Forests, livelihoods and REDD+ implementation in the Yasuní Biosphere Reserve, Ecuador

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Summary

Forests represent vital food and income sources for rural households as well as reserves for crisis periods. Therefore, deforestation and forest degradation can endanger the livelihoods of forest dependent communities. Moreover, deforestation is the second largest cause of GHG emissions, and triggers biodiversity loss and global climate transformations. Rural livelihoods need special attention since they are highly vulnerable to the effects of climate change. In this context, REDD+ has arisen to the UNFCCC negotiation table as an affordable option to mitigate climate change and at the same time to promote sustainable development. However, a better understanding of the potential positive and negative impacts of REDD+ implementation is needed. The latter, is especially true for Indigenous Peoples (IP) and forest dependent dwellers in tropical rainforests.

The research presented herein is a multilayer study that contributes to elucidate possible tradeoffs of REDD+ implementation from a bottom-up perspective. The Yasuní region in the Ecuadorian Yasuní Biosphere Reserve was selected as a case study. The region is part of a larger REDD+ project conducted by the German NGO Welthungerhilfe. Here, the three most widespread ethnic groups living on the buffer zone of the Yasuní National Park were chosen. Two communities from each ethnicity, the Shuar and the Kichwa indigenous groups and the Colonists (mestizos), with different distance to markets were selected as study groups. The multilayer approach starts at the household level then goes up to the community and finally to the regional-landscape levels.

At the household level, an analysis of income generation from subsistence and cash sources is presented. In summary, all the communities in the study earn high off-farm revenues from unskilled labor provided by oil companies and receive external aid. The study also shows that IP have higher dependency on forest and environmental resources when compared to colonists. Eventually, high off-farm income might reduce, at least temporally, the pressure on forests. Against this background, REDD+ is a weak incentive for the studied households when compared to the high off-farm revenues from unskilled labor. This applies even more when considering the engagement in time-consuming REDD+ project activities like reforestation, forest monitoring, etc.

At the community level, the land configuration and institutional frame for decision-making for shared resources are analyzed. Here two forms of communal arrangements are presented: Common Property Management Regimes (CPMRs) and Colonists' Cooperatives. The framework of Ostrom (1990) on governance of Common Pool Resources (CPR) is used as a conceptual setting. The results suggest that more and more, both, IP land configuration and community-based organizations are acquiring mestizo characteristics. This partially governmental promoted *mestizaje* through Agrarian Reform legacies and actual legal frameworks is triggering privatization of farms inside community lands and hence promoting forest fragmentation and affecting ancestral forms of rules for resource use.

At the landscape level a revision of the historical and territorial configuration as well as the management plans for the YBR are presented. Additionally, legal frameworks for REDD+ as well as consultation and participation mechanisms are discussed. According to the data of the study, insecure land administration and titling rights can hinder REDD+ implementation and generate conflicts due to the overlapping of IP lands with oil blocks and protected areas. Moreover, inconsistencies between management plans and legal frameworks reduce the effective involvement and decision making of IP and small farmers. The analysis concludes suggesting a wide and embedded landscape vision for the Yasuní area.

The Livelihood Framework has been commonly used to study household conditions and use patterns of environmental resources that can shape and predict conservation, deforestation or degradation processes. However, attempts like the one presented here exemplify the necessity of bottom-up perspectives prior to the implementation of global climate change mechanisms such as REDD+.

From a practical perspective, the results provide insights for project developers and policy makers for the design of REDD+ approaches. The full and complete involvement of local communities into forest governance is the only way to reach conservation and sustainable development of tropical forests. Moreover, multicultural diversity and customary resources use rules, and traditional practices should also be promoted.

Resumen

Los bosques representan fuentes vitales de alimentos e ingresos para los hogares rurales, en especial durante períodos de crisis. Por lo tanto, la deforestación y la degradación forestal pueden poner en peligro los medios de subsistencia de las comunidades que dependen de los bosques. Además, la deforestación es la segunda causa más importante de emisiones de Gases Efecto Invernadero (GEI) y desencadena la pérdida de biodiversidad y el cambio climático. Los medios de subsistencia rurales necesitan una atención especial, ya que son altamente vulnerables a los efectos del cambio climático. En este contexto, REDD+ ha surgido en la mesa de negociación de la Convención marco de las Naciones Unidas para el Cambio Climático (CMNUCC) como una opción asequible para mitigar el cambio climático y, al mismo tiempo, para promover el desarrollo sostenible. Sin embargo, se necesita una mejor comprensión de los potenciales impactos positivos y negativos de la implementación de REDD+. Esto último, es especialmente importante en el caso de los Pueblos Indígenas (IP) y los campesinos dependientes de los bosques tropicales.

La investigación presentada es un estudio a varios niveles que contribuye a elucidar las posibles implicaciones de la implementación de REDD+ desde una perspectiva de local hasta internacional. La región de la Reserva de la Biosfera del Yasuní en Ecuador fue seleccionada como estudio de caso. La región es parte de un proyecto REDD+ realizado por la ONG alemana Welthungerhilfe. Aquí se eligieron los tres grupos étnicos más representativos que habitan en la zona de amortiguamiento del Parque Nacional Yasuní. Se seleccionaron como grupos de estudio dos comunidades de cada etnia, los grupos indígenas Shuar y Kichwa y los colonos (mestizos), con diferentes distancias a los mercados. El enfoque multiescalar comienza en el nivel del hogar, luego sube a la comunidad y al final al nivel del paisaje regional.

A nivel de hogar, se presenta un análisis de la generación de ingresos a partir de fuentes de subsistencia y dinero en efectivo. En resumen, todas las comunidades estudiadas generan altos ingresos fuera de la finca como mano de obra no calificada trabajando para las compañías petroleras y reciben ayuda externa. El estudio también muestra que los Indígenas tienen una mayor dependencia de los recursos forestales y ambientales en comparación con los colonos. Eventualmente, estos altos ingresos generados fuera de la finca podrían reducir, al menos temporalmente, la presión sobre los bosques. En este contexto, REDD+ constituye un incentivo débil para los hogares estudiados cuando se compara con los altos ingresos de la mano de obra no calificada. Esto se aplica aún más cuando se considera el involucramiento en las actividades del proyecto de REDD+ que requieren mucho tiempo, como la reforestación, monitoreo forestal, etc.

A nivel comunitario, se analiza la configuración de la tierra y el marco institucional para la toma de decisiones sobre los recursos compartidos. Aquí se

presentan dos formas de arreglos comunales: Regímenes Comunes de Gestión de la Propiedad (CRPM) y Cooperativas de Colonos. El marco teórico de Ostrom (1990) sobre la gobernanza de los recursos communes (CPR) se utiliza como marco conceptual. Los resultados sugieren que cada vez más, tanto la configuración de la tierra de las IP como las organizaciones comunitarias están adquiriendo características mestizas. Este mestizaje promovido parcialmente por el gobierno a través de los legados de la Reforma Agraria y los actuales marcos legales está desencadenando la privatización de las fincas dentro de las tierras comunitarias y por lo tanto promoviendo la fragmentación del bosque y afectando las formas ancestrales de regularización para el uso de los recursos.

A nivel del paisaje se presenta una revisión de la configuración histórica y territorial así como los planes de manejo para la Reserva de la Biosfera Yasuní. Además, se discuten marcos legales para REDD+, así como mecanismos de consulta y participación. De acuerdo con los datos del presente estudio, la inseguridad en la administración de la tierra y los derechos de titulación pueden obstaculizar la implementación de REDD+ y generar conflictos debido a la superposición de tierras indígenas con bloques de petróleo y áreas protegidas. Además, las incoherencias entre los planes de gestión y los marcos jurídicos reducen la participación efectiva y la toma de decisiones de los Inddígenas y los pequeños agricultores. El análisis concluye sugiriendo una visión de paisaje amplia e integrada para el área del Yasuní.

El marco teórico de medios de vida (Lifelihood Framewrok) se ha utilizado comúnmente para estudiar las condiciones de los hogares y generar patrones de uso de recursos ambientales que pueden moldear y predecir procesos de conservación, deforestación o degradación. Sin embargo, intentos como el presentado aquí ejemplifican la necesidad de perspectivas ascendentes previo a la implementación de mecanismos globales de mitigación como REDD+.

Desde la perspectiva práctica, los resultados proporcionan nuevas percepciones para los desarrolladores de proyectos y los formuladores de políticas para el diseño de enfoques REDD+. La verdadera y plena participación de las comunidades locales en la gobernanza de los bosques es la única manera de alcanzar la conservación y el desarrollo sostenible de los bosques tropicales. Además, igual de importantes son la diversidad pluricultural y la promoción de reglas tradicionales para el uso de los recursos, así como las prácticas tradicionales.

Zusammenfassung

Wälder sind lebenswichtige Nahrungs- und Einkommensquellen für ländliche Haushalte und dienen als Reserven in Krisenzeiten. Deshalb können Abholzung und Walddegradierung die Lebensbedingungen der waldabhängigen Gemeinschaften gefährden. Darüber hinaus ist Abholzung die zweitgrößte Ursache für Treibhausgasemissionen, Biodiversitätsverlust und Klimawandel. Der ländliche Raum bedarf einer besonderen Aufmerksamkeit, da er sehr anfällig für die Auswirkungen des Klimawandels ist. In diesem Zusammenhang ist REDD+ als eine günstige Alternative zur Verringerung des Klimawandels und zur Förderung einer nachhaltigen Entwicklung aus dem Rahmenübereinkommen der Vereinten Nationen über Klimaänderungen (englisch United Nations Framework Convention on Climate Change, UNFCCC) hervorgegangen. Allerdings sind die potenziellen positiven und negativen Auswirkungen von REDD+ noch relativ unbekannt. Das gilt ins besondere für indigene Völker und andere vom Wald abhängige Bevölkerungsgruppen in tropischen Regenwäldern.

Die hier vorgestellte Forschung ist eine mehrschichtige Studie, die dazu beiträgt, mögliche Alternativen der REDD+ Implementierung aus einer Bottom-up-Perspektive zu erklären. Als Fallstudie wurde die Yasuní-Region im gleichnamigen ecuadorianischen Biosphärenreservat ausgewählt. Die Region ist Teil eines größeren REDD+ Projektes der Deutschen NRO Welthungerhilfe. Hier wurden die drei am weitesten verbreiteten ethnischen Gruppen ausgewählt, die in der Pufferzone des Yasuní-Nationalparks leben. Zwei Gemeinden von jeder Ethnie mit jeweils unterschiedlichen Entfernungen zu den Märkten wurden als Studiengruppen ausgewählt. Hierbei handelt sie sich um die indigenen Gruppen der Shuar und Kichwa sowie die Gruppe der Kolonisten (Mestizen). Der Mehrskalenansatz umfasst die Haushaltsebene, die Gemeindeebene sowie die regionale Landschaftsebene.

Auf der Haushaltsebene wird eine Analyse der Einkommensgenerierung, die sich aus der Subsistenzwirtschaft und der Barmitteleinnahme zusammensetzt, vorgestellt. Zusammenfassend lässt sich feststellen, dass die Mehrheit der untersuchten Haushalte hohe Einnahmen von Ölfirmen erhalten, denen sie als ungelernte nicht-landwirtschaftliche Arbeitskräfte zur Verfügung stehen. Darüber hinaus bezieht ein Großteil der Haushalte staatliche Unterstützungen. Die Studie zeigt, dass die indigenen Völker trotzt der vergleichsweise hohen Einkünfte aus ihrer Arbeit im Ölsektor und externer Hilfen eine größere Abhängigkeit von Wald- und Umweltressourcen als die Kolonisten haben. Dieses hohe nicht-landwirtschaftliche Einkommen könnte - zumindest zeitweise - den Druck auf die Wälder reduzieren. Vor diesem Hintergrund ist REDD+ ein relativ schwacher finanzieller Anreiz für die untersuchten Haushalte. Dies gilt umso mehr, wenn man das Engagement in mehrjährigen REDD+ Projekten wie Wiederaufforstung, Waldüberwachung usw. betrachtet.

Auf Gemeindeebene werden die Landkonfiguration und der institutionelle Rahmen für die Entscheidungsfindung gemeinsamer Ressourcen analysiert. In dieser Studie werden zwei Formen kommunaler Vereinbarungen vorgestellt: Common Property Management Regimes (CPMRs) und Kolonisten-Kooperativen. Als konzeptioneller Rahmen wird der theoretische Ansatz von Ostrom (1990) zur *Governance of Common Pool Resources (CPR)* verwendet. Die Ergebnisse deuten darauf hin, dass sich immer mehr indigene Landkonfigurationen denen der Mestizen angleichen. Hinterlassenschaften aus Agrarreformen und geltende rechtliche Rahmenbedingungen fördern die Privatisierung der bäuerlichen Betriebe in den Gemeindeländern und damit die Waldzersplitterung. Dieses wiederrum beeinflusst die traditionelle Ressourcennutzung.

Auf Landschaftsebene werden eine historische und territoriale Konfiguration sowie Managementpläne für das Biosphärenreservat Yasuní vorgestellt. Darüber hinaus werden rechtliche Rahmenbedingungen für REDD+, Konsultations- und Beteiligungsmechanismen diskutiert. Ergebnisse der Datenanalyse zeigen, dass unsichere Landadministration sowie Titelrechte die REDD+-Implementierung behindern können. Des Weiteren kommt es zu einer Überlappung von indigenem Land mit Erdölblöcken und Naturschutzgebieten, wodurch es zu potentiellen Konflikten kommen kann. Darüber hinaus verringern inkonsistente Managementplänen und rechtliche Rahmenbedingungen die effektive Beteiligung und Entscheidungsfindung von indigenen Völkern und Kleinbauern. Schlussfolgerung der Analyse ist, dass es einer breiten und eingebetteten Landschaftsplanung der Yasuní Region bedarf.

Das *Livelihood Framework* Konzept wurde häufig angewandt, um die Haushaltsbedingungen und Verwendungsmuster von Umweltressourcen zu untersuchen. Diese Prägungen können Entwaldung, Erhaltung oder Abbauprozesse vorhersagen und beeinflussen. Erkenntnisse, wie die hier vorgestellten, verdeutlichen jedoch die Notwendigkeit von Bottom-up-Perspektiven vor der Umsetzung globaler Klimaschutzmechanismen wie REDD+.

In praktischer Hinsicht liefern die Studienergebnisse Einblicke zur Konzeption von REDD+ Ansätzen für Projektentwickler und Entscheidungsträger. Die partizipative und intensive Beteiligung der lokalen Gemeinden an der Waldnutzung ist der einzige Weg, um die Erhaltung und nachhaltige Entwicklung der tropischen Wälder zu gewährleisten. Darüber hinaus sollten die ethnische Diversität sowie die traditionelle Ressourcennutzung aufrecht erhalten und gefördert werden.

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List of Acronyms

CDM	Clean Development Mechanism
COICA	Coordinator of Indigenous Organizations of the Amazon Basin
CPMR	Common Property Management Regimes
CPR	Common Property Resources
GHG	Greenhouse gas
HH	Household
IP	Indigenous Peoples
INEC	Instituto Nacional de Estadísticas y Censos
LPG	Liquefied petroleum gas
MAE	Ministry of Environment of Ecuador (Ministerio de Ambiente del Ecuador)
MRV	Measurement, Reporting and Verification
NEA	Northeastern Amazon (Ecuador)
NGOs	Non-Governmental Organizations
NTFPs	Non-Timber Forest Products
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	Reducing Emissions from Deforestation and forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD)
US$	United States dollar
WHH	Welthungerhilfe
YNP	Yasuní National Park
YBR	Yasuní Biosphere Reserve

"Not everything that can be counted counts,
and not everything that counts can be counted"
Albert Einstein (1879-1955)

Chapter 1

Introduction

1. Introduction

1.1. Amazon Tropical Rainforests: the case of Ecuador

1.1.1. Deforestation and land use in the Ecuadorian Amazon

The Amazon basin contains more than 40% of the global tropical rainforests (Cenamo et al. 2009). They store nearly 80 billion tons of carbon (Ruesch & Gibbs 2008; Carvalho et al. 2004). Rainforests provide important numerous ecosystem services including climate regulation and are among the ecosystems with the highest biodiversity (Tschakert et al. 2007). However, nowadays these highly biodiverse areas are threatened and their destruction can have impacts on the global climate. Worldwide deforestation accounts for, at 12.5%, the second largest cause of Greenhouse Gas (GHG) emissions (Houghton et al. 2010).

Ecuador is one of the countries with the highest deforestation rates in South America, with the Northeastern Amazonian region being especially affected. The main drivers are colonization, oil exploitation (Pan 2003; Bilsborrow et al. 2004; Barbieri & Carr 2005) and population growth (Pan et al. 2007). The region is characterized by high historical deforestation rates of 0.61% (for the period 1991-2000), which diminished to 0.17% over the last decade (2000-2008) (Castro et al. 2013). However, projections show that deforestation rates will double again in the next decade (2008-2020) (Castro et al. 2013).

Small landowners have been directly associated with the clearing of land for agricultural or pastoral use in many tropical forests (Marquette 1998; Pichon 1996; Siren 2007). Unlikely in the Brazilian Amazon, where large-scale agriculture, ranching and logging are the main contributors to deforestation (Carr et al. 2007), in the Ecuadorian Amazon small-scale agriculturalists are the principal agents of land conversion (Pan et al. 2004; Gerold & Lanfer 2001; see Figure 1.1). Deforestation has been related to market oriented agriculture, cattle production, coffee production and, most recently, to illegal logging and uncontrolled wood extraction (Bustamante et al. 1993; Carr et al. 2008; Arruti 2011).

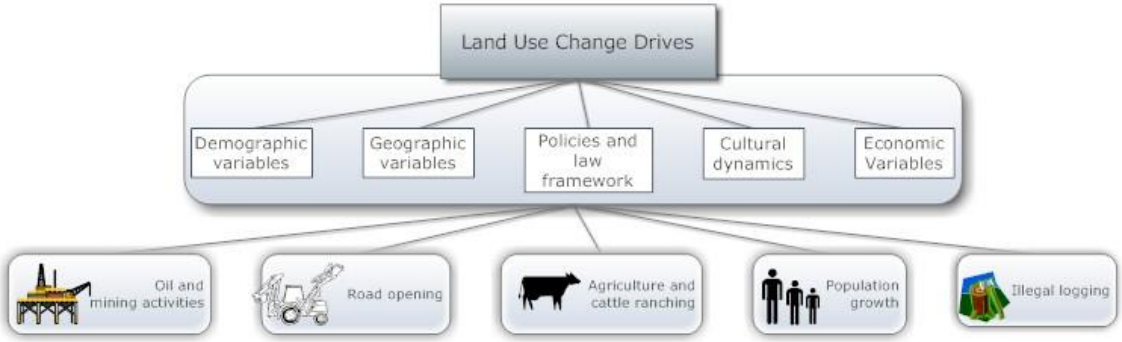

Figure 1.1 Deforestation drivers in the Ecuadorian Amazon

1.1.1.1. Land Use and Land Use Change

Land use is highly variable within the Ecuadorian Amazon. It results from differences in land tenure, market access, labor availability, infrastructure, biophysical conditions, and other demographic and environmental features (Pichon 1996; Siren 2007; Gray et al. 2008). Traditional knowledge, ethnicity and social structure can also affect land use in the Northeastern Amazon (Pichon 1997; Gray et al. 2008). Other important factors are policies in form of credits and incentives that stimulate and shape land and forest use (Pichon 1997a).

Small farmers' livelihoods and practices in the Amazon cannot be explained through traditional land-use decision-making criteria (Pichon 1997a). Lack of expansion and closed frontiers in the Ecuadorian Amazon created a 'multiphase response' phenomenon characterized by land intensification and fragmentation as well as off-land migration (Pichon 1993; Barbieri et al. 2005). Contrary to the idea that colonists are poorly adapted to the rain forest conditions, Pichon (1997) argues that newcomers are in a continuous adaptation process. Moreover, colonists have a variety of land uses during any occupying period and this multi-crop system also supports a divergence to the peasant pioneer theory[1] (Pichon 1996).

Virtually all groups practice shifting-cultivation, especially Shuar and Kichwa (Quichua) communities (Rudel et al. 2002). Slash-and-mulch clearing (to leave cut vegetation to decompose on the same site, instead of burning it) is more common than slash-and-burn, especially in the Northeastern Amazon (Pichon 1996; Barbieri & Carr 2005; Carr et al. 2006), mainly due to the prolonged rainy season (Holt et al. 2004; Barbieri et al. 2005; Carr et al. 2006). Climatic conditions also allow flexible cultivation times; therefore, communities in this area can start planting at any time of year (Holt et al. 2004). Traditionally, fallow-lands (locally called *barbecho* or *rastrojo*) were abandoned for 3-5 years; however,

[1] Initially the Shuar and Kichwa clear land to grow subsistence crops and perennial cash crops. After some time, when the soil quality debilitates they convert into pasture lands. It is locally known as *socola, plantio, tumba* and *chapeo* (Pichon 1996).

population growth, land competition and market integration have shortened fallow periods in some indigenous groups in the Amazon region (Siren 2007).

Figure 1.2 Deforestation drivers in the study area

Along with shifting agriculture, local inhabitants of the Amazon are also engaged in market-oriented activities like cash cropping and livestock production (Gray et al. 2008). Increasing immigration and high fertility rates promote the demand for land and fragmentation of existing areas (Barbieri et al. 2005; Morales et al. 2010), especially Indigenous Peoples (IP) that live an “accelerated cultural fragmentation and homogenization” (Perrault 2001:384) (Figure 1.2). Recent road enlargement and off-farm employment constitute critical transformations (Pan et al. 2004; Messina & Walls 2005). Other changes in livelihood strategies could be reinforced due to the provision of health and educational services, low mortality rates, the establishment of national parks and legalization of indigenous territories (Gray et al. 2008).

1.1.2. Cultural landscape of the Northeastern Amazon

The Amazon region of Ecuador is the second poorest area (20.6%) of the country, and accounts for nearly 60% of the population, one which cannot meet their basic needs (INEC 2009). Puerto Francisco de Orellana (locally known as Coca) is the largest city in the study area and capital of the Orellana province with 72,795 inhabitants (INEC 2010). The Agrarian Reforms and the oil boom that promoted the colonization of Amazonian lands triggered migration from other provinces, especially Loja and Manabí. Consequentially, the population increased at an extraordinarily fast rate (54%) in the Orellana province over the last decades: 136.396 (2010), 86.493 (2001) (INEC 2010). Not only *mestizo* colonizers but also other IP migrated to the area. Since then, more and more local IP are gradually adapting to market economies. They generally aspire to get access to health, education and tools to become better off (Redford & MacClean Stearman 1992). Rural settlements are "acquiring urban characteristics (…) without the corresponding improvements in infrastructure, such as sanitation, garbage disposal and treated water, and accessibility to health and family planning facilities" (Barbieri & Carr 2005). Recent road enlargement, electrification and off-farm employment constitute critical transformations (Pan et al. 2004; Messina & Walls 2005). Currently, there are vast employment opportunities in oil companies, the public sector, tourism, markets and hospitality sectors for people in this province, especially in urban centers (Barbieri et al. 2005).

1.1.2.1. Ethnographical characteristics of local population

The Amazon is home of 12 IP groups and colonists. The three most widespread and populous groups are the Kichwa, Shuar and the Colonists. One of the most important clusters where they coexist is the Yasuni Biosphere Reserve (YBR), which is the study area of this dissertation. Indigenous lands in the YBR account for nearly 50% of the lands surface. The YBR overlaps the territories of the Waorani, Kichwa and Shuar IP, as well as the untouchable zone of the isolated tribes of the Tagaeri and Taromenane. The Kichwa and Shuar IP have a long history of interaction and acculturation. They have been displaced from their original territories and are both numerous in the Ecuadorian Amazon. Nevertheless, they markedly differ in linguistics, socio-cultural and land use activities. Inter-ethnic hostility, especially between Waorani and other indigenous groups, has been defined by deaths, conflicts and aggressions (Lu 1995) throughout history.

IP are continuously evolving and changing. They are "highly heterogenic and complex" (Blom et al. 2010). The Kichwa have become a model of development to other IP. Nowadays, they share important similarities with Colonists

(mestizos). Other ethnicities have adopted their house-types, dietary habits, and marital alliances (Lu 1995). Inter-ethnic marriages have become more common in this area; even IP marry historical enemies such the Waorani (Lu 1995).

1.1.2.1.1. Kichwa

The Kichwa are the largest and most widely spread ethnic group in the Amazon region (Holt et al. 2004). Probably, they fled to the lowlands, escaping from the Spanish conquerors and eventually started spreading into the Amazon (Holt et al. 2004). Some of them have lived in this region since the rubber boom, and others came later looking for available lands (Proyecto Bosques 2009). The Kichwa located in the study area are called Kichwa Naporuna (Kichwa living along the Napo river). They speak Runa Shimi (a dialect based on the Kichwa language of the Kichwa people located in the Andes) and Spanish (DINIEB 2011; Holt et al. 2004). Their "identities are complex and overlap with white-mestizo identities" (Uzendoski 2005).

1.1.2.1.2. Shuar

There are nearly 45,000 Shuar traditionally living in Southern Ecuador, in the provinces of Morona Santiago and Zamora Chinchipe, and Northern Peru (Bremner & Lu 2006). They belong to the Jivaro linguistic family (Pohle et al. 2010; Moya 2000; Holt et al. 2004). The Shuar are known for the ritual of head shrinking (*tsantsas*). First trading contact was established during the gold, quinine and rubber expeditions in the 19th century. The Shuar have suffered from a strong acculturation process in the last years, especially because of the missions (Evangelical and Catholic, depending on the region) (Rudel et al. 2002). Later, due to external pressures (oil, mining and mainly demographic growth) they migrated to Orellana and other Amazonian provinces (Condepe 2012; Holt et al. 2004). They acquired lands in the Northeastern Amazon using legal instruments like Colonists (Bremner & Lu 2006). In the region of this study they settle along roads and their activities are highly market oriented (Bremner & Lu 2006).

