dios, 2002—2006

Indicators	**Already certified n=3**	**Planning certification n=4**	**Not-planning certification n=5**	**Total n=12**
Produced capital				
Equipment ($)	300,229 [a, b]	90,095 [a]	21,243 [b]	113,940
Roads ($)	593,333 [a, b]	31,015 [a]	24,987 [b]	169,083
Harvesting fee ($)	204,141	95,856	95,773	122,892
Loan ($)	210,989 [a, b]	4,350 [a]	4,214 [b]	55,953
Management plans ($)	76,640 [a]	26,178	34,407 [a]	42,222
Area (ha)	68,531	27,293	34,474	40,595
Natural capital				
Approved timber volume (m^3/ha)	49.15 [b]	40.68 [c]	20.86 [b, c]	34.54
A category	3.47 [b]	2.95	0.97 [b]	2.26
B category	1.05	0.59	0.72	0.76
C category	8.57 [b]	6.05 [c]	2.86 [b, c]	5.35
D category	20.27 [b]	17.17 [c]	7.93 [b, c]	14.10
E category	15.78	13.93	8.37	12.08
Species per POA (N°)	18.27	13.08	13.78	14.67
Harvested timber volume (m^3/ha)	10.38	5.90	4.28	6.34
A category	2.91	2.39	0.82	1.87
B category	0.24	0.03	0.39	0.23
C category	1.03	0.41	0.40	0.56
D category	4.04	2.37	2.32	2.77
E category	2.17 [b]	0.70	0.34 [b]	0.92
Species per POA (N°)	5.80	3.45	4.32	4.40

[13] Because there are three pairs of comparisons among SMFEs planning certification, Appendix H presents the p (F) values for each pair.

Table 5-6. Continued

Human capital				
Enterprise members (N°)	10	6.5	6.60	7.42
Logging experience (N° members)	10	6.5	5.60	7.00
Business experience (N° members)	10	6.5	5.60	7.00
Education (schooling years)	13.67	10.25	13.60	12.50
Members' performance (%)	66.70	75.00	60.00	66.68
% SMFEs with low performance	0	25.0	40.0	
% SMFEs with medium performance	100.0	25.0	40.0	
% SMFEs with high performance	0	50.0	20.0	
Social capital				
Density of membership (N°)	0 [b]	0 [c]	1.40 [b, c]	0.58
% SMFEs with no association	100.00	100.0	0	
% SMFEs with 1 association	0	0	60.0	
% SMFEs with 2+ associations	0	0	40.0	
Participation (%)	84.60	84.62	75.38	80.75
Networks (% of diversity of people assisting SMFE)	79.37 [a, b]	39.28 [a]	50.46 [b]	53.96
Exclusion (% existence of exclusion among members)	28.60	35.70	42.84	36.90
Trust (% extent of trust among members)	97.23	70.83	61.66	73.61
Conflict: % SMFEs in conflict	0.0	25.0	20.0	16.70
% SMFEs in peace	100.0	75.0	80.0	83.30

Significance level of 0.05

[a] denotes significance between already certified and planning certification

[b] denotes significance between already certified and non-planning certification

[c] denotes significance between planning certification and non-planning certification

Produced Capital

In terms of produced capital assets for SMFEs that are already certified, planning to attain certification, and not planning to be certified, statistically significant differences were found for the following variables: equipment, roads, loans, and management plans as shown in Table 5-6. Certified SMFEs significantly exceeded the other two groups in several respects. For example, the value of the equipment possessed by certified enterprises was three times larger than the ones seeking certification and fourteen times larger than the ones not planning to seek certification. This difference is due to the larger quantity of heavy forest equipment and transportation items owned by certified enterprises in 2006. Among SMFEs that are not-planning certification, some of them possess very little heavy equipment. Indeed, forest equipment owned by non-certified

enterprises (planning and non-planning certification) was mostly light and less expensive, which explains its low value.

With respect to roads value, certified enterprises significantly surpassed the road value of enterprises planning certification by nineteen times, and the road value of enterprises not planning certification by twenty four times. The large difference between these three groups is mainly because certified enterprises invested a significant amount of money in road construction and maintenance during 2006 as a pre-condition to the certification process. Also the difference is because while certified enterprises have mainly terrestrial access to their concession contracts, only 50% of the enterprises planning certification have terrestrial access, and 40% of the enterprises not planning for certification have this type of access.

Concerning the harvesting fee value,[14] although no statistical differences at $p < 0.05$ exist, certified SMFEs report almost twice the accumulated harvesting fee value than the other two groups. The average harvesting fees offered by certified SMFEs was 0.86 $/ha, in comparison to 1.00 $/ha from the ones planning certification, and 0.77 $/ha from the ones not planning certification. However, certified SMFEs report larger aggregated harvesting fees due to the larger extension of concession areas granted to these enterprises. As of the 2006 harvest, all certified SMFEs paid their total harvesting fees as a pre-condition to the certification process. In the case of enterprises planning certification, 50% of them had paid their total harvesting fees, and the other 50% had paid 77% of the total. In the case of enterprises not planning for certification, 60% of them had paid their total harvesting fees while only 40% had paid 85% (as of March 2008).

[14] Fee in US$/ha that has to be paid annually for all hectares in the forest concession.

With respect to formal loans received to finance enterprise operations, there is a significantly large difference between certified enterprises and the other two groups (which possess similar values). This difference is a result of the large loans from banks and large private enterprises made mainly to certified SMFEs because of the fixed capital they own (in term of property) and the several years of experience they possess as business enterprises. Meanwhile, the other two groups of enterprises, which mainly do not have a credit history because most of them have been working in informal logging during the previous forest regime, received only small loans from FONDEBOSQUE. For example, 50% of the enterprises planning certification received these small loans; 40% of the ones not planning for certification also received such loans. However, all SMFEs in Tahuamanu have received loans through the informal system of *habilito* in order to finance most of their harvesting activities, because loans received through the few formal financial institutions have not been sufficient.

The costs of management plans is almost three times the value for enterprises planning certification (statistically significant), and double the value for enterprises not planning certification (not significant). This difference is because the average annual harvested area is larger among certified enterprises (1,488 ha) in comparison with the ones planning certification (690 ha), and the ones not planning to be certified (1,446 ha). Although the concession areas of certified enterprises are two and a half times larger than among enterprises planning certification, and twice as large as the ones non-planning certification, no significant differences were found.

Natural Capital

The results of the analysis show that among the three groups, statistically significant differences exist for some natural capital assets (see Table 5-6). Total timber volumes approved for certified enterprises and enterprises planning certification are similar, and both exhibit significant differences from the total volumes approved for enterprises that are not planning to

seek certification. In this case their volumes were almost half those of the former groups. Specifically, there were statistically significant differences in approved volumes for mahogany (A category), and species of C and D category between certified enterprises and those not planning certification. Also, there were significant differences in approved volumes for species of D category between enterprises not planning to certify and those planning to do so.

With respect to total timber volumes and number of species harvested by SMFEs in the three groups, there were no significant differences—with the exception of differences in harvested volumes of species of E category between certified enterprises and enterprises not planning certification. Certified enterprises harvested 21% of their total approved volume. From this volume, 39% corresponds to species of D category, and 28% to mahogany. Enterprises planning certification harvested 15% of their total approved volume, from which mahogany and the species of D category each comprised up to 40% of the total volume harvested. In the case of enterprises not planning to certify, almost 21% of their total approved volume was harvested, of which 54% comprised species of D category, and 19% consisted of mahogany. Although SMFEs planning certification account for a large percentage of mahogany harvested with respect to their total harvested timber, the percentage of mahogany harvested with respect to their total mahogany approved is similar to the other two groups (84% for certified SMFEs, 81% for SMFEs planning certification, and 84% for SMFEs not planning certification). It was expected *a priori* that SMFEs planning certification would have harvested more timber than the ones not planning certification because of the major volumes of timber and major terrestrial access to harvest hardwoods (such as species of D and E category). However, SMFEs planning certification harvested less timber because, in 50% of those enterprises, no harvesting of any species was carried out for two consecutive years. This also explains why their volumes are

much smaller than among certified enterprises, although they do have similar total approved volumes.

Human Capital

The results of the analysis, presented in Table 5-6, show no significant differences among the three groups for the indicators under study. As of 2006, certified enterprises maintained their same number of members since the time of enterprise formation. Again, due to the fact that these SMFEs are mainly family businesses with greater cohesiveness among their members, they also share common goals to a greater extent. However, 50% of enterprises planning certification had experienced reductions of 58% in their memberships, and 60% of the enterprises not planning certification had suffered reductions that varied from 17% to 70%. These reductions in membership among SMFEs planning and not planning certification have been attributed to differences and internal problems among members in those SMFEs, which has caused divisions in managing the forest concession and the enterprise, and less stability of their business enterprise.

During the harvest of 2006, all members in certified enterprises and in enterprises planning certification had previous experience in logging and business activities. Among enterprises that are not planning to seek certification, only 40% of them reported that all their members had previous experience with logging and business. The other 60% of these SMFEs reported that most of their members had previous logging and business experience. Among certified SMFEs, their members gained experience due to the holding of forest contracts and permits during the previous forest regime. This is also true for some of the SMFEs planning certification and those not planning it (especially since 1992 when logging became an important activity in the province). However, in most cases previous experience has been gained on the job from informal logging carried out in the province for the selective harvesting of mahogany and

its commercialization. Only with the implementation of the concession system, and through assistance from environmental NGOs, did all concessionaires begin to learn new terminology and the basics of forest and business management. However, as previously stated, certified SMFEs have received more formal and personalized training on forest inventory, reduced impact techniques, road planning, industrial security, and first aid because of a formal agreement of technical and financial assistance with WWF-MDD for the certification process.

There are no statistically significant differences in terms of average years of schooling, although some variation in the level of education among the three groups (with respect to education among SMFE members) does exist. Among certified enterprises, in 33% of them the manager had completed undergraduate education, in 33% the manager had incomplete undergraduate education, and in the other 33% the manager only had completed secondary education. In the case of the managers of enterprises planning certification, 50% of them had completed secondary education, 25% of them had completed a 3 year technical education, and 25% of them had only completed primary education (6 years of schooling). Among managers of enterprises not planning for certification, 40% of them had completed undergraduate education, 20% of them had incomplete undergraduate education, and 40% of them had completed secondary education.

Managers of certified SMFEs and SMFEs not planning certification have higher levels of education than managers from SMFEs that are planning for certification. This higher level of education has allowed these two groups to understand better and process information related to the certification process and make decisions whether to attain it or not. Among certified SMFEs, from the moment they learned about forest certification they understood they had to reorganize their administrative and forest management practices, and make investments in order to fulfill all

of the certification requirements. Among SMFEs not planning certification, they understood that the attainment of forest certification required great investments and was a costly process that in the short term could not be an objective for their enterprises.

In different tasks concerning enterprise and concession area management, all managers of certified enterprises reported a medium level of performance for their members; they expressed that their members still need to improve in many aspects in order properly conduct forest management. In the case of enterprises planning certification, 50% of them reported a low and medium level of performance for their members. Among enterprises not planning to certify, a large majority (80%) also reported a low and medium level of performance.

Social Capital

The results of the analysis (Table 5-6) show that the only statistically significant differences observed among pairs of group means were for the indicators 'density of membership' and 'networks' at $p < 0.05$. For example, enterprises not planning certification belonged mainly to one forest association: the *Asociación de Concesionarios Forestales de Tahuamanu*; however certified enterprises and enterprises planning certification did not belong to any forest association. The *Asociación de Concesionarios Forestales de Tahuamanu* "basically functions when there is a problem that affects concessionaires in the province" (SMFE representative, pers. comm. 2007). However, it has been reported that the sporadic meetings celebrated under this association have been mainly to look for endorsement to address problems affecting some members of this association, but not problems affecting all members:

> "when there was a problem that affected the President or one of its friends, only in that moment the President wanted the endorsement of the members of the Association, but when the members had problems with other enterprises, they [i.e., the President and his friend] did not do anything, so they acted by convenience" (Concessionaire, pers. comm. 2007).

Thus this association has not fulfilled the expectations of its members, and because of dissatisfaction has prevented other concessionaires from looking for membership.Concerning participation of enterprise members with respect to meetings and enterprise activities in general, participation is relatively high among all three groups, but certified enterprises as well as enterprises planning certification do show higher levels of participation of their members than those enterprises that are not planning certification. Certified enterprises are mainly family businesses, so they have close relationships among their members and greater interest in participating in the enterprise's activities. The SMFEs planning certification and the ones with no plans for seeking certification are mainly businesses formed by people with no familial ties that have neither close nor previous relationships. Thus, there are no specific characteristics that confirm more participation among members in the first group than in the other. One explanation for the observed differences in participation between these groups is that there is only one owner (or the majority of enterprise shares are held by one person among few members) in 50% of the SMFEs that are planning certification.

With respect to networks, certified SMFEs presented a significantly higher percentage in comparison to the other two groups. This means that certified enterprises had assistance by relatively more people outside the enterprise and/or by institutions mainly for financial purposes than the other two groups. While certified enterprises had access to some banks for acquiring (a few) large loans, and also had access to *habilitadores* for acquiring working capital to develop their harvesting activities, the enterprises planning certification had relied totally on *habilitadores* as their main source of financial support for their operations. The same is true of the SMFEs that are not planning for certification. In terms of commercial assistance, *habilitadores* have been the ones mainly supporting SMFEs in the three groups.

Regarding the *exclusion* variable, the three groups reported that differences in education, wealth, and political ideas among enterprise members had created some divisions between members inside the enterprise. Enterprises not planning to certify reported the highest values of differences among their members, such that in 60% of these SMFEs, between 17% to 70% of their members had dropped membership. Although there were some internal differences among members of the certified enterprises, no serious conflicts were reported, and *trust* (the extent to which members in a SMFE trust each other) is scored much higher than in the other two groups. This is mainly because of family ties among members in certified enterprises. However, some conflict situations have been reported inside enterprises planning certification, and in the ones that are not planning to certify (25% and 20%, respectively).

In summary, SMFEs that are already certified in Tahuamanu have significantly larger/higher produced capital assets (equipment, roads, and loan) than non-certified SMFEs in the province (i.e., SMFEs planning and not-planning it). Also, SMFEs already certified have significantly larger volumes of mahogany and species of C and D category than SMFEs not-planning to get certified. However, very similar characteristics exist among the three groups with respect to human and social capital assets. There is not statistical different at $p < 0.05$ for most indicators, with the exception of 'density of membership' which is significantly larger among SMFEs not-planning certification than among certified SMFEs and those planning certification, and 'networks' which is significantly larger among certified enterprises than among non-certified SMFEs (i.e., SMFEs planning and not-planning certification). Table 5-7 shows a summary of the main characteristics among SMFEs planning certification in Tahuamanu.

Table 5-7. Characteristics of private SMFEs planning certification in Tahuamanu

Capital types	Characteristics	Already certified	Planning certification	Not-planning certification
Produced	*Equipment	>quantity & value; heavy forest equipment	medium value; mainly light, less durable	lower value; mainly light, less durable
	*Roads	>value; 67% terrestrial access	smaller value; 50% terrestrial access	smaller value; 40% terrestrial access
	*Harvesting fee	>value; all paid total fee	lower value; 50% paid total fee	lower value; 60% paid total fee
	*Loan	>value; 67% received large loans from banks, large entrepreneurs, and all received small loans from *Fondebosque*	lower value; 50% received small loans from *Fondebosque*	lower value; 40% received small loans from *Fondebosque*
	*Management plans	>value; average annual area 1,488 ha	lower value; average annual area 690 ha	medium value; average annual area 1,446 ha
	*Area	> area	medium size	medium size
Natural	*Approved volume	> mahogany & D category volume	large mahogany & D category volume	smaller volume all categories
	*Harvested volume	> volume; 21% of approved volume; 6 spp. per year	smaller; 15% of approved volume; 3 spp. per year	smaller; 21% of approved volume; 4 spp. per year
Human	*Members reduction	no reduction	in 50% SMFEs	in 60% SMFEs
	*Logging & business experience among all members	all SMFEs	all SMFEs	40% SMFEs (60% most)
	*Education	67% post-secondary	50% secondary, 25% post-secondary	60% post-secondary, 40% secondary
Social	*Associations membership	no SMFEs	no SMFEs	all SMFEs

Implications of SMFEs Capitals and Capabilities for Forest Management Capacity

Capital is fundamental for the functioning and success of SMFEs, and for the economic development of these entities as well as for the economic development of the regions where these enterprises are located. Capital, in its various forms (produced, natural, human, and social), is particularly important in the case of private SMFEs in Madre de Dios because they are the most important social actors in the management of the natural tropical forests of the area of greatest biodiversity in Peru.