1.1.2.1.3 Colonists

Colonists (*mestizos, campesinos*) is used to refer to the descendants of Spanish and indigenous peoples, "a very heterogeneous group who either live in tows, rural communities or scattered farms (*finca*s)" (Pohle et al. 2010:483). Today, Colonists represent the largest population group in the Orellana province (60%), despite 40 years ago, when they only represented 5% of the population (Proyecto Bosques 2009). Compared to the previous groups, the *campesino* women are less engaged in agricultural activities (Barbieri & Carr 2005). Land use patterns among colonists have been largely studied in the Northeastern Ecuadorian Amazon (Pichon 1996; Marquette 1998; Barbieri & Carr 2004; Pan et al. 2004; Barbieri et al. 2005; Messina & Walsh 2005).

In general, household decision-making has been poorly studied among the aforementioned groups. This is especially important to understand deforestation

and land use change patterns. In the next section, we present a theoretical framework on the Livelihood Framework that will serve as the structure for the analysis of REDD+ in the present work.

1.2. The Livelihood Framework

The Livelihood Framework has been widely used to understand household decision-making, especially to analyze deforestation patterns and land use decisions (Ellis 2000; Sherbinin et al. 2008; Babigumira et al. 2014). Livelihoods and sustainable livelihoods can be defined as:

> *"A livelihood comprises the capabilities, assets, (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance their capabilities and assets both now and in the future, while not undermining the natural resource base" (Carney 1998:4).*

The core of a Sustainable Rural Livelihood Framework is based on five capital assets (after Carney 1998; DFID 1999; Ellis 2000; Sherbinin et al. 2008) (see Figure 1.3):

a. **Natural capital:** natural resource stocks, or local environmental endowment (e.g. water, wind, soil, forest resources), it also includes resource flows and services;
b. **Social capital:** networks, connectedness, norms and sanctions, relations of trust, reciprocity and exchanges (e.g. membership in groups, relations of trust, access to wider institutions of society);
c. **Human capital**: skills, education, local knowledge, the ability to work, and good health;
d. **Physical capital:** productive assets (land, tools, oxen) as well as infrastructure goods (roads, communication infrastructure, adequate shelter, access to energy and water supply);
e. **Financial capital**: includes available stocks and regular inflows of money like cash savings, credit, regular remittances and pensions.

Diversification of income sources can improve food security, diminish the effects of seasonality, and provide higher income and diverse environmental benefits. Therefore, equally important are the analyses related to the vulnerability context and the transforming processes that influence the access, use and accumulation of assets (after Carney 1998; Ellis 2000; Sherbinin et al. 2008; Babigumira et al. 2014):

a) **Social relations** (e.g. gender, ethnicity, spiritual connections to land);
b) **Institutions** (e.g. legal system, right to organize, common property regimes, land tenure arrangements, incentives, policies), markets (e.g. access, transportation);
c) **Organizations** (government agencies, community groups, NGOS, etc.);

d) The **vulnerability context** and external environment (e.g. shocks, seasonality, labor opportunities, climate change, culture).

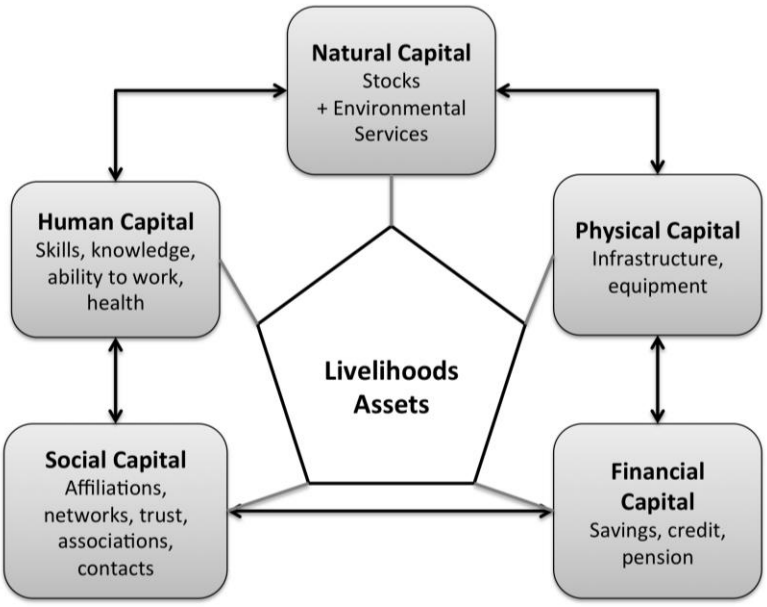

Figure 1.3 Capital Assets and the Livelihood Framework (modified after Carney 1998 and Sherbinin 2006)

Forest coverage, high biodiversity and good environmental conditions are associated with better livelihoods, food security and lower vulnerability and reduced risk exposure. In this context, incentive based mechanisms to reduce climate change can become a valuable opportunity to increase forest coverage and with it the already mentioned benefits. Therefore, the increment of carbon stocks will not only increase the adaptability to climate change but also will reduce the vulnerability to risks by increasing the overall household resilience. Moreover, forest diversity might also help to strengthen and maintain cultural-environmental identities bringing more benefits to local communities.

1.3. Incentive-based mechanisms: REDD+

1.3.1. REDD+: concept and criticism

Reducing Emissions from Deforestation and forest Degradation (REDD) was introduced in 2005 in the Conference of the Parties in Montreal (COP11) of the United Nations Framework Convention on Climate Change (UNFCCC) as a mechanism that provides incentives for forest conservation in developing countries. The plus after REDD (REDD+) was developed in further negotiations

and broadens the scope to other activities that lead to the enhancement of carbon stocks (e.g. forest management, logging practices, reforestation, etc.). REDD+ has the potential to provide economic incentives that could enhance the living conditions of forest-dependent communities (Blom et al. 2010). Moreover, these incentive schemes represent an affordable option for GHG reduction (Nehren et al. 2011). Nevertheless, REDD+ has been deeply criticized for the commodification of ecosystem services that can have profound socioeconomic impacts (Ghazoul et al. 2010; Corbera & Brown 2010). Additionally, failures with previous mechanisms to reduce GHG emissions, like CDM, which have proved difficult to implement on small scales, increase the skepticism about the success of REDD+ (Loaiza et al. 2010, Blom et al. 2010).

1.3.2. REDD+ in Ecuador

Since 1999 Ecuador has been a signatory of the United Nations Framework Convention on Climate Change (UNFCCC). This was ratified in 2005. Additionally, since 2009 Ecuador is part of the REDD+ UN-Programme and a voluntary country to develop Social and Environmental Principles and Criteria and the Participatory Governance Assessment for REDD+ Social and Environmental Standards (SES).

The National REDD+ Programme of Ecuador is part of the National Climate Change Strategy (2012-2025). Through the National Climate Change Mitigation Plan it seeks the reduction of GHG emissions. The National Programme for REDD+ in Ecuador is based on Ecuador's Forest Governance Model. It pursues the promotion of sustainable forestry development in Ecuador, ensures equal and rational access to forest resources through land regularization, reinforces forestry laws and norms, promotes sustainable forest management, preserves environmental services from forests and creates knowledge and capacity building (MAE 2012). The National REDD+ System includes: a) an Incentive System (including Socio Bosque), b) a Forestry Control System, c) a Forestry Information System (Measurement, Reporting and Verification MRV), and d) Regulation of Land Tenure (MAE 2012).

Ecuador will implement REDD+ at the national level with a mixture of funds from public, bilateral and multilateral sources. As part of the readiness phase, Ecuador has shown great advancements in the National Forest Information and Monitoring System. In 2011 Ecuador presented the Historical Deforestation Map, the National Forest Inventory in 2012, and in 2015 Ecuador's Forest Reference Emission Level for Deforestation. Further progresses regarding Socio-Environmental Standards, Forestry Control Systems should be presented in the short term.

1.3.2.1. Socio Bosque

Launched in 2008 by the Ministry of Environment *Socio Bosque* is a direct economic incentive per forest-conserved hectare. Forest owners can receive up to a maximum of US$ 30/ha. Payments reduce inverse proportionally by the number of hectares registered in the program. Priority is given to areas with high threat of deforestation and poverty, as well as to forests that provide environmental services. The program includes a wide variety of ecosystems such as: Paramos, tropical dry forests, tropical rain forests, and mountainous forests.

Between 2008 and 2012, 1780 agreements have been signed to protect more than one million ha and with 121.428 beneficiaries (MAE 2012). In 2011, 39% of the participants were Kichwa communities, 19% *mestizos* and 3% Shuar (MAE 2012).
Participants from the *Socio Bosque* Programme must present an investment plan prior to the approval of contracts. According to the Ecuadorian Ministry of Environment (2011) individuals invest 42% in their household, 27% in livelihood conservation and maintenance activities, 19% in funds and savings, 7% to pay debts and 5% to purchase assets. Communities, on the other hand, invest 39.3% of the conservation revenues in health, education and social activities, 22.3% in conservation and land tenure, 20.1% in productive activities and 18.3% in organizational capacity building.

1.4. Objectives of the Study

Rural livelihoods of forest dependent communities in developing countries can be seriously threatened due to the persistent instability of political, climatic and income conditions. Furthermore, in Northeastern Ecuador, external pressures like oil exploitation and population growth along with land tenure insecurity further endanger their well-being. However, it is challenging to find workable means to conserve tropical rainforests and at the same time enhance the living conditions of the poor inhabitants that directly depend on them. With this perspective REDD+, has been promoted as an innovative mechanism to encourage sustainable development and thus reduce GHG emissions. Despite this, many questions remain unanswered. This study contributes to raise data about possible risks and opportunities of REDD+ implementation in the Ecuadorian Amazon, based on the premise that REDD+ can be only successfully implemented if the welfare of rural household is secured. Despite its importance there is a lack of ground data about forest dwellers livelihoods. In this context, the present study aims to contribute to fill the gap and provide novel information on off-farm income, common property management regimes, and top-down REDD+ mechanisms.

1.4.1. Research Questions

Hence, the research questions of the present study are as follows:

i. What is the current situation concerning household structure, use of resources and forest dependence in private and community lands of the Colonists, Shuar and Kichwa people living at the Yasuní Biosphere Reserve?
ii. Do well-integrated market economy communities have more potential and are they better organizationally structured to participate in climate change mitigation mechanisms?
iii. How have evolved land tenure and resources been used in community lands? Would actual configuration allow local inhabitants to participate in the REDD+ mechanism?
iv. With the aim of reducing impacts, what might the best scenarios of REDD+ implementation be in the community lands of the Shuar and Kichwa IP and the Colonist lands of the YBR?

1.4.2. Objectives

The overall objective of this dissertation is to better understand rural livelihoods and their forest-dependency to provide information of potential benefits and impacts of the implementation of REDD+ in local communities and indigenous groups in the Yasuní Biosphere Reserve in the Ecuadorian Amazon.

The specific objectives of the research are:

1. To describe the socio-economic household and organizational characteristics of forest dwellers in the Yasuní and to evaluate their livelihood subsistence mechanisms.
2. To define the management rights and use of resources of rural livelihoods in private and traditionally/customarily managed community lands.
3. To analyze how current legal frameworks and management plans can match with a future implementation of REDD+ in indigenous lands and small landholdings of the Northeastern Amazon.

1.5. Methodology

A multi-level survey was developed to investigate income generation, land management and resource use. The obtained data was analyzed using a

descriptive statistical analysis of variance test and comparison of means when needed. The work presented here has three different levels of analyses: the household, the community and the landscape-regional level (Figure 1.4 and Figure 1.5).

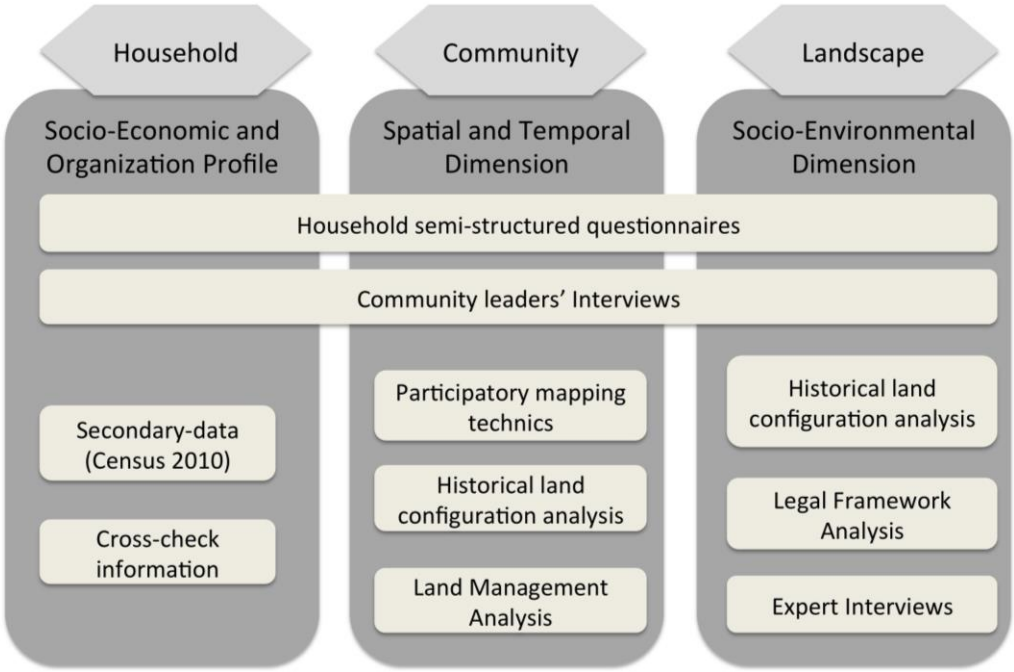

Figure 1.4 Methodological Approach

Figure 1.5 Researcher during field work

1.5.1. Study Area

The study area is located in Orellana province, which is part of the Ecuadorian Amazon. All selected communities are part of a project by the German NGO Welthungerhilfe (WHH) on REDD+ and situated on the buffer zone of the Yasuní National Park, part of the Yasuní Biosphere Reserve. The Yasuní Biosphere Reserve covers 16,820 km^2 and has an average annual rainfall of 3300 mm. Specific information about the study area can be found in Chapters 2, 3 and 4 (Figure 1.6).

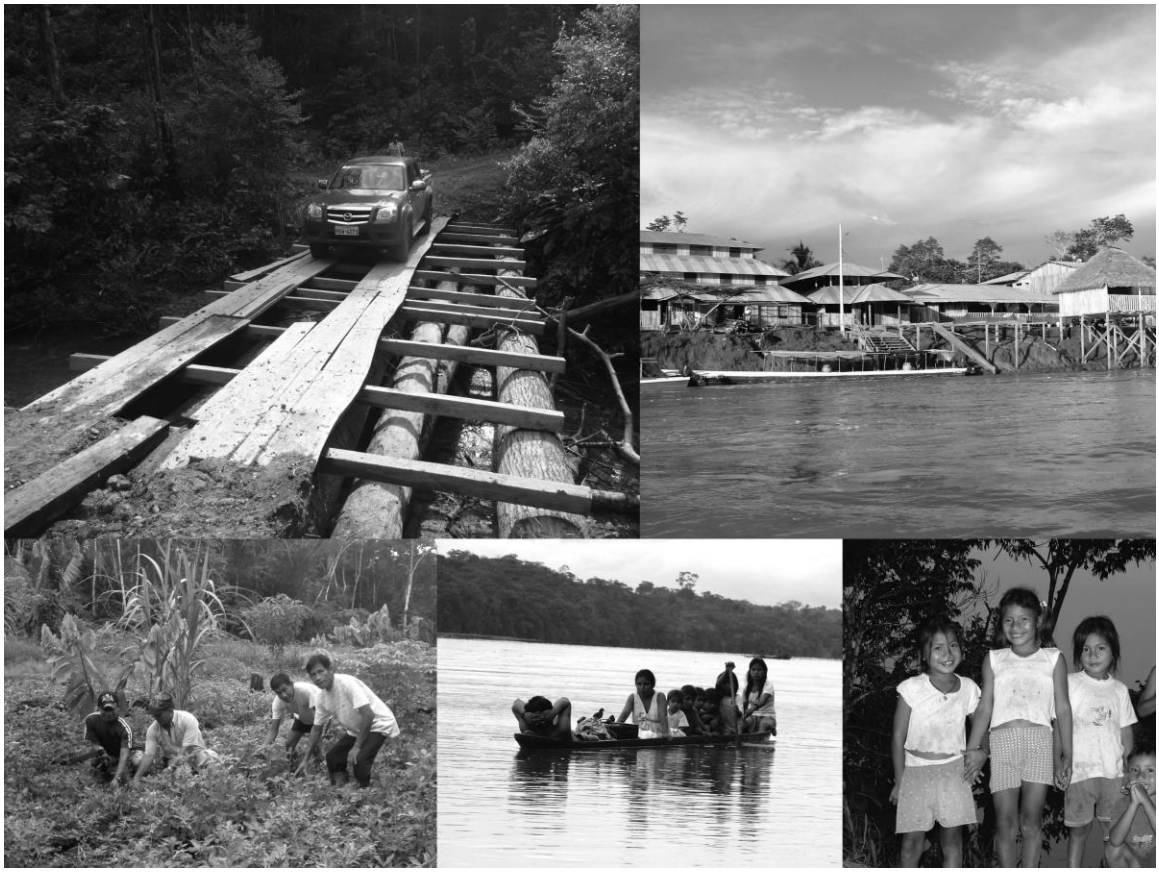

Figure 1.6 Study area: communities, roads and people

1.5.2. Criteria to select communities

The studied communities were chosen according to the following parameters (Table 1.1):

1. Willingness to participate in the REDD+ pilot project: all selected communities were part of the WHH project.

2. Ethnicity: most of the community population is Kichwa, Shuar or mestizo.
3. Distance to main market: calculated according to the travel time, which in turn depends on the absolute distance (km from the provincial capital), accessibility of the transport infrastructure (river, road, trail, etc.), and frequency of public transportation.
4. Population size: no more than 100 households, and to interview at least 50% of them.
5. Association: All communities are legally registered (*Art. 27, Registro Oficial No. 315*) and own (partial) lands. Indigenous communities should have a global land title of at least a portion of claimed lands. And Colonists should be organized in an Association.
6. Natural forest: communities should have at least a portion of natural forest.

Table 1.1 Selected communities and criteria

	La Reina^	Union Lojana	Tiguano^	Rumiñahui	Mandarina	Sinchi Napo^
Ethnic Group	Mestizo (Colonists)		Shuar		Kichwa	
Creation year	1980	1991	1985	1996	1998	1975
Area (ha)	1437	1269	1394 (1500)*	235*	3076 (2000)*	8420 (8000)*
Deforestation rate (2000-2010) annual	0.1%	0.1%	0.2%	0.3%	0.1%	0.01%
Households	41 (20)**	28 (20)**	35 (20)**	13 (11)**	34 (20)**	38 (20)**
Distance to main market (km)	66	40	66	70	67	152
Travel time to market (min.)	90	90	90	120	140	480
Accessibility	Road, public transport	Road (trail)	Road, public transport	Trail	River, trail	River

Criteria to select households

At the household level, families were chosen according to the following criteria:

1. 20 families per community were randomly selected to reduce wide variation sample size (Bremner & Lu, 2006). An exception is the community of Rumiñahui, which only consists of 13 households, of which only 11 could be accessed.
2. Interviews were conducted with the male and female household-heads.

1.5.3. Semi-structured questionnaires

Through semi-structured questionnaires and other available secondary data, demographical characteristics, farm ownership and characterization as well as socio-political organizational structures were measured. The questionnaire can be found in Appendix A.

1.5.4. Total Income Calculation

The Total Income for each Community and household was calculated according to the following criteria (Figure 1.7):

TOTAL CASH INCOME	Cash farm income - Inputs	Crop
		Livestock + byproducts (e.g. eggs, milk)
		Aquaculture
	Forest-related cash income	Wood related forests products sale (e.g. cut wood) and NTFPs
	Environmental Cash Income	Sales of raw collected products (hunting + fishing)
		Own produced (handicrafts)
	Off-farm Income	Labor (skilled und unskilled)
		Miscellaneous (gifts, remittances, etc.)
TOTAL SUBSISTENCE INCOME (monetary value)	Subsistence farm income	Consumption of own produced crops
		Consumption of own produced livestock + byproducts
		Consumption of goods derived from aquaculture
	Forest related Income	Consumption of own collected forest goods (timber, firewood, NTFPs)
	Environmental Income	Consumption of own collected goods (hunting + fishing)

Figure 1.7 Total Income Calculation

1.5.5. Participatory Mapping Technics

Through semi-structured group discussions (Communal Workshop Questionnaire in Appendix D), interviews to community leaders (Appendix E) and other

participatory mapping techniques (Mather et al. 1998; Jackson et al. 1994, Tipula 2008).

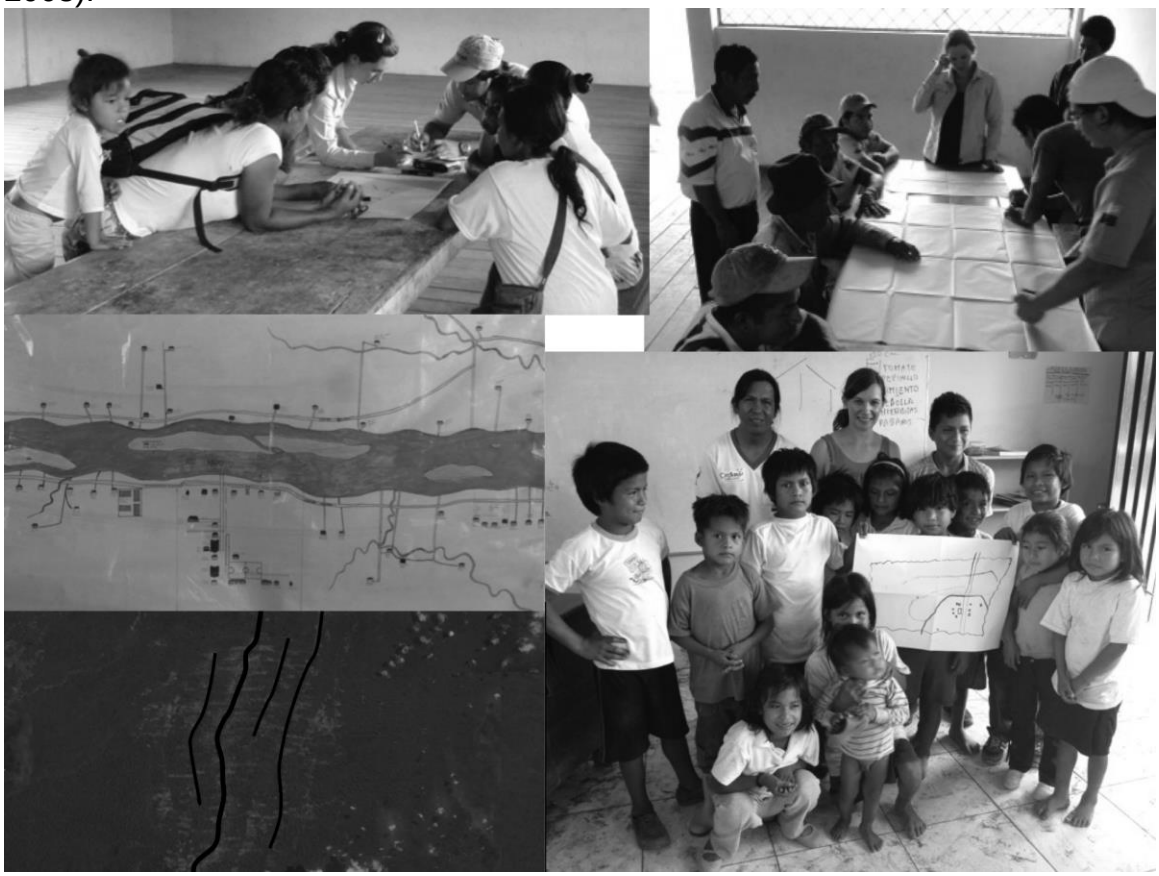

Figure 1.8 Photos showing workshops on participatory mapping technics

1.5.5.1. Community Mapping

Between four to five work groups of 10-15 individuals were formed, depending on the number of attendees). At least one-woman group was formed in each community (Figure 1.8). Each group selected one speaker to present the final map. Using flipcharts and/or muster maps and/or photography and markers groups identified main geographical characteristics. Names were written in Spanish and in the native language. The following information was recorded:

1. Territorial boundaries in the study area were identified and demarked:
    a. Administrative boundaries
    b. Community boundaries
2. Location of the household area
3. Location and identification of forests (conservation status)
4. Location and type of resources use sites (frequency)
5. Religious or cultural sites
6. Geographical representation of conflict areas
7. Location of facilities: health center, school, nearest road, water provision
8. Location of hunting sites and fallow lands
9. Overlapping zones with other ethnic groups and conflict areas

10. Location of oil/mining concessions

Then in plenary the maps were presented and discussed. Additional information about forest values was added:

11. Economic (economic importance: forest products, fisheries…)
12. Subsistence value (produce food and materials)
13. Spiritual and religious (sacred and spiritual)
14. Historic (belong our ancestors)

1.6. Thesis outline

The present manuscript encompasses three peer reviewed journal publications that were published within the PhD candidacy. The thesis has three core chapters (Chapters 2, 3 and 4).

Chapter 2 focuses on income generation and forest dependency in the studied communities. It provides responses for research questions i and ii and provides data to support objective 1. It presents information about subsistence-based production systems and an overview of the characterization of households and land use in the study area. Finally it provides a discussion about the implications for the design of REDD+ projects. The chapter corresponds to the article:

Loaiza T., Nehren U. & G. Gerold. (2015). REDD+ and incentives: an analysis of income generation on forest-dependent communities of the Yasuní Biosphere Reserve, Ecuador. Applied Geography 62:225-236

Chapter 3 explores question 3 and answers objective 2. This chapter presents an analysis of Common Property Management Regimes (CPMRs) and Colonist cooperatives to assess land configuration and institutional arrangements for decision-making for resource use. Furthermore, it includes a comparison of ancestral and actual forms of community-based organizations and its implications for REDD+ implementation. The following article corresponds to Chapter 3:

Loaiza T., Nehren U. & G. Gerold. (2016). REDD+ implementation in the Ecuadorian Amazon: Why land configuration and common-pool resources management matter. *Forest Policy and Economics 70:67-79*

Chapter 4 presents the problematic past and present territorial configuration. Moreover, it discusses actual management plans of the YBR and examines the actual legal frameworks with focus in REDD+ challenging issues. It responds to question 4 and is related to objective 3. Chapter 4 corresponds to the article:

Loaiza T., Borja M.O., Nehren, U. & G. Gerold. (2016). Analyzing REDD+ from an institutional and landscape perspective: insights from the Ecuadorian Northeastern Amazon. Submitted to Forest Policy and Economics.

Finally, Chapter 5 provides a synthesis of the main conclusions and an outlook of the results obtained throughout this work. All three publications combined shed light over a livelihood framework of the studied communities to assess social relations and the vulnerability context based on the organizations and institutions, as well as capital assets. An overview of the three papers merged into the Livelihood Framework is presented in Figure 1.9.

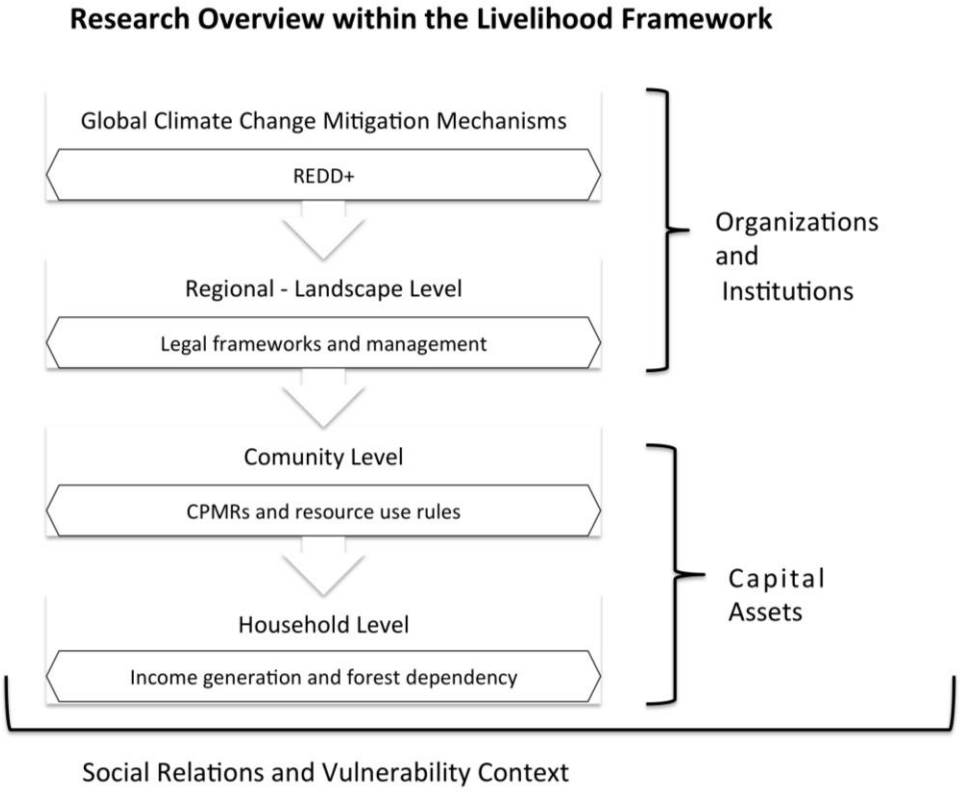

Figure 1.9 Research Overview

Chapter 2

REDD+ and incentives: An analysis of income generation in forest-dependent communities of the Yasuní Biosphere Reserve, Ecuador

Toa Loaiza, Udo Nehren, Gerhard Gerold

Applied Geography 62 (2015) 225-236

2. REDD+ and incentives: An analysis of income generation in forest-dependent communities of the Yasuní Biosphere Reserve, Ecuador

2.1. Abstract

Reducing Emissions from Deforestation and Forest Degradation (REDD+) is considered a promising strategy to slow down deforestation rates, promote sustainable forest use, and support rural livelihoods under the umbrella of climate change mitigation. However, so far there is only little field-based knowledge on how REDD+ can go along with subsistence-based production systems and livelihoods of forest-dependent communities. We addressed this research gap by analyzing the income generation of three widespread ethnic groups (Colonists, Shuar, Kichwa) in the buffer zone of the Yasuní National Park in Ecuador to better understand their livelihoods and possible engagement in REDD+. We selected two communities of each ethnic group (close-to and far-from markets) and used household surveys to (a) calculate household incomes, (b) assess the degree of forest-dependency, and (c) discuss how REDD+ schemes can be designed along with traditional subsistence-based production systems. We found that the studied indigenous communities have a higher degree of forest-dependency and higher environmental income compared to Colonists. However, our assumption that close-to-market communities have a lower degree of forest dependency and higher cash income due to better market access and labor opportunities applies only to the Colonists and Shuar, but must be rejected for the Kichwa who gain income from timber sale. Despite these differences, all communities receive high off-farm revenues from unskilled labor provided by oil-companies and external aid. Therefore, dependency on agriculture and forestry is temporarily reduced. Under these circumstances, REDD+ provides only weak financial incentives so that the willingness to participate in REDD+ is low.

Keywords: Yasuní; Ecuador; Amazon; income generation; forest–dependency; REDD+

2.2. Introduction

Deforestation and degradation of tropical rainforests are associated with global to local environmental problems, such as enhanced greenhouse gas emissions, biodiversity loss, soil degradation, and negative impacts on the water cycle (TEEB, 2010). This in turn negatively affects living standards of the world's poor and has direct impacts on livelihoods of forest-dependent communities in rainforest regions (Sunderlin et al., 2005; Wunder et al., 2014).

To reduce deforestation and forest degradation and at the same time support rural livelihoods, it is important to understand the way of living and income generation of forest-dependent rural communities. This is particularly the case when implementing post-Kyoto climate change mitigation mechanisms such as 'Reducing Emissions from Deforestation and Forest Degradation (REDD+)' that aim at reducing atmospheric greenhouse gases (GHG) by providing economic incentives to land owners for preserving forests and sustainable forest management (UNFCCC, 2011).

REDD+ policies explicitly include the targets of biodiversity conservation as well as the "full and effective engagement of indigenous peoples and local communities in, and potential contribution of their knowledge to, monitoring and reporting of activities relating to REDD+ (…)" (UNFCCC, 2009). Therefore, the active involvement of forest-dependent communities in REDD+ projects is mandatory to achieve the expected positive effects on forest conservation and sustainable rural livelihoods and to avoid undesirable and potentially harmful effects, such as infringing indigenous rights, social values or traditional lifestyles (Milne et al., 2001; Asquith et al., 2002; Grieg-Gran et al., 2005; Pagiola et al., 2005; de Koning et al., 2011; Groom & Palmer, 2012; Mswima & Kanyama, 2014). This in turn requires a better understanding of livelihoods and income generation of forest-dependent communities participating in REDD+ projects, which so far have only received little attention.

We address this research gap by analyzing income generation as a key livelihood indicator of different forest-dependent groups in a REDD+ pilot project in the Yasuní Biosphere Reserve (YBR) in Ecuador, a highly biodiverse and resource-rich area with the largest oil reservoirs of the country. The REDD+ pilot project is led by the Welthungerhilfe and partners (FEPP-HIVOS) and co-financed by the European Commission. Ecuador is one of the target countries for REDD+, as it is known as one of the world´s most biodiverse countries, which is at the same time losing its forests at extremely high rates (MAE, 2011; FAO, 2011).

The Northeastern Amazon is one of the deforestation and degradation hotspots of the country, where agricultural frontier expansion mainly triggered by oil

exploitation is the root cause of deforestation (Mena et al., 2006). Small farmers' livelihoods have been directly associated with land clearing for agricultural and pasture use (Pichon, 1997; Marquette, 1998; Gerold & Lanfer, 2001; Bilsborrow et al., 2004; Barbieri & Carr, 2005; Siren, 2007). Illegal logging and uncontrolled wood extraction (Arruti, 2011) are factors associated with frontier expansion. Moreover, high birth rates and immigration from other parts of the country increase the pressure on natural resources (Pan et al., 2007).

In 2010, the YBR was designated as the most biodiverse place on Earth (Bass et al., 2010). Subsequently, governmental institutions and international NGOs have intensified their investments in the area to promote sustainable development and biodiversity conservation, and REDD+ is one supporting strategy. At the same time, international companies continue exploiting the oil resources.

In the Ecuadorian Northeastern Amazon up to 12 different ethnic groups coexist and use forest resources for their livelihoods; among them the Kichwa and the Shuar indigenous groups and the Colonists or *Mestizos*. The latter are Spanish-indigenous descendent farmers that have arrived from other provinces since 1970, especially after the oil boom. The different groups extract forest products but also practice shifting-cultivation, which is particularly the case for the Shuar and Kichwa communities (Harner, 1972; Rudel et al., 2002).

It is well known that forests in developing tropical countries significantly support livelihoods and represent important sources of subsistence and cash income (Uberhuaga & Olsen, 2008; Angelsen et al., 2009; Uberhuaga et al., 2012), especially those of indigenous populations that directly depend on forest resources for a wide range of livelihood activities (Campbell & Luckert, 2002). Poor rural households depend on a common pool of natural resources and are highly vulnerable to external risks such as weather extremes, plant diseases, pests, and market price fluctuations of agricultural products (Campbell & Luckert, 2002). Therefore, forest resources such as timber and non-timber forest products can serve as 'savings' for austere periods (Godoy et al., 2000; Sheil & Wunder, 2002). At the same time, forests are wildlife habitats for hunting and fishing activities.

Lately, forest and environmental income have gained more attention, especially in the context of poverty alleviation (Sjaastad et al., 2005). However, only little is known about the contribution of forests to household income (Cavendish, 2002; Godoy et al., 2002; Uberhuaga et al., 2012). Various studies show diverse outcomes of the effects of the distance to the markets and market integration in the commercialization of neotropical rainforests products for the household income (Godoy et al., 1995, 1997, 2002; McSweeney, 2002). For instance, higher income and proximity to markets can reduce forest dependency (Godoy et al., 1995, 2002), but higher income and market penetration can also lead to higher extraction and higher revenues from forests products (McSweeney, 2002; Godoy et al., 2002).

Until date there are only a few studies from Latin America and other tropical forest regions that evaluate the value of forests for income generation at community and household scales (McSweeney, 2002; Uberhuaga et al., 2012). Among these studies are those by Melnyk & Bell in Venezuela (1996), Godoy et al. (2000, 2002) and McSweeney (2002) in Central America, Coomes et al., (2004) in Peru and Uberhuaga et al. (2012) in Bolivia. These studies use different methodological approaches to assess rural income sources. Some only focus on direct income generated by agriculture, fishery and forestry activities, while others also consider subsistence income and indirect forest values. Therefore it is difficult to compare the results. In Ecuador only little research on forest-related income has been conducted so far. Worth mentioning are studies by Grimes et al. (1994) on the economic value of non-timber forest products in the Upper Napo region and by Neira et al. (2006) on the sustainability of subsistence products in the NE Amazonia.

Considering forests as important income sources to sustain rural livelihoods, we compare three forest-dependent ethnic groups in the YBR: Colonists, Kichwa and Shuar, which are the most widespread groups in the buffer zone of the Yasuní National Park. Among others, these groups differ with respect to their origin, societal structure, degree of forest dependency, and access to markets. We selected two communities from each group and (i) calculated the different income sources of the households considering cash and subsistence income, (ii) assessed the degree of forest-dependency based on their share of forest and environmental income as well as income diversification, and (iii) discussed how REDD+ schemes can be designed along with traditional subsistence-based production systems without compromising their livelihoods.

We hypothesize that there are differences in income generation and forest dependency that are determined by ethnicity and distance-to-markets. We assume that close-to-market communities have a lower degree of forest dependency and higher cash income due to better market access and labor opportunities. Moreover, we expect that indigenous communities have a higher degree of forest-dependency and higher environmental income compared to Colonists. We believe that these differences need to be considered in the design of REDD+ schemes.

2.3. Methodology

2.3.1. Case study area and study groups

The YBR is located in the Northeastern Amazon basin of Ecuador, with the largest proportion in the Orellana province at 00°10' to 01°45'S and 75°20' to 77°00'W and altitudes between 200 and 300 m a.s.l. (FOES-REGAL, 2008). It covers a total area of 16,820 km^2 of tropical moist forest, which has been partly replaced by agroecosystems (Finer et al., 2009). The climate is characterized by average annual rainfall of 3,000-3,600 mm and average annual temperatures of 24°C with a prolonged rainy season and unmarked seasonal fluctuations in precipitation and temperature (Holt et al., 2004). The reserve is known for its extraordinary biodiversity and designated as a high carbon biomass region (approx. 111-160 tones/ha) (Finer et al., 2009). Soils include poor quality acid-red soils and alluvial soils that are more fertile compared to the Amazon in Peru or Brazil because of nutrient rich volcanic deposits (Barbieri & Carr, 2005).

According to INEC (2012), there are about 48,000 inhabitants in the YBR and indigenous lands account for more than 50% of the area. The YBR includes the Yasuní National Park, the Waorani Indigenous Reserve, the untouchable zone of the Tagaeri-Taromenane isolated tribes and the buffer zone along the Napo River and the Yuca/Auca roads where indigenous people share their territories with Colonists. Insecure land tenure is a main conflict in YBR: 34% of the Colonists, 80% of the Kichwa and 65% of the Shuar groups own farms without land titles (FOES-REGAL, 2008), which promotes further migration and clashes with neighbors and opens the door for political manipulation, especially related to oil and mining concessions.

Our study area is located in the buffer zone of the Yasuní National Park along the Napo River and the Auca Road and can be described as a mosaic of forests, pasture lands, agricultural lands and secondary vegetation (Zapata-Rios et al., 2006; Suarez et al., 2009) (Figure 2.1). According to the YBR baseline by FOES-REGAL (2008), 56% of the people living along the roads and the Napo River are engaged in agriculture activities; the majority is underage or retired. The area has high levels of poverty (81% among the indigenous populations and 93% in the non-indigenous groups) and only 14% of the people work in mining and oil related activities. The most important crops planted along the roads are coffee, plantain, cacao and cassava, while plantain, cassava, maize and cacao dominate along the Napo River. About 50% of the farms have a size between 30 and 50 ha, 40% <30 ha and only 10% >50 ha (FOES-REGAL, 2008).

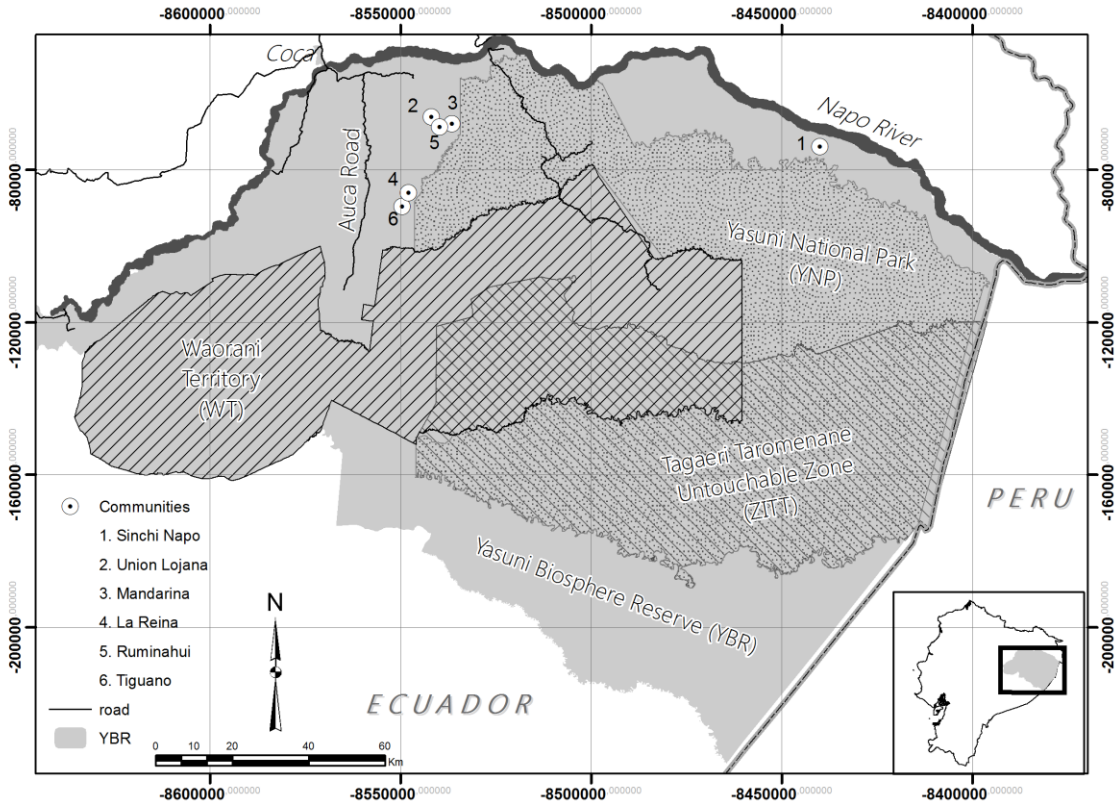

Figure 2.1 Case study area with surveyed communities

For our study, we selected the three most widespread ethnic groups in the YBR: the Colonists, the Shuar and the Kichwa. Waorani indigenous groups only live in the core area of the YBR, but not in our study area, and were therefore not included. We selected two communities from each ethnic group: Colonists (La Reina y Union Lojana), Shuar (Tiguano y Rumiñahui) and Kichwa (Mandarina y Sinchi Napo) located close-to-markets and far-from-markets, respectively (Figure 2.1). All communities are legally registered (Art. 27, Registro Oficial No. 315) and have (partial) land rights (Table 2.1). The ethnic groups markedly differ in linguistics, socio-cultural characteristics, and land use activities. Both indigenous groups have a long history of contact and acculturation. They have been displaced from their original territories and are both widespread in the Ecuadorian Amazon.

The Shuar and Kichwa still practice cut-and-mulch agriculture (Figure 2.2). This practice is more common than slash-and-burn in the Northeastern Amazon, mainly due to the prolonged rainy season (Pichon, 1996; Holt et al., 2004; Barbieri & Carr, 2005; Carr et al., 2006). Climatic conditions allow flexible cultivation times; therefore communities can start planting any time of the year (Holt et al., 2004). They leave fallow lands (locally called *rastrojo*) for 2-3 years (Gray et al., 2008). However, increasing land pressure has resulted in shorter fallow periods in some regions (Siren, 2007). The Colonists are farmers that

arrived in the 70s after the oil boom. They practice agriculture and livestock production and are engaged in off-farm activities.

Figure 2.2 Shifting agriculture and cut-and-mulch are common practices in the Northeastern Amazonia of Ecuador

2.3.2. Research and sample design

A pre-field visit was undertaken from November 2011 to February 2012 to compile general information on the study area, establish contact with local communities and stakeholders and test the pilot questionnaires, which were developed before the first field campaign. In a second field campaign between September 2012 and March 2013, empirical information about forest resource use, demographics, farm-related activities and income sources was collected. Extended fieldwork periods were needed to build trust relationships and acceptance among community members. In a third field study from February to April 2014, some missing data were collected and all data were validated. Community members did translations when necessary.

We collected and aggregated data at the community and the household level. At the community level we gathered data from two settlements of each ethnicity

(n=6). A community was defined as an aggregate of households juridically constituted according to the Ecuadorian legislation (Art. 57). All selected communities are located in the Orellana province and all of them are connected to the major city of Coca (formally named as Puerto Francisco de Orellana) through roads and/or rivers. Communities were selected according to (1) their willingness to participate in the REDD+ pilot project, (2) representativeness of the ethnicity, and (3) distance to markets. Profiles of the studied communities are presented in Table 2.1. In each community, semi-structured interviews with community leaders were conducted to gather data about population size and dynamics, access to infrastructure (roads, schools, health centers, water, energy), and land rights.

Table 2.1 Communities profile

	La Reina^	Union Lojana	Tiguano^	Rumiñahui	Mandarina	Sinchi Napo^
Ethnic Group	Mestizo (Colonists)		Shuar		Kichwa	
Creation year	1980	1991	1985	1996	1998	1975
Area (ha)	1437	1269	1394 (1500)*	235*	3076 (2000)*	8420 (8000)*
Deforestation rate (2000-2010) annual	0.1%	0.1%	0.2%	0.3%	0.1%	0.01%
Households	41 (20)**	28 (20)**	35 (20)**	13 (11)**	34 (20)**	38 (20)**
Distance to main market (km)	66	40	66	70	67	152
Travel time to market (min.)	90	90	90	120	140	480
Accessibility	Road, public transport	Road (trail)	Road, public transport	Trail	River, trail	River

* Land claimed that are inside protected areas or/and in conflict with neighboring communities.
** Number of surveyed households.
^ Communities located far-from-markets

At the household level, 20 families per community were randomly selected to reduce wide variation sample size (Bremner & Lu, 2006). An exception is the community Rumiñahui that only consists of 13 households, of which only 11 could be accessed. Hence, the total sample is n=111. The interviews were conducted with the household heads (male) and their spouses. Households are defined according to Babigumira et al. (2014, p.11) as a "group of people (normally family members) living under the same roof, and pooling resources (income and labor) for their livelihood". Household questionnaires are subdivided in three main categories: (i) basic demographics, (ii) land cover and land use data, and (iii) income sources. The latter includes cash and subsistence income, farm and off-farm income, forest income, and environmental income (Table 2.2).

Table 2.2 Total income components

TOTAL CASH	Cash farm income	Crop

INCOME	- Inputs	Livestock + byproducts (*e.g., eggs, milk*)
		Aquaculture
	Environmental cash income	Sales of raw collected products (*e.g., hunting, fishing*)
		Own produced (handicrafts)
	Forest-related cash income	Wood-related forest products sale (*e.g., cut wood*) and NTFPs
	Off-farm income	Labor income (*skilled and unskilled*)
		Miscellaneous (*e.g., gifts, remittances*)
TOTAL SUBSISTENCE INCOME (Monetary value)	Subsistence farm income	Consumption of own produced crops
		Consumption of own produced livestock + byproducts
		Consumption of goods derived from aquaculture
	Forest-related income	Consumption of own collected forest goods (*includes firewood consumption and NTFPs*)
	Environmental income	Consumption of own collected goods (*e.g., hunting, fishing*)

2.2.2.1 Data Analysis and Processing

We quantified the household net total income based on the methodologies of Cavendish (2002) and Uberhuaga et al. (2012) on cash, subsistence income and forest dependency. Cavendish (2002; p. 34) defines household income as the "total income: (...) cash income plus value of all non-purchased goods and services consumed or used by the household during the accounting period of time". The total income is made up of the sum of all the economic value of products from a household in a year minus the farm inputs (seeds, feed, etc.) (Table 2.2).

Forests products were defined as products used (place, quantity and values) by a household in a certain period of time (1 or 3 months) during the same season (Uberhuaga & Olsen, 2008). Monetary values of farm and forest products not sold on the market were estimated using the methodology of Uberhuaga and Olsen (2008) and Uberhuaga et al. (2012). The estimations took into account farm-gate prices (value at the farm), barter values (value derived from exchange of product with market commodity), substitute values (value derived from local market price of close substitute), willingness to pay, and distant market prices (price on distant market minus transportation costs to market). Local labor rates were crosschecked with the key stakeholder interviews and local inhabitants.

We calculated the total income based on a recall period of three months to obtain data for cash and subsistence income. Then we adjusted the obtained values according to the main end-crop production period (for our case coffee and cacao) without taking into consideration preliminary investment costs. As recommended by Cavendish (2002) and Angelsen and Lund (2011), households' own-labor input into productive actives was not taken into account. The reported values are absolute values minus inputs, excluding labor costs and transportation. We considered two main variables for the analysis of the empirical data: a) distance to markets (close-to-markets and far-from-markets) and b) ethnicity (Kichwa,

Shuar and Mestizos). We considered market distance, as stated in the bibliography, to be an important indicator of forest-dependency. Moreover we assume that there are dissimilarities between ethnicities because of differences in traditions and land management practices. In the majority of the cases, we only show the outcomes of the variable that express the greatest dissimilarities.

Forest dependency is defined as the share of total market and non-market income generated from forest-products (including raw and processed timber and non-timber products). Forest-dependency is measured through the relative forest income: the ratio of total forest income to total income (Vedeld et al., 2007, Uberhuaga et al., 2012).

Forest environmental dependency, as another important indicator, is defined as the ratio of absolute forest environmental income to total income (Vedeld et al., 2004).

Finally, we also calculate the **Coefficient of Specialization (SC)** according to Coomes (1992) and McSweeney (2002), with a range from 1 = completely specialized to 0 = highly diverse.

$$SC = \left(\sum_{i=1}^{n} X_i^2\right)/10000$$

X_i = percentage of total market income contributed by sector *i*
n = number of sectors in which the household is engaged

Data were collected giving quantitate values to farm products and forests resources in order to allow comparisons. Data were crosschecked through field visits and consultation of local experts. Reference data were inquired in main, medium and small towns to verify information given at the communities: Prices (crops, bush-meat, aquaculture investments, etc.), salaries, and productivity. Neither indirect-use nor existence values were considered (e.g., drinking water, protection of biodiversity) in this study.

2.4. Results

Results are presented in two parts. First we briefly characterize the selected communities and households with respect to basic demographics, land tenure, living environment and land-use. In the second part we present the total income (cash and subsistence income) subdivided by off-farm, farm, forest and environmental income. Based on our results we discuss the degree of forest dependency and potential for REDD+ implementation.

2.4.1. Characterization of communities and households

As expected, close-to-market-communities have greater accessibility to public services (education, health, electrification, etc.) and infrastructure than to far-

from-market-communities. In all surveyed communities land tenure is still unclear: 62.0% of the respondents are under communal land tenure, while 24.8% are private owners and 13.3% do not have a legal title. All indigenous communities still have part of their land under legalization process. All communities sell part of their products in the province capital Coca and in nearby market towns. Particularly prices for coffee and cacao are higher in the province capital, where the collection centers are located.