Sufficient and reliable access to financial resources is critical for the development of any SMFE. However, financial resources are one of the major limitations to the effective operation of SMFEs (Auren & Krassowska 2004). Small entrepreneurs in Madre de Dios are characterized by having limited financial resources, and basic financial services (i.e., a checking account) are rarely granted by formal financial institutions like commercial banks to SMFEs that are starting their activities in the logging business (Lewis et al 2004). This is because most SMFEs do not have a credit history, nor business experience. In addition, loans given by banks have high interest rates which are almost prohibitive for most SMFEs starting logging activity; thus most SMFEs cannot access and/or afford these credits because of their low margins (Lewis et al 2004). Only from 2003 throughout 2004, did FONDEBOQUE[15] provide small loans to SMFEs with the aim of building a credit history for these enterprises. However, because of the short-term and small amounts of capital provided, almost all SMFEs have relied, and many still do, on working with contractors and particularly with *habilitadores* to finance their harvesting activities. This is a disadvantage to SMFEs due to the conditions of these systems; however, they are the only available options that all SMFEs can access. In the case of contractors, they use their own personnel and equipment to harvest SMFEs' annual forest areas and provide SMFEs a percentage of the harvested timber or the value of this timber, which usually favors the contractor. In the case of *habilitadores*, the SMFE carries out the harvesting of their annual forest areas, relying on the advance of money from *habilitadores* on the condition that they later sell all the timber to these *habilitadores* at prices fixed by the latter (i.e., prices lower than the market, and sub-estimation of timber volumes). This situation of limited financial resources, and particularly of limited formal financial sources, is a big constraint not only among SMFEs in

[15] An institution established to facilitate financing of projects to promote sustainable forest development in cooperation with a financial institution: the *Caja Municipal de Tacna*.

Madre de Dios (as this study has demonstrated) and Ucayali (Arce 2006), but also among the most successful SMFEs in Bolivia, Brazil, Colombia, and Ecuador (Tomaselli & Tuoto 2004).

Thus restrictions of small loggers' financial resources and lack of formal financial mechanisms have not only perpetuated the informal system of *habilito*, but have also restricted operation possibilities and fulfillment of obligations of SMFEs. For example, financial barriers and difficulties in accessing credit have reduced the opportunities of SMFEs in investing in new and more equipment. Most SMFEs do not have adequate equipment to carry out forest management in an efficient manner, and the equipment they do own is mainly light, less durable and obsolete. Thus little investment in technology has led to selling mainly round-wood at lower prices because of the lack of transformation equipment by most SMFEs, and to the high levels of wastage of timber. Although this last point has not been evaluated in this study, it is known that in the Peruvian Amazon (specifically in the Department of Ucayali, the main center of timber production) the wastage of timber from log to sawn-wood for several species is around 45—48% (Vásquez 2007).

Financial barriers and restrictions in accessing credit have also reduced the opportunities of SMFEs in fulfilling their obligations. For example, relatively few SMFEs (an average of 43%) had been able to pay their total harvesting fees through the 2006 harvest, despite the promotional program of discounts set up by INRENA for the first five years of the forest concession contract operation. This has resulted in most than half of all SMFEs (i.e., 57%) not being able to mobilize (i.e., transport and commercialize) their harvested timber from their forest concessions since payment of the harvesting fee is a requirement for this, thus incurring losses for these enterprises and in some cases engaging in illegal actions (e.g., selling of *guias de transporte*) in order to fulfill this obligation. It is also important to note that certified SMFEs have received financial

support from WWF-MDD in preparation for the certification process, for the evaluation process, and also for the audit process (i.e., first evaluation audit after receiving the certification certificate). Although no information regarding the amount of the subsidy has been released by the interviewees, it has been mentioned that the attainment of forest certification would not have been possible at the time it was obtained (and its evaluation continued) without the subsidy from WWF-MDD. A similar situation has occurred in Guatemala where the NGO providing technical assistance to a community enterprise has subsidized more than 50% of the condition costs for the second phase of certification; if the subsidy did not exist, this community would have not been able to meet the necessary conditions to keep its forest certification certificate (Soza 2003).

Availability and secure tenure of land as well as trees is important to the success and profitability of SMFEs (Auren & Krassowska 2004). Private SMFEs in Madre de Dios were granted forest concessions for a period up to 40 years (following evaluations every five years); thus they have secure land and forest resources. However, the type of timber species and their volumes present in forest concessions are significant for SMFEs' operability and profitability. Mahogany, cedar, and *tornillo* are the three most valuable species in the country (2.8 US$/board feet, 1.1 US$/board feet, and 0.4 US$/board feet respectively). However, over time mahogany and cedar have been over-exploited in the Department and in some areas like Manu they have been almost exhausted. Thus SMFEs in Manu are characterized by the presence of lower priced and lesser-known timber species. This limitation has resulted in the harvesting of larger volumes of timber by these enterprises (in comparison with SMFEs in the other two provinces), in order to compensate for the lack of valuable resources (even though some lesser known species started having demand in the market since 2004). This has also reduced their financial possibilities to

invest in equipment, to fulfill their obligations in paying their total harvesting fees, and to carry out their AOPs on time.

In contrast, commercial populations of mahogany are still present in the Tahuamanu province, the least harvested region in the Department, and endowments of this species have provided a special advantage to SMFEs there. This is because mahogany, or red gold ("*oro rojo*") is readily convertible into cash (CESVI 2005). Thus mahogany became the main source of financing short term activities (e.g., purchase of consumables, paying for forest censuses and/or road building) and a strategic tool in the process of capitalization (CESVI 2005). This provided SMFEs with more financial advantages that resulted in the better fulfillment of their operations (i.e., carrying out AOPs on time), of their obligations (i.e., payment of harvesting fee), and in the possibility of investing in equipment. As a result, SMFEs with mahogany in their forest concessions have proven to be better off; this has been especially the case of SMFEs which attained forest certification.

CESVI (2005) notes that if the price of mahogany had not reached the attractive level it did, many SMFEs would have become bankrupt. Thus the question that remains is what is going to happen when SMFEs do not have any more mahogany in their concessions? The experience of the SMFE "La Chonta" (Bolivia) suggests that the introduction of lesser known timber species is important when adopting sustainable forest management, especially when valuable timber species (mahogany and cedar) are rare. However, the processing of lesser known timber species (because of their low market values) requires increasing the scale of production and the adoption of improved technologies to reduce production costs and increase product value to obtain profitability (Tomaselli & Tuoto 2004). Thus, SMFEs in Madre de Dios will progressively have to find new species to use in their operations in order to retain their economic viability. Putzel

(2009) indicates that some lesser known species are progressively being introduced due to new demand from the Chinese market; this should help those SMFEs willing and able to adopt these alternative species.

The levels of technical skills for forest management tend to be low among SMFEs (Auren & Krassowska 2004), which is also a restriction to their effective operation. In Madre de Dios most members of 73% of the SMFEs had previous experience in logging activities before the formation of the SMFE. However, this was mainly practical experience in selective logging obtained from the holding of 1,000ha forest contracts and from informal logging activities carried out by most loggers during the previous forest regime (before 2002). But no formal training in forest management and business was previously provided to these small loggers. Only recently with the formation of SMFEs, have concessionaires been exposed to the concept of forest and business management due basically to the assistance from environmental NGOs (i.e. WWF-MDD, ProNaturaleza, and CESVI).[16] Concessionaires have recognized that they did not understand anything about these topics at the beginning; for example, they did not know what a forest census was, how to carry it out, what its cost was, or the value of its utility (CESVI 2005). Also, this formal training has been limited to some SMFEs under assistance by these NGOs; it has not been permanent. Thus there has not been any follow-up training after the assistance by NGOs ended. The training provided to SMFEs has also been mainly in technical aspects of forest management; however a more specialized and permanent training is necessary, especially in areas related to enterprise organization and management, conflict resolution, community relationships, among others.

[16] Other institutions such as the *Cámara Forestal Nacional*, FONDEBOSQUE, and ITTO conducted some workshops on issues related to forest management for all concessionaires.

In addition to the limited training opportunities and almost no investments in human capital, there is the issue of the low level of education of most members of SMFEs and of the casual employed workers hired within SMFEs, which has resulted in difficulties in managing the enterprise and the forest concession. The temporary nature of many workers employed within SMFEs and their limited skills base may have also led to losses and inefficiencies because of the few incentives to produce efficiently (Auren & Krassowska 2004). Knowledge and understanding of both forest management and business skills are necessary to make an enterprise profitable and to meet all legal responsibilities. Start up SMFEs in Madre de Dios did not have the skills and capacity to prepare management and business plans,[17] nor did they realize the importance in keeping financial records. The ability to undertake effective budgeting, preparation of business plans, and keep accurate financial records is important in helping a business to secure capital and to engage in multi-stakeholder interactions (Auren & Krassowska 2004) which includes engagement in the market. Thus SMFEs in Madre de Dios, due to their limited human capital and the novelty of the process they have undertaken, needed more external support in building their skills and capacities in order to have better opportunities for their development.

Organization and networking among SMFEs are typically poor, which restricts opportunities for effective operation (Auren & Krassowska 2004). In Madre de Dios most SMFEs have weak organization. This has been particularly true during the first three years of enterprise operation when members tended to operate as individuals, resulting in competition among members and mutual distrust, which generated internal conflicts and weakening of the

[17] Assisting NGOs helped SMFEs in the elaboration of these plans.

enterprise. In many cases these problems resulted in exclusion of members and as consequence dropping in enterprise membership:

> "There was bad management of the enterprise so we did not believe in the manager…so we decided to work individually dividing the volume of the annual harvesting area among all the members. The manager did not participate in the meetings, but we had to pay the harvesting fee that he must have paid" (Concessionaire, pers. comm. 2007).

> "Gradually members started transferring their actions to other people [outside the enterprise] remaining less members. There was not agreement, we had too many internal disputes [*mucho pleito interno*], and we never reached a consensus (Concessionaire, pers. comm. 2007).

Weak organization led to enterprises not fulfilling the payment of the harvesting fee on time because of disagreements among members in providing the amount necessary to fulfill this responsibility, and also in illegal actions due to the harvesting of more volumes or species than the ones only contemplated in the AOP and/or because of the sale of *guias de transporte* used to 'legalize' timber harvested in illegal ways:

> "Initially we were 17 members, but in time several members left the enterprise…there has been pillage [*saqueo*] promoted by the previous managers of this enterprise and by some members. They had benefited with the illegal logging [i.e., harvesting in different areas of the concession, sell of transportation permits] and when I received the enterprise [as the fourth manager] I did not receive any document of the enterprise and realized the enterprise owns all the harvesting fees since 2002" (Concessionaire, pers. comm. 2007).

Failure of SMFEs to better organize themselves has restricted their opportunities to participate in ongoing assistance (training and support) offered by governmental and non-governmental programs, and also has reduced their opportunities for advocacy and lobbying (Auren & Krassowska 2004). Thus understanding and internalization of the awareness for group action is an aspect that still needs to be resolved among SMFEs (Auren & Krassowska 2004).

Although participation by individuals in social networks increases their possibility of accessing information and/or transactions (Grootaert & Bastelaer 2002), enterprises in Madre de Dios have seen these possibilities restricted for them. This is because networking among SMFEs

is poor, and the main social network is formed by the *habilitadores* who manage a clientele (i.e., patronage) relationship because of the lack of economic resources and financial opportunities available to SMFEs.

Summary

This chapter presented the results and analysis of the forest management capacity of private SMFEs, in terms of the type of assets that the SMFEs possess. Factor analysis helped to verify that the indicators selected represent each type of capital for forest management capacity (produced, natural, human, and social capital) among the private SMFEs in Madre de Dios (Appendix F). All of these items were later used as dependent variables in the MANOVA analysis.

Three MANOVA analyses explored differences in the assets pertaining to each type of capital among the SMFEs by province, certification status in the department, and certification status in the Tahuamanu province (Tables 5-2, 5-4, and 5-6). In general, the results reported in this chapter offer evidence that the capacities for forest management among private SMFEs in Madre de Dios exhibit significant variation among the three provinces, and especially between the certified and non-certified SMFEs. Significant differences are particularly observed for the produced and natural capital assets that these SMFEs possess. However, very similar characteristics in terms of their human and social capital assets are common for SMFEs in the department. A synthesis of the results of these MANOVA analyses, as well as policy implications drawn from these results, is presented in detail in the next chapter.

CHAPTER 6
SUMMARY AND CONCLUSIONS

Overview

This final chapter contains four sections. The first section presents conclusions drawn from the results derived from the stakeholder analysis discussed in chapter 4, as well as the results of the forest management capacity analysis discussed in the previous chapter. In particular, the role and influence of the main forest stakeholders in the concession system and the capital assets held by private SMFEs in Madre de Dios are discussed. The second section discusses the policy implications of this study; especially in regard to the possibilities of the forest concession system continuing to promote long term sustainable forest management in Madre de Dios, as well as in other areas of Peru. Some recommendations are also provided that might help to improve the forest concession system. The third section describes some limitations of this study while the last section suggests some future work and areas of focus that are worth investigating further.

Summary of the Findings and Results

Stakeholder Analysis

The forest concession regime in Peru, as a system for responsible forest management and social development, is still in the initial phase of development. In Madre de Dios, the first department where the system was implemented in 2002, the role and actions of social actors in the forest sector have been very important in influencing the policy changes and management and conservation of forests there. Although initial opposition to the forest concession system by some groups of small loggers existed, and local authorities wanted to bring back the old forest regime of overexploitation, the new system continued to be implemented. Thus, from the moment of its inception, small and medium entrepreneurs became the most important forest management actors because they were involved in direct implementation of timber concessions

and management plans. The State (represented by INRENA) and a few environmental NGOs became key actors of the system because they were promoting it and providing support for its implementation. In addition, their actions subsequently influenced the efforts and decisions of private SMFEs as they proceeded in carrying out forest management. Thus, the state and these NGOs have significantly influenced the viability of the new forest management model in the long run.

INRENA has been responsible for the administration of forest concession contracts (evaluation of GFMPs and AOPs, and registration of concession contracts), and for concessions supervision until June 2005, as well as approval of the AOPs since 2005. Although administration of forest concession contracts also implies support to SMFEs in terms of the different aspects related to the implementation of their contracts (e.g., legal and technical aspects), INRENA's role has been mainly one of communicating procedures involved in the implementation of the system. They have not, however, been good at monitoring, nor as consultants in support of training and/or other matters related to the permanent promotion of the system and its more sustainable practices. This has been mainly due to INRENA's limited capacity in personnel, funding, and infrastructure. Thus, INRENA has not been able to fulfill all of its functions appropriately and this has affected program development. For example, limited personnel in each Technical Administration—two people responsible for the administration of 40 and 33 SMFEs per Administration, respectively—has been a main constraint in the operative capacity of INRENA to evaluate AOPs in the field. Moreover, the centralization of INRENA's functions in the Lima office has produced delays in AOP approvals which have resulted in delays in starting the harvesting period and losses to concessionaires. A similar situation has occurred among communities in Brazil, where it has taken an average of 2.5 years to approve

forest management plans; this has happened at least since before 2006, when IBAMA was the central agency responsible for approving management plans (Amaral & Amaral 2005).