On average of the six study communities, households have 4.8 members and male household-heads are 39 years old. Most of the household-heads are migrants from other provinces. This is the case for 97% of both Colonist and Shuar communities and 90% of the near-to-market Kichwa communities. Only in the Kichwa communities that are far-from-market there is a majority (90%) who was born in the same province.

The average farm size of each household within the six communities is 45.2 ha. Apart from the main farmhouse, almost 20% of the interviewed families own or rent a secondary house, often in the communal center, where schools and health care facilities are located. Other popular locations for secondary houses are in the market towns and along main roads for better labor accessibility.

Figure 2.4 shows the proportion of land-cover classes according to ethnicity. The three study groups still have a high proportion of their farms under forest coverage (76.5%) with relatively higher forest cover in the Kichwa communities. The quality of the forests varies mainly according to the frequency and intensity of human impacts, such as shifting cultivation and selective timber extraction. Another 6.9% of the land cover is classified as fallows and 2.7% as wetlands.

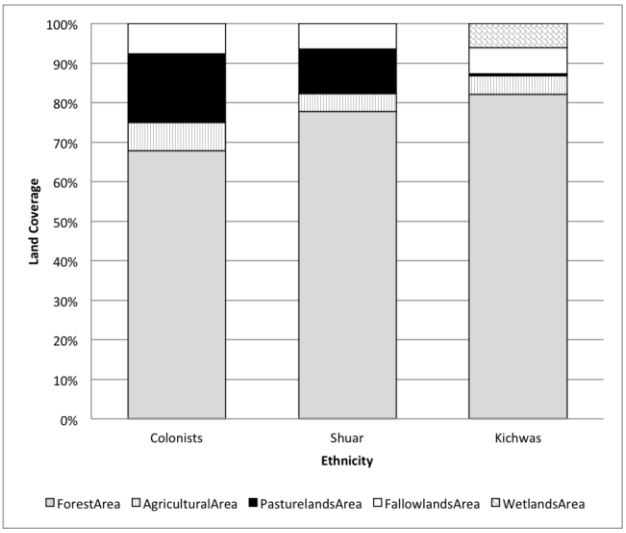

Figure 2.3 Land-cover according to ethnicity

The Colonists and Kichwa have a higher proportion of agricultural lands (on average 2.9 ha and 2.6 ha per household respectively) compared to the Shuar

(1.7 ha per household). Most agricultural patches can be classified as agroforestry, even though they are the result of shifting cultivation and not intentionally managed. In 35% of the cultivated area, plantain (*Musa spp.*) and manioc (*Manihot esculenta*) grow in mixed patches. They represent an important dietary supplement, especially for indigenous groups. Additionally, perennial cash crops such as coffee (*Coffea canephora*) and cacao (*Teobroma cacao*) cover 25.4%, respectively 19.3%, of the agricultural land. The three groups also grow annual crops such as corn in 11.8% and rice in 4.4% of the cultivated area. In general agricultural land use is characterized by a low degree of technology; for instance less than 10.0% of the surveyed households use agro-inputs.

Colonist and Shuar communities use considerably higher proportions of their land as pastures (about 17.3% and 11.4%, respectively). In contrast, in the Kichwa communities cattle ranging plays a marginal role. This is reflected by only 0.4% of the land that is used as pastures. Community members of all study groups reported that cattle production is declining. Farmers referred to the low meat prices and the difficulties encountered in bringing the meat to the markets as reasons to diminished livestock production. The most important inputs for livestock production are maize and feed, which account for 51.0% of the operational costs.

Income and livelihood activities are gender-dependent. Men are the principal off-farm labor-force within the families. Some roles for household activities are clearly defined: women take care of domestic chores, while men go hunting (in 86.4% of the households), fishing (88.8%) and lead timber extraction (90.3%). Women on the other hand lead firewood collection (45.6%) and support timber extraction.

3.2.2 Total income and subsistence income

The **total income** average per household over the six communities is US$ 508.8 monthly. This includes both cash and subsistence income from off-farm, agricultural and environmental sources (Figure 2.4). The average number of household members does not correlate with the total household income (p=0.0191153). The household average is below the national rural income average, which is US$ 567.1 including subsistence income (Encuesta Nacional de Ingresos y Gastos en Hogares Urbanos y Rurales 2011-2012: INEC, 2012).

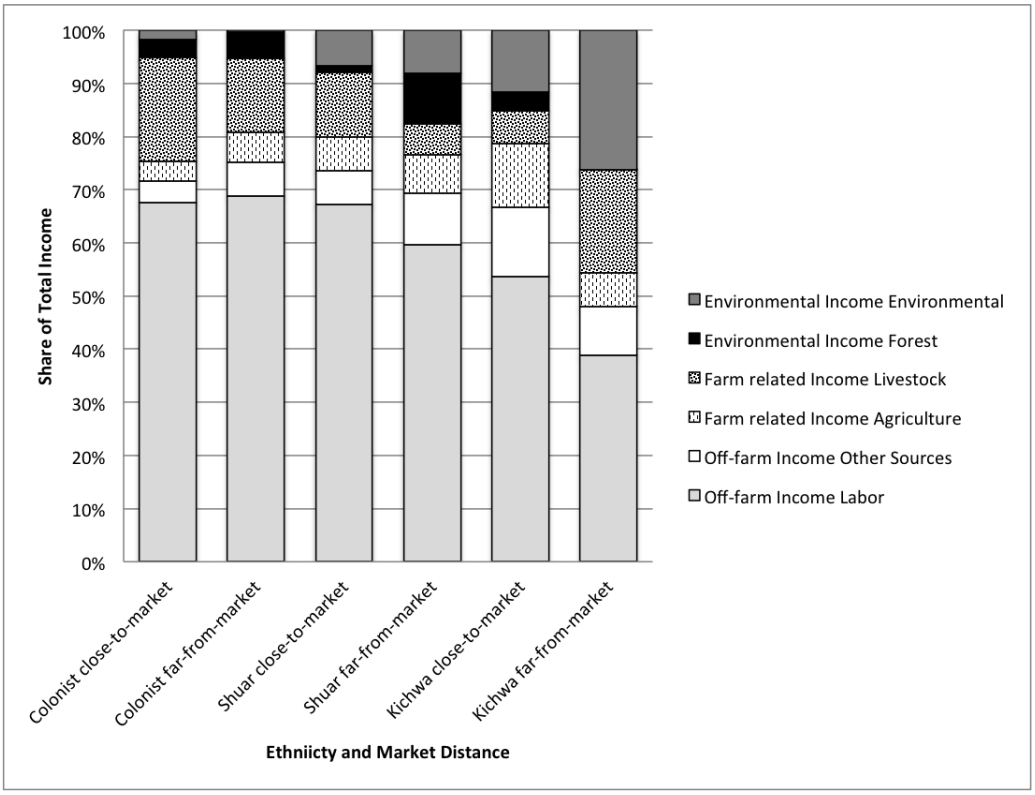

Figure 2.4 Total income per ethnicity/market distance and according to income source

The average **subsistence income** over all study groups is US$ 88.4 per household and month, corresponding to 17.4% of the total income. The share of subsistence income differs markedly between the ethnic groups. Kichwa are more reliant on subsistence income compared to the other groups with a share of 21.2% (close-to-market) and 36.5% (far-from-market), respectively (see Table 2.3). For the Shuar, the proportion is considerably lower with 13.7% (close-to-market) and 18.3% (far-from-market), respectively. We see this as an indicator for an acculturation process with a shift from subsistence to a more market-oriented production. For the market-oriented Colonist communities, the share of subsistence income is the lowest with 8.7 and 10.2%, respectively.

Table 2.3 Cash and subsistence income in (US$) according to ethnic group and distance to the markets

	Colonists close-to-market				Colonists-far-from-market			
	Subsistence		Cash		Subsistence		Cash	
	Net (US$)	Rel %*	Net (US$)	Rel %	Net (US$)	Rel %*	Net (US$)	Rel %
Off-farm Income	-	-	106,800.0	78.7	-	-	93,000.0	82.2
Agriculture	698.0	5.4	4,610.5	3.4	1,812.0	14.1	5,164.0	4.6
Livestock	6,673.2	51.3	22,276.5	16.4	7,586.0	59.2	11,972.8	10.6
Environmental	5,630.4	43.3	2,000.0	1.5	3,424.0	26.7	3,000.0	2.7
Total Annual Household Income	13,001.6	100.0	135,687.0	100.0	12,822.0	100.0	113,136.8	100.0
	Shuar close-to-market				Shuar-far-from-market			
	Subsistence		Cash		Subsistence		Cash	
	Net (US$)	Rel %*	Net (US$)	Rel %	Net (US$)	Rel %*	Net (US$)	Rel %
Off-farm Income	-	-	109,920.0	85.3	-	-	34,200.0	85.2
Agriculture	6,810.5	33.3	2,612.0	2.0	2,450.0	27.3	905.0	2.3
Livestock	4,414.6	21.6	13,724.0	10.6	480.0	5.3	2,376.0	5.9
Environmental	9,244.2	45.2	2,680.0	2.1	6,044.4	67.4	2,644.0	6.6
Total Annual Household Income	20,469.3	100.0	128,936.0	100.0	8,974.4	100.0	40,125.0	100.0
	Kichwa close-to-market				Kichwa-far-from-market			
	Subsistence		Cash		Subsistence		Cash	
	Net (US$)	Rel %*	Net (US$)	Rel %	Net (US$)	Rel %*	Net (US$)	Rel %
Off-farm Income	-	-	67,200.0	84.6	-	-	56,400.0	74.9
Agriculture	6,602.2	30.9	5,540.5	7.0	5,146.0	11.9	2,383.8	3.2
Livestock	1,196.0	5.6	5,040.0	6.3	7,666.4	17.7	15,080.0	20.0
Environmental	13,540.8	63.5	1,680.0	2.1	30,500.4	70.4	1,430.0	1.9
Total Annual Household Income	21,339.0	100.0	79,460.5	100.0	43,312.8	100.0	75,293.8	100.0

Rel %* is the Relative Income

Off-farm income is the most important income source for all studied communities. For the Colonists and Shuar, it varies between 69.7% and 73.8% of the total income. Only for the Kichwa it is lower with 66.7% (close-to-market) and 47.6% (far-from-market), respectively (see Table 2.4). Off-farm income includes both unskilled labor mainly provided by oil companies, as well as donations. The

latter play a minor role and derive from the human development bonus of US$ 50 per month that the Ecuadorian government pays to almost 60% of the surveyed households.

The share of **agricultural income** is generally low varying from 3.5% (Colonists, close-to-market) to 12.1% (Kichwa, close-to-market). Independent of the market distance, the Kichwa have a higher total annual production than the other groups, but at the same time a lower income per unit area (Figure 2.5). This is probably due to limited technical skills, high post-harvest losses, high transportation costs and dependency on external intermediary buyers, who push prices down. Fluctuating crop prices sometimes do not even cover production costs, making off-farm income more attractive than agricultural income. Among the investigated communities, farm-gate prices vary considerably with up to 37.0% for cacao, 50.0% for plantain, cassava and maize and 77.0% for coffee. As a consequence, coffee production has decreased within the past years, because market prices have dropped and at the same time the demand for off-farm labor has increased.

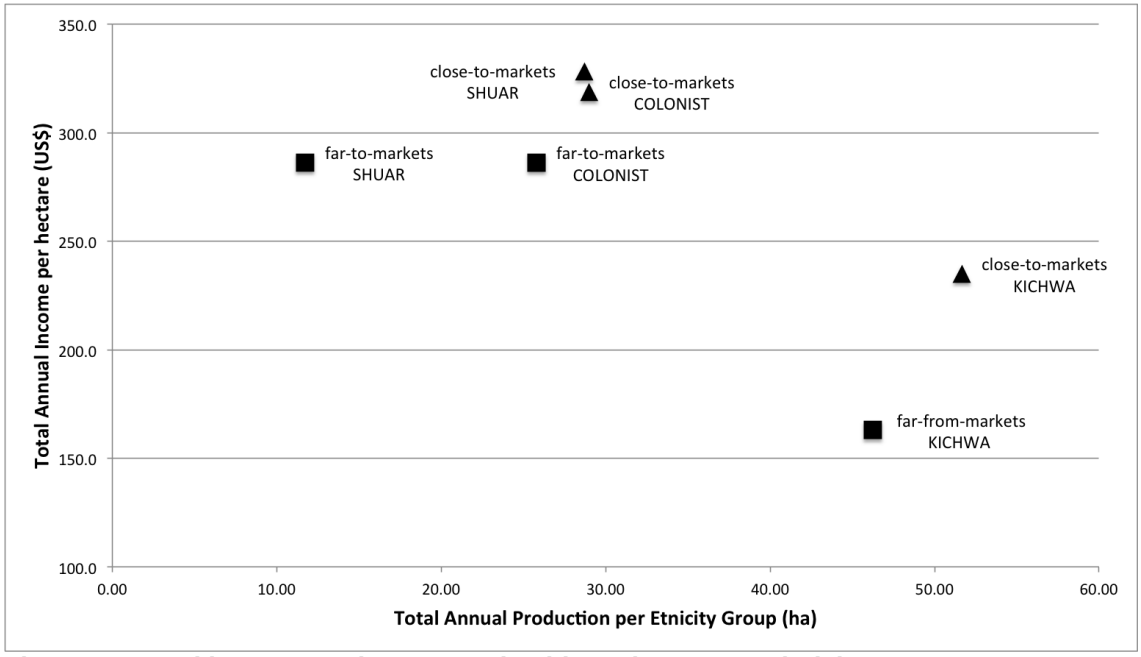

Figure 2.5 Total income per hectare and cultivated area per ethnicity

Income from livestock production varies between 5.8% for the far-from-market Shuar and 19.5% for the close-to-market Colonists (see Table 2.4). While cattle are of high importance for the Colonists, the Shuar and Kichwa mainly rely on poultry production. Aquaculture with introduced *Tilapia* species and the native Tambaqui (*Colossoma macropomum*) plays a certain role for the Colonist groups with 2.4% and 4.1% of the average total income, respectively, while it is less important for the other groups (<2.0%). In comparable studies on income sources of forest-dependent communities in Peru (Coomes et al., 2004), Bolivia (Uberhuaga et al., 2012) and Honduras (McSweeney, 2002), farm income (agriculture and livestock) has been pointed out as the main income source. This

is not the case in our study, where off-farm income ranks first and farm incomes only generates between 12.7% and 25.5% of the total income (see Table 2.4).

Forest income generates between 0.9% (Kichwa, far-from-market) and 9.6% (Shuar, far-from-market) of the total income (Table 2.4). In contrast to Godoy et al. (2002), who found that forest income diminishes with distance to markets, in our study we did not find a relation between these two variables. While forest income for Colonists is mainly based on timber production, the Shuar and Kichwa also use firewood and non-timber forest products (NTFPs). The majority of respondents from all groups reported that wood-extraction was only done for subsistence reasons, which complies with the legal regulations. However, as the sale of timber without a withdrawal permit is illegal, the reliability of the answers remains questionable. Interviewees reported that timber withdrawal permits are difficult to get, as the application process is time consuming and the permits are expensive. Therefore the investment is often not seen as beneficial.

Forest products such as fruits, vegetables and larvae are collected opportunistically. Household members collect them when trees are fructifying, along walks or during hunting excursions. Therefore they had difficulties to provide exact timing and quantities of collected NTFPs. Children seem to be important collectors, but their degree of participation is difficult to measure. Extraction of medicinal plants has probably diminished due to the offer of free public health services.

Firewood remains an important resource for indigenous peoples. For all study groups, the average time for wood collection is about 30 minutes per day. The majority of households collect firewood on a daily basis (59.6%), while 24.5% reported to gather it weekly. Kichwa and far-from-market Shuar communities are highly dependent on firewood, as they still cook on an open fire. In contrast, Colonists and Shuar close-to-market use mainly gas (70.0%). We used one LGP 15kg cylinder gas as a substitute value to calculate the share of firewood to the total income. In Ecuador, an average household uses 2.04 LGP cylinders per month (30.6 kg); the subsidized unit costs 1.60 US$ (data for January 2014). This corresponds to an annual average value of US$ 39.2. There is few data about firewood collection in Neotropical rainforests to compare to our findings. The research from Gram et al. (2001) in the Peruvian Amazon who calculated an average firewood value of 145 US$ per year is worth mentioning, but they do not explain the methodology they used.

Environmental income from fishing and hunting is considerably important for the Kichwa far-from-market (26.0%). For the Shuar and Kichwa close-to-market, the share is between 6.7% and 11.7%, while environmental income does not play a crucial role for the Colonist communities with 0.3% and 1.7%, respectively (see Table 2.4). Our data show that differences between ethnic groups are more distinct than the distances to markets. Regarding bush-meat collection, people in the communities stated that higher cartridge prices and governmental control of

firearms considerably reduced hunting activities. Nevertheless, hunting might be underestimated, as selling bush-meat is illegal and therefore respondents avoided giving clear answers. A study by Neira et al. (2006) in Kichwa communities in Ecuador shows that frequent hunters obtain between 20-80 US$ per month from bush-meat sales. The most common bush-meat species are mammals (*Dasyprocta fuliginosa*, *Agouti paca*, *Dasypus novencictus*, *Tayassu pecari*, *Logotrix lagotricha*, *Allouatta seniculus*) and birds (*Pipile cumanensis*).

Fishing is especially important for Kichwa communities with a share of 9.4% (close-to-market) and 21.4% (far-from-market) of the total income. In contrast, it varies between 2.5% to 4.3% for the Shuar and Colonist communities. The main collected fish species are: *Prochilodus nigricans*, *Aequidens tetramerus*, *Hypostomus micropunctatus*.

Table 2.4 Total income by sector and Specialization Coefficient according to Ethnicity and Distance to the markets

	CLOSE TO MARKETS						FAR FROM MARKETS					
COLONIST	La Reina						Union Lojana					
No. Households	41.0						28.0					
No. Interviewed	20 (48.8%)						20 (71.4%)					
Coefficient of Specialization	0.5						0.5					
Average Income per Household/month (US$)	619.5						524.8					
	Total (US$)	**%**	**SD**	**Max**	**Min**	**N**	**Total (US$)**	**%**	**SD**	**Max**	**Min**	**N**
Off-farm	**106,800.0**	**71.8**					**93,000.0**	**73.8**				
Labor	100,200.0	67.4	424.4	1,260.0		20	85,200.0	67.6	3,836.7	10,800.0		20
Donations~	6,600.0	4.4		600.0		11	7,800.0	6.2		600.0		13
Farm	**34,258.2**	**23.0**					**26,534.8**	**21.1**				
Agriculture	5,308.5	3.5	795.1	2,400.0		10	6,976.0	5.5	552.2	2,352.0	120.0	14
Livestock □	28,949.7	19.5	3,644.3	15,750.0		18	19,558.8	15.5	1,032.4	3,600.0		19
Environmental	**7,630.0**	**5.1**					**6,424.0**	**5.1**				
Forest°	5,038.0	3.4	1,594.9	4,000.0	38.4	4	6,100.0	4.8	1,071.5	3,000.0		6
Environmental+	2,592.0	1.7	194.9	720.0		4	324.0	0.3		288.0	36.0	2
TOTAL INCOME	**148,688.2**	**100.0**					**125,958.8**	**100.0**				
SHUAR	Tiguano						Ruminahui					
No. Households	35.0						13.0					
% Interviewed	20 (57.1%)						11 (84.6%)					
Coefficient of Specialization	0.5						0.4					
Average Income per Household/month (US$)	622.5						372.0					
	Total (US$)	**%**	**SD**	**Max**	**Min**	**N**	**Total (US$)**	**%**	**SD**	**Max**	**Min**	**N**
Off-farm	**109,920.0**	**73.6**					**34,200.0**	**69.7**				
Labor	100,320.0	67.2	6,041.3	21,600.0		20	29,400.0	59.9	3,334.7	9,000.0		10
Donations~	9,600.0	6.4		600.0		16	4,800.0	9.8		600.0		8
Farm	**27,561.1**	**18.5**					**6,211.0**	**12.7**				
Agriculture	9,422.5	6.3	426.1	1,809.0	72.0	19	3,355.0	6.8	231.2	650.0	70.0	9
Livestock □	18,138.6	12.1	871.8	2,400.0		20	2,856.0	5.8	405.8	1,040.0		10
Environmental	**11,924.2**	**8.0**					**8,688.4**	**17.7**				
Forest°	1,982.4	1.3	423.0	1,000.0		7	4,730.4	9.6	1,313.7	4,038.4		8
Environmental+	9,941.8	6.7	407.6	1,800.0	720.0	5	3,958.0	8.1	1,313.7	4,038.4	10.0	5
TOTAL INCOME	**149,405.3**	**100.0**					**49,099.4**	**100.0**				
KICHWA	Mandarina						Sinchi Napo					
No. Households	34.0						38.0					
% Interviewed	20 (58.8%)						20 (52.6%)					
Coefficient of Specialization	0.3						0.2					
Average Income per Household/month (US$)	420.0						494.2					
	Total (US$)	**%**	**SD**	**Max**	**Min**	**N**	**Total (US$)**	**%**	**SD**	**Max**	**Min**	**N**
Off-farm	**67,200.0**	**66.7**					**56,400.0**	**47.6**				
Labor	54,000.0	53.6	631.0	2,760.0		21	45,600.0	38.5	548.5	2,400.0		20
Donations~	13,200.0	13.1		7,200.0	600.0	11	10,800.0	9.1		600.0		18
Farm	**18,378.7**	**18.2**					**30,276.2**	**25.5**				
Agriculture	12,142.7	12.1	446.4	1,853.2	24.0	21	7,529.8	6.4	286.5	1,056.0	72.0	20
Livestock □	6,236.0	6.2	912.0	4,160.0		20	22,746.4	19.2	1,422.0	6,000.0		20
Environmental	**15,220.8**	**15.1**					**31,930.4**	**26.9**				
Forest°	3,429.6	3.4	394.7	1,538.4	19.2	21	1,119.2	0.9	77.2	358.4	3.2	20
Environmental+	11,791.2	11.7	155.0	972.0	600.0	17	30,811.2	26.0	472.7	1,512.0	24.0	20
TOTAL INCOME	**100,799.5**	**100.0**					**118,606.6**	**100.0**				

*Share of the Absolute Total Annual Income + Hunting and Fishing

□ Including Farm-by-products and Aquaculture) ~NGOs and Governmental Aid, Bonus, Etc

°Timber, Firewood & NTPPs

2.5. Discussion

2.5.1. Forest dependency

Forest dependency is often measured only based on the share of forest income. We think that environmental income should be considered as well when defining forest dependency, as fishing and hunting strongly depend on healthy forest ecosystems. The latter was also advocated by Vedeld et al. (2007). Therefore we include data on both the forest-related and environmental income. Additionally, we should also consider that environmental and climatic conditions such as rainfall and phenological cycles severely affect production and collection patterns. Therefore high levels of income heterogeneity can occur within one year or during subsequent years. In this respect, McSweeney (2002), Godoy et al. (2002) and Coomes et al. (2004) made similar observations.

The share of forest-related income is 3.9% over all study groups, ranging between 1.0% for the far-from-market Kichwa and 9.6% for the far-from-market Shuar (Table 2.4). Even though forest-related income might be underestimated, as explained in the previous section, it is still very low when compared to other studies, such as those by McSweeney (2002) in Honduras and Uberhuaga et al. (2012) in Bolivia that provide higher values with 3.0-47.0% and 18.0-24.0%, respectively. Noticeable in all studies are large deviations between the studied groups, which can be partly explained with respect to timber sale. Other factors include the accounting of firewood and NTFPs, which differs considerably between the different groups.

If we consider both, forest-related income and environmental income, percentages range from 5.1% for both Colonist groups, to 7.9% for Shuar close-to market, 15.1% for the Kichwa close-to-market, 17.7% for the Shuar far-from-market and 26.9% for the Kichwa far-from-market. However, this is still very low when compared to other studies, as for example those by Godoy et al. (2002) in Bolivia and Honduras, who calculated environmental-related income shares of 17.0% up to 45.0% (including bush-meat and fisheries). The comparably low weight of forest-related (environmental) income in our study can be explained mainly with the high off-farm income provided by the oil companies. Over all study groups, NTFPs account for only 0.1% of the total income; Colonists did not report NFTPs at all. Even taking into account the uncertainties in data acquisition, the importance of NFTPs must be rated as very low. Uberhuaga et al. (2012) presented comparable values for the Bolivian lowlands, where NTFPs represent less than 1% of the total household income. In Ecuador, Grimes et al. (1994) reported a potential average net annual value of US$ 115 from NTFPs, which corresponds to a comparably small percentage.

Taking a look at income diversification (Table 2.4), we see that both Colonist groups and Shuar close-to-market have a relatively high coefficient of specialization between 0.50 and 0.48, followed by Shuar far-from-market (0.38) and Kichwa close-to market (0.33). The lowest degree of specialization – or in other words, the highest income diversification – is represented by the Kichwa far-from-market (0.24). This indicates that Colonists but also Shuar close-to-market have a stronger market-orientation and are less dependent on forest and environmental income.

2.5.2. Implications for the design of REDD+ projects

Our data shed light over strategies to promote deforestation avoidance under REDD+. The communities chosen for our study were those interested in REDD+ participation to generate additional income. They are characterized by low deforestation rates between 0.3% and 0.01% for the decade 2000-2010 (HIVOS-FEPP, 2012), low cash-related forest-dependency, and high off-farm income, even though there are differences between the ethnic groups and the distance-to-markets. Moreover, a high percentage of households of these communities have a secondary house outside the community. This indicates that communities engaging in REDD+ are those with low dependency on forest-related cash income, where the pressure on forests is already comparably low, so that there is only little effect on deforestation avoidance under REDD+. We could even say that communities participating in REDD+ obtain some extra income for forests that would have been maintained anyway without additional incentives. To give an example, the community "Ruminahui" with a projected deforestation rate of 0.3% (the highest among our communities), equivalent to 3 ha per year for 2020 (HIVOS-FEPP, 2012), and considering the lowest carbon stock of 161.79 t/ha (593.7 tCO_2/ha) (MAE, 2013) with an average fix REDD+ carbon price of US$ 7.2/tCO_2e (Goldstein et al., 2014), the community could gain in a ten-year payment contract 8,976.7 US$/year or 690.5 US$ year per family. These values represent the 70% of the total calculated value following Evans et al. (2013). However other costs such as insurance and monitoring should be also added.

Communities with higher deforestation rates (1.8% deforestation rate in the Northeastern Amazon for the period 1996-2002 in Mena et al., 2006) and potentially higher revenues from REDD+ showed no interest in participating in the REDD+ pilot project. These communities are probably engaged in more profitable activities such as logging or do not have land rights over occupying territories. Other reasons are the difficulty to enter REDD+ projects when compared to the National Scheme Sociobosque and the anti-REDD lobbying (Reed, 2011).

Considering the targeted long-term perspectives of REDD+ frameworks, we must take into account that off-farm income provided by oil companies is only temporal. After oil exploitation, the companies will leave the region and temporal labor will likely decline. This will reduce off-farm income possibilities and probably set higher pressures on forest resources, as can be seen in other regions where oil companies already left.

When implementing REDD+, we must also consider that before the current oil exploitation the region has already experienced coffee, cacao and cattle ranching booms (Erazo, 2011) and also the influence of governmental policies, availability of credits, and engagement of NGOs have changed over time. These external factors have immense impacts on livelihoods, income generation, and land use. Therefore livelihood strategies in the Northeastern Amazon cannot be explained through traditional land-use decision-making processes (Pichon, 1997a; Rudel et al., 2002; Barbieri et al., 2005). In this context we must understand that all study groups still undertake shifting cultivation with almost 40% of the selected households practicing cut-and-mulch on a regular basis. As long as the population density is not too high, traditional land use practices are considered sustainable as they conserve soil fertility, encourage food security, and minimize negative impacts on species diversity (Siren, 2007). Therefore they should be incorporated in REDD+ schemes and enough land should be kept to ensure this. The same applies for hunting, fishing and firewood collection, which should be permitted at least to a certain extent. Moreover, REDD+ should be part of an overall development strategy aiming at income diversification. Due to the high fluctuation of market prices of perennial cash crops, but also carbon prices, subsistence income from various sources remains particularly important in the long term.

With respect to diversity of the forests, we must consider that Colonist and Shuar communities practiced selective timber extraction in the past, so that most of the valuable trees have already been logged. In contrast, Kichwa have larger territories where most of the valuable trees are still present. Therefore REDD+ could be a suitable instrument to protect these rich forests on Kichwa lands in the future.

Apart from deforestation avoidance, there is the possibility of forest reforestation under REDD+. However, in our study region this option is limited to pasturelands of Shuar and Kichwa communities. Cattle ranging is not a traditional land use practice of these ethnicities. It is promoted by the Ecuadorian government who donates animals and provides cheap credits for livestock production (III Censo Nacional Agropecuario 2012- INEC, 2012). As cattle ranging negatively affects biodiversity and soil conditions (Pichon, 1996; Rudel et al., 2002) and at the same time only generates a small proportion of the total income, pasturelands could be converted to forests. In contrast, cattle ranging plays a crucial role for the Colonists as a coping strategy during times of economic crisis. Moreover, livestock ownership provides them access to loans. Therefore converting

pastureland to forests is not a promising strategy for them. Here, introducing agroforestry systems and including them into REDD+ schemes could achieve enhancement of carbon stocks.

2.6. Conclusions

In the case of our studied communities in YBR, both market distance and ethnicity have an impact on the sources and amount of income as well as the degree of forest-dependency. Our hypothesis that close-to-market communities have a lower degree of forest dependency and higher cash income due to better market access and labor opportunities can be restricted to close-to-market Colonists and Shuar and rejected for the Kichwa community, as the latter depend on the sale of timber that increases the degree of forest dependency. Our second hypothesis that indigenous communities have a higher degree of forest-dependency and higher environmental income compared to Colonists can be validated. Colonists and close-to-market Shuar are market-oriented, while far-from market Shuar are currently shifting from subsistence to market economies. In contrast, despite their distance to markets, the Kichwa are more dependent on subsistence income and have a higher degree of income diversification.

Despite differences between ethnic groups, all communities receive high off-farm revenues from unskilled labor provided by oil companies as well as external aid from the government and from international NGOs. Due to these external sources, dependency on agricultural, livestock, forestry and environmental income is temporarily reduced independently of differences in ethnicity and market distance. The latter also decreases, at least temporarily, the pressure on forest resources in the selected communities and therefore deforestation rates. Under these circumstances, REDD+ provides only weak financial incentives for the studied communities. However, this conclusion is specific to the studied communities that are currently strongly influenced by oil exploitation and should therefore not be generalized. However, we believe that these differences need to be considered in the design of REDD+ schemes. Since oil exploitation is the major indirect cause of deforestation, the cost-opportunity of oil-related off-farm income cannot compete with any other income alternative. Moreover, households willing to engage in REDD+ activities have high off-farm income and might not directly depend on forest income for cash income generation.

2.6.1. Acknowledgments

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Chapter 4

REDD+ implementation in the Ecuadorian Amazon: Why land configuration and common-pool resources management matter

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3. REDD+ implementation in the Ecuadorian Amazon: Why land configuration and common-pool resources management matter

3.1. Abstract

Community-based forest management under REDD+ has been suggested as a promising mechanism to conserve forests and at the same time enhance living conditions of their inhabitants. In the buffer zone of the Yasuní National Park in Ecuador, we analyzed the spatial and institutional configuration of Common Property Management Regimes (CPMRs) of two indigenous groups (Shuar, Kichwa) and a group of Colonist cooperatives in their historical development. We used the Ostrom (1990) principles to assess land configuration and institutional arrangements for decision-making in the use of shared resources and analyzed the implications for REDD+ implementation. We found that CPMRs of the two studied indigenous groups are becoming increasingly similar to those of the Colonists as a result of agrarian reforms and legal frameworks for communal organization. The informal continuation of traditional forms of organization under (modern) formal structures and the overlap of de jure and de facto rights hinder efficient and transparent forest governance and REDD+ implementation. Spatial and institutional homogenization of CPMRs of various ethnic groups and privatization of farms inside CPMRs causes further forest fragmentation and impedes conservation goals.

3.2. Introduction

Deforestation and degradation of tropical rainforests affect the global and regional climate and can have serious impacts on livelihoods in developing countries (Wunder et al., 2014). To counteract these negative effects and enhance forest carbon stocks in developing countries, Reducing Emissions from Deforestation and Forest Degradation (REDD+) was introduced at the 11th session of the Conference of the Parties (COP 11) to the United Nations Framework Convention on Climate Change (UNFCCC), November 2005 in Montreal, Canada. REDD+ is a mechanism that provides financial incentives to conserve and sustainably manage forests. However, it is not clear under which conditions REDD+ can become a real opportunity to protect large community-managed lands. This paper provides ground-based data that enrich the scientific debate on trade-offs of REDD+ implementation through an analysis of the spatial and institutional dimensions of communal arrangements. Community-based forest management has been suggested as an appropriate approach to involve the local population in natural resource management and forest conservation. It was also considered to bring efficiency, efficacy and equity to REDD+ (Agrawal and Angelsen, 2009) and had the additional advantage of lower transaction costs

in the REDD+ implementation process (Chhatre et al., 2012). Moreover, large forest areas under autonomous governance in community lands are associated with high carbon pools, ownership and long-term sustainability (Pretty, 2003; Bremner and Lu, 2006; Chhatre and Agrawal, 2009; Porter-Bolland et al., 2012).
Apart from financial revenues, the participation of Indigenous Peoples (IP) in REDD+ projects can enhance their actual living conditions by providing non-carbon benefits like food security, diversification of income, land tenure rights and the reinforcement of local community organizations (Lawlor et al., 2013; Chhatre et al., 2012). However, there is still uncertainty on how REDD+ could be implemented without damaging traditional Common Property Management Regimes (CPMRs) (Bluffstone et al., 2013). Restrictions to forest use and governmental control associated with REDD+ can endanger the livelihoods of forest dwellers (Bluffstone et al., 2013). To avoid this, it is crucial to have a profound knowledge regarding customary management of land and resources especially in rich and complex cultural and biological environments. Only then REDD+ and other conservation strategies can provide sufficient protection for local inhabitants and enhance forest conservation. Furthermore, we argue that not only existing knowledge but also the revalorization of traditional practices of community forest management can provide critical achievements to REDD+ initiatives. Moving from the ‘tragedy of the commons’ in open-access land resources (Hardin, 1968), Ostrom (1990) proposed eight principles for the design of CPMRs. These principles are related to boundaries, rules, collective choice arrangements, monitoring, sanctions, conflict resolution, institutional recognition and networks. These widely used principles characterize how successful and stable institutions for the sustainable governance of common-pool resources (CPRs) should look like. According to Schlager and Ostrom (1992), CPMRs' rights are conceptualized as operational rights (access and withdraw rights) and collective choice decisions (including management, exclusion and alienation rights). In this context, clear rights and responsibilities with regard to CPRs are essential for the effective management of CPMRs. Rights can have a legal recognition (de jure rights) or the users/local organizations can state and implement customary rights by themselves (de facto rights). However, these two types of rights can overlap and may cause legal uncertainties and conflicts (Schlager and Ostrom, 1992; Bremner and Lu, 2006).
Besides clear ownership arrangements and control over territories, social capital plays a major role to ensure conservation compliance. In CPMRs, social capital encompasses trust, reciprocity, common rules, networking and locally enforced incentives and sanctions (Ostrom, 1990; Agrawal, 2001; Dietz et al., 2003; Bremner and Lu, 2006). However, the ability to organize is not uniform among all groups and inappropriately planned management of forests in indigenous lands can lead to monopolization of resources by elites (Nagendra and Ostrom, 2012; Krause et al., 2013). Therefore, it is important that multi-scale governmental policies and plans interact with CPMRs (Ostrom and Nagendra, 2006; Nagendra and Ostrom, 2012).
Insecure land tenure and inappropriate participation mechanisms as well as the lack of clear rules and rights for natural resources management can have

negative impacts on the livelihoods of the local population and also become obstacles for successful REDD+ implementation (Chhatre et al., 2012). To guarantee full and effective participation in REDD+, the UNFCCC (2011) dictates the “respect for the knowledge and rights of IP and members of local communities”.

Despite its importance, little attention has been given to CPMRs and local decision-making institutions for resource use especially in the Amazon region (Richards, 1997; Bremner and Lu, 2006). This is reflected by only few studies that deal with CPMRs in Amazonian countries, such as those by Richards (1997); Lu (2001); Bremner and Lu (2006) and Oldekop et al. (2013) in Ecuador, Becker and León (2000) in Bolivia, Chase Smith (2000) in Brazil and Peru, and Giudice and Yu (2009) in Peru. Especially for countries like Ecuador, where IP' territories represent 60% of the country's forests, which in turn store almost 80% of the biomass carbon, CPMRs are of utmost importance (Bertzky et al., 2010; Lopez et al., 2013).

This article provides important ground data that contribute to the practical design of REDD+ in community-managed lands. It is based on an assessment of land configuration and institutional arrangements for decision-making in the use of shared resources. Our results are presented in two parts: First we conduct a spatiotemporal analysis of the dynamics of land configuration to better understand the historical and cultural context of current land and resources distribution and management practices. Using the theoretical framework of CPMRs by Ostrom (1990) and followers, we then characterize CPMRs based on institutional arrangements for decision-making of shared resources and explore resource use rules and management of CPMRs. Hereafter we analyze de jure versus de facto rights of CPRs' principles comparing the three study groups. Finally we discuss the implications of customary and actual land configuration and traditional institutional arrangements for REDD+ implementation.

3.3. Methodological approach

3.3.1. Analytical framework

Our study is based on a spatial-temporal analysis of land configuration as well the principles on sustainable management of Common Property Management Regimes (CPMRs) developed by Ostrom (1990) and subsequent amendments by Schlager and Ostrom (1992); Agrawal (2001) and Dietz et al. (2003). There is empirical evidence that these principles can serve as a good basis to analyze CPMRs with respect to institutional arrangements for decision-making and social capital as well as resource use rules and management of CPMRs (Cox et al., 2010). Following Richards (1997) and Bremner and Lu (2006), we construe CPMRs as collective ownership arrangements where holders regulate the access and use of Common Property Resources (CPRs) and limit access to non-owners.

In this context, the terms CPMRs, commune, community, and center are frequently used interchangeably. Apart from these aspects, we assume that the principles for the effective management of CPRs can also guide the design of REDD+ based on CPMRs, as the REDD+ mechanism should build on the existing regimes. Considering the cultural and organizational differences between the three study groups (Shuar, Kichwa, Colonists), it is moreover important to differentiate between de facto and de jure rights of common resources use and management.

3.3.2. Study area

The study area is located in the Orellana province within the Yasuní Biosphere Reserve (YBR) in the northeastern Amazon basin of Ecuador. The YBR covers an area of 23,662 km2 (FOES-REGAL, 2008; Figure 3.1). The core area encompasses the Yasuní National Park (located between the Nashiño and Yasuní Rivers), the Waorani Ethnic Reserve and the Untouchable Zone of the isolated tribes of the Tagaeri and Taromenane groups (ZITT). The buffer area stretches along the Napo River and the Yuca and Auca roads (Finer et al., 2009). The YBR is part of a larger tropical rain forest area with average annual temperatures of 25 °C and average annual precipitation of 3000 mm (FOES-REGAL, 2008). This highly biodiverse ecosystem contains important aboveground carbon reservoirs (circa 111– 160 tons/ha) (Bertzky et al., 2010). Indigenous Peoples' territories represent 50% of the YBR; however, not all of them have legal recognition. For example, in the Orellana province only 12.9% of the Kichwa, 23.1% of the Shuar and 54.2% of the Colonists who live there have recognized land tenure (FOES-REGAL, 2008).
The Ecuadorian Northeastern Amazon region has experienced fast population growth since the 1970s, when the construction of roads for oil exploration started. Along with the agrarian reforms in 1964 and 1972, the state government awarded farms (fincas) of 50 ha to enhance the colonization of the Amazon region (Pan et al., 2004; Proyecto Bosques, 2009). After Colonists settled in the region, they were able to gain the land titles if at least 50% of the terrain was cleared (Richards, 1997; Perreault, 2001). The government, clerics, and some indigenous leaders stimulated IP to form farmers' cooperatives as a (cheaper) possibility to obtain land prior to the legal constitution of indigenous communities

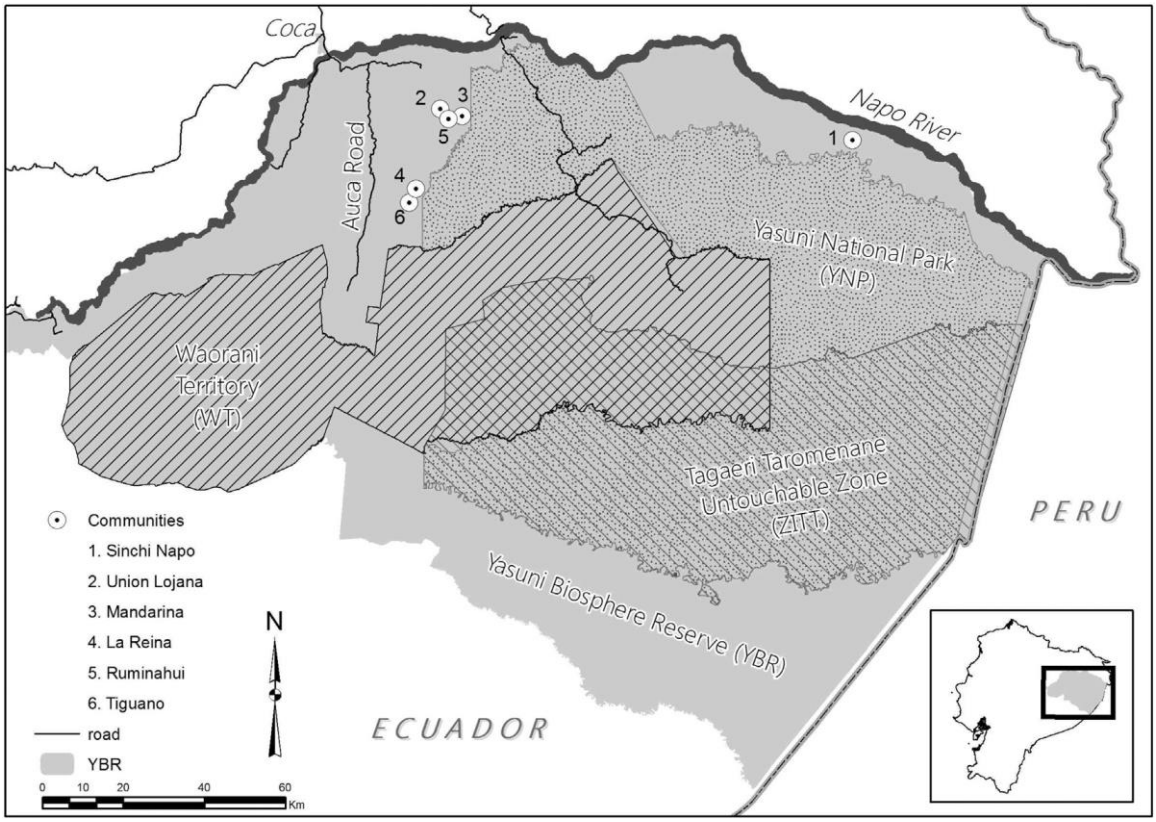

Figure 3.1 Study area and surveyed communities (taken from Loaiza et al., 2015)

(Erazo, 2011). This triggered an unplanned colonization process accompanied by large-scale deforestation, which is still ongoing and among the highest in Latin America (Pichon, 1997; Zapata-Ríos et al., 2006; Finer et al., 2009). Increasing immigration and high fertility rates of the local population increase the demand for land and cause further landscape fragmentation (Barbieri et al., 2005; Morales et al., 2010). Off-farm income, shifting agriculture, livestock production, hunting and fishing are main subsistence activities for local inhabitants (Loaiza et al., 2015). Indigenous communities living in the YBR are adapting to market economies and live in "accelerated cultural fragmentation and homogenization" (Perreault, 2001).

3.3.3. Study groups

With the Kichwa and Shuar indigenous groups and the Colonists we chose the three ethnicities with the highest population living in the buffer zone of the Yasuní National Park. The Kichwa (Quichua) are the largest and widely spread indigenous group in the Ecuadorian Amazon region (Holt et al., 2004). The Kichwa in the study area are known as Kichwa Naporuna[2]. They speak Runa Shimi, a dialect based on the Kichwa language, and Spanish. Their "identities are

[2] Kichwa living along the Napo river.

complex and overlap with white-mestizo identities" (Uzendoski, 2005).
There are almost 45,000 Shuar traditionally living in southern Ecuador and northern Peru (Bremner and Lu, 2006). They belong to the Jivaro linguistic family (Moya, 2000; Holt et al., 2004; Pohle et al., 2010). The first peaceful contact with Colonists was in the early 19th century during trading expeditions to extract gold, quinine and rubber. The Shuar are known for the ritual of shrinking human heads (tsantsas) (Gerique, 2010). Due to mining and the unfair redistribution of land in favor of Colonists, the Shuar started migrating to Orellana province and other Amazon provinces looking for new living space (Holt et al., 2004). Today, their livelihood activities are highly market-oriented (Bremner and Lu, 2006). So far there are only few studies on the livelihoods of the Shuar in the northeastern Amazon. The term Colonists (mestizos) is used to describe the "people of mixed Spanish and indigenous descendants" (Pohle et al., 2010). The Colonists in YBR are migrants coming from other provinces, principally Loja and Manabí. Today, Colonists now represent the largest population group in Orellana province (60%), despite the fact that only 40 years ago they made up only 5% of the population (Proyecto Bosques, 2009). Land use patterns among Colonists have been largely studied in the northeastern Amazon region (Marquette, 1998; Pan et al., 2004; Barbieri et al., 2005; Barbieri and Carr, 2005; Messina and Walsh, 2005).

3.3.4. Research design and methods

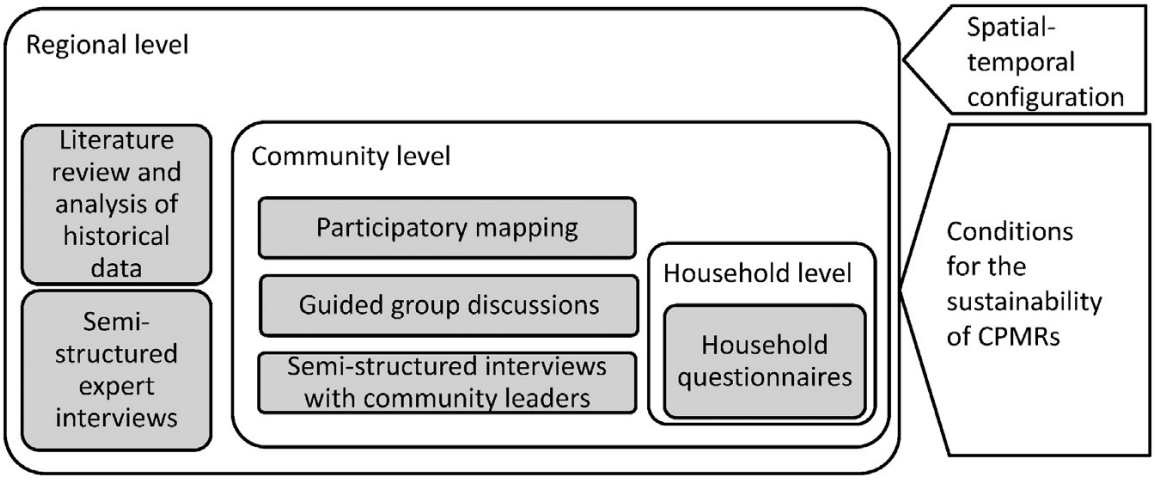

Figure 3.2 Scale of analysis and methods used

This research is based on a multi-layer approach, from the regional over the community to the household level. A summary of data sources and variables is presented in Figure 3.2. The analysis of the spatio-temporal dynamics of land configuration was conducted at the regional level to analyze the evolution of CPMRs throughout history. It is based on a combination of literature review, historical documents, maps, and chronicles from the Centro de Investigaciones

Culturales de la Amazonía Ecuatoriana (CICAME) as well as qualitative data collection from expert interviews using a semi-structured guideline. The interviewed experts are academics who work with indigenous lands, history and cultural aspects in the Ecuadorian Amazon.

The analysis of the conditions for the sustainability of CPMRs, including the institutional arrangements, decision-making and a comparison of de jure and de facto rights are based on data obtained at the community and household levels. The communities were selected within the frame of a REDD+ pilot project (2011–2015) of the German NGO Welthungerhilfe, Fondo Ecuatoriano Populorum Progressio (FEPP), and Hivos. All communities were willing to engage in the REDD+ initiatives. For each ethnic group (Kichwa, Shuar and Colonist), we selected one community that was close-to-markets and one that was far-from markets (n = 6) to compare the effects of market integration over land configuration. Distance to markets is determined by the travel time, which in turn depends on the absolute distance (km from the provincial capital), accessibility of the transport infrastructure (river, road, trail, etc.), and frequency of public transportation. All communities are registered according to the Ecuadorian legislation (Art. 27, Registro Oficial No. 315). Table 3.1 provides an overview of the six selected communities.

At the community level, we gathered data on CPMRs, organization and decision-making, contact and affiliation with other institutions/organizations, community land rights and land acquisition history as well as use of CPRs based on expert interviews with the presidents of the community assembly council (n=4). To get a clearer picture of territorial configuration and use of CPRs inside CPMRs, participatory mapping techniques and guided group discussions were applied, as described in Mather et al. (1998); Jackson et al. (1994) and Tipula (2008). These activities were carried out during organized community meetings.

For the participatory mapping in each community, at least one group of males and one group of females were formed to consider gender specific differences in resource use. Each group consisted of 4–10 individuals. The session was moderated and guided by one author. Maps were drawn in A0 format, indicating principal rivers, roads and settlements (Figure 3.3). Other information like demarcation of territories, facilities, locations and type of resource use sites, conflict and spiritual places were also identified. Names were written in Spanish and/or native languages. The resulting map was presented and discussed in the plenary meeting (Figure 3.3). During these meetings guided discussions about resource use and rules were accomplished with the same groups. At the household level, questionnaires were conducted in order to acquire information on participation in decision-making, land tenure rights and resource use rules. We randomly selected 20 families (n = 111) per community (except one with only 13 households) to diminish the variation in sample size (Bremner and Lu, 2006).

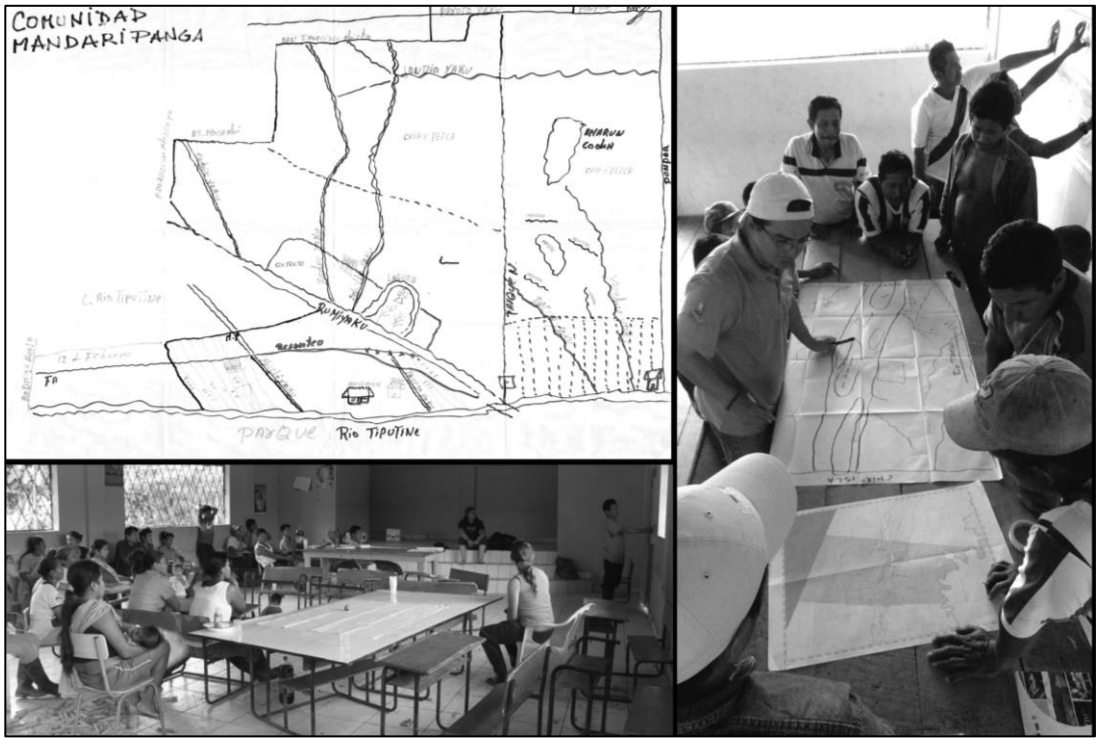

Figure 3.3 Community participatory mapping in a Kichwa community

3.4. Results

3.4.1. Spatial configuration

3.4.1.1. Spatio-temporal land configuration

In this section we present the spatial configuration of CPMRs at the community level for the two indigenous groups for the colonial and re- publican periods to understand the transformation process towards actual patterns of land configuration (Figure 3.4).