In addition, INRENA has suffered from budget limitations that have made it impossible to carry out field inspections in all forest concessions; instead, they only carry out these inspections in forest concessions having mahogany—due mainly to funding provided by the SMFEs holding those AOPs. Despite INRENA's budget limitations and additional cuts through time, other tasks to support the forest concession process and responsibilities have been delegated to the local Technical Administrations, thus restricting even more the institution's capacity to intervene effectively in the forest management of the region. In addition to personnel limitations, labor instability, and budget cuts inside the institution, corruption of some INRENA personnel has hampered the new concession system. The primary acts of corruption mentioned by all types of respondents (i.e., from concessionaires, NGOs, and even some people from within INRENA itself) are: personnel receiving bribes to hurry paper work, the forgery and sale of timber transportation permits, and changes in volumes in INRENA's database to authorize larger timber volumes in AOPs. Despite the widespread comments about these actions, no formal denunciations have been recorded; the only exception was the case of the Tambopata-Manu Technical Administrator who was stripped of his position in November 2007 (and later prosecuted), due to illicit acts committed during his administration.

In the case of environmental NGOs, their participation—from discussions in the elaboration of the NFWL, to assistance provided to interested participants in the public bidding process, and later assistance to SMFEs—has been vitally important for the viability of the forest concession process. They have provided technical assistance in the formation of SMFEs, in the development of SMFEs' technical proposals to participate in the bidding process, in the

elaboration of management plans (GFMP and AOPs), and for training with regards to forest management and business topics. They also have provided financial assistance to carry out forest inventories covering almost 100% of the expenses related to this activity in the first year of SMFEs' operation, and reducing this assistance gradually in some cases. And, in the specific case of WWF, full payment of evaluation assessments was provided to the SMFEs currently holding forest certification certificates.

CESVI and *ProNaturaleza* provided assistance to selected SMFEs in the Tahuamanu province from 2002 to 2006. The narrow scope of their projects, and their sufficient capacity in terms of personnel and funding, has allowed these NGOs to work closely with their SMFEs. This has resulted in the fulfillment of management responsibilities by those SMFEs. In the case of ACCA, it signed an agreement with only one SMFE from the Manu province due mainly to overlapping land claims between ACCA's conservation concession and that SMFE forest concession. Thus, ACCA has paid the harvesting fee of this SMFE from 2003 to 2007.

WWF-MDD has been the most influential NGO in the department due to the large budget and scope of its CEDEFOR project. It has provided initial assistance to 23 SMFEs and worked in all three provinces of Madre de Dios. However, the number of assisted SMFEs declined over time, and in 2006 WWF-MDD assisted only the 5 SMFEs that were applying for forest certification; moreover, these concessionaires were not even part of the pool of SMFEs initially assisted by the organization. This reduction in the number of assisted SMFEs over time has generated controversy among the various entities involved in forest management in the department. WWF-MDD personnel pointed out that the main reasons for this reduction in assistance are: (1) a debugging process of focusing technical assistance on only one group of SMFEs that were working according to the NFWL standards, and were progressing in fulfilling

all requirements to reach forest certification; (2) budget cuts; and (3) limited personnel. However, some concessionaires have asserted that this reduction in assistance has instead been due to: (1) SMFEs refusing WWF-MDD assistance due to disappointment with the organization in not fulfilling its promises; (2) disagreements over operational issues in developing the GFMP;[1] and particularly (3) WWF's priority in fulfilling its certification goals.

When WWF-MDD later realized that, although it had the largest pool of SMFEs under assistance in the department, none of its assisted SMFEs were ready to reach certification (which was the project's main goal), it changed its focus by dropping assistance to SMFEs that still needed assistance. WWF-MDD then offered support to SMFEs that were better off (and that were not under its original assistance) in order to at least partially fulfill its certification goal. One person interviewed commented that "the problem with WWF is that they work only towards numerical goals. The important thing for them is to have a certain number of hectares of forest under management: "to have one million hectares of certified forests, so you are simply one more token in its interests" (SMFE representative pers. comm. 2007).

The broad scope of the CEDEFOR project, its ambitious certification goal, and its limited capacity in terms of personnel and funding in Madre de Dios, did not allow this organization to work closely with the SMFE's they were assisting. WWF-MDD assistance created many expectations among SMFEs that ultimately could not be fulfilled. For example, WWF personnel promised equipment grants to their assisted SMFEs, something that was much needed by these small loggers who did not possess adequate and sufficient forest equipment. WWF also promised funding to cover several forest activities, something that was also necessary given the constraints

[1] A concessionaire commented that WWF initially established a harvesting cycle of 30 years for its assisted enterprises, which was not agreed by some SMFEs. Also, it has been pointed out that WWF imposed certain behavior rules to its assisted SMFEs and some of them did not like it, refusing its assistance. Only one concessionaire has expressed that some SMFEs did not agree with WWF in following all regulations established by law, thus considering WWF as an impediment for them to do illegal logging.

in financial resources these enterprises had, and the lack of formal financial institutions providing credit to small entrepreneurs. Differences in vision in carrying out CEDEFOR's activities and assistance directed to concessionaires, and a lack of knowledge about the reality of Madre de Dios concessionaires by WWF-Lima staff, also generated certain frictions between WWF-Lima and WWF-MDD. Other differences emerged, especially under the centralized administration of CEDEFOR funding by the Lima office. This resulted in disagreements in allocation of necessary funds and the timing of these allocations to carry out certain activities in the field in Madre de Dios, which affected the effectiveness of assistance to SMFEs (e.g., the work of timely ground testing AOPs and close monitoring [*acompañamiento*] of concessionaires' activities).

Although two multi-stakeholder consultative organizations emerged in Madre de Dios to support the new system and to look for solutions to problems generated during its implementation, their functioning has depended on specific circumstances of each of these organizations. For example, the *Mesa de Diálogo y Concertación Forestal de Madre de Dios* (MDCF-MDD) became the main forum for the discussion of issues related to the forest concession system, and more generally the forest sector in the department. They presented some proposals that included help for better implementation of the second round of public bidding in the department. They also exerted pressure on government agencies to carry out supervision of the forest concessions. Finally, the MDCF-MDD insisted on the formation of a Regional Commission to fight against illegal logging. Despite important achievements, the MDCF-MDD was practically inactive during 2006—2007 due to the lack of interest of some of the actors participating in this institution. For example, as the situation became more or less stable with respect to the implementation of the forest concession system after 2003, INRENA did not have

the same participation on this board. In the case of grassroots organizations, their participation waned in time because they realized that there was mainly a consensus to have this board's meetings when INRENA had some interest at stake. This situation seems to have been common in other Departments where similar forums for dialogue have been formed in Peru; Soria (2003) points out the perspective of several NGOs on INRENA's self-interested use of this type of dialogue forum.

In the case of local *Comités de Gestión de Bosques* (CGB), they were established in the department as civil organizations to control harvesting activities, to coordinate monitoring services, and to promote conflict resolution in their respective forest administration units. However, as the functioning of these organizations is dependent on budgetary allocations from INRENA, their work has been limited because of a failure in obtaining these funds, due mainly to bureaucratic procedures from INRENA.

Forest Management Capacity Analysis

As shown in Chapter 4 and summarized in the previous section, stakeholder analysis is an important tool for understanding how the forest concession system works in Madre de Dios. Similarly, the analysis of the capacities of SMFEs (shown in chapter 5 and summarized in this section) is important also, since both types of analysis interact and reinforce each other. In tandem, they provide explanations for the performance of the new concession system in Madre de Dios, by incorporating the characteristics of SMFEs as well as their broader context.

In terms of produced, natural, human, and social capital, the capacity of a SMFE is extremely important for its development—particularly when carrying out sustainable forest management practices to improve certification compliance. In Madre de Dios, private SMFEs are the most important actors in the management of the permanent production forests. Among them, their capacities for forest management vary greatly by province and certification status; this

especially occurs in terms of their produced and natural capital assets. There is not much variation in terms of their human and social capital assets, however.

Amongst the different assets, produced assets are crucial to actually carrying out forest management because material and financial resources are necessary for the activity itself and for fulfilling all economic responsibilities of a business. Thus in terms of produced capital assets, SMFEs in the Tahuamanu province (which also contains the only SMFEs certified in the department) have larger concessions and annual operating areas, possess more value in equipment, have invested more in roads, and have received larger loan amounts than SMFEs from the Tambopata and Manu provinces. In Tahuamanu there are more harvesting units, and thus larger areas of permanent production forests, than in the other provinces because of the more recent history of land occupation in that province. In Tahuamanu, SMFEs possess more value in their equipment because of their heavy forest equipment; however, most of the equipment is obsolete and inefficient. In general, SMFEs from Madre de Dios and the Peruvian Amazon do not have necessary and adequate equipment to carry out their harvesting activity in an efficient way. This is because of the restricted financial resources of SMFEs members and the difficulties in accessing credit, which reduces the opportunities of SMFEs to invest in forest equipment and innovative technologies. This lack of adequate technology has resulted in most SMFEs selling (mainly) a product without any transformation (i.e., round-wood), low prices, and the high levels of wastage of timber.

The lack of adequate formal financial mechanisms for the forest sector in the Peruvian Amazon has limited the effective operation of SMFEs and has facilitated the predominance of the informal clientele system of *habilito* in the department, and in the entire Amazon region, as the main source to finance timber harvesting activities. Restriction in financial resources among

SMFEs and the lack of financial mechanisms have resulted also in the inability of several SMFEs to pay their obligatory harvesting fees, which has impaired the mobilization of their harvested timber. This ultimately affects the management of their enterprises since several of them have effectively been paralyzed.

Timber resources, or natural capital assets, are fundamentally essential for a logging operation since they are the raw material needed to carry out their business. In the case of the SMFEs in Madre de Dios in particular, the type of timber species and their volumes present in forest concessions appear to determine the productivity and outcome of a forest operation. In Tahuamanu, for example, SMFEs (especially the certified ones) have more valuable timber resources than concessionaires in the other two provinces. The most significant timber species in Tahuamanu is mahogany (2.8 US$/bf)[2], the presence of which is a reflection of the more recent logging activity there. In Tambopata, the most significant timber species is cedar (1.1 US$/bf). However, over time mahogany and cedar have been over-exploited in the Department and in Manu they have almost been exhausted. Manu is characterized mainly by the presence of lower priced and lesser-known timber species and *tornillo* (0.38 US$/bf) is the most significant timber species there. This limitation of SMFEs in Manu to only having lower priced timber species has resulted in the harvesting of larger volumes of timber by these enterprises (in comparison with SMFEs in the other two provinces) in order to compensate for the lack of valuable resources. This has also reduced their opportunities in terms of their financial possibilities to invest in equipment, to fulfill their obligations in paying their total harvesting fees, and to carry out their AOPs on time.

[2] Prices as of September 2005, considering the best selling scenario.

On the other hand, SMFEs in Tahuamanu have harvested the smallest volumes of timber (in comparison with SMFEs in the other two provinces) due to their larger endowments of mahogany (the most valuable timber species in the country) and timber species of category D (particularly *shihuahuaco*). The lower harvested volumes among SMFEs in Tahuamanu, together with the high capital endowments, do not necessarily imply better management of forest resources. It is mainly a reflection of market trends and also, in part, to enterprises' capacities and delays in AOPs' approval. In the case of Madre de Dios, the main species with market demand are mahogany, cedar and since 2004 species of category D (i.e., *shihuahuaco*). Thus, SMFEs in Tahumanu have harvested mainly species with market demand, which means they have harvested almost all their approved volumes of mahogany and started harvesting volumes of species of D category since 2004, leaving species with no market demand in the forest until they observe demand for them. Also, SMFEs in Tahumanu have not harvested higher volumes of approved timber species because of financial and technical limitation of many SMFEs there. Another reason to harvest less volume of approved timber has been because of delays in approval of the AOPs, which restricted the harvesting operations to mainly the dry season since most SMFEs in Tahuamanu are restricted to terrestrial transportation.

Thus, the presence of mahogany in forest concessions of Tahuamanu's SMFEs has provided a special advantage to these enterprises due to its high value and demand; this species became the main source of financing short term activities, thus providing more financial advantages that resulted in the better fulfillment of their operations, of their obligations, and in the possibility of investing in equipment in comparison to SMFEs in the other provinces. As a result, SMFEs with mahogany in their forest concessions are proven to be better off. Moreover, the SMFEs of Tahuamanu with the highest volumes of mahogany have been able to attain forest

certification (although it should be noted that these SMFEs have also received financial assistance from NGOs for actions required to improve forest management and for the evaluation process).

Thus, most SMFEs' operations in Madre de Dios have been based on the three traditional species (i.e., mahogany, cedar, and *Cedrelinga catenaeformis*) because of their commercial high values and established markets. This has occurred particularly during the first two years of operation when mahogany and cedar were almost exclusively harvested. However, since these species are rare in some concessions, some SMFEs have started increasing the number of species harvested since 2004-2005; in particular some lesser known species (LKS) have progressively been introduced in Madre de Dios due to new demands from the Chinese market (Putzel 2009). However, still the average number of timber species (seven species per AOP) and volumes (2.9 m^3/ha) under harvest is low when compared to operations in other countries in Latin America such as Bolivia. The experience of the SMFE "La Chonta" in Bolivia shows that in order for this enterprise to improve its forest practices and adopt SFM, it was necessary to introduce lesser known species (LKS) into its harvesting in order to harvest higher volumes of timber per unit area (3-8 m^3/ha). This allowed this enterprise to reduce its harvesting costs, especially because of the scarcity of mahogany and cedar (Tomaselli & Tuoto 2004). However, the process of introducing new LKS is not easy since the processing characteristics of many of them may be unknown. Moreover, it requires the adoption of improved technologies and investments in developing new processes and products to reduce production costs and increase product value in order to obtain profitability (Tomaselli & Tuoto 2004). Also, many of these species are unknown in the international market and the probability is low that LKS are harvested while the supply of the current traditional species remains stable. On the other hand, however, many of these species

are locally marketed at low prices (Youngs & Hammett 2000) and therefore do offer somewhat of an opportunity. Thus, SMFEs in Madre de Dios will face technological and market challenges as they start widening the use of new LKS in order to manage their forest concessions and in order to increase and/or keep their economic viability.

Experience in logging, knowledge, and skills (human capital) are also very important in the actual implementation of forest management. In Madre de Dios, SMFEs share similar characteristics in education, and in previous logging and business experience. A common characteristic among SMFEs in the department is their limited level of education. Only in Tahuamanu have SMFEs managers had some post-secondary technical studies, while in Tambopata and Manu, managers of the SMFEs only had some secondary schooling. The low level of education among most members of SMFEs in Madre de Dios may have affected their possibilities to look for new markets, to negotiate, and to find cost-effective ways to carry out their operations. This is so particularly since their previous logging experience was mainly related to gaining some mechanical skills in the practice of selective logging under short-term businesses managed by large loggers. This has constituted one of the factors complicating management of forest concession areas and management of the enterprise for many concessionaires, since it requires knowledge and understanding of both forest management and business skills to make an enterprise profitable and to meet all legal responsibilities. Although several SMFEs in the department have received training in aspects related to forest management and business planning, especially from the NGOs assisting them, this training has been limited in the sense that it has not been continuous through time. Moreover, the limited level of education of many SMFE members (and their lack of exposure to long-term businesses) has affected their full understanding of the real implications of sustainable forest management. However, it can be

pointed out that in the five years since SMFE emerged, they have acquired some practical training, and have become accustomed to the new terminology of forest management. Nevertheless, it is not possible to say how effective this training has been in their performance in doing better forest management since it has not yet been measured. There is some indirect evidence from community forest concessionaires in Guatemala. While the level of education within the community concessionaires there is not directly reported, Cortave (2003: 26) points out the "impressive development of enterprises' human capital" in forest management due to the constant technical support received by their monitoring NGOs. Yet, other researchers point out that these Guatemalan concessionaires still need to improve their business capacity in terms of production, market, sales, reinvestments, among other things (Carrera & Prins 2008). In the Mexican case, Antinori (2005) found a positive explanatory effect in an index of human capital stock for the vertical integration of 45 community enterprises from Oaxaca. This effect was based on labor skills. During a concession period, community members working for large concessionaires learned mechanical skills in extraction and processing, and some technical skills in administration and documentation.