In colonial times there were no clear community boundaries and households were highly mobile (Macdonald, 1997). Rivers and other geographical barriers defined inter-ethnic territorial borders. Traditional subsistence land activities of indigenous groups were based on a mixture of orchards, shifting cultivation and gathering of forest resources. Traditionally, both Shuar and Kichwa had highly diverse home gardens where they cultivated manioc (*Manihot esculenta*), plantain (Musa spp.) and sweet potato (*Ipomoea batatas*), along with other vegetables and medicinal plants. Fruits, fibers, larvae and other forest products were collected around the home garden. Both groups went on hunting and

fishing expeditions of some hours to several weeks or even months (Macdonald, 1997; Lu et al., 2012).

For the Kichwa, the largest territorial settlement is the extended family (ayllu), which can often be identified by the last name (Moya, 2000; Uzendoski, 2005). The ayllu is mainly organized in a patriarchal structure, but matriarchal arrangements exist as well (Uzendoski, 2005). A group of ayllu forms a territorial clan or *muntun* (Moya, 2000). A muntun can represent families, towns or larger villages and its inhabitants share the same consanguinity, history or culture (Uzendoski, 2005). Traditionally, the Kichwa had a secondary house in the forest, which was used during hunting expeditions (Macdonald, 1997) (Figure 3.4a).

In case of the Shuar, in their original territories in Southern Ecuador, homes were located within 1–2 days walking distance from each other and houses were abandoned after 5–9 years when bush-meat was scarce. Their home gardens could reach up to 7000 m2, depending on the number of wives (Moya, 2000). Land was considered as a common resource and Shuar could freely choose the preferred locations to build a house and open an orchard. However, the house had to be separated by a minimum distance to other properties to keep enough space for farm activities (approx. 1 km distance). A Shuar family owned the farmland that they cultivated. Nonetheless, wild products such as chonta (*Bactris gasipaes*), cacao (*Theobroma cacao*) and cultivated fruits were common resources (Allioni et al., 1978). Shuar never shared large territories because of their hostile clan relations, especially due to wars and kidnapping of women (Figure 3.4d).

Table 3.1 Profiles of the selected communities (modified from Loaiza et al., 2015)

	La Reina^	Unión Lojana	Tiguano^	Rumiñahui	Mandarina	Sinchi Napo^
Ethnic group	Mestizo (Colonists)		Shuar		Kichwa	
Creation year	1980	1991	1985	1996	1998	1975
Total area (ha)	1437	1269	1394 (1500)*	235*	3076 (2000)*	8420 (8000)*
Households	41 (20)**	28 (20)**	35 (20)**	13 (11)**	34 (20)**	38 (20)**
Community center	X	-	X	X	X	X
Oil/seismic activities	X	X	X	X	X	-
Distance to main market (km)	66	40	66	70	67	152

* Land claimed is inside protected areas or/and in conflict with neighboring communities
** Number of surveyed households
^ Communities located far-from-markets

During republican times, property structure changed drastically due to the influence of missionaries and agrarian reforms. Many IP started to form farmer associations in order to gain land and reduce the Colonists' expansion (Perreault,

2003). As a consequence, land arrangements changed first from scattered-dispersed residences to more or less centric configurations and later on to defined communities and associations (Moya, 2000; Rudel et al., 2002) (Figure 4b and e). Other ethnicities, especially the Kichwa, started migrating to rural remote areas and formed communities with other migrants. For instance, the Kichwa canelos from the highlands and the central-eastern Amazon area gained access to new territories (Naranjo, 1977). Therefore, lowland Kichwa as those living in our study area can be considered to be a multi-ethnic group as a result of migration and inter-ethnic marriages (Moya, 2000). In contrast to the Kichwa, the Shuar were living in remote and hard to access areas in the southeastern Amazon region. Moreover, they were more aggressive and resistant, so that the Spanish colonizers never completely controlled the Shuar territories, which led to a retarded colonizing process. Nevertheless, in the beginning of the 19th century, gold mining and resettlements by evangelizing missions forced them into contact with foreign cultures. Later the Peru-Ecuador war (1941) and the oil companies put pressure over territories accelerating the Shuar acculturation process. As a consequence, Shuar started to migrate to the northeastern Amazon region looking for new territories. Once established, they acquired lands following land redistribution policies. During this period, inter-ethnic conflicts for land control were more common and intense than today.

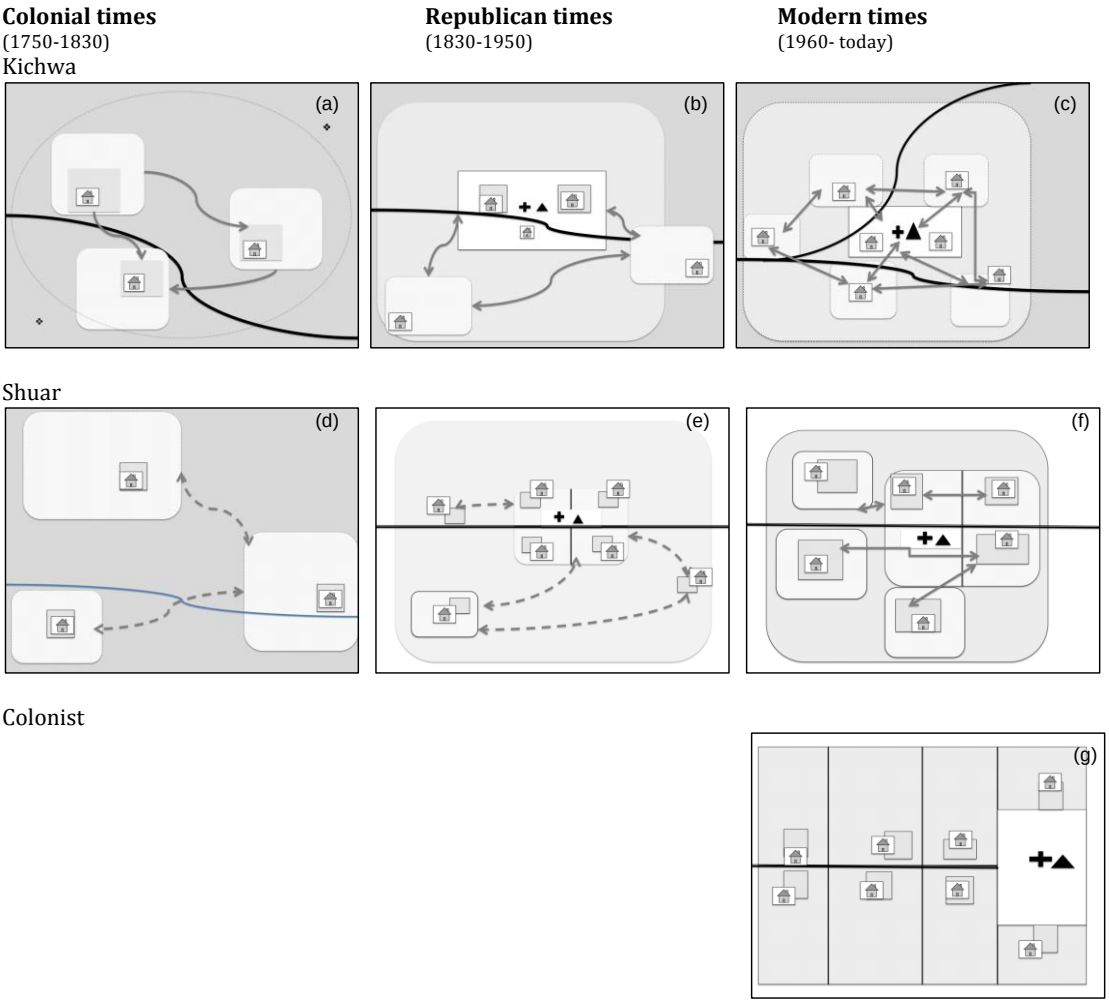

Figure 3.4 Spatio-temporal dynamics of land configuration

In modern times, private landholders, IP or public entities claimed tenure rights over the lands in YBR. As a result of market integration and land distribution policies, they resettled along main roads or rivers (Figure 4c and f). We found that all studied groups have a strong tendency to arrange CPMRs following the patterns from the agrarian reforms of the 60s and 70s. Surprisingly, even though IP have autonomy to define land configuration according to their traditions, CPMRs are converging into this homogenous pattern. In the six studied communities we found the following land arrangements: land is parceled in properties of 250 m × 2000 m (50 ha) starting from the main road or river. This is called the first line (Figure 5). When no more land is available, a second line with the same property size is traced 4000 m from the main road or river. Various initiatives have been taken to avoid land distribution conflicts; for instance, the close-to-market Kichwa community arranged a topographer to divide farms of 50 ha along the new road. All surveyed communities have already established or plan to establish a community center with facilities like a church, school, health center and other services.

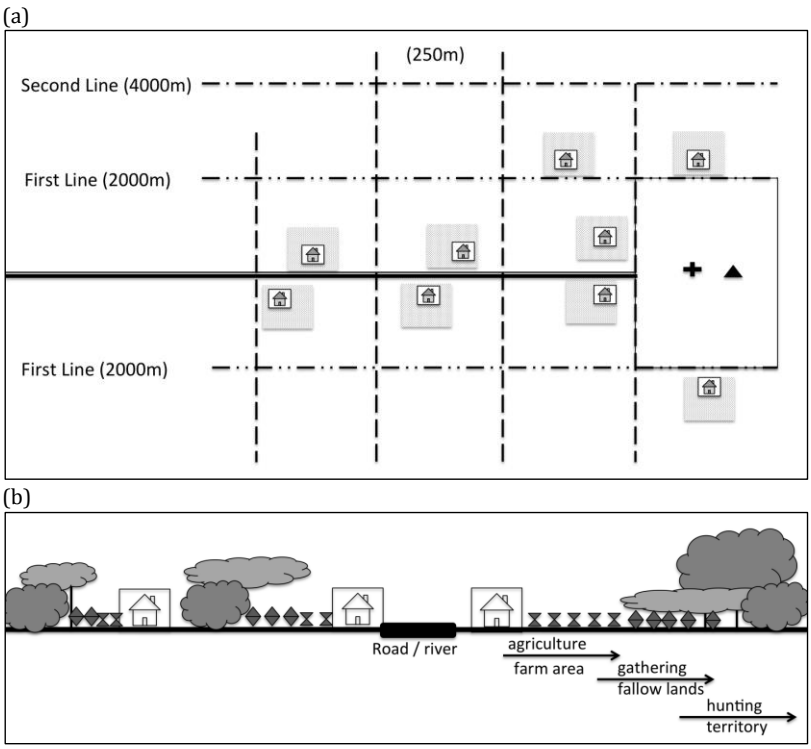

Figure 3.5 Modern land configuration: (a) horizontal view, (b) vertical view

3.4.2. Characterization of CPMRs

3.4.2.1. Institutional arrangements for decision-making and social capital

At the community level, for all ethnic groups decisions are taken in general assemblies with general consensus. This formal organizational structure of decision-making is a legacy of the Kichwa and nowadays enforced by the government. It has partly replaced customary decision-making bodies. For the Kichwa, the extended family is the center of the socio-political patriarchal organization. At the community level decisions are taken in hierarchal assemblies and both husband and wife take intra-household decisions. For the Shuar, the extended family (clan) is the center of the organizational structure. Traditionally Shuar communities did not have any hierarchical organizational structure, however, shamans or elders played an important role in mediating community issues (Allioni et al., 1978). Lately, the traditionally polygamist Shuar are moving to monogamous marriages also with partners from other ethnicities. As a consequence of monogamy, women are less involved in decision-making processes and landholders are increasingly males. Colonists take decisions at the nuclear family level and respond to the political administrative organizations.
Nowadays all communities, centers or cooperatives are required to take decisions according to the law for the organization and regime of communities

(Registro Oficial 315-2004) in order to fulfill legal requirements (Table 3.2). Normally, household heads and family members can attend assembly meetings, while communities can allow or exclude the participation of outsiders. Assemblies can be held in the native language and/or in Spanish. An elected assembly council leads the session and has the typical western structure with a president, vice president, secretary, treasurer and vocals (Figure 6). Democratic elections are held every two years with the right of re-election. Women can participate and can also be elected as council members. Ancestral leaders like the elders (yachac in Kichwa) or shamans were integrated as the Captains (appointed by religious orders) or the Syndics (usually corresponding to a political authority). Even though still part of the council, their important function as community decision-makers has been curtailed due to insufficient Spanish writing and reading skills. Additional commissions to support sport championships, as well as the parent committee are today also present in community customary institutions.
Not all households within the community boundaries are necessarily members of the customary community institutions. Depending on the internal community rules, non-community members living within the boundary of a community can be either completely excluded from the assemblies or participate without voting rights. All interviewed Kichwa household heads are associates, but principally other members from the extended family can participate in the assemblies as well. In the two Shuar communities, household heads that are non-members correspond to recently formed families under probation. According to the respondents, new Shuar families must show that they can work the land and sustain a family in order to obtain the full rights of a community member. In the case of the Colonists, a new landowner can become a member of the cooperative after paying a fee of US$50. The surveyed non-members of the Colonists' associations are households that have yet to pay the membership fee. Young adults without a family can only vote if they have their own farm.
In the surveyed communities men dominate the assemblies. In 59.5% of Colonists, 25.0% of Shuar and 31.7% of Kichwa households, male household heads attend the meetings alone. In the majority of the indigenous communities male and female household heads attend the meetings together. However, normally Kichwa women do not vote if men are present. On the other hand, Shuar women can inherit land and act as members separately from their husbands. After the oil boom, the number of participating women has increased since men are more frequently engaged in off-farm labor. In the surveyed communities, the percentage of women that attend the meetings alone is 10.8% for the Colonists, 15.6% for the Shuar and 14.6% for the Kichwa.
Community councils send invitations to meetings: either via written convocations (51.3% Colonists, 67.7% Shuar and 41.5% Kichwa) or oral communication (43.2% of the Colonists, 32.3% Shuar and 19.5% of Kichwa) depending on the location and distance of households. Ordinarily, the Kichwa communities have fixed meeting dates, like for ex- ample the first Sunday of the month. Shuar and Kichwa household heads attend meetings more regularly (90.6% and 95.1%, respectively) than Colonists (81.1%). According to the Articles 15 and 16 of the Registro Oficial 315, the government promotes both, meeting announcement and

dates (Table 3.2). Important decisions such as oil and seismic concessions or REDD+ project participation are taken in the general assembly with the participation of a vast majority of the com- munity members. The assembly council is in charge of communicating the decisions to the project executors. In certain cases, like oil concessions and REDD + projects, commissions can be formed to serve as mediators between the communities and the project executers.

3.4.2.2. Social capital

According to our study, intra-community interactions, cooperation and trust can be used as powerful indicators for the successful implementation of REDD +. Moreover, negotiations, benefit-sharing and monitoring activities under strong social institutions bring equity and better management of forest resources as stake- holders are effectively integrated. In this context, we documented several forms of cooperation as an indicator for social capital among our studies communities. One common example of communal cooperation is the voluntary labor exchange called minga. Shuar and Colonists have also adopted this traditional Kichwa practice. A minga is a meeting of communal members to complete a task in benefit of the community, like for instance to maintain local roads and community boundaries. All households are obligated to assist in the voluntary labor exchanges. Some communities like the far-from-market Kichwa community had a fixed monthly date for the minga work, while other communities announce mingas during general assemblies. The members of the community work together for hours or even days until the work is done. All household heads of the surveyed indigenous communities responded that at least one household member participates in the communal work. Sometimes, this joint community work includes helping a house- hold of the community after a disaster or constructing a new house. In exchange for the help, the family who benefits provides food and drinks to the minga helpers.

Another form of labor exchange is the prestamanos. Usually some members of the extended family or some neighbors are invited by a household to participate in farming or construction activities. The benefited household will return the favor, also in form of labor. Prestamanos is still widely practiced in Kichwa and Shuar communities (Holt et al., 2004). Additional reciprocal interactions include the distribution of goods, especially surpluses obtained from hunting and horticulture (Uzendoski, 2005).

Other forms of cooperation like bartering are increasingly disappearing. However, members of the Kichwa and far-from-market Shuar communities still share a high sense of reciprocity, cooperation and redistribution of goods and services among them. Nevertheless, even in Shuar and Kichwa communities it is hard to promote extra work for non-tradition activities especially since male household heads are often away generating oil-related off-farm income. In the local oil industry, 21 working days and 7 days off are the norm. This adds pressure on female household heads who end up taking on part of the husband's household and community responsibilities. In our REDD+ pilot project, developers successfully

invested great efforts and energy in socializing to encourage people to engage in less- intense non-tradition activities like raising chickens.

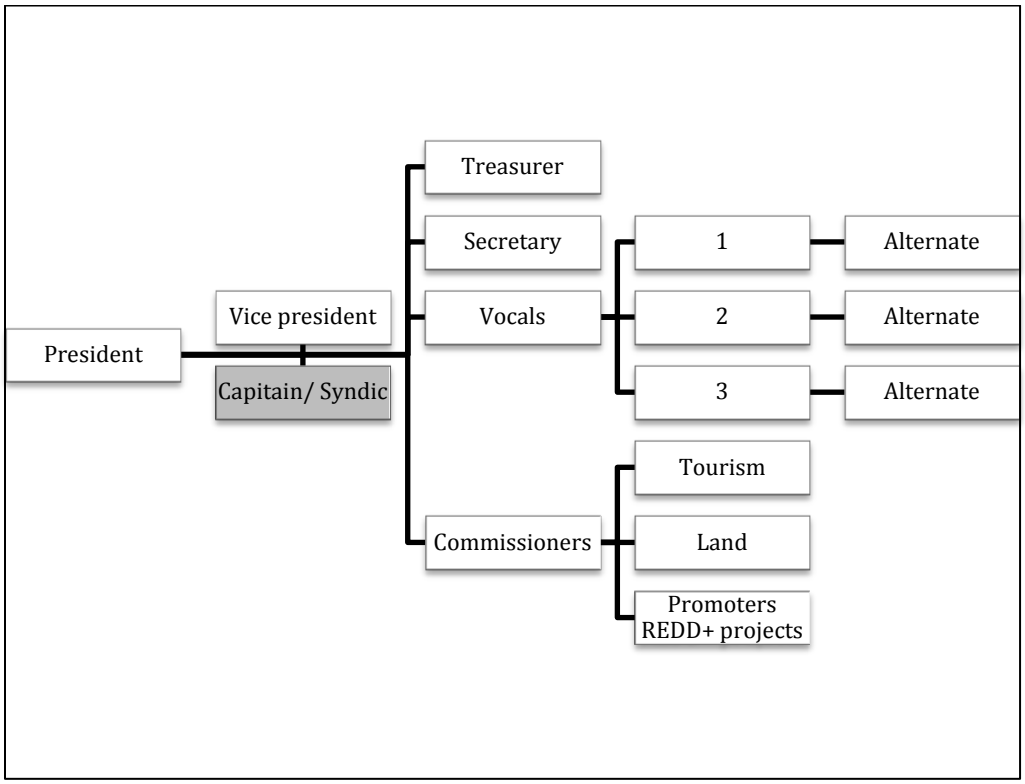

Figure 3.6 Organizational chart of formal decision-making institutions

3.4.3. CPMRs' operational rights

The four surveyed indigenous settlements are legally recognized as communities, while the two Colonist settlements are considered cooperatives. However, indigenous communities can be designated, as true CPMRs while Colonist associations do not share CPRs. The indigenous communities' sizes vary widely from 235 ha to 16,420 ha (Table 3.1). However, neither the Colonists' associations nor the IP' communities have totally legalized land tenure. In our study area, 13.3% of the private owners (Colonists) do not have legal land title. In the same way, indigenous communities claim land titles for over 38.5% of their actual occupied area (Table 3.1). Indigenous lands that overlap territories of other ethnicities and national parks are the cause for the most common conflicts reported by ingenuous community leaders. Moreover, new colonizers (indigenous and mestizos) from other regions often invade demarcated indigenous lands. According to Art. 50 of the Registro Oficial 315, indigenous communities must have a management plan in place to govern awarded lands and properly manage them. The management plan demarcates the allocation of the reserve and farms and has approved by the communal assembly and the

government. However, too often the indigenous communities see the management plan as a mere administrative procedure to gain land rights rather than an instrument for sustainable land use planning. For instance, ritual and sacred places are not considered in the management plans, which may hinder their protection. More- over, despite the fact that three out of four of the studied indigenous communities (except Ruminahui) have a reserve as dictated by the management plan, the reserve is not clearly demarcated and lacks regulations regarding resource use and management.

Regarding access, as the right to enter a physical property, members of the studied communities were able to quickly and easily identify neighboring communities during participative mapping workshops. Indigenous respondents said that hunters from other communities and land invaders were the most common struggles. Indigenous members trespass community boundaries for hunting, especially to enter protected areas were bush-meat is more frequently found. However, Colonists' private property is rarely trespassed. All interviewed house- hold heads confirmed that community/association members know and respect farm boundaries.

Withdraw, as the right to obtain or use products and resources from indigenous CMPRs, is subject to few internal regulations. The Ecuadorian Constitution (Art 84.4) enables the communities to use, usufruct, manage, and conserve renewable resources in their lands. However, bush-meat and wood extraction is only allowed for subsistence (Law 19, Art. 83). For all studied indigenous communities, every- day CPRs such as firewood, food and hunting are primarily obtained directly from the farm area. Also for all groups, the search can be ex- tended to surrounding lands like protected areas or the community re- serve in case of shortages. Medicinal plants and seasonal food products can also be freely collected in community reserves or paths, according to availability and seasonality. Wood for construction is mainly obtained from the own farm or when absolutely needed from communal areas, only with the permission of the assembly council. For special occasions like weddings or family tragedies, the assembly can allow the sale of wood in order to cover expenses. This is especially the case in Kichwa communities. As Colonists do not have CPMRs, forest and farm products are considered private property and can be only extracted by the farm owner. Farm products inside the Colonists' properties can be commercialized. Colonists consider environmental income (fisheries, etc.) a CPR and can be also freely traded if legally allowed. For all inhabitants, there are restrictions for bush-meat, wildlife and timber commercialization.

3.4.3.1. Collective management of resources

Collective management of resources refers to the right to regulate internal use patterns and transform the resource by making improvements (Schlager and Ostrom, 1992). In the case of the Colonists, private property inheritance, management, transfer and exclusion rights are excludable, and land can be transacted freely. Transactions are processed according to the Ecuadorian legislation in formal institutions. In the following, practices related to exclusion,

alienation, transfer, sanctions and rules, as main management rights for indigenous CPMRs are described.

Exclusion, as the control of access to other users, is challenging, especially in large communities. Territorial community patrols are rare and intruders can only be convicted during hunting expeditions. Far-from- market Kichwa do patrolling activities at least once a year when they clean and reopen community borders. Likewise, far-from-market Colonists also stated to do boundary' maintenance every two years. The other studied communities do not have any surveillance activities in their lands. The close-to-market Kichwa did not even notice that they had invaders in their lands for N10 years. Formal exclusion procedures are costly and tedious. Therefore, local inhabitants use it as the last option once mediation trough community institution has failed.

For indigenous CPMRs, alienation, as the right to sell or lease lands, is not permitted. The Ecuadorian constitution bans any commercial trans- action or division within community lands (Art. 66 §22). However, leasing of land, as a form of compensation, is tolerated in the case of mining and oil concessions.

When it comes to transfer rights in indigenous CPMRs, usually family members can either inherit farmlands or the land will return to the community. While the Kichwa women usually move to their husband's farm and do not have their own land, women of the far-from-market Shuar can inherit land and own it independently of their husband. Therefore, when two Shuar of the same community marry, they become independent associates of the community, owning their individual farms.

In far-from-market communities, where more land is available and population density is still low, considerations about private lands inside common properties are almost nonexistent. Nevertheless, as shown in the previous section, the tendency is to move to this kind of land configuration which also includes private property rights and management.

In certain cases, IP' households can be relocated after deliberation in the communal assembly (e.g. to allow for an extension of a school or health center, in the case of disasters, flooding, etc.). Also, young Kichwa families wishing to start a new farm can request community land from the council. The council or the assembly determines location and size of new farms. In general, each family receives a 50 ha farm in available areas, frequently close to their relatives and/or close to a river or road. In both Kichwa and Shuar communities there is the possibility for out- siders, principally relatives of associates, to obtain land and build a farm. However, this is only the case when enough land is available.