Social assets are important because they have the potential to contribute to better development of forest management and enterprise performance since they facilitate transactions among people. Among SMFEs in the three provinces, social capital assets are similar with respect to the variables networks, exclusion, level of trust, situation of conflict and participation in the enterprise; however there are differences in networks between certified and non-certified enterprises. In Madre de Dios, networking among SMFEs is poor, thus the possibilities offered by social networks of increasing availability of information and/or transactions are restricted among the examined enterprises. This is because the main social network is formed by the

habilitadores (timber buyers who 'lend' money to SMFEs through the informal system of *habilito*) who manage a clientele (i.e., patronage) relationship because of the lack of economic resources and financial opportunities available to SMFEs.

Most SMFEs in Madre de Dios have weak organization. This has most particularly been during the first three years of operation when members tended to operate as individuals, resulting in competition among members and mutual distrust which generated internal conflicts and the weakening of the enterprise. In many cases these problems resulted in exclusion of members and, as a consequence, the reduction in enterprise membership. Weak organization has resulted in several enterprises not fulfilling the payment of the harvesting fee on time because of disagreements among members in providing the amount necessary to fulfill this responsibility. Weak organization has also resulted in divisions among members in managing their concessions. This has resulted in illegal actions by some SMFEs due to the harvesting of more volumes or species than the ones only contemplated in the AOP and/or because of the sell of *guias de transporte* used to 'legalize' timber harvested in illegal ways. Failure of SMFEs to better organize themselves has also restricted their opportunities to participate in ongoing assistantship offered by non-governmental programs.

Policy Implications and Recommendations

The main conclusions from this study are that: (1) the forest concession system was not implemented with adequate state resources for sufficient oversight to ensure legal forest management, (2) NGO support proved crucial, but constituted a patchwork with little coordination and much shifting in priorities and collaborations due to limited capacity and failing to manage expectations realistically, (3) private SMFEs did need assistance from NGOs, but received very short-term assistance instead of sustained support over time, and (4) private SMFEs vary in their capacity, and while most lack adequate capacity for sustainable forest

management certification, those that attained certification received more support for it, a problematic allocation of scarce resources by NGOs among private SMFEs.

Although Peru has committed to international conventions to promote and implement sustainable forest management, it is not sufficiently prepared to offer the political, legal and administrative conditions to ensure sustainable forest management in practice. This is because the State has not made regulation of the forestry sector a high priority (Smith et al. 2006, Malleux 2008). Consequently, inadequate State resources (directed to INRENA) have been allocated for the implementation of the forest concession system as the new model of forest management. Parallel to the limited financial and technical capacity of INRENA, the administrative capacity of this institution has also proven to be inefficient. This is attributed to the concentration of roles (i.e., granter of forest contracts, regulatory, monitor, judge and jury [“*juez y parte*”]) in this one institution, which has not improved efficiency and transparency in forest administration (Chirinos & Ruiz 2003). A different situation seems to have occurred in Bolivia, where Contreras-Hermosilla & Vargas (2002) point out that the political will of the State and the democratic participation of the main forest actors have led to successful efforts to reform the forestry sector, to restructure government institutions, to the implementation of sustainable forest management practices, and to promote forest certification. However, Pomeroy’s study (2008) in Santa Cruz, Bolivia, presents discrepancies about the effectiveness of a decentralized administration of the forestry sector there, and shows that challenges and conflicts emerged among different social actors due to this process.

Under the Peruvian forest concession system, private SMFEs (which differs from community-based enterprises in the type of access rights to forest resources and the type of enterprise and forest resources governance) are obligated to elaborate and implement forest

management plans. However, there is a parallel scheme of forest harvesting (i.e., permits and authorizations) for small farmers and local communities to harvest timber in favorable conditions in comparison to the exigencies for private SMFEs.[3] These parallel schemes generate an important distortion of the timber market, and private SMFEs lose competitiveness due to the lower prices of timber coming from these legal parallel schemes (Malleux 2008). This duality in the forestry norms, along with the limited capacity of INRENA, are barriers that not only limit INRENA's fulfillment of its functions and operations to better implement the concession system and forest management in the country; they also limit the capacities of private SMFEs to carry out proper forest management, due to the market competition of the other legal harvesting schemes and due to the incapacity of INRENA in properly administering and supervising forest contracts and their management.

All these issues (in conjunction with limited private SMFEs capacity) make the operation of private SMFEs more difficult. For example, it makes more difficult the decision of a private SMFE to engage in important investments that are adequate to the requirements of the certification process. This particularly occurs in a context where there are no conditions of security, stability, and fair competitiveness that guarantee that private SMFE investments and efforts are going to be properly compensated and/or successful and sustainable (Malleux 2008). Thus, it is imperative that the State allocate adequate resources for the proper implementation of the forest concession system and to secure legal forest management in the country. It is important to strengthen the capacities of INRENA through the allocation of sufficient financial resources, by increasing the number of qualified personnel, and the provision of continuous training to its

[3] Although users of permits and authorizations also have the obligation of elaborating management plans (i.e., the presentation of only annual operating plans) (DS N°048-2002-AG), they pay harvesting fees only for the timber harvested and not for the total area of their contracts as SMFEs do. Also, conditions and requirements for forest access are simpler for users of permits and authorizations (Directiva N°001-2003-INRENA-IFFS) in comparison to concessionaires (i.e., SMFEs) which allows for timber production with lower costs of production.

personnel to increase their capacities. It is also important to make improvements in INRENA's organization and administrative procedures in order to make the organization more effective in its operation, supervision, control, and enforcement mechanisms, but mainly in its promotion (i.e., diffusion of norms, regulations, and administrative procedures to forest users) and assistance roles. This is because INRENA is an organization that mainly controls the fulfillment of norms and regulations by the forest users (i.e., following documentary procedures established in regulations); however, it has not provided any technical support or training to private SMFEs. There is therefore an important need to improve these aspects.

With respect to environmental NGOs, they have been in favor of the forest concession process from the beginning since they understood that the model of forest concessions is conceptually adequate for the sustainable management of the forest resources in the country (Malleux 2008). They have therefore been very influential in the viability of this process from its inception. Support from environmental NGOs proved to be crucial; they became the main source of private SMFE technical support and the main source of financial support for forest certification in Peru. However, they have worked according to their own interests without a group vision or teamwork for a common agenda of sustainable development in Peru; they have worked in short-term alliances, with limited agreements, and suspicion among them (Soria 2003).

Despite the support to private SMFEs by the three main environmental NGOs, it was not continuous, and instead changed over time due to shifting priorities and to their respective projects' scopes. Thus, the impact of their support on the performances of the private SMFEs has been different. CESVI and ProNaturaleza, both with projects of narrow scope, worked closely and provided constant assistance to the private SMFEs they assisted. As a result, these

concessionaires were able to fulfill their management responsibilities better, though this impact was not widely felt. In contrast, WWF-MDD had a broader project scope, an ambitious certification goal, and a limited capacity in terms of personnel and funding in Madre de Dios. The result is that they did not work closely nor provide sufficient assistance with any individual private SMFE.

The projects implemented by these NGOs lasted the first five years since the concession system began. At the end of these projects, assistance to private SMFEs from these actors was finished for all practical purposes since there has not been any other support of this magnitude in the department. This affected private SMFEs management operations and, especially among certified private SMFEs, it created uncertainty of not being able to continue holding the certificate due to impossibilities in paying the assessments. Thus it is important that environmental NGOs understand that the forest concession system is a process of social change, where the people are the ones doing and deciding the forest management (Soria 2003). Therefore, more assistance and longer commitment is necessary to support these real actors of forest management. Especially necessary is an understanding that forest management is a gradual process of social learning and adaptation; that is, it is not only a technical and administrative process as some NGOs in Peru seem to have thought since they had as final goals of their projects numbers of managed or certified areas.

It is also crucial that the State establish mechanisms that secure consistent assistance (technical, financial, access to information) for these private SMFEs, in order to develop their capacities for forest management. This is particularly important given the fact that private SMFEs suffer from several constraints that include limited human, financial, technical, and managerial capacities, which restricts their opportunities to carry out responsible forest

management. Although there has been training in forest management, this has generally been restricted mainly to some private SMFEs (the ones with assistance from an NGO, and the ones whose managers live in Puerto Maldonado) with little continuity. Also, these trainings have been restricted mainly to technical aspects of forest operations but not to managerial issues; thus it is necessary to generate capacities among concessionaires, establishing a program of technical training, tranference of technology, and access to technical, economic, and market information.

Private SMFEs lack, or are restricted in, financial resources. There is a lack of adequate financial mechanisms for the forest sector (considered a risky sector), which has restricted tremendously the operational possibilities of private SMFEs (i.e., harvesting activity, transportation, elaboration of management plans, payment of harvesting fees, etc.). This has contributed to perpetuation of the informal system of *habilito* (clientele system), despite the disadvantages it represent for private SMFEs due to reductions in timber prices and volumes. Despite financial restrictions for most private SMFEs in Madre de Dios, the enterprises with mahogany in their forest concessions (i.e., enterprises from Tahuamanu) have proven to be better off and have been able to fulfill their management responsibilities –and in some cases their certification objectives. Thus in the middle of the financial instability most private SMFEs face, it is imperative that credit lines be established for these enterprises, with low interest rates, and also incentives for enterprises fulfilling all management requirements.

Although the forest concession system is the new model of forest management in Peru that has captured the interest of many small loggers, it demands more responsibilities by the new concessionaires and their private SMFEs[4] that are not easy to assume. This is especially true after decades of disorder and over-exploitation of resources in the forest sector, the limited

[4] For example, it demands the elaboration and implementation of management plans, payment of annual harvesting fees for the total area of the concession, and fulfillment of legal and labor requirements.

capacity of most enterprises (although some important exceptions), the limited capacity and interest of the State in the forest sector, and a more individualistic agenda of environmental NGOs in the sustainable management of forest resources in Peru. Therefore, much more effort is needed to reinforce the logging experience and the acquired management knowledge of private SMFEs, and especially to strengthen the institutional framework to maintain more responsible practices in the future. This is particularly important in this stage of the forest concession system when some results of the introduction of the first large scale policy effort to introduce sustainable forest management and increase equity, through the granting of forest concessions to private SMFEs, into the Peruvian Amazon are already noticeable.

Differences and Similarities with the Bolivian Concession System

New logging concession systems have been instituted in many other tropical countries in recent years. Peru's neighbor Bolivia has a solid framework of forest policies and regulations and thus constitutes a useful case for comparison to the Peruvian experience in Madre de Dios. In fact, much of Bolivia's 1996 legal forest framework inspired the Peruvian forestry reform enacted in 2000 (Traffic & WWF 2006): the new Forestry and Wildlife Law N° 27308, which established the forest concession system. The Amendment to this new Forestry Law (*Reglamento de la Ley Forestal*), which was approved in 2001, has experienced several modifications—which reflect the instability of a forest sector that does not favor long-term investments and has poor governmental institutions. In Bolivia, however, the Forestry Law N° 1700 was enacted in 1996 and the Amendment to this Law was also approved in the same year. In contrast to the Peruvian case, the Bolivian forest regulations have experienced little alteration—which has allowed stability and credibility in the forest sector, and has subsequently facilitated investments in the sector (Guevara et al 2004).

The Forestry Superintendence is a strong and trustworthy institution in the Bolivian legal framework (Guzmán 2002, Guzmán & Quevedo 2007). This position is responsible for the administration and regulation of the forest sector, has a considerable degree of independence from political influences, and has autonomy from the Ministry of Sustainable Development (Guevara et al 2004, Guzmán 2002). The situation is much different in Peru because INRENA, the institution responsible for the administration of forest resources, is an organization that is somewhat compromised because the appointment of its director and personnel is a function of political considerations and/or political favors. Also, as previously shown in the section on Madre de Dios, INRENA is invested with limited capacities by the government. Consequently, these factors have generated instability in the forest policies of Peru.

The advancement in sustainable forest management in Bolivia is notable. This has been due mainly to its solid legal framework and to the significant support of several institutions (Jack 1999), but also to the fact that Bolivia is currently the country with the largest area of natural tropical forests certified in the world. Bolivia has 28.8 million hectares of forest for production, of which 7.4 million have been granted as forest concessions for 40 years to private timber companies and local social groups (*Agrupaciones Sociales del Lugar*-ASL),[5] as harvesting permits to indigenous groups (*Tierras Comunales de Origen*-TCO) and to private properties, and as harvesting contracts in public lands (Guzman & Quevedo 2007). As of September 2009, 1.7 million hectares under forest production have been certified there (FSC 2009a). Although the Bolivian experience with concessions has been positive overall, Guzman and Quevedo (2007)

[5] An ASL is a group of people with *personeria juridica* formed by traditional users, *comunidades campesinas*, indigenous groups, or other users that use forest resources inside the jurisdiction of a municipality benefited with forest concessions. These groups are similar to the private SMFEs in Peru in terms of area granted, and capacities.

report that the greatest success has been with the forest concessions granted to private timber companies, as compared to ASLs.

Despite the fact that there are 24.6 million hectares of forest for production in Peru, of which 7.5 has also been granted as forest concessions for 40 years to only private SMFEs, the advancement of sustainable forest management is still incipient and the implementation of the forest concession system has met with major difficulties. For example, 10.7% of the total area granted and adapted as forests concessions in the country (i.e., 850,104 ha) have been disqualified due to illegal actions. Moreover, an additional area of 68,699 ha has been returned to the State due to impossibilities in managing the forest concession for productive purposes. The attainment of forest certification has been meager, as well; as of September 2009, only 623,224 hectares under forest production have been certified (FSC 2009a).

One of the difficulties in the implementation of the concession system in Peru has been the lack of adequate financial resources. For example, the major financial support came from the CEDEFOR-WWF Project (with financial support from USAID), which had a budget of approximately US$ 5 million for the entire lifespan of the project (2003-2006). Although the CEDEFOR-WWF project was key in the implementation of the concession system (particularly given the limited capacity of the State) and in the establishment of the Peruvian Council for Voluntary Forest Certification, its support to private SMFEs was limited to a very short duration instead of being sustained over time, which was needed since most SMFEs lack adequate capacity for sustainable forest management. However, in Bolivia the implementation of the Forestry Law N° 1700 and the new system of forest management has been facilitated mainly by the significant technical and financial support received. For example, the BOLFOR Project, with support from USAID, had a budget of US$ 25 million for the 10 years (1994-2003) of its first

round. BOLFOR has also contributed to the establishment of the Bolivian Council for Voluntary Forest Certification, provided extension services to rural communities and forest industries, granted fellowships to Bolivians for post-graduate study, hosted international students and scientists, carried out applied research, and helped in the creation of (or strengthening of existing) public and private organizations to carry out activities ranging from regulatory control to research. Due to the success of this project, USAID planned a second six-year phase (2004-2009) that maintains the same overall goals (Chemonics International 2004).