3.4.3.2. Sanctions and rule enforcement

In all surveyed communities there are clear rules for resource use when it comes to timber extraction, especially for highly valuable woods. Additionally, the far-from- market Kichwa community engaged in tourism activities has banned hunting close to visitors' sites. Also, far-from-market Kichwa and close-to-market Shuar reported prohibiting poison fishing with barbasco (Jacquinia sprucei). Far-from-market Shuar and Colonists do not have sanctions for land transgressions

or for resource misuse. How- ever, in all cases respondents said that in severe cases, the assembly council would take the decision regarding corresponding sanctions. Nevertheless, there are also de jure rules to control wood extraction and barbasco. Interviewers reported that rules for resource use are increasingly disappearing, mainly as an effect of “privatization” of farms. In the surveyed communities, 90.6% of the Shuar and 100% of the Kichwa respondents believe that community rules are enforced.
All studied groups have clear sanctions only for non-attendance at meetings and mingas but not for resource misuse. Depending on the community, a fine has to be paid to the community treasurer. Fines for not attending meetings and mingas range from US$2–10, and up to US$10 in case of emergency meetings. When a family is unable to pay this fine, they can clear the debt with labor in service to the community. However, de facto payments are rarely enforced.

3.4.3.3. External environment

At the national level, the Ecuadorian Constitution warrants all forms of social customary organization, cultural identity, self-determination, and land tenure inside indigenous territorial jurisdictions. Moreover, the COOTAG (Código Orgánico de Organización Territorial, Autonomía and Descentralización) opens up the possibility to create Indigenous Territorial Circumscriptions in order to suit and strengthen indigenous autonomy and self-governance. Additionally, Art. 171 of the constitution allows the use of norms and proceedings to solve internal conflicts inside indigenous territories. Nevertheless, the normative is still under debate causing uncertainties and conflicts. Furthermore, unclear rules of procedure generate confrontations between de facto and de jure rights. Conflicts can exacerbate since communal institutions have low control over decisions regarding subsoil resources[3].

3.4.3.4. Networking

In general, local indigenous communities have been well organized in ‘formal’ organizations and can be highly influential political stakeholders (Messina and Walsh, 2005). The Confederation of Indigenous Nationalities of the Ecuadorian Amazon – CONFENIAE (Confederación de las Nacionalidades Indígenas de la Amazonía Ecuatoriana) – is the main IP' organization of the Ecuadorian Amazon, which in turn is part of the Confederation of Indigenous Nationalities of Ecuador (CONAIE) and the Coordinator of Indigenous Organizations of the Amazon River Basin (COICA). However, lately IP' organizations in Ecuador have suffered setbacks in terms of political influence. Additionally, many of them have joined Alianza País, the current president's party, looking to attract public works and benefits. Kichwa are the most organized in highly hierarchical organizations. Disagreements within Kichwa communities can be mediated by local authorities

[3] According to Art. 1 of the Constitution (2008), mining and oil extraction activities of national priority and decision rights belong to the central government.

or at a higher level by the respective indigenous leader association (Fontaine and Narvaez, 2007). However, depending on the political cli- mate, organizational arrangements can change. The studied far-from- market community is part of the FICAE (which groups together Kichwa organizations of Orellana) and the close-to-market are currently disassociated from any organization.
The Shuar Federation is also a strong organization, founded in the early 1960s as one of the first indigenous organizations in South America, although mainly active in southern Ecuador. The close-to- market Shuar community is member of the FENASH-O (Federación de la Nacionalidad Shuar-Orellana) and the far-from- market community is related to Sarentza, a Shuar organization in Southern Ecuador.
Regarding Colonist associations, both communities recently abandoned the Federation of Peasant Communities of Orellana-FOCAO and are not part of any nested organization.

3.4.4. De jure versus de facto rights: effective management of CPRs

We use the eight principles for the effective management of CPRs of Ostrom (1990) and Dietz et al. (2003) as indicators for stable CPMRs prior to a REDD+ implementation. In Table 3.2 we present a comparison between formal or de jure and customary decision-making institutions or de facto rights for the eight principles along the three ethnic groups in the studied communities. Results show that de jure rights provide extensive guarantees for land tenure, recognition of CPMRs and contemplate sanctions and nested-community approaches. However, there are difficulties to effectively enforce the law at the ground level. Additionally, incompatibility between de jure and de facto rights regarding rules for resource use and conflict resolution mechanisms can hinder the sustainable management of CPRs and also REDD+ projects.

Table 3.2 Comparison of the accomplishment of *de jure* versus *de facto* rights in the CPRs' principles of the studied groups

<table>
<tr><th colspan="2" rowspan="2"></th><th></th><th colspan="2">IP</th></tr>
<tr><th>Colonists</th><th>Shuar</th><th>Kichwa</th></tr>
<tr><th>CPRs' principles</th><th>de jure</th><th colspan="3">de facto</th></tr>
<tr><td rowspan="2">1. Land tenure and boundaries clearly defined; invaders can be expelled to avoid resource extraction</td><td rowspan="2">The Constitution recognizes and guarantees property rights in public, private, community, state, associative, cooperative, and mixed forms[1)]; relocation and redistribution is stated to avoid land conflicts[2)]</td><td colspan="3">Tenure and boundaries partly recognized; overlaps with protected areas; long and difficult bureaucratic procedure to expel intruders; long distances and poor accessibility make land titling costly</td></tr>
<tr><td>Incursions of voluntarily isolated tribes</td><td>Overlapping other territories</td><td>Presence of intruders</td></tr>
<tr><td>2. Rules for the use of collective goods well</td><td>Communities own management rights over renewable resources[3)]; extraction of forest</td><td colspan="3">Barbasco and explosives for fishing still used; some commercialization of bush-meat and illegally logged wood</td></tr>
</table>

adapted to local needs	products only for subsistence[4]; explosives and toxics forbidden[5]; subsistence hunting in protected areas prohibited[6]; wood harvesting only with legal management plan[7]	No CPRs' rules for other forest products	Subsistence wood extraction only with authorization of the community council; for the vast majority of the studied communities existing CPRs' rules are clear	
3. Most individuals participate in communal decision-making processes regarding resource management	Decisions are taken with consensus in the general assembly[8]; oil and mining prospection and concessions only possible after prior, free and informed consultation[9]	Highly democratic institutions; a higher political instance decides over disagreements regarding non-renewable resources; clash of formal institutions with customary decision-making institutions		
		Decision-making in formal institutions and nuclear family	Customary decision-making in clans	Customary decision-making in extended families
4. Clear legal recognition of CPMR institutions; authorities respect the customary land management inside communities	≥50 inhabitants can form a pre-cooperative, cooperative, center, or community for CPMRs[10]; the state shall ensure that decisions in the indigenous jurisdiction are respected by institutions and public authorities and are subject to judicial review[11]	Customary land configuration is becoming homogenous		
		Private property in pre-cooperatives or cooperatives	Semi-private properties in CPMRs, which are called centers	Family farms in CPMRs, which are called communities
5. Low cost monitoring system run by locals	Not stipulated	Private owners responsible for monitoring	None	Maintenance of borders; inspections during hunting expeditions
6. Graduated system of sanctions	Unauthorized extraction of forest and wildlife products subject to a fine of 1,000 to 1,500 general minimum living wages[12]	Subject to ordinary rules	None; if necessary to be decided by the council board	
			Rarely enforced	Enforced
7. Easily accessible and cheap mechanism for conflict resolution	Community council must meet the first Sunday of the month[13]; general assembly should meet when necessary with a minimum of 20 inhabitants[14]	Meetings every two months or as required; *mingas* usually biennially	Monthly or as required; *mingas* only when needed	Fixed date once a month, also for *mingas*
		Intra-communal decision-making processes considered as fair		
8. CPMRs organized in multiple layers of nested institutions	CPMRs under urban or rural parish jurisdiction; administrative dependency of the MAGAP; 20≥ communities have the right to form federations[15]	Associations and IP' organizations suffered a reversal in the past years; little cooperation between IP' organizations and formal governmental institutions; actual legislation difficult to implement; unclear roles of governmental institutions		

[1] Constitution Art. 321; [2] COOTAG, Proyecto Plan Tierras - MAGAP and MAE in protected areas; [3] Constitution Art. 84 §4;
[4] Law 19, Art. 83; [5] Law 19, Art. 89; [6] TULAS IV-Art. 78; [7] Acuerdo Ministerial No. 39-2003; [8] Registro Oficial 315, Art. 16; [9] Constitution Art. 57; [10] Registro Oficial 315, Art. 5; [11] Constitution Art. 171; [12] TULAS IV-Art. 78; [13] Registro Oficial 315, Art. 15; [14] Constitution Art. 16; [17] Registro Oficial 315, Art. 22

3.5. Discussion

Successful REDD + implementation can only be achieved if basic requirements are met, in particular with respect to clear boundaries, se- cure land tenure and low-cost mediation that strengthen land rights. Our research demonstrates that

the CPMRs of the two studied indigenous groups are becoming spatially more homogenous and increasingly similar to those of the Colonists. Following this pattern, former common lands are continuously being divided up into private properties under communal land titles. Subdivision of existing farms due to population growth and market pressure can lead to the degradation of the existing resources, as already described by May (1992) as the 'tragedy of the non-commons'. Where land is scarce, privatization of farms inside com- munity lands is more frequent. In a study in the northeastern Amazon, Bilsborrow et al. (2004) found that in a ten-year period (1990–1999) al- most 70% of the surveyed farms were subdivided, dropping from 46.5 to 25.5 ha. Policies "favor(ing the) privatization of property rights" in CPMRs (Richards, 1997) and legacies of agrarian reforms can have a great impact over land configuration and greatly increase forest fragmentation.

Long-term REDD+ contracts of 20 to 30 years could be a threat to livelihoods if sufficient land resources are not ensured for future generations. Moreover, allocating lands for REDD+ projects can lead to land use intensification, as the forested land cannot be used for agricultural activities, so that the remaining land is likely to be used more intensively. This in turn leads to the reduction of fallow periods and is likely to de- crease soil fertility. Such actions will not only affect overall conservation goals but also set in danger the livelihoods of local populations. Diversifying household income, especially farm income and promoting traditional practices such as agroforestry, mixed crop-systems and crop rotation can be effective ways to support sustainability. Moreover, promoting REDD+ according to the traditional land configuration (e.g. smaller household farm areas and a large reserves for hunting and gathering) cannot only enhance forest carbon sequestration and avoid parcelization but also simplify monitoring activities.

Land tenure remains an issue for forest conservation and REDD+. Even though existing legal frameworks provide constitutional rights, our results demonstrate that holding a land title does not mean secure administration and control over the corresponding territories. This rep- resents a key issue under REDD+, which has been widely discussed. However, without doubt mitigation projects can promote greater legal certainty and provide means to strengthen access and withdraw operational rights as well as exclusion rights to enhance territorial control. Moreover, clarity with respect to oil and mining concessions that over- lap with REDD+ projects and adjacent areas is still needed.

We found that not only homogenization and privatization of the geographical space is taking place, but also community decision- making institutions are becoming more uniform. The Ecuadorian legal framework that provides clear guidelines for intra-communal decision-making, in particular the law for the organization and regime of communities (Registro Oficial 315-2004) fosters this process. However, it is wrong to perceive IP as homogenous entities with respect to institutional arrangements and decision-making processes. As previously explained, traditional legacies in communal decision-making institutions still exist informally under the above-mentioned formal structures. Contrary to a study by Varughese and Ostrom (2001) in Nepal, where it cannot be proven whether

heterogeneity has an impact on CPMRs institutions, in our studied communities ethnicity and homogeneity are important determinants of intra-communal participation, which have an impact on customary decision-making bodies. Typically, IP and Colonists in the Ecuadorian Amazon region have tended to form associations to acquire land rights according to their origins (ethnicity and geographical precedence) in order to avoid conflicts. However, in practice this is not always possible. We found that the coexistence of di- verse groups can lead to disparities inside decision-making institutions. For instance, the close-to-market Kichwa community is divided in two powerful decision-making groups that formed due to their origin and religion: (a) the evangelical lower Napo Runas and (b) the catholic Canelos (Kichwa coming from Pastaza). Another example for disparities inside decision-making institutions are three Shuar households that have farms inside a far-from-market Colonist association (Union Lojana), but do not participate in cooperative assemblies.

There is no clear pattern on resource rules adoption and enforcement inside CPMRs; some rules correspond to traditional legacies while others contradict or enforce formal legal frameworks. In general, resource use rules are disappearing or being replaced by formal legal frameworks. There is evidence for this in a study conducted in the 1970s in the Upper Napo region, where strict rules for trail use, hunting and fishing activities in Kichwa CPMRs are reported (Macdonald, 1997). Similar to our findings, recent studies such as Lu et al. (2012) for Kichwa communities and Bremner and Lu (2006) for Shuar communities reported barbasco prohibition, which is formally banned.

Full and effective participation of IP along with forest management should be reinforced in order to achieve successful consultation, monitoring, accountability and benefit-sharing of REDD+ projects. Decision-making for REDD+ in communities is challenging, as pointed out by Krause et al. (2013): “interfering with communal decision- making involves a trade-off between respecting communal autonomy and internal decision-making process on one hand, and the imposition of terms and processes to achieve full and effective participation of com- munity members on the other”.

Not only informally persisting traditional forms of organization can clash with formal institutions, but also the overlap of de jure and de facto rights can create conflicts. Even though the Ecuadorian Constitution is highly advanced regarding indigenous autonomy, Novo (2014) points out that “the legislation is contradictory and difficult to implement, or no serious attempt has been made to implement it”. If REDD+ project developers overlook these discrepancies in forest management institutionalism, and instead impose new mechanisms for consultation and participation, organizations can become unequal and non- representative. As a result, customary forms of good forest administration can be diluted.

We would also like emphasize the importance looking back into customary rules and decision-making community institutions rather than creating new precepts and structures that might not work on the ground. The enforcement of the still strong intra- and intercommunal social capital as well as traditional forms of cooperation (e.g., mingas) can greatly support REDD + achievements. Furthermore, recovering expertise on managing forest resources can ensure

long-term sustainability and livelihood improvements under the REDD+ umbrella. Traditional knowledge is especially important for benefit-sharing and monitoring activities.

IP play a key role in safeguarding existing forests that provide important ecosystem services. Extensive, isolated and regulated CPMRs with autonomous governance have been associated with higher carbon storage (Rudel, 1995; Chhatre and Agrawal, 2009; Oldekop et al., 2013). Therefore far-from-market Kichwa communities are the most suitable to engage in REDD+, since they have larger territories to cope with population growth and stronger community-based organizations. These might also be reasons for the high number of Kichwa contracts under SocioBosque, a national program that provides payments to maintain existing forests (Mohebalian and Aguilar, 2015). Ironically, these stable communities have the lowest deforestation rates, so that there is only a small additionality according to current REDD+ discussions. However, increasing external pressures can threaten even stable communities and therefore climate change mitigation policies should include the cost of maintaining and consolidating existing protected areas and indigenous reserves (Walker et al., 2014). These external pressures include land reforms legacies and insecurity regarding land tenure and management rights that were presented here, as well as the increasing political instability and the new oil and mining concessions. Nevertheless we cannot undervalue the role that REDD+ negotiations have in enforcing the discussion about the importance of forest degradation, secure land rights and IP' participation. This debate could be transformed in policies that promote sustainable forest management and better consultation and participation mechanisms.

We therefore assume that integrating and promoting traditional knowledge and practices into REDD+ can have a more profound conservational impact than creating new rules to manage common shared resources and lands. In this way, community forest management through REDD+ can support its effectiveness and legitimacy, preventing conflicts and promoting more equal benefit-sharing.

3.6. Conclusions

The ongoing homogenization of CPMRs bears the risk of further forest loss and fragmentation in addition to other pressures such as population growth and resource exploitation. This can become a threat to the livelihood of IP. Overall there is the necessity of clear rules and recognized rights as well as secure land tenure; these are supreme prerequisites of any REDD+ project. Moreover, the limited ability to take decisions regarding oil and mining concessions and prospections at the community level threaten the sustainable governance of forest re- sources and future REDD+ implementation. Decision-making institutions and land arrangements for REDD+ that are contrary to customary traditions can endanger and weaken traditional social structures. Paradoxically, Kichwa and far-from-market communities that have stronger community-based organizations and keep low deforestation rates are not eligible for REDD+ unless oil exploitation occurs and are therefore more vulnerable to external threats.

Empowering forest owners through community-based forest management might be the best way to protect forests, especially in countries like Ecuador, where IP already have tenure rights over forests.

3.7. Acknowledgments

First of all we would like to thank all communities and families that participated in this research. We would further like to thank the Center for Natural Resources and Development (CNRD), The Federal Ministry for Economic Cooperation and Development (BMZ), and the German Academic Exchange Service (DAAD) for providing research funds and technical support. The work would not have been possible without the support of the German NGO Welthungerhilfe. We thank FEPP and the staff of the project, especially Robert Grassmann, Javier Vargas and Angel Jimenez for their support. We are also grateful to the Familia Cruz for all the support during our historical research.

3.8. Appendix A: Decision-making Questionnaire

		Ethnicity		
		% Colonists	% Shuar	% Kichwa
Family structure	Nuclear	89.2	90.6	29.2
	Extended	10.8	9.3	70.7
Farm land tenure	Private	100.0	9.3	0.0
	Private in CPMRs	0.0	100.0	97.5
	Global	0.0	0.0	2.4
Land titling	Private title	72.9	3.1	2.4
	In process	27.0	31.2	7.3
	Global	0.0	87.5	68.2
Household area (m^2)		45.8	54.4	57.1
House ownership	Own	89.2	100.0	97.5
	Other	10.8	0.0	2.4
Resource use rules	Clear	94.6	96.8	100.0
	Unclear	5.4	3.1	0.0
Resource use rule enforcement	Yes	94.6	90.6	100.0
	No	5.4	9.3	0.0
Assembly member	Yes	94.6	96.8	100.0
	No	5.4	3.1	0.0
Regularity attending meetings	Yes	81.1	90.6	95.1
	No	13.5	9.38	4.8
Meeting	Written	51.3	67.7	41.4

announcement	Oral	43.2	32.2	19.5
	Fix date	5.4	0.0	39.0
Family members participation	Both	21.6	53.1	43.9
	Both, principally male household head	8.1	6.2	19.5
	Both, principally female household head	5.4	3.1	2.4
	Man and kids	5.4	3.1	2.4
	None	8.1	3.1	2.4
	Only male household head	45.9	15.6	9.7
	Only female household head	2.7	9.3	7.3
	Woman & daughters	2.7	3.1	4.8
	Other members	0.0	0.0	4.8
Decision-making	Unknown	5.4	3.1	0.0
	Community level	0.0	96.8	100.0
Fair decision-making	Yes	94.5	96.8	100.0
	No	5.4	3.1	0.0

Chapter

4

Analyzing REDD+ from an institutional and landscape perspective: insights from the Ecuadorian Northeastern Amazon

Toa Loaiza, María Olga Borja, Udo Nehren, Gerhard Gerold

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4. Analyzing REDD+ from an institutional and landscape perspective: insights from the Ecuadorian Northeastern Amazon

4.1. Abstract

Ecuador is currently completing the readiness phase for the implementation of the Reducing Emissions from Deforestation and forest Degradation (REDD+) mechanism at the national level. Many challenges regarding rights, institutional frameworks and land tenure remain open in this country where Indigenous Peoples (IP) occupy 56% of the Ecuadorian Amazon. We focused on the Yasuní Biosphere Reserve to exemplify obstacles and answers found in the last years. In a REDD+ pilot project, six communities of the most widespread ethnicities (Shuar, Kichwa and Colonists) living in the buffer zone of the Yasuní National Park, with different distances to markets, were chosen. We used literature research, analysis of international and national agendas, as well as primary data on REDD+ perception, intra-communal decision-making and land tenure obtained through semi-structured household interviews and personal observations. First, we look back at the development of territorial arrangements and then define the configuration of actual land tenure and rights. Second, we analyze persistent management conflicts within institutional arrangements and explore legal frameworks with a focus on participation and consultation. Finally, we present a discussion on the spatial configuration of the area. Our results show that not only insecure land tenure is a challenge but that land overlapping and unclear institutional responsibilities further exacerbate the problem. For IP and all other groups, engagement in REDD+ in Ecuador will require mediation by the central government, which has exclusive competences over ecosystem services, including carbon rights. We also found that culture and ancestry aspects remain relevant, but that policies tend to homogenize IP. Despite great advancements of the Ecuadorian government, implementing equitable methods for participation and consultation remains a challenge in this pluricultural country.

4.2. Introduction

Deforestation and land use change are considered the second highest source of total global greenhouse gas (GHG) emissions, accounting for 12.5% of total anthropogenic emissions between 1990 and 2010 (Houghton et al. 2012). Despite efforts to reduce forest loss, tropical deforestation continued unabated between 2000–2012, increasing by 2,100 km2 per year (Hansen et al. 2013). The world's largest continuous rainforest areas (more than 6 million km2; almost half of the world's tropical rainforests) are located in Latin America and principally in the Amazon basin (RAISG 2015a). They represent high carbon sinks (60–80

billion tC; Carvalho et al. 2004) and provide important ecosystem services (Ruesch & Gibbs 2008). On top of that, Amazonian forests significantly support livelihoods, especially of IP whose territories cover 27.5% of the biome (RAISG 2015a). These indigenous groups directly depend on forest resources.

In Ecuador, nearly 40% of the original forests have been converted to other uses (Sierra 2013). Still largely untouched, the majority of the remaining forests are located in the country's Amazon (territory to the east of the Andes mountain range Cordillera), where only 10% of the forests have been transformed (ca. 10,000 km2) (RAISG 2015a). Also located in the Amazon are the majority (86%) of Ecuador's IP' territories (Lopez et al. 2016). IP occupy 56% of the Amazon region (65,243 km2), and within its boundaries lay 61% (ca. 60,240 km2) of the country's remaining Amazonian forests. However, IP have recognized rights over only 68% (ca. 44,437 km2) of those territories (RAISG 2015a, Lopez et al. 2016). Ecuadorian tropical rain forests have one of the highest deforestation rates in South America (FAO 2011). The published data about forest loss differs. For instance, the FAO (2011) calculated an annual deforestation rate of 1.5% for the period 1990–2000 and 1.8% for the period 2000–2010. In contrast, the Ministry of Environment of Ecuador (MAE 2012a) estimated a loss rate of 0.71% for 1990–2000 and 0.66% for 2000–2008.

The Yasuní National Park (YNP) has been described as one of the most biodiverse ecosystem in the world (Bass et al. 2010). Along with the Waorani Ethnic Reserve and the Tagaeri-Taromenane Intangible Zone (ZITT), the YNP forms the UNESCO Yasuní Biosphere Reserve (YBR). The YBR is located in Ecuador's northeastern Amazon and is home to nearly 45,000 people, including 2,000 indigenous Waorani who live in the nuclear area (Smith et al. 2009). Other groups include the Kichwa (Quichua), the Shuar and the Colonists who reside in the buffer zone (Larrea & Warnars 2009). The Tagaeri and Taromenane are two semi-nomadic tribes living in voluntary isolation within the YBR. Their total population is roughly estimated to include 300 individuals (Larrea & Warnars 2009).

Yasuní is not only important for its biological and cultural richness, but strategic non-renewable energy reserves are also located underneath the YBR upon which Ecuador largely relies (Larrea & Warnars 2009). The recent executive decision to drill in the area shows how at risk ostensibly secure landscapes like the YBR in fact can be. Historically, the exploitation of non-renewable resources has caused major shifts in landscape structures and ecosystem functioning. This has also affected the livelihoods of the native inhabitants, causing serious social and environmental conflicts.
Coping with deforestation, agricultural expansion and population growth is highly challenging. Therefore, we need to look at biosphere reserves as bio-cultural landscapes (Bridgwater 2002) assisted by sustainable land use practices. In this context, REDD+ can provide incentives for forest conservation, encouraging sustainable development and at the same time enhancing the living conditions of

local inhabitants and indigenous communities (Blom et al. 2010). Furthermore, schemes like REDD+ together with maintenance and restoration of carbon pools can represent an affordable option for GHG mitigation. However, inflexible mitigation mechanisms such as the Clean Development Mechanism (CDM) have shown to be non-replicable and inaccessible to small landholders (Blom et al. 2010). In addition, it is even more difficult to implement in areas like the YBR, where access to temporary oil-related off-farm income reduces communities' willingness to participate in REDD+ (Loaiza et al. 2015).

IP' lands under recognized common property rights are the best way of controlling deforestation and thus enhance the sustainable management of resources (Hayes & Murtinho 2008). However, given land tenure insecurity, population growth, external pressures (such as oil exploitation, palm oil plantations, and mining) as well as the depletion of colonization options on existing agricultural frontiers, there is uncertainty over how IP' institutions can adapt and respond to these challenges (Hayes & Murtinho 2008). Legal frameworks and governmental policies have a strong influence on the way community-based institutions and household decisions regarding land use are evolving and adapting (Loaiza et al. 2015, Loaiza et al. 2016). Therefore, it is necessary to revise and analyze past and current legal frameworks as well as development policies to better plan future local development in a sustainable manner.

With this important information in mind, in the next section an analysis of the challenges of REDD+ design and implementation in Ecuador is presented. First, we explore the historical territorial configuration of the lands that today are part of the YBR. Then, we review actual forms of land tenure and the difficulties that go along with land titling and rights. Thirdly, we analyze present management challenges in the YBR. Then, we examine the actual legal framework for REDD+ with a special focus on participation and consultation. Finally, we discuss the necessity of a landscape approach, learning from the past and truly promoting diversity IP.

4.3. Case study area and research methods

Ecuador is a signatory of the United Nations Framework Convention on Climate Change (UNFCCC) and since 2009 part of the UN-REDD Programme. It is also a pilot country for the UN-REDD Programme to develop voluntary national REDD+ Social and Environmental Standards (SES) as part of the UN-REDD Programme of Social & Environmental Principles and Criteria and the Participatory Governance Assessment. Ecuador will implement REDD+ on a national scale (art. 1 Ministerial Agreement 033-2013). Additionally, Ecuador has a national forest conservation incentives program called Sociobosque that is being 'exported' to other countries like Bolivia and Peru.

The present research is based on a REDD+ pilot project in the YBR. The DEIC Yasuní project (Deforestación Evitada Integral con las Comunidades) was conducted by the German NGO Welthungerhilfe and its Ecuadorian partners (FEPP-HIVOS) and co-financed by the European Commission. The DEIC project included other activities beside REDD+, like land planning and management, as well as productive activities to promote food security, income diversification and reduce the pressure on forests.