Thus, the forest concession system in Bolivia has been a relatively successful tool for forest management. This relative success has been evident in the concessions granted to private timber companies (usually with large areas) that had previous logging experience and tended to be capitalized with a certain degree of vertical integration. Such characteristics helped these companies to advance in the better management of their forest operations and to attain FSC certification, in most cases, with the possibility of selling their products in international markets. However, the results have been less obvious in concessions granted to ASLs. These groups were previously informal forest users, with no technical expertise in forest management and very little capital; they have been granted much smaller areas in comparison to the private timber companies (Guzmán & Quevedo 2007). None of the ASL is certified, which may be the result of their high degree of technical vulnerability, low levels of technical assistance, deficient organization and administration, and lack of capacity in business management (Quevedo 2006). In the same way, indigenous communities in Bolivia have trouble attaining forest certification because of their difficulties in implementing forest management plans (Quevedo 2006).

In Peru, the implementation of the forest concession system is still a process in transition towards better forest management, and although some private SMFEs have attained certification,

most private SMFEs lack adequate capacity (financial, human, technical, and managerial capital) for sustainable forest management. This is because many of the small loggers forming private SMFEs (that were later granted forest concessions) had previously been informal loggers that possessed neither entrepreneurial skills nor sufficient capital assets. Thus, it is important to establish mechanisms that secure consistent assistance to private SMFEs in order to further develop their capacities for forest management. Furthermore, it is also important to strengthen the framework of forest policies and regulations in Peru to provide stability and credibility in the forest sector, so as to reach advances in forest management as Bolivia has demonstrated is possible.

Limitations of the Study

Although the researcher became familiar with the study area and many of their actors, the main limitation of the study has been the limited availability of directly comparable information for the studied private SMFEs. The non-participation of the enterprises managed by the Schipper family also limited this study somewhat. Unfortunately most enterprise concessionaires have not recorded any information related to costs of their forest operations, which (1) limited the scope of this study to fewer variables than expected, and (2) obligated the researcher to rely on estimates for several variables related to costs (produced capital) more than on factual data. The private SMFEs administered by the Schippers did not participate in this study because their administrator never delivered the information required, despite agreeing to do so. These enterprises are located in the Tahuamanu province and present different characteristics from the ones studied here, especially since they have sufficient financial resources and capacity as a result of the longer history of timber exploitation by this family in the Peruvian Amazon. Thus, the inclusion of these enterprises in this study would most likely have confirmed the significant differences observed for private SMFEs' produced capital (i.e., material and financial resources)

between Tahumanu and the other two provinces (i.e., Tambopata and Manu). However, the real differences among these provinces with respect to this type of capital are likely to be larger and more pronounced than what is suggested in this study. Thus the participation of these enterprises in this study would have provided more detailed differences among private SMFEs from Tahuamanu, and it would have enriched the results of this study.

Future Work

In order to continue investigating the capacities for forest management of SMFEs in Madre de Dios and elsewhere, it is essential to have sufficient information that is reliable. Thus it is necessary to implement a system of recording the basic operational information of these SMFEs. SMFEs capacities (in terms of produced, natural, human, and social capital) vary over time and space; this study focused on one period of time (accumulated capital in five years) and was limited to only one region. Thus, studies focusing on more regions in Peru where the forest concession system has been already implemented (such as Ucayali and Loreto) would be useful, especially given the limited information on private SMFEs encountered in this study. Also, it would be useful to revisit the private SMFEs already contacted in this study and see what their progress is in the near future, especially since a new study could provide more information on their management status after the assistance of environmental NGOs has practically been terminated.

In the specific case of Madre de Dios, the next step on research about private SMFEs capacities would be to study each stage of the forest operation (i.e., forest censuses, harvesting, transportation, timber sales) and record in detail all costs and times involved in carrying out these. This information would be useful for having detailed information on the main restrictions of every one of these stages, and also for purposes of estimating the efficiency of these forest operations and valuation of timber resources. This is important in order to generate more

integrated information about the real capacities for forest management and the use of the timber resource, which would be very useful as a basis to focus support and assistance to SMFEs in specific areas of major identified limitations.

Future research should also consider focusing on a comparative analysis of SMFEs' capacities for forest management among countries in Latin America that have experienced similar forestry policy reforms, and that have adopted similar forest management systems. For example, due to the adoption of the forest concession system as their systems for forest management, a comparison of SMFEs' capacities for timber management among Peru, Bolivia, and Guyana would be very interesting and informative. This type of research project would increase the limited information and knowledge about the SMFE sector in Latin America, allowing for a more detailed and informed characterization. It would also facilitate additional exploration of the specific factors and actors that positively or negatively affect the capacity of SMFEs to carry out forest management in the region, as well as the impacts of such management (and the policies regulating them) on the natural resource base and its conservation.

APPENDIX A
HISTORICAL EVOLUTION OF PERUVIAN FOREST POLICIES AS TO 2007

Date	Norm	Description of Policy
1963	DL 14552	Creation of the Forest and Wildlife Service
1974	DL 20653	Indigenous community and agrarian promotion Law for *Selva* and *Ceja de Selva* regions
1975	*DL 21147*	*Forestry and Wildlife Law (FWL)*
1977	DS 161-77-AG	Regulation of forest extraction and transformation
	DS 160-77-AG	Regulation for conservation units
1987	DS 021-87-AG	Suppression of forest extraction permits
1990	DL 613	Formal necessity to update the FWL in the Environmental and Natural Resources Code
1995	DS 010-95-AG	Forest extraction contracts in free availability forests
1997	L 26821	Organic Law for sustainable use of natural resources
	RM 1024-99-AG	Extension of operation of forest extraction contracts
1998		Prepublication of the Amendment of the protected natural areas Law for public opinion
1999	L 26834	Protected natural areas
	DS 047-99-AG	Declaration of prohibition of mahogany and cedar extraction from Madre de Dios
	DS 010-99-AG	National strategy of protected natural areas-Plan Director
2000	*DL 27308*	*New Forestry and Wildlife Law (NFWL)*
	RM 245-2000-AG	Establishment of the price for timber in its natural state by commercial categories
2001	L 27506	Canon Law, creation of the Forest Canon
	DS 038-2001-AG	Approval of the Amendment of the Protected natural areas Law
	DS 015-2001-PCM	Constitution of a multi-sector special commission for indigenous communities
	DS 014-2001-AG	Amendment of the NFWL
	RJ 226-2001-AG	Establishment of 29 Technical Forest Administrations
	RJ 095-2001-AG	Approval of reference terms for the GFMP and AOP
	RM 1351-2001-AG	Creation of permanent production forest (PPF) in Madre de Dios
	RM 1349-2001-AG	Creation of PPF in Loreto
	RM 0566-2001-AG	Complementary dispositions for granting conservation concessions
2002	DS 058-2002-AG	Approval of size of harvesting units for PPF in Pasco
	DS 052-2002-AG	Conformation of a multi-sector commission that will design a strategy against illegal logging
	DS 048-2002-AG	Modification of the Amendment of the NFWL (article 128)
	DS 036-2002-AG	Modification of the Amendment of the NFWL (21st complementary disposition)
	DS 026-2002-AG	Modification of the Amendment of the NFWL (article 383)
	DS 019-2002-AG	Promotion and determination of the size of harvesting units in PPF
	DS 006-2002-AG	Modification of the Amendment of the NFWL (article 106)

	DS 005-2002-AG	Approval of the Amendment of the Canon Law
	RJ 296-2002-AG	Approval of formats for the three reports with character of judicial declaration and terms for presentation
	RJ 280-2002-AG	Approval model for timber transportation permits (*guía de transporte*) for forest concessions
	RJ 032-2002-AG	Conformation Ad-hoc Commission to conduct process of forest concessions granting
	RM 632-2002-AG	Inclusion of zone 6 in Pasco PPF
	RM 549-2002-AG	Creation of PPF in San Martin, Huanuco, Pasco, Junin, Ayacucho Cusco, and Puno departments
	RM 260-2002-AG	Creation of PPF in Ucayali department
2003	DS 037-2004-AG?	Approval harvesting units in Loreto
	DS 033-2003-AG	Modification of the Amendment of the NFWL (article 70°, and 86°)
	DS 014-2003-AG	Approval of number and surfaces of harvesting units in Madre de Dios for the second public bidding
	DS 012-2003-AG	Fractioning in harvesting fees for the 1st year of concession
	DS 011-2003-AG	Modification of DS 052-2002-AG about the Commission to fight illegal logging
	DS 006-2003-AG	National interest declaration against illegal logging
	DS 004-2003-AG	Regulation of FONDEBOSQUE as a private institution in promoting sustainable forest management
	RJ-160-2003-AG	Resolution of PMFC-ZE surface
	RJ 129-2003-AG	Reference terms and formats for reports with character of judicial declaration
	RJ 128-2003-AG	Approval of promotional program and chronogram to pay harvesting fees
	RJ-109-2003-AG	Approval of presentation format and baselines to elaborate GFMP and AOP
	RJ 082-2003-AG	Approval of Directive for exclusion and compensation of areas in forest concessions
	RJ 031-2003-AG	Conformation of Ad-hoc Commission for public biddings in Loreto PPF
	RJ 010-2003-AG	Restructuration Ad-hoc Commission
2004	L 28204	Law of transference of confiscated timber by the forest authority
	DS 036-2004	Fusion of INRENA and OSINFOR
	DS 029-2004-EF	Modification of DS 005-2002-EF of Canon Law
	DS 029-2004-AG	Dispositions about forest concessions previous to DS 033-2003; incorporation of article 91A to the Amendment of the NFWL
	DS 011-2004-AG	Modification of the Amendment of the NFWL (article 109°)
	RJ 178-2004-AG	Creation of Transitory Commission to carry out OSINFOR functions until its installation
	RJ 161-2004-AG	Regularization of harvesting fees for 2002, 2003 and 2004
	RJ 149-2004-AG	Extension of 120 days in the deadline to present PGMF and POA for 2nd harvest (*zafra*) in San Martin department
	RJ 148-2004-AG	Extension of 60 days in the deadline to present PGMF and POA

		for 2nd *zafra* in the Madre de Dios and Ucayali departments
	RJ 112-2004-AG	Extension deadline to mobilize approved balances
	RJ 104-2004-AG	Promotional regimes (discounts in harvesting fees)
	RJ 019-2004-AG	Approval procedures of authorization for mobilization of timber balances
	RM 586-2004-AG	Resize of Ucayali PPF
	RM 441-2004-AG	Resize of zone 3 of Madre de Dios PPF
2005	DS 034-2005-AG	Modification of the Amendment of the NFWL (article 74° numeral 70.2, article 91°A)
	DS 033-2005-AG	Modification of the Amendment of the NFFL (article 74°, 74.1, 74.2, articles 346°, 365°)
	DS 009-2005-AG	Declare without effect Pasco PPF (disqualify RM 0632-2002-AG and part of RM 0549-2002-AG referred to creation of Pasco PPF)
	DS 005-2005-AG	Modification of the Amendment of the NFWL (article 3° numeral 3.96)
	DS 004-2005-AG	Modification of the Amendment of the organization and functions of INRENA; incorporation of OSINFOR (supervisory of forest concessions for timber purposes) to INRENA
	RJ 298-2005-AG	Modification of RJ 163-2004
	RJ 296-2005-AG	Resize of zone 1 of Puno PPF
	RJ 252-2005-AG	Resize of zone 3 of Madre de Dios PPF
	RJ 244-2005-AG	Approval of the Amendment of the financial debt for harvesting fee
	RJ 215-2005-AG	Basis to strength forest concessions for timber purposes
	RJ 206-2005-AG	Resize of zone 1 of San Martin PPF
	RJ 181-2005-AG	OSINFOR functions
	RJ 174-2005-AG	Suspension of RJ 041-2004
	RJ 107-2005-AG	Resize of zone 1 of Ucayali PPF
	RJ 105-2005-AG	Approval National mahogany volume for 2005
	RJ 097-2005-AG	Resize of zone 1 of Madre de Dios PPF
	RJ 094-2005-AG	Resize of zone 3 of Madre de Dios PPF
	RJ 083-2005-AG	Suspension of RJ 073-2005 application
	RJ 073-2005-AG	Establishment of a payment regime for the harvesting fee
	RJ 012-2005-AG	Revoke articles 4° and 5° of RJ 102-2004
	RM 670-2005-AG	Modification of RM 0549-2002 (article 2°)
	RM 0235-2005-AG	Formalization of the *Mesa de Diálogo y Concertación Forestal*
	RM 144-2005-AG	Suspension of RM 0549-2002 referred to creation of Puno PPF
2006	L 28852	Law of promotion of private inversion in reforestation and agroforestry
	DS 048-2006-AG	Modification of the Amendment of the NFWL (articles 109.5°, 110°, 114°, 119° y 120°)
	DS 007-2006-AG	Modification of the Amendment of the NFWL (articles 46°, 51°, 52°, 54°, and from 53° section g and i, and addition of section j)
	RJ 347-2006-AG	Approval National mahogany volume for 2007
	RJ 331-2006-AG	Enforced measures to assure mahogany's sustainable harvesting and conservation

	RJ 238-2006-AG	Manual of administrative procedures for mahogany harvesting, transport and export
	RJ 232-2006-AG	Approval of referential terms to formulate forest management plans in indigenous communities
	RJ 216-2006-AG	Resize of zone 3 of San Martin PPF
	RJ 209-2006-AG	Procedures for disqualification plans of forest concession contracts
	RJ 176-2006-AG	Modification of the Amendment of the refinancing regime for harvesting fee debt (article 7°)
	RJ 162-2006-AG	Resize of zone 1 of San Martin PPF
	RJ 136-2006-AG	Resize of zone 4 of Loreto PPF
	RJ 081-2006-AG	Modification of RJ 102-2004-AG (article 2°)
	RJ 016-2006-AG	Establishment of the National volume of mahogany exports
	RM 434-2006-AG	Modification of RM 0586-2004-AG (article 2°)
	RM 318-2006-AG	Resize of zone 6 of Loreto PPF
	RS 002-2006-AG	Approval of National reforestation plan
2007	L 29020	Modification of Law 28204
	DS 011-2007-AG	Transference of INRENA faculties to Regional Governments
	RJ 056-2007-AG	Resize of zone 2 of Huanuco PPF
	RJ 032-2007-AG	Constitution of the Commission to fight illegal logging (COATCI)

L: Law
DL: Law Decree
DS: Supreme Decree
RJ: Chief Resolution
RM: Ministerial Resolution
RS: Supreme Resolution

APPENDIX B
FOREST ORGANIZATION QUESTIONNAIRE

The School of Natural Resources and Environment at the University of Florida is conducting an independent research study about forest concessions in Madre de Dios. In order to understand the factors affecting the development of forest enterprises and forest management, Ms. Cossío is conducting face-to-face interviews with forest organizations. You have been selected to be a respondent. Privacy is a key principle of this survey. There are no wrong or right answers, most importantly candid and honest answers are the most useful. If you have any questions about this survey, please feel free to contact either the following people: Dr. Stephen Perz (sperz@soc.ufl.edu, 352-392-0265 ext. 234), or Dr. Karen Kainer (kkainer@latam.ufl.edu).

N° Interview: Date:

Name Organization:

Location: *Province: *District:

Section I. RESPONDENT'S DATA

1. Name:
2. Position in the organization:
3. Sex: (1) Male (2) Female
4. Age:
5. Education:
6. Where are you from (city/department)?
7. How long have you been settled in this area (Puerto Maldonado, Iberia, Iñapari, Bajo Colorado) (years)?

Section II. POLITICAL-ECONOMIC CONTEXT

8. Who are the main individuals or organizations with whom the organization has links with respect to the forest concession system? What is the nature of those links? Do a map with arrow showing intensity of relationships (record objectives underlying linkages, and functions of the most important partners).
9. Since when does this organization is working in Madre de Dios?
10. What are your main functions/roles?
11. What is your capacity to fulfill your function/roles (personnel, financial)?

12. How did this organization get involved with the forest concession system/concessionaire enterprises/certification?
13. How many and what enterprises is this organization providing support to?, what type of support? For how long?
14. What are/were the main factors favoring this support?
15. What are/were the main factors constraining this support?
16. How is/was your relationship with enterprises and/or other actors in the forest sector (negotiation or conflict)?
17. When did these relations started? For how long?
18. If there were conflicts what was the main cause of conflicts and when it happened?
19. How would you characterize the organization's relationship with other regional organizations? Could you describe your relationship with the government?
20. What is your perspective on enterprises performance?
21. What do you think are the main problems faced by SMFEs in Madre de Dios? And in other departments? (e.g., Ucayali, Loreto, etc)
22. What are the big steps in carrying out forest management in Madre de Dios?
23. What is your perspective on constraints/difficulties in forest management?
24. What are the big steps in carrying out certification?
25. What is your perspective on constraints/difficulties in certification?
26. What is your perspective on constraints/difficulties in preventing to attain certification?
27. What have been/are crucial events and problems in the forest management process?
28. What have been/are crucial events and problems in the certification process?
29. What is your perspective for the future of forest management in Madre de Dios?
30. What is your perspective for the future of certification in Madre de Dios?

APPENDIX C
SMFE QUESTIONNAIRE

The School of Natural Resources and Environment at the University of Florida is conducting an independent research study about forest concessions in Madre de Dios. In order to understand the factors affecting the development of forest enterprises and forest management, Ms. Cossío is conducting face-to-face interviews with forest enterprises from the first public bidding. You have been selected to be a respondent. Privacy is a key principle of this survey. There are no wrong or right answers, most importantly candid and honest answers are the most useful. If you have any questions about this survey, please feel free to contact either the following people: Dr. Stephen Perz (sperz@soc.ufl.edu, 352-392-0265 ext. 234), or Dr. Karen Kainer (kkainer@latam.ufl.edu).

N° Interview: Date:

Enterprise Name:

Location:

*Province: (1) Tahuamanu (2) Tambopata (3) Manu

*District:

Access: *Distance from concession to main road (hr. or Km):

Section I. RESPONDENT'S DATA

1. Name:
2. Position in the enterprise:
3. Sex: (1) Male (2) Female
4. Age:
5. Education (# years completed):
6. Where are you from (city/department)?
7. How long have you been settled in this area (years)?:
8. Do you carry out other activities besides logging? Which ones?
9. What is your current annual income for logging activity?

Section II: HISTORY AND ENTERPRISE ORGANIZATION

10. Enterprise's type of society:
    (1) SAC (2) SRL (3) SA/EIRL (4) Natural person
11. Why did you decide to form the enterprise?

12. How was the enterprise created? Who was most responsible for its creation? (e.g., government mandate, some people decision, suggestion of outside NGO)?
13. Did you have external support to form the enterprise (from who), or did the members do it by themselves? How did the members become involved?
14. As the enterprise developed, what sort of help has it received from outside? Has it received advice and/or funding or other support from the government? What about from NGOs? How did you get this support? Who initiated it? How was the support given? What benefits and limitations has the enterprise derived from this support?
15. In what ways has the enterprise changed its structures (e.g. managers)?
16. How is the Manager of this enterprise selected? How are decisions made?
17. What is the enterprise structure?
18. How many members does the enterprise have? Have there been any changes in member numbers? Why?

# memb.	Sex	Age	# years educ.	# years previous experience logging, before 2002	# years previous experience business, before 2002	Relation members (Fam, Neigh, Ind)	# times training/last year	# days training
1Ger								
2								
3								
4								
…								

19. How are the utilities and activities distribution among enterprise's members?
20. What are your main markets/buyers?
21. What do you think about the performance of this enterprise in carrying forest management?
22. What would you do to make this enterprise more effective?
23. What are the main problems inside this enterprise?

Section III. PHYSICAL CAPITAL

24. Enterprise assets

Asset	**Number**	**Year of purchase**	**Unitarian Cost ($ or S/.)**	**Fabrication year**
Motosierra				
Serrucho de trozar				
Sierra mecanica				
Sierra circular				
Sierra cinta				
Traca-traca				

Bote con motor				
Canoa con motor				
Peque-peque				
Carreta				
Aserradero complete				
Aserradero portatil				
Castillo manufacturado				
Mesa con disco circular				
Mesa con sierra circular				
Tractor				
Camion				
Cargador frontal				
Volquete				

25. What has been the amount ($ or S/.) invested in road construction and maintenance of them since enterprise formation (2002-2006)?
26. What has been the amount ($ or S/.) invested in supplies (computer, office materials, etc.) since enterprise formation (2002-2006)?
27. What has been the amount ($ or S/.) invested in buildings since enterprise formation?
28. What has been the amount ($ or S/.) invested in the following:

    *harvesting fees:

    *PGMF elaboration:

    *POAs elaboration (2002-2006):

Section IV. FINANCIAL CAPITAL

29. What has been the amount received ($ or S/.) as loan since enterprise formation (2002-2006)? By whom? Explain process of loan.
30. What has been the amount received ($ or S/.) as support by NGOs or other organizations since enterprise formation (2002-2006)? explain
31. What has been the economic contribution ($ or S/.) of enterprise members since enterprise formation (2002-2006)?
32. What is the amount ($ or S/.) of enterprise savings in the bank?
33. What are the mechanisms to finance the harvesting activities (bank credits, habilito, other)? Explain. In case of habilito explain who are main habilitadores and the process.

Section V. NATURAL CAPITAL

34. What is the concession area (ha) per contract?
35. What is the total timber volume (m3) (approved and extracted) since enterprise formation (2002-2006)?

POA	Total (m3)	Timber Category				
		A (m3)	B (m3)	C (m3)	D (m3)	E (m3)
2002						
2003						
2004						
2005						
2006						

36. What was the total number of species (approved and extracted) per POA (2002-2006)?
37. How did you find the concession when you got the contract in terms of forest resources? Was it logged before?

Section VI. HUMAN CAPITAL

38. How many members in the enterprise had previous experience in logging activities to the formation of the enterprise?
39. How many members in the enterprise had previous experience in business activities to the formation of the enterprise?
40. What is the amount ($ or S/.) invested in training of personnel since formation of enterprise (per year)?

Amount ($)	2002	2003	2004	2005	2006

41. How many times did enterprise members receive any training from NGOs or GOs?
42. What is the level of education of the Administrator (Gerente) (years of schooling)?
43. What is your annual salary (for all activities)?
44. How would you rate the performance of this enterprise' members:

    Low (1) Medium (2) High (3)

Section VII. SOCIAL CAPITAL

6A. Structural Social Capital

6A1. *Organizational density and characteristics*

45. Are you or is someone in the enterprise a member of any groups, organizations, or associations (forest related) in the region? Name them.

46. Which of these groups is the most important to you (the 3 most important)?
47. Overall, are the same people members of these different groups or is there little overlap in membership?

    No overlap (1) Some overlap (2) Much overlap (3)

48. About the members of these three groups… Yes (1) No (2):

	Group		
	1	2	3
Are members mostly of the same gender?			
Do members mostly have the same occupation?			
Are members mostly from the same age group?			
Do members mostly have the same level of education?			

49. How does the group usually make decisions?

	Group		
	1	2	3
The leader decides and informs the other group members			
The leader asks group members what they think and then decides			
The group members hold a discussion and decide together			
Other (specify)			

50. Overall, how effective is the group's leadership?

	Group		
	1	2	3
Very effective			
Somewhat effective			
Not effective at all			

51. Do you think that by belonging to this group you have acquired new skills or learned something valuable?

	Group		
	1	2	3
Yes			
No			

6A2. ***Networks and Mutual Support Organizations***

52. If there is a financial problem in the enterprise, who is the first person or institution the enterprise ask for help to deal with the situation?
53. If there is a technical problem in the enterprise, who is the first person or institution the enterprise ask for help to deal with the situation?

54. Identify up to 3 specific individuals/institutions who asssited the enterprise in the following areas:

a. Borrowing money:

b. Trading timber:

c. Taking care of enterprise:

6A3. *Exclusion*

55. Differences often exist between people working in the same enterprise. To what extent do differences such as the following tend to divide people in the enterprise?

    Not at all (0) Somewhat (1) Very much (2)

56. Do these differences cause problems? Yes (1) No (0)

57. How are these problems usually handled?:

    Members work it out between themselves (1) The manager intervene (2)

    Judicial authorities mediate (3)

6A4. *Participation*

58. How often the members of the enterprise get together in enterprise's meetings?

    Few times/month (5) Once/month (4) Few times/year (3)

    Once/year (2) Never (1)

59. Do you consider that enterprise's members are active in the entreprise, such as by attending meetings, or are you relatively inactive?

    Very active (3) Somewhat active (2) Not active (1)

60. Overall, how would you rate the spirit of participation in this enterprise?

    Very high (5) High (4) Average (3)

    Low (2) Very low (1)

6B. Cognitive Social Capital

6B1. *Trust and Cooperation*

61. Do you think that in this enterprise people generally trust one another in matters of roles?

    Do trust (3) More less trust (2) Do not trust (1)

62. Do you think over the last two years this level of trust has gotten better, gotten worse, or stayed about the same?

    Better (3) The same (2) Worse (1)

63. Compared with other enterprises, how much do people of this enterprise trust each other in matters of roles?

More than other enterprises (3) The same as other enterprises (2) Less than others (1)

64. Tell me whether in general you agree or disagree with the following statements:

	Strongly agree (3)	More less Agree (2)	Disagree (1)
Most people in this enterprise are basically honest and can be trusted			
People are always interested only in their own welfare			
Members of this enterprise are more trustworthy than others			
In this enterprise, one has to be alert or someone is likely to take advantage of you			
If I have a problem, there is always someone to help me			
I do not pay attention to the opinions of others in the enterprise			
Most people in this enterprise are willing to help if you need it			
This enterprise has prospered in the last two years			

6B2. ***Conflict Resolution***

65. In your opinion, is this enterprise generally peaceful or conflictive?

    Peaceful (1) Conflictive (2)

66. Compared with other enterprises, is there more or less conflict in this enterprise?

    Less (1) The same (2) More (3)

67. Are the relationships among people in this enterprise generally harmonious or disagreeable?

    Harmonious (1) Disagreeable (2)

68. Compared with other enterprises, are the relationships among people in this enterprise more harmonious, the same, or less harmonious than other enterprises?

    More harmonious (1) The same (2) Less harmonious (3)

Section VIII: OTHER ENTERPRISE ASPECTS

Institutional Capacity

69. How many managers did the enterprise have? How has been the relationship between the manager and members?

70. How is members participation in enterprise's meetings, decision making, informal opportunities to discuss ideas?
71. Do you think the enterprise have organizational culture? Is it well organized? Are there rules that members know about? Were there problems of theft of property or supplies? If there is conflicts what are the resolution mechanisms within the enterprise?
72. What do you think about the organizational capacity of this enterprise, in terms of carrying out specialized activities (e.g., credit, commercialization)?, reflecting on and learning from previous experiences?

Forest management

73. What is your strategy for doing your forest management plan?
74. What is your situation carrying out forest management according to Forest Law (harvesting fee payment, presentation of POAs up to 2006)?
75. What are the big steps you have to go through to follow forest management according to what the Forest Law says?
76. Did you pursue certification? Yes (1) No (2)
77. Are you planning to pursue certification? why? Yes (1) No (2)
78. What are the big steps you had to go through to attain forest certification?
79. Do you think there are limitations in forest certification?
80. How did the certification process work (costs, NGO support, etc.)?
81. What is the next step for you? what do you anticipate to do?
82. Why do you want to continue?
83. How long do you think the concession system will last? Why?

Political-Economic Context

84. Who are the main individuals or organizations with whom the enterprise has links in order to carry out the forest management?
85. What do you think are the main problems faced by SMFEs in Madre de Dios?
86. What are the big steps in carrying out forest management in Madre de Dios?
87. Were there constraints/difficulties in doing forest management?
88. What is your perspective for the future of forest management in Madre de Dios?
89. What is your perspective for the future of certification in Madre de Dios?

APPENDIX D
PARTICIPATING SMFEs

	Person Interviewed	Name SMFE
1	Hugo	Agroindustrial Victoria SAC
2	Luis Valdivia	Maderera Amazonía Tecnificada SAC, AMATEC
3	Víctor Espinoza	Grupo Espinoza (Aserradero Espinoza SA, Maderas Cocama EIRL)
4	Ignacio Cárdenas Rojas	Empresa Maderera Catahua Tahuamanu SAC, CATAHUA
5	Federico Ríos	Corporación Forestal Tres Fronteras SRL, CORPFOREST
6	Fernando Quezada Echevarría	Empresa de Extracción, Transformación y Comercialización Iberia SAC, EMETCI
7	Jil Cesar Gibaja Peralta	Empresa Forestal Portillo SRL, EMFORPORTILLO
8	Elmer Hermoza	Empresa Maderera Industrial Isabelita SAC, EMINI
9	Raúl Villafán Castillo	Forestl Río Huáscar SRL
10	Abraham Cardozo	Consorcio Maderyja&Maderacre (Maderera Río Yaverija SAC, Maderera Río Acre SAC)
11	Rafael Viena	Empresa de Productores Forestales Iberia SAC, MADERERA IBERIA
12	Sonia Blanco	Empresa Maderera Paujil SAC, PAUJIL
13	Wilson Miranda	Shihuahuaco Timber SAC, SHIHUAHUACO
14	Julio Chirinos Medina	Maderera TresFronteras SAC, TRES FRONTERAS
15	Moisés Lazo	Empresa Maderera Boleo SAC, MADEBOL
16	Margarita Pari	Maderera Forestal Lagarto SAC, MADEFOL
17	Justino Palomino Mercado	Maderera Tawari SRL
18	Manuel Martín Mayorga	Martin Mayorga
19	Hugo	Empefomsba
20	Víctor Herrera	Empresa Maderera Ecológica Manu SAC, EMECOMANU
21	Segundo	Empresa Maderera Victoria San Juan Grande SAC, EMAVISJUG
22	Simeón Suárez	Empresa de Pequeños Extractores Forestales Colorado Dos SAC, EMPEFOC-DOS
23	Hipólito Chulla	Empresa de Pequeños Extractores Forestales con Manejo Sostenible Guacamayo SAC, EPEFOMSG
24	Fortunato Cruzado	Inversiones Maderera Bajo Colorado SAC, INBACO
25	Isabel Almirón Torres	Empresa Maderera Forestal Punkiri Chico SAC, MAFOPUNCHI
26	Marco Antonio Texi	Marco Antonio Texi
27	Apolinario Fernández	Inversiones Apolo SRL

APPENDIX E
PARTICIPATING KEY EXPERTS

	Person interviewed	Institution represented
	2005	
1	Miguel Pacheco	WWF-Lima
2	Summer Trejo	WWF-MDD
3	Jaime Semizo	WWF-MDD
4	Mikel Manrique	ProNaturaleza
5	Miguel	CESVI-MDD
6	Nelson Melendez	CESVI-MDD
7	Jorge Alva	ACCA
8	Franz Segovia	FONDEBOSQUE
9	Mariana Cerna	INRENA-MDD
10	Edith Meza	INRENA-MDD
11	Jenny Fano	OSINFOR
12	Edwin Ruiz	Cámara Forestal Nacional-MDD
13	Mishari García	UNAMAD
14	Víctor Zambrano	Mesa de Diálogo y Concertación Forestal MDD
15	Arnaldo García	Mesa de Diálogo y Concertación Forestal MDD
16	Wilson Miranda	Asociación de Concesionarios de Madre de Dios
17	Federico Ríos	Asociación de Concesionarios de Tahuamanu
18	Luis Zegarra Cajat	Federación de Extractores Forestales de Madre de Dios
19	Mauro Vela	Consultor forestal

	Person interviewed	Institution represented
	2007	
1	Edith Condori	WWF-MDD
2	Mikel Manrique	Pronaturaleza
3	Nelson Melendez	CESVI
4	Juan Carlos Flores	ACCA
5	Alonso Córdoba	Fondebosque
6	Celim Huamán	INRENA-MDD
7	Gastón Chucos	INRENA-MDD
8	Ernesto Villagaray	Gobierno Regional MDD
9	Wilson Miranda	Asociación de Concesionarios de Madre de Dios
10	Federico Ríos	Asociación de Concesionarios de Tahuamanu, consultor
11	Deuso Souza	Asociación de Ecología y Medio Ambiente del Tahuamanu
12	Francisco Ruiz	Asociación de Pequeños Extractores de Madera de la Provincia del Tahuamanu, APEMAP-T
13	Arnaldo García	Comité de Gestión de Bosques del Río Las Piedras
14	Luis Zegarra Cajat	Federación de Extractores Forestales de la Región de MDD
15	Ricardo Estrada	Consultor forestal, Rainforest
16	Mauro Vela	Consultor forestal

APPENDIX F
FACTOR ANALYSIS

Because there are many indicators relative to the number of observations, an exploratory factor analysis was applied as the first step in the SMFE capital analysis to assess the underlying patterns of relationships for the capital indicators. It was also used to reduce the number of indicators by identifying underlying common factors that represent each fundamental construct; namely produced, natural, human, and social capital. Thus, individual factor analyses were carried out for each group of capital indicators. Principal component analysis was used to determine the factor structures for the six indicators designed to measure produced capital, the two indicators that measure natural capital, the five indicators measuring human capital, and the twenty-three indicators that measure social capital. Due to the small population in this study, as well as the larger number of indicators representing social capital, I performed multiple factor analyses instead of just one.

The most widely used orthogonal factor rotation method (i.e., Varimax) was used to rotate the factor structures in order to get a simple structure and to make the factors more meaningful,[1] in order to facilitate interpretation (Hair et al 1998). Components with eigenvalues[2] greater than 1.0 were considered in this analysis; when they were close to 1.0, a scree plot of eigenvalues was used to arrive at a final number of factors. In addition, indicators with component loading of 0.50 or greater were kept (Hair et al 1998). Cronbach's alpha was used to measure reliability[3] of the indicators in every construct, considering a value of 0.50 or greater as acceptable (Baumgartner & Jackson 1995). The Kayser-Myer Olking (KMO) statistic was used to check for

[1] According to Hair et al (1998), rotation improves interpretation of the factors by reducing some of the ambiguities that often accompany the initial unrotated factor solutions.

[2] It is the variability of a factor.

[3] Reliability determines how consistently the selected variables measure some construct.

appropriateness of exploratory analysis as a method of analysis for the indicators in each construct. For this study, the value of KMO for all constructs was larger than 0.5 (see Tables below); thus the use of exploratory factor analysis was deemed to be appropriate.

For produced capital I employed the six relevant indicators in the first factor analysis. The produced capital indicators are positively related and loaded high in one of two factors, which together accounted for 88.6% of the total variance in those six indicators, as shown in Table F-1. In the first, factor indicators are more related to the SMFE liabilities; while in the second, factor indicators are more related to fixed capital (fixed assets)—or what for SMFEs usually becomes fixed capital (in the case of loan amount). Harvesting fee, cost of management plans, and size of concession areas constitute important dimensions of produced capital for SMFEs, thus accounting for most of its variance. The six indicators representing produced capital yielded a reliability coefficient of 0.67 (Cronbach alpha).

In the case of natural capital, the two indicators used to measure it are loaded into one single factor. The two indicators are positively related and account for 82.7% of the total variance, yielding a reliability coefficient of 0.79, as shown in Table F-2.

For human capital, two factors were identified by factor analysis which explains 76.7% of the total variance, as shown in Table F-3. The first factor is related to members' previous job experience, and the second factor is more related to a member's current performance in the enterprise. The five items under human capital yielded a reliability coefficient of 0.77.

In the case of social capital (Table F-4), as this indicator is composed of other constructs (i.e., *Networks, Participation, Trust,* and *Exclusion*), and particularly because of the large number of indicators being considered, I performed multiple factor analyses instead of just one. For *Networks*, two factors were identified by factor analysis and account for 66.8% of the total

variance; and its six indicators yielded a reliability coefficient of 0.63. For *Participation*, a single factor was identified accounting for 86.2% of the total variance; and its two indicators yielded a reliability coefficient of 0.73. For the concept *Trust*, a single factor was identified that explains 67% of the total variance; and its eight indicators yielded a reliability coefficient of 0.92. Finally, *Exclusion* (also a single factor) was identified and accounts for 90.8% of the total variance; and its three indicators yielded a reliability coefficient of 0.91. Although two factors were identified in the case of the *Networks* concept, there is no particular meaning for each of these separate factors. Thus, the factors analyses for these constructs of social capital (i.e., *Networks, Participation, Trust, and Exclusion*) validate the creation of individual scales that are used in the analysis of SMFEs capacities as new indicators of social capital as shown in Table 5-1. Also, in this factor analysis series the indicators "conflict" and "density of membership" were not considered for analysis because they are formed by a single indicator each.

Table F-1. Factor loadings of produced capital dimensions

Indicators	**Factor 1**	**Factor 2**
Loan		.980
Roads		.920
Equipment		.724
Harvesting fee	.971	
Concession area	.909	
Management plans	.891	
Eigenvalue	3.79	1.52
Percentage of variance explained	63.19	25.38
Cumulative variance explained	63.19	88.57
Cronbach alpha		0.67
KMO		0.59

Table F-2. Factor loadings of natural capital dimensions

Indicators	**Factor 1**
Total approved volume	.910
Total harvested volume	.910
Eigenvalue	1.66
Percentage of variance explained	82.74
Cumulative variance explained	82.74
Cronbach alpha	0.79
KMO	0.50

Table F-3. Factor loadings of human capital dimensions

Indicators	Factor 1	Factor 2
Logging experience	.963	
Business experience	.960	
Enterprise members	.782	
Members' performance		.826
Education		.504
Eigenvalue	2.78	1.06
Percentage of variance explained	55.58	21.14
Cumulative variance explained	55.58	76.72
Cronbach alpha		0.77
KMO		0.64

Table 4. Factor loadings of social capital dimensions

Networks	**Factor 1**	**Factor 2**
2nd person/institution to commercialize timber	.806	
2nd person/institution to lend money	.799	
3rd person/institution to lend money	.772	
3rd person/institution to commercialize timber	.715	
1st person/institution to ask for financial help		.883
1st person/institution to lend money		.868
Eigenvalue	2.48	1.53
Percentage of variance explained	41.26	25.50
Cumulative variance explained	41.26	66.76
Cronbach alpha		0.63
KMO		0.57

Participation	**Factor 1**
Qualification of participation spirit	.929
Members participation in meetings	.929
Eigenvalue	1.73
Percentage of variance explained	86.24
Cumulative variance explained	86.24
Cronbach alpha	0.73
KMO	0.50

Trust	**Factor 1**
Members trust other members	.946
Most members are honest and can be trusted	.893
Trust improved in the last 2 years	.853
If any problem there is always someone to help	.840
You have to be alert so no one takes advantage	.802
Most members are able to help if you need	.784
Enterprise prospered in the last 2 years	.701
Members interested only in their own benefit	.694
Eigenvalue	5.36
Percentage of variance explained	66.97
Cumulative variance explained	66.97
Cronbach alpha	0.92
KMO	0.87

Table F-4 Continued

Exclusion	**Factor 1**
Differences divide members	.968
Differences had caused problems	.959
Problem solved by	.927
Eigenvalue	2.72
Percentage of variance explained	90.77
Cumulative variance explained	90.77
Cronbach alpha	0.91
KMO	0.74

The factor analyses, which considers KMO values higher than 0.5, component loadings of 0.50 or greater, and Cronbach's alpha of 0.50 or higher, show that the indicators of the various capitals do in fact form coherent factors. The factor analysis thus validates the conceptual framework. This provides the basis for a series of comparisons of capabilities of SMFEs across Madre de Dios.[4]

[4] The series of factor analyses performed here resulted in factor scores or indices for each type of capital under analysis. These resulting indices were used in further multi-regression analysis and Multivariate analysis of variance with the purpose of understanding the relationship between the dependent variable "forest management performance" (for which an index variable was created) and the capacity of SMFEs (in terms of indices for each type of capital serving as independent variables). These analyses are presented in Appendix G because no significant differences were found for this type of analysis.

APPENDIX G
ADDITIONAL FACTORS ANALYSIS PROCEDURES

In order to understand the relationship between forest management performance and the capacity of SMFEs in terms of their capital assets, a multiple regression was performed. For the regression analysis several variable indices were constructed. Indices of each type of capital served as independent variables and the index of forest management performance served as dependent variable.

The original set of variables used in this dissertation to represent each type of capital was replaced with a smaller set of variables. These new variables or indexes of each type of capital are the result of the factors scores constructed by developing the series of factor analysis presented in Appendix F.

Three variables that are important in knowing the status of a SMFE in following forest management according to the NFWL (Table G-1) were replaced by a new variable which resulted from the factor score: the "the index of forest management performance" variable. This new variable is defined as the overall performance of a SMFE in carrying out forest management according to the regulations of the new Forestry and Wildlife Law.

Table G-1. Factor loadings of forest management dimensions

Items	**Factor 1**
Situation management plans	.931
Number AOPs mobilized	.886
Harvesting fee paid	.870
Eigenvalue	2.41
Percentage of variance explained	80.25
Cumulative variance explained	80.25
Cronbach alpha	0.81
KMO	0.71

The results of the multiple regression analysis shown below, shows that there is not statistical significance of differences among the variables under study, which may be better explained by the low number of degrees of freedom. Usually in regression analyses, the degrees

of freedom need to be at least 30; however in this case the population sample is 27 for which the degrees of freedom are 19. The value of R^2 is 0.555, which means that approximately 55% of the variation in the index of forest management performance is explained by the indices of capital.

Table G-2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.555[a]	.308	.054	.780671

a. Predictors. (Constant), Index Produced Cap, Index Human Cap, Index Natural Cap, Index participation, Index trust, Index exclusion, Index networks.

Table G-3. ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.165	7	.738	1.211	.344[a]
	Residual	11.580	19	.609		
	Total	16.744	26			

a. Predictors. (Constant), Index Produced Cap, Index Human Cap, Index Natural Cap, Index participation, Index trust, Index exclusion, Index networks.
b. Dependent variable: Index Forest Management

Table G-4. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.000	.150		.000	1.000
	Index Produced cap	.218	.332	.185	.657	.519
	Index Natural cap	.408	.209	.421	1.954	.066
	Index Human cap	-.318	.356	-.236	-.894	.382
	Index Networks	-.241	.444	-.146	-.544	.593
	Index Participation	.154	.251	.166	.614	.547
	Index Trust	.797	.465	.665	1.713	.103
	Index Exclusion	.558	.378	.631	1.476	.156

A multivariate analysis of variance (MANOVA) was also performed in order to examine differences in the capacity of SMFEs in terms of their capitals through the three distinctions made in Chapter 5 (i.e., by province, certification status in the Department, and certification planning in Tahuamanu). This time the dependable variables used were the indices of each type

of capital created as result of the factors scores constructed by developing the series of factor analysis presented in Appendix F. The results below (Table G-5) show that there are significant differences in produced capital among the SMFEs in the Tahuamanu and Manu provinces, but not other significant differences were found among SMFEs in the three provinces for the other types of capital. In the case of certification status, results (Table G-6) show that there are significant differences between certified and non-certified SMFEs in the Department in terms of their produced capital and their index of networks. Among SMFEs in Tahuamanu, the results (Table G-7) show that significant differences were found for produced capital among SMFEs already certified and the ones planning certification and the ones non-planning it; significant differences were found for natural capital among SMFEs already certified and the ones non-planning certification; and significant differences were found for the network index among SMFEs already certified and the ones planning certification and the ones non-planning it.

Table G-5. MANOVA by province

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
prov	Index Produced cap	3.090	2	1.545	4.137	.029
	Index Natural cap	2.044	2	1.022	1.557	.231
	Index Human cap	1.135	2	.567	1.690	.206
	Index Networks	.009	2	.005	.018	.982
	Index Participation	.526	2	.263	.336	.718
	Index Trust	.212	2	.106	.222	.802
	Index Exclusion	1.356	2	.678	.811	.456
	Index Forest Management	1.536	2	.768	1.212	.315

Table G-6. MANOVA by certification status in Madre de Dios

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
certific	Index Produced cap	5.986	1	5.986	24.665	.000
	Index Natural cap	.358	1	.358	.513	.481
	Index Human cap	.613	1	.613	1.787	.193
	Index Networks	2.328	1	2.328	15.366	.001
	Index Participation	.065	1	.065	.084	.774
	Index Trust	1.196	1	1.196	2.858	.103
	Index Exclusion	.010	1	.010	.011	.916
	Index Forest Management	.790	1	.790	1.239	.276

Table G-7. MANOVA by certification planning status in the Tahuamanu province

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
certplan	Index Produced Cap	3.748	2	1.874	4.406	.046
	Index Natural Cap	1.831	2	.915	3.898	.060
	Index Human Cap	.184	2	.092	.168	.848
	Index Networks	2.870	2	1.435	13.223	.002
	Index Participation	.575	2	.287	.377	.696
	Index Trust	1.834	2	.917	1.765	.226
	Index Exclusion	.212	2	.106	.093	.912
	Index Forest Management	.322	2	.161	1.389	.298

APPENDIX H
P-VALUES (MANOVA)

Comparison of Forest Management Capacity between private SMFEs in the Tahuamanu and Tambopata provinces. P-values based on MANOVA.

Indicators	**Tahuamanu n=12**	**Tambopata n=6**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	113,940	14,237	**0.0331**
Roads ($)	169,083	22,906	0.2043
Harvesting fee ($)	122,892	88,631	0.3604
Loan ($)	55,953	7,504	0.3947
Management plans ($)	42,222	20,380	0.0764
Area (ha)	40,595	24,242	0.1566
Natural capital			
Approved timber volume (m^3/ha)	34.54	26.35	0.4359
A category	2.26	0.79	**0.0343**
B category	0.76	1.87	**0.0101**
C category	5.35	16.24	**0.0052**
D category	14.10	2.94	**0.0002**
E category	12.08	4.51	**0.0182**
Species per POA (N°)	14.67	12.30	0.4510
Extracted timber volume (m^3/ha)	6.34	13.29	0.2249
A category	1.87	0.79	0.0930
B category	0.23	1.54	**0.0004**
C category	0.56	8.72	**0.0113**
D category	2.77	0.85	0.3650
E category	0.92	1.41	0.7721
Species per POA (N°)	4.40	7.10	0.2704
Human capital			
Enterprise members (N°)	7.42	4.83	0.4167
Logging experience (N° members)	7.00	3.83	0.3656
Business experience (N° members)	7.00	4.17	0.4481
Education (schooling years)	12.50	11.00	0.3918
Members' performance (%)	66.68	72.25	0.5399
Social capital			
Density of membership (N°)	0.58	1.17	0.0719
Participation (%)	80.75	79.47	0.8070
Networks (% diversity people assisting SMFE)	53.96	60.32	0.5075
Exclusion (% existence of exclusion among members)	36.90	16.67	0.2730
Trust (% extent of trust among members)	73.61	79.87	0.5264
Conflict: % SMFEs in conflict	16.70	0	0.3172

Comparison of Forest Management Capacity between private SMFEs in the Tahuamanu and Manu provinces. P-values based on MANOVA.

Indicators	**Tahuamanu n=12**	**Manu n=9**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	113,940	6,960	**0.0017**
Roads ($)	169,083	2,587	**0.0142**
Harvesting fee ($)	122,892	48,477	**0.0409**
Loan ($)	55,953	8,189	0.2526
Management plans ($)	42,222	10,657	**0.0009**
Area (ha)	40,595	18,899	**0.0246**
Natural capital			
Approved timber volume (m^3/ha)	34.54	35.25	0.9279
A category	2.26	0.22	**<0.0001**
B category	0.76	0.88	0.8491
C category	5.35	20.63	0.0001
D category	14.10	3.38	**<0.0001**
E category	12.08	10.14	0.4185
Species per POA (N°)	14.67	14.12	0.7646
Extracted timber volume (m^3/ha)	6.34	24.63	**0.0078**
A category	1.87	0.22	**<0.0001**
B category	0.23	0.60	0.2283
C category	0.56	16.51	**<0.0001**
D category	2.77	1.71	0.9948
E category	0.92	5.58	**0.0070**
Species per POA (N°)	4.40	11.10	**0.0251**
Human capital			
Enterprise members (N°)	7.42	10.33	0.2183
Logging experience (N° members)	7.00	4.33	0.1735
Business experience (N° members)	7.00	4.33	0.1740
Education (schooling years)	12.50	10.56	0.1986
Members' performance (%)	66.68	66.68	0.9816
Social capital			
Density of membership (N°)	0.58	0.11	0.1129
Participation (%)	80.75	74.33	0.3261
Networks (% diversity people assisting SMFE)	53.96	53.94	0.9877
Exclusion (% existence of exclusion among members)	36.90	25.40	0.4775
Trust (% extent of trust among members)	73.61	73.61	0.9787
Conflict: % SMFEs in conflict	16.70	11.11	0.7028

Comparison of Forest Management Capacity between private SMFEs in the Tambopata and Manu provinces. P-values based on MANOVA.

Indicators	**Tambopata n=6**	**Manu n=9**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	14,237	6,960	0.4306
Roads ($)	22,906	2,587	0.3401
Harvesting fee ($)	88,631	48,477	0.3652
Loan ($)	7,504	8,189	0.8752
Management plans ($)	20,380	10,657	0.1806
Area (ha)	24,242	18,899	0.5418
Natural capital			
Approved timber volume (m^3/ha)	26.35	35.25	0.4157
A category	0.79	0.22	**0.0368**
B category	1.87	0.88	**0.0201**
C category	16.24	20.63	0.4296
D category	2.94	3.38	0.9164
E category	4.51	10.14	0.0991
Species per POA (N°)	12.30	14.12	0.6400
Extracted timber volume (m^3/ha)	13.29	24.63	0.2245
A category	0.79	0.22	**0.0291**
B category	1.54	0.60	**0.0101**
C category	8.72	16.51	0.1323
D category	0.85	1.71	0.3868
E category	1.41	5.58	**0.0386**
Species per POA (N°)	7.10	11.10	0.3626
Human capital			
Enterprise members (N°)	4.83	10.33	0.0779
Logging experience (N° members)	3.83	4.33	0.7678
Business experience (N° members)	4.17	4.33	0.6636
Education (schooling years)	11.00	10.56	0.7828
Members' performance (%)	72.25	66.68	0.5737
Social capital			
Density of membership (N°)	1.17	0.11	**0.0042**
Participation (%)	79.47	74.33	0.5512
Networks (% diversity people assisting SMFE)	60.32	53.94	0.5211
Exclusion (% existence of exclusion among members)	16.67	25.40	0.6491
Trust (% extent of trust among members)	79.87	73.61	0.5624
Conflict: % SMFEs in conflict	0	11.11	0.5243

Comparison of Forest Management Capacity between Certified and Non-certified private SMFEs. P-values based on MANOVA.

Indicators	**Certified n=3**	**Not-certified n=24**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	300,229	25,611	**<0.0001**
Roads ($)	593,333	17,071	**<0.0001**
Harvesting fee ($)	204,141	76,265	**0.0423**
Loan ($)	210,989	6,550	**<0.0001**
Management plans ($)	76,640	20,623	**0.0007**
Area (ha)	68,531	24,878	**0.0040**
Natural capital			
Approved timber volume (m^3/ha)	49.15	30.93	0.0998
A category	3.47	0.98	**0.0086**
B category	1.05	1.04	0.9169
C category	8.57	13.40	0.6135
D category	20.27	6.51	**0.0042**
E category	15.78	9.00	0.0941
Species per POA (N°)	18.27	13.42	0.1639
Extracted timber volume (m^3/ha)	10.38	14.43	0.9004
A category	2.91	0.85	**0.0095**
B category	0.24	0.70	0.4655
C category	1.03	8.52	0.3344
D category	4.04	1.73	0.2707
E category	2.17	2.63	0.6844
Species per POA (N°)	5.80	7.41	0.8785
Human capital			
Enterprise members (N°)	10.00	7.54	0.7080
Logging experience (N° members)	10.00	4.83	0.2163
Business experience (N° members)	10.00	4.92	0.2276
Education (schooling years)	13.67	11.25	0.2697
Members' performance (%)	66.70	68.07	0.9710
Social capital			
Density of membership (N°)	0	0.63	0.1479
Participation (%)	84.60	77.54	0.4318
Networks (% diversity people assisting SMFE)	79.37	52.37	**0.0271**
Exclusion (% existence of exclusion among members)	28.60	28.57	0.7258
Trust (% extent of trust among members)	97.23	72.22	0.1098
Conflict: % SMFEs in conflict	0	12.50	0.5344

Comparison of Forest Management Capacity between private SMFEs already certified and planning certification in the Tahuamanu province. P-values based on MANOVA.

Indicators	**Already certified n=3**	**Planning certification n=4**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	300,229	90,095	**0.0095**
Roads ($)	593,333	31,015	**0.0276**
Harvesting fee ($)	204,141	95,856	0.2933
Loan ($)	210,989	4,350	**0.0054**
Management plans ($)	76,640	26,178	**0.0490**
Area (ha)	68,531	27,293	0.0672
Natural capital			
Approved timber volume (m^3/ha)	49.15	40.68	0.5711
A category	3.47	2.95	0.5432
B category	1.05	0.59	0.4289
C category	8.57	6.05	0.3527
D category	20.27	17.17	0.6694
E category	15.78	13.93	0.7038
Species per POA (N°)	18.27	13.08	0.2874
Extracted timber volume (m^3/ha)	10.38	5.90	0.3428
A category	2.91	2.39	0.4591
B category	0.24	0.03	0.2867
C category	1.03	0.41	0.1791
D category	4.04	2.37	0.5847
E category	2.17	0.70	0.0764
Species per POA (N°)	5.80	3.45	0.3187
Human capital			
Enterprise members (N°)	10	6.5	0.6319
Logging experience (N° members)	10	6.5	0.6418
Business experience (N° members)	10	6.5	0.6418
Education (schooling years)	13.67	10.25	0.1435
Members' performance (%)	66.70	75.00	0.7998
Social capital			
Density of membership (N°)	0	0	1.0000
Participation (%)	84.60	84.62	0.9853
Networks (% diversity people assisting SMFE)	79.37	39.28	**0.0062**
Exclusion (% existence of exclusion among members)	28.60	35.70	0.9640
Trust (% extent of trust among members)	97.23	70.83	0.2401
Conflict: % SMFEs in conflict	0.0	25.0	0.4505

Comparison of Forest Management Capacity between private SMFEs already certified and non-planning certification in the Tahuamanu province. P-values based on MANOVA.

Indicators	**Already certified n=3**	**Non-planning certification n=5**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	300,229	21,243	**0.0011**
Roads ($)	593,333	24,987	**0.0195**
Harvesting fee ($)	204,141	95,773	0.2618
Loan ($)	210,989	4,214	**0.0045**
Management plans ($)	76,640	34,407	0.1079
Area (ha)	68,531	34,474	0.1361
Natural capital			
Approved timber volume (m^3/ha)	49.15	20.86	**0.0237**
A category	3.47	0.97	**0.0487**
B category	1.05	0.72	0.5471
C category	8.57	2.86	**0.0121**
D category	20.27	7.93	**0.0299**
E category	15.78	8.37	0.0850
Species per POA (N°)	18.27	13.78	0.3064
Extracted timber volume (m^3/ha)	10.38	4.28	0.1286
A category	2.91	0.82	0.0572
B category	0.24	0.39	0.6929
C category	1.03	0.40	0.1771
D category	4.04	2.32	0.5040
E category	2.17	0.34	**0.0348**
Species per POA (N°)	5.80	4.32	0.4281
Human capital			
Enterprise members (N°)	10	6.60	0.6745
Logging experience (N° members)	10	5.60	0.5053
Business experience (N° members)	10	5.60	0.5053
Education (schooling years)	13.67	13.60	0.9812
Members' performance (%)	66.70	60.00	0.6461
Social capital			
Density of membership (N°)	0	1.40	**<0.0001**
Participation (%)	84.60	75.38	0.3821
Networks (% diversity people assisting SMFE)	79.37	50.46	**0.0262**
Exclusion (% existence of exclusion among members)	28.60	42.84	0.8411
Trust (% extent of trust among members)	97.23	61.66	0.1032
Conflict: % SMFEs in conflict	0.0	20.0	0.5258

Comparison of Forest Management Capacity between private SMFEs planning and non-planning certification in the Tahuamanu province. P-values based on MANOVA.

Indicators	**Planning certification n=4**	**Non-planning certification n=5**	
	Mean	**Mean**	**P-value**
Produced capital			
Equipment ($)	90,095	21,243	0.2042
Roads ($)	31,015	24,987	0.9225
Harvesting fee ($)	95,856	95,773	0.9746
Loan ($)	4,350	4,214	0.9647
Management plans ($)	26,178	34,407	0.5339
Area (ha)	27,293	34,474	0.5717
Natural capital			
Approved timber volume (m^3/ha)	40.68	20.86	**0.0479**
A category	2.95	0.97	0.1123
B category	0.59	0.72	0.7992
C category	6.05	2.86	**0.0475**
D category	17.17	7.93	**0.0470**
E category	13.93	8.37	0.1314
Species per POA (N°)	13.08	13.78	0.9171
Extracted timber volume (m^3/ha)	5.90	4.28	0.5128
A category	2.39	0.82	0.1700
B category	0.03	0.39	0.1171
C category	0.41	0.40	0.9500
D category	2.37	2.32	0.9130
E category	0.70	0.34	0.6809
Species per POA (N°)	3.45	4.32	0.7722
Human capital			
Enterprise members (N°)	6.5	6.60	0.9286
Logging experience (N° members)	6.5	5.60	0.8403
Business experience (N° members)	6.5	5.60	0.8403
Education (schooling years)	10.25	13.60	0.1056
Members' performance (%)	75.00	60.00	0.4365
Social capital			
Density of membership (N°)	0	1.40	**<0.0001**
Participation (%)	84.62	75.38	0.3532
Networks (% diversity people assisting SMFE)	39.28	50.46	0.2824
Exclusion (% existence of exclusion among members)	35.70	42.84	0.7877
Trust (% extent of trust among members)	70.83	61.66	0.6013
Conflict: % SMFEs in conflict	25.0	20.0	0.3532

APPENDIX I
TIMBER SPECIES HARVESTED IN MADRE DE DIOS BY COMMERCIAL CATEGORY

Category	Scientific name	Common name
A	*Swietenia macrophylla*	Caoba
B	*Cedrela odorata*	Cedro
C	*Cedrelinga catenaeformis*	Tornillo
	Amburana cearensis	Ishpingo
	Aspidosperma macrocarpon	Pumaquiro
	Aniba sp	Moena
	Aniba panurensis	Moena alcanfor
	Aniba roseadora	Moena rosada
	Calophyllum brasiliense	Lagarto caspi
	Hura crepitans	Catahua
	Virola sebifera	Cumala
	Virola sp.	Cumala
	Chorisia integrifolia	Lupuna
	Chorisia sp	Lupuna
	Juglans nigra	Nogal
	Juglans sp	Nogal
D	*Copaifera reticulata*	Copaiba
	Copaifera officinalis	Copaiba
	Coumarouna odorata	Shihuahuaco
	Dipteryx micrantha	Shihuahuaco
	Dipteryx alata	Shihuahuaco
	Dipteryx spp.	Shihuahuaco
	Dipteryx odorata	Charapilla
	Tabebuia sp	Tahuari
	Tabebuia impetiginosa	Tahuari
	Aspidosperma subincanum	Quillobordon
	Aspidosperma vargasii	Quillobordon
	Jacaranda copaia	Achihua
	Huberodendron swietenoides	Achihua
	Calycophyllum spruceanum	Capirona
	Cinnamomun camphora	Alcanfor, Pepa de alcanfor
	Dialium guianense	Palisangre
	Ficus killipii	Matapalo
	Ficus guianensis	Renaco
	Vochysia sp.	Alcocaspi
	Chimarrhis sp.	Papelillo
	Podocarpus sp.	Romerillo

	Ormosia sunkei	Huayruro
E	*Myroxylon balsamun*	Estoraque
	Manilkara bidentata	Quinilla
	Hymenaea spp	Azucar huayo
	Hymenaea courbaril	Azucar huayo
	Hymenaea palustris	Azucar huayo
	Hymenaea oblongifolia	Yutubanco
	Couratari guianensis	Misa
	Couratari spp	Tauari
	Mezilaurus itauba	Itahuba
	Mezilaurus sp	Itahuba
	Apuleia leiocarpa	Ana caspi
	Apuleia mollaris	Ana caspi
	Matisia sp	sapote
	Schizolobium sp	Pashaco
	Schizolobium amazonicum	Pino chuncho
	Ocotea marmellensis	Moena negra
	Vismia sp	Inca pacae
	Ocotea sp	Moena
	Ceiba pentandra	Huimba
	Quararibea cordata	Sapote
	Astronium sp.	Palo baston
	Clarisia racemosa	Mashonaste
	Nectandra rediculata	Laurel
	Protium sp	Copal, incienso
	Brosium alicastrum	Manchinga
	Bursera graveolens	Palo santo
	Cordia alliodora	Laurel
	Ficus insipida	Oje
	Guarea guidonia	Requia
	Myroxylon sp.	Palo peruano
	Pourouma cecropiifolia	Uvilla
	Pouteria neglecta	Caimito
	Castilla ullei	Goma
	Spondias mombin	Ubos
	Unonopsis matewsii	Marañon del monte
	Ocotea costulata	Alcanfor
	Anacardium occidentale	Cashu
	Castilla ulei	Goma
	Cedrela dugesii	Nogalillo
	Ficus sp	Oje
	Hevea brasiliensis	Shiringa, Jebe

Inga sp	Shimbillo
Minquartia guianensis	Huacapú
Ocotea jelskii	Ishpinguillo
Protium aracouchini	Isica
Vouacapoua americana	Huacapu

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BIOGRAPHICAL SKETCH

A native of Peru, Rosa Cossío grew up with a keen interest in the natural world. Educated in forestry sciences at the Universidad Nacional Agraria La Molina (UNALM), she soon developed a thesis on biological control in order to get her Forestry Engineer degree. After working as a forest specialist in the UNALM greenhouse, and participating in the Andean Amazon Rivers Analysis and Management (AARAM) project, she enrolled in the graduate program at Florida International University in order to pursue interests in riparian environments and people. After obtaining a master's degree in Environmental Studies, she moved to Gainesville to continue the study of people and their relationships with both forests and the environment. She received her Ph.D. from the University of Florida in the Fall of 2009.