To explore the legal, management and REDD+ frameworks, literature research, analysis of international and national agendas, as well as expert interviews were undertaken. Other primary data on REDD+ perception, intra-communal decision-making and land tenure was obtained through semi-structured household interviews and personal observations. Within the DEIC Yasuní project, six communities of the most widespread ethnicities (Shuar, Kichwa and Colonists) living in the buffer zone of the YNP with different distances to markets were chosen (Loaiza et al. 2015, Loaiza et al. 2016) (Tab. 4.1).

Table 4.1 Studied Communities

	La Reina^	Union Lojana	Tiguano^	Rumiñahui	Mandarina	Sinchi Napo^
Ethnic group	Mestizo (Colonists)		Shuar		Kichwa	
Creation year	1980	1991	1985	1996	1998	1975
Total area (ha)	1437	1269	1394 (1500)*	235*	3076 (2000)*	8420 (8000)*
Households	41 (20)**	28 (20)**	35 (20)**	13 (11)**	34 (20)**	38 (20)**
Distance to main market (km)#	66	40	66	70	67	152

* Land claimed is inside protected areas or/and in conflict with neighboring communities
** Number of surveyed households
^ Communities located far-from-markets
# Distance to market determined by accessibility (river, road, seasonality, etc.), distance (km from the provincial capital), frequency of public transportation and travel time

4.4. Land Configuration Analysis

4.4.1. History and development of territorial arrangements in the YBR

Understanding the connections between current and historical land distribution policies provide clues regarding the impacts such reforms have over deforestation and social conflicts in the area (Figure 4.1). During colonial times, IP living in the foothills of the Andes mountain range Cordillera fled to the lowlands to escape the Spanish conquerors, occupying the Amazon. Omaguas and Zaparos, original inhabitants occupying ancestral territories in the

northeastern Amazon (between the Curaray and Napo River) mixed with migrating IP and practically disappeared. Slavery and colonization for the establishment of haciendas (farms) and rubber plantations, along with the spread of deadly diseases and inter-ethnic conflicts, forced remaining inhabitants to spread along the Tiputini River (Cisneros in Fontaine & Narvaez 2007). By the end of the 19th century, IP living on the western slopes of the Andes mountain range Cordillera, mainly Kichwa, migrated to remote and unpopulated areas to gain lands (Moya 2000, Proyecto Bosques 2009). Additional migration was triggered by the border conflict with neighboring Peru and overpopulation in the recently established settlements. Only the Waorani were able to keep a good portion of their original territories, mainly because it was hard to access for the colonists.

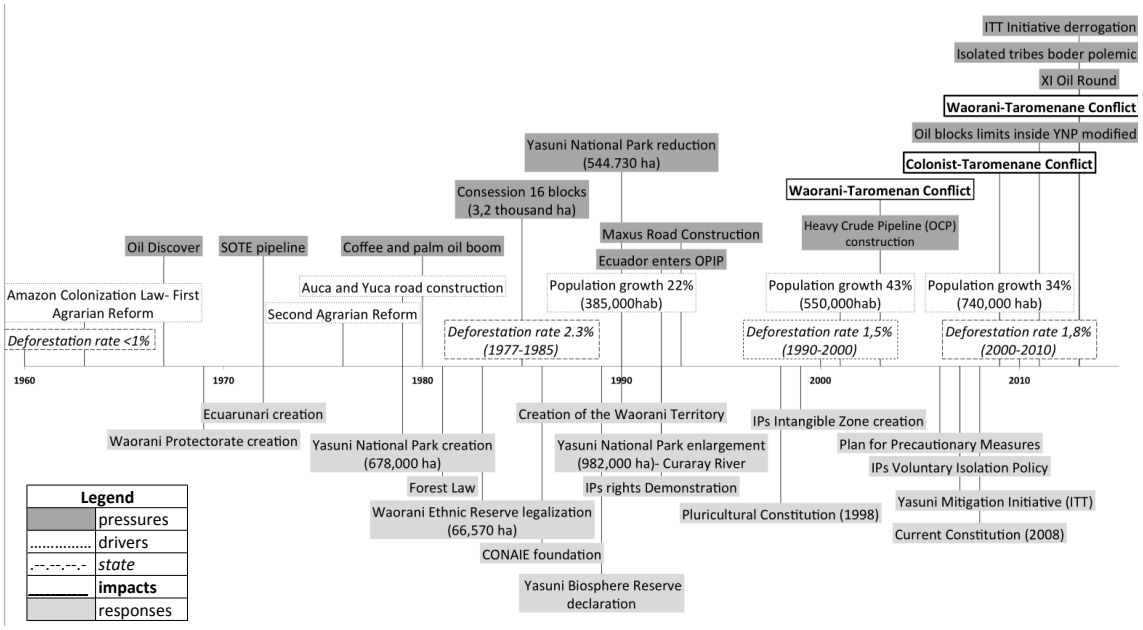

Figure 4.1Timeline showing key dates of driving forces, pressures, states, impacts, response (DPSIR) defining land configuration in the YBR

The DPSIR widely used by the European Environmental Agency (EEA) "represents a systems analysis view: social and economic developments exert pressure on the environment and, as a consequence, the state of the environment changes" (EEA 2007).

During the early republican times, land regulation attempts were unsuccessful. In a territory of international dispute with Peru, the Ecuadorian government offered Ecuadorians 'empty lands' (res nullius, tierras baldías) to enhance occupation and safeguard the country's sovereignty. Agrarian reforms (1964, 1972 and 1979) were promoted, creating spontaneous and uncontrolled colonization in what was perceived as the 'empty' Amazon region (Proyecto Bosques 2009, Morales et al. 2010, Lopez et al. 2016). Farmers were awarded farms (fincas) of 50–100 ha, normally located along parallel rows up to 16 km off the main road (Proyecto Bosques 2009). As a result, the agricultural frontier was considerably expanded, overlapping with and reducing IP ancestral territories.

Government integrationist indigenismo policies, clerics and some indigenous leaders motivated IP to form farmers' cooperatives as a cheaper process to obtain land titles, prior to the legal constitution of indigenous communities. Only after prolonged negotiations, IP could apply for farms of up to 100 ha. In the 20th century, and even today, governmental plans try to integrate IP as farmers to secure land rights and facilitate funds for raising cattle and coffee production.
Ecuador was first recognized as a multicultural nation in 1980, under the democratic regime's Plan Nacional de Desarrollo del Gobierno Democrático. In 1981, former President Roldós expelled the Summer Institute of Linguistics (an evangelic mission promoting literacy) and transferred its duties to the Ministry of Health and Education with the mandate to adapt these according to the indigenous worldview (Whitten 1981). Additionally, IP started to organize and form associations to pressure land recognition through the adjudication of boundaries by themselves (self-bordering or in Spanish autolinderación). In 1992, after a big uprising (Allpamanta, Kawaymanta, Jatarishun, which is Kichwa for: 'for land, for life, rise up'), IP won the assignment of nearly one million hectares in the Amazon. Land adjudications were based on agreements without any kind of supporting regulation. Ecuador's 1998 Constitution was aligned with the ILO Agreement 169, of which Ecuador is signatory. Further improvements were made in the current Constitution (Constitución de la República del Ecuador 2008), which establishes 21 collective rights (art. 57–60) and also recognizes nature rights. The Constitution protects communities' lands making them "inalienable, indefeasible and indivisible" (art. 66, §22). IP' have ownership rights of ancestral lands and territories and can obtain these lands for free. Additionally, these lands are exempt of taxes and fees (Constitution art. 57). In the same way, the Constitution allows IP to use, usufruct, manage and conserve renewable resources within their lands. ILO Agreement 169 (art. 14, 1989) safeguards nomad peoples and shifting cultivation practitioners. Nowadays, the Subsecretary of Lands and Agrarian Reform of the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (Executive Decree 373-2010) is the organism in charge for adjudging lands in favor of indigenous communities, farmer (campesinos) communities and farmers in general (Agrarian Development Law Executive Decree 2099-1994).

4.4.2. Actual configuration of land: tenure and rights

Today there are four land occupancy schemes in the Ecuadorian Amazon: (1) Indigenous territories: large-scale areas allocated to ethnic communities. The concept of territoriality as an integrated unit is almost inexistent. These lands do not hold global land tenure titles. (2) Communities (comunas, comunidades) are common property arrangements where several indigenous families formed a legal entity with a minimum of 50 inhabitants. Shuar community lands are called centers. (3a) Pre-cooperatives are farmer associations seeking adjudication of

occupied lands. Farmers usually claim 50 ha per household. (3b) Cooperatives are legally recognized farmers' organizations. They are mainly formed by mestizo families (mixed racial or indigenous ancestry) but can also include IP' households. This land arrangement is frequent in the Amazon since cooperatives are a prerequisite to get individual land titles, access to basic services, road and access maintenance, etc. (4) Private property in form of farms or plots (solares) are usually located along roads and close to urban or semi-urban settlements.

The Constitution of 2008 recognizes IP' ancestral rights over territories. Despite the great advances achieved in the last years, land tenure insecurity and overlapping land rights remain key sources of conflicts. A significant portion of the inhabitants of the Ecuadorian Amazon is still in the process of claiming the legal recognition of their territories. IP are disproportionally affected by this. They occupy territories corresponding to 65% of the forest in Ecuador, however 37.5% of these IP do not hold legal recognition of this land (Palacios 2005).
Many currently recognized and unrecognized IP' lands do not match ancestral territories. Original IP occupying these territories were extinguished, absorbed or displaced (Morales et al. 2010). Nonetheless, as land legalization progresses, the risk of conflicts between ethnicities rises and will persist with the inconsistent use of the terminology referring to "ancestral territories."

There is no clear definition of what can be considered ancestral territories in the Constitution. The most used de facto concept, acknowledged by the MAE, considers ancestry as the 'preexistence of IP' communities with respect to the State' (MAE 2006). Following this argument, even the government has displaced IP from their ancestral territories for the creation of protected areas, for example the Waorani in the YNP. Little (2001) describes how a 30–300 year time frame is used to argue for land ownership, depending on the IP' group. Additionally, he also describes how governmental institutions and some IP prefer to be recognized as individual communities rather than as an ethnic territory to avoid territorial conflicts and because of economic interests.

Interethnic conflicts may further increase as IP become colonizers and use legal mechanisms to gain properties in non-traditional territories (Bremner & Lu 2006). For example, currently migrating Shuar who were traditionally living in southern Ecuador are competing with the Kichwa living in the northeastern Amazon for resources and territories (Fountaine & Narvaez 2007). However, recently settled Shuar in the northeastern Amazon were initially considered Colonists and received farms instead of community lands and, as such, were excluded from the community-management plans of the Cuyabeno Reserve located on the limits of the YBR (Little 2001).

Other disputes associated with IP' lands occur, for example, where their territories overlap with protected areas (Figure 4.2). For instance, nearly 40% of the Waorani territory overlaps with the Yasuní National Park (YNP) (5,376 km2) and an additional 2,204 km2 were declared part of the Tagaeri-Taromenane

Intangible Zone (ZITT) (Executive Decree 552-1999) (Tab. 4.2). In total, 56% of the Waorani territory (7,580 km2) overlaps with the ZITT. Additionally, an area of 1,016 km2 of Kichwa territory overlaps with the YNP. Far from being the exception, cases of overlap occur in almost 30% of IP' territories (19,212 km2) in the Ecuadorian Amazon. Overlay leads to many conflicts, especially in those territories where traditional IP' rights of use and domain were not recognized during the protected area's establishment. (Lopez et al. 2016).

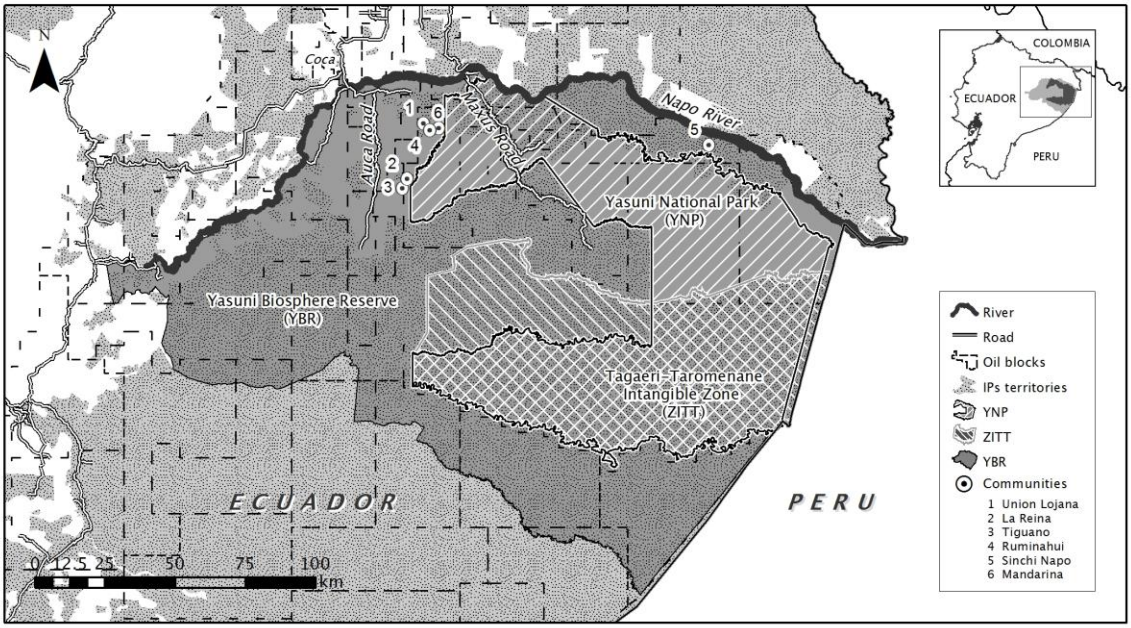

Figure 4.2 Study area with IP' territories and overlapping land rights

Table 4.2 Kichwa, Shuar, Waorani and Tagaeri-Taromenane Indigenous territories, concessions and protected areas

Data from EcoCiencia/RAISG (2015)
*Tagaeri-Taromenane territories are shared with the Waorani IP.

Indigenous group	Surface km^2	Occupied territory in %	Percent of country area %	Amazon %	Land titled %	Oil blocks and mining concessions %	Protected areas %
Kichwa	23058.19	30.45	8.99	19.78	69.55	77.60	27.45
Shuar	10451.51	8.92	4.08	8.96	91.08	61.96	16.53
Waorani	13555.40	0.24	5.29	11.63	99.76	40.78	55.92
Tagaeri-Taromenane *	7586.99		2.96	6.51		5.28	73.22

According to Ecuador's legislation, IP can have tenure rights over lands inside protected areas if these lands were occupied before the protection status was declared. Whenever possible, the MAE will try to expropriate or relocate private landowners and IP's communities living inside the National System of Protected Areas (SNAP) (Ecuadorian Forest Law art. 73-1981). If not, the MAE will establish a co-management agreement. However, despite many efforts, 30% of IP' lands still remain in protected areas (19,216 km2) (MAE 2006, RAISG 2015b). In contradiction to this, art. 100 of the Organic Code Territorial Organization and Autonomy (COOTAG 2010) ratifies IP' occupation and administration rights over occupied ancestral lands in today's protected areas.
Additional conflicts arise as a consequence of the overlap of IP' territories and protected areas with oil and mining concessions (Tab. 4.2), and the lack of recognition of bi-national ethnic territories, like the Shuar (Ecuador-Peru) or Cofan (Colombia-Ecuador). Regarding the PNY, 46% of its territory (4,705 km2) overlaps with oil blocks.

It should be noted that 26% of the Tagaeri-Taromenane Intangible Zone (ZITT) (2,031 km2) overlaps with land that the Waorani hold titles for. However, since the creation of the ZITT, and its delimitation in 2006, the acquirement of land titles has become complicated especially for households located in the buffer zone of the ZITT. The government should attempt to relocate families as part of the Precautionary Measures Plan to protect the voluntarily isolated tribes Tagaeri-Taromenane (Pueblos Indígenas Tagaeri y Taromenane Medidas Cautelares MC-91/06) (see below). In 2014, the Fondo Ecuatoriano Populorum Progressio (FEPP) and the Ministry of Agriculture (MAGAP) signed an agreement to regulate land tenure in two cantons of the buffer zone of the ZITT. However, the authors did not have access to the details of the procedure (RE-MAGAP-010-2014 Desarrollo e Implementación de la Regularización de la Tenencia de la Tierra en la Zona de Amortiguamiento PNY-ZITT).

Ecuadorian history shows that land rights have been granted to IP only after their demands have escalated to protests and strikes against the government. Moreover, holding legal land titles does not consolidate land administration. The shapes and limits of oil concessions, protected areas and intangible zones, along with their management plans, have been changed to favor the exclusion of natural resource rich areas (Lopez et al. 2016). Even more, insecurity of land tenancy could be a governmental strategy to shape borders according to the national oil-mining-related priorities.

Undeniably, secure land tenure is key to REDD+ project design. The majority of Payment for Ecosystem Services (PES) projects considers land titling as a prerequisite for enrollment (Corbera et al. 2011). This is also the case for the studied REDD+ pilot project's communities and for Sociobosque's communities. However, holding land titles does not guarantee a conflict-free occupancy. For example, despite having land titles (at least partially), five out of the six studied communities have frequent invasions by and conflicts with neighboring communities (Loaiza et al. 2016). Moreover, all of the studied communities still claim the recognition of over 40% of their occupied community lands. This is also true for the project's private landholders, where not all members of the cooperatives have land titles. Common explanations given are costs, remoteness, and the already mentioned conflicts related to the buffer zone of ZITT.

4.5. Management conflicts in the YBR

In this section, we illustrate the complexity of implementing sustainable development strategies in culturally and biologically diverse areas where non-renewable resource extraction has priority. For that, the YBR is used as an exemplification to show how the overlap of diverse transversal administrative layers can lead to mismanagement. The YBR is probably the most complex case in Ecuador, as it has more land planning and management procedures than any other area in the country. The overlap of different land categories coupled with conflicting administrative entities' competences hinder its management and thus the overall conservation goals of the YBR. Here, we present the management layers at the national and regional levels and compare it with YBR's management plan to exemplify the contrasts between legal frameworks, de facto regulations and the mentioned management plan. Emphasis is put on extraction of non-renewable resources, hunting, and logging (Figure 4.3).

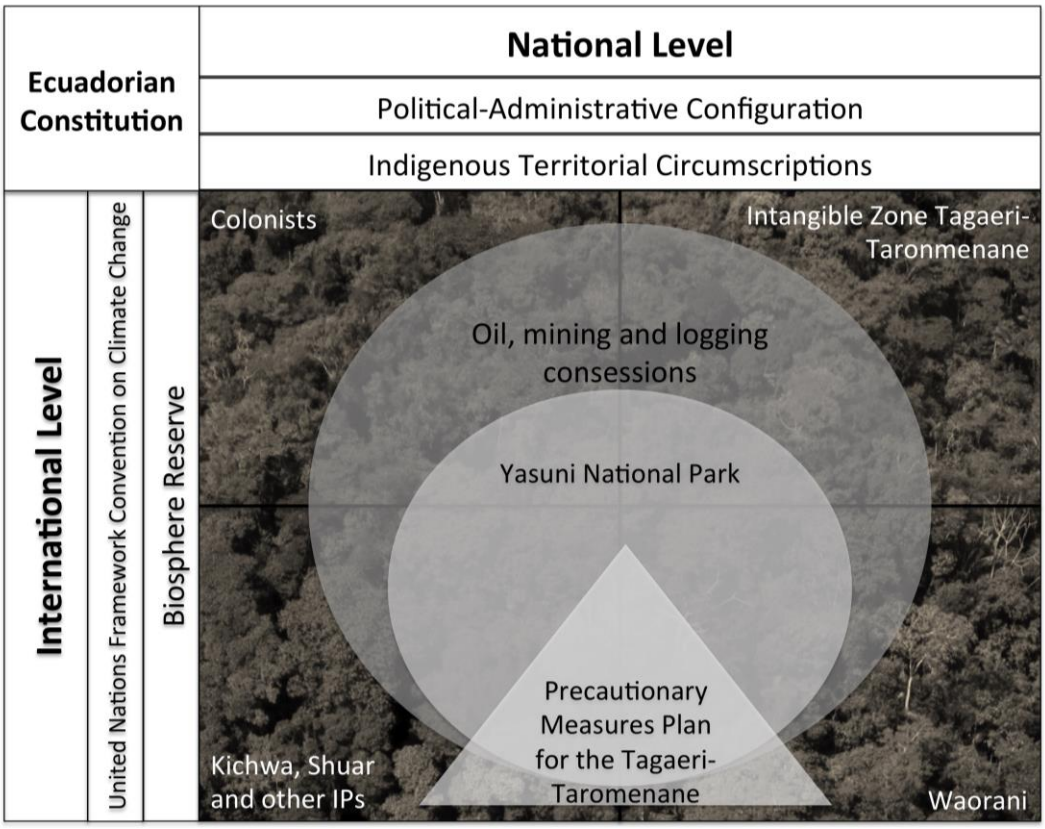

Figure 4.3 Configuration of Yasuní Biosphere Reserve according to the administrative and geographical divisions

Ecuador's political-administrative division does not follow geographical features or biodiversity distribution patterns, making conservation complex. It reduces efforts on wildlife connectivity and makes the administration of natural resources less effective. Multi-layered and clear rules of procedure are needed in order to empower local communities for better forest governance and at the same time effective structures for decision making. New forms of political administrative organization, the Indigenous Territorial Circumscriptions, were created in the Constitution. These special Indigenous Territorial Circumscriptions can be established in order to suit and strengthen indigenous autonomy (Constitution art. 257). Indigenous territorial jurisdictions respond to the juridical pluralism that warrants IP the right to social organization, cultural identity, lands and territories, previous consultation, free and informed participation, self-determination, autonomy, and autogoverning inside their lands. Furthermore, art. 171 of the Constitution authorizes the use of norms and proceedings to solve internal conflicts occurring in their jurisdictions, which institutions and public authorities should respect. Nevertheless, customary decision-making bodies can collide with formal institutions especially when de jure and de facto rights compete with each other (Loaiza et al. 2016). Moreover, the Constitution underlines the importance of the Amazon biome and mandates the creation of a special area that integrates social, environmental, economic and cultural dimensions together with the

territorial planning to guarantee its conservation and the Sumak Kaway ("Good living" in the Kichwa worldview is based on the harmonic relation between man and nature) (art. 250). To achieve indigenous good living, the Institute ECORAE (Eco-development for the Amazon Region) through Presidential Compromise (SIGOB-15031 2014) is in charge of the plan for Transforming Agricultural Systems in the Ecuadorian Amazon (ATPA). According to this new structure, IP' Territorial Circumscriptions and Decentralized Autonomous Governments (GADs) are in charge of plans and policies to achieve sustainability. However, up to now has not been implemented due to legal gaps.

On a regional level, another management layer originates from the Precautionary Measures Plan for the Protection of the Tagaeri-Taromenane IP (Plan de Medidas Cautelares para la Protección de los Tagaeri-Taromenane). According to the Constitution (art. 57), the territories of voluntarily isolated tribes are irreducible and extractive activities are prohibited there. The violation of these rights constitutes a crime of ethnocide. Therefore, the state should think about several measures to warrant the voluntary isolation of a nomadic group such as the Tagaeri-Taromenane. The protection of these voluntary isolated IP is in itself challenging, even more so considering that 63% of their territories and the 10 km buffer zone overlap with the YNP and oil blocks (22.7%) (Papparlardo et al. 2013). Unenforced land rights together with the inconsistency in border definition and the incursion of illegal loggers, has directly caused the death of dozens of Tagaeri-Taromenane, Waorani and Colonists (Papparlardo et al. 2013). Additionally, not only the size and shape of the oil blocks, but also the maps indicating the presence (more importantly, absence) of voluntarily isolated IP are continuously being modified to allow extraction (Papparlardo et al. 2013). After 2010, MAE's duties related to the Precautionary Measures Plan were transferred to the Ministry of Justice, Human Rights and Cults (Executive Decree 503-2010). Now, the MAE is only in charge of providing environmental technical advice. However, oil concessions are being granted inside the ZITT, despite the existing legal framework and proven fragility of voluntarily isolated IP. Moreover, Ecuador has been accused at the Inter-American Commission on Human Rights of not doing enough to protect voluntarily isolated tribes and illegally altering maps (IACHR 2015).

The Preliminary Proposal for the Limitation, Zoning and Land Use in the Yasuní Biosphere Reserve (Comité de Gestión de la Reserva de Biósfera Yasuní 2011) was developed through an evaluation and consultation process with key stakeholders from indigenous communities, the private sector and civil society. It recommends a core, a buffer and a transition zone with different resource-use intensities. Core zones are areas designated for conservation, research and educational activities, generally representing regions with high biodiversity and cultural significance. The YBR core zone comprises the YNP, the ZITT and the Waorani Ethnic Reserve. According to Ecuador's Environmental Law and the YBR management plan, oil exploitation inside the YNP and the Waorani Reserve are permitted only under high social and environmental standards and are

banned in the ZITT. The reality, however, is that oil blocks overlap with these three areas, covering 79.8% of the YBR (Pappalardo et al. 2013).

While the YBR management plan allows subsistence hunting in the National Park exclusively 'for communities,' the Forest Law bans hunting but allows sustainable and traditional fishing for IP (Ley Forestal y de Conservacion de Areas Naturales y de Vida Silvestre, Registro Oficial 418-2004, art. 87). On the other hand, the TULAS (Juridically subordinated legal framework. Texto Unificado de Legislación Secundaria, Medio Ambiente –TULAS, Executive Decree 3516-2003), which establishes environmental politics for the MAE, prohibits hunting in protected areas (Libro IV, art. 114) while allowing 'rational exploitation' of natural resources (Libro XIV, art. 170). De facto, sustainable hunting is allowed to communities who are presumed to live inside the protected area, and communities living within the buffer zone may at times infringe on the YNP limits when hunting, although it is known to be prohibited. Furthermore, while the YBR management plan prohibits commercial logging, the Ecuadorian law allows sustainable timber harvesting in IP' lands (Ministry Agreement 139-2010). Regarding the core zone, inconsistencies have risen due to the unclear definition of 'high standards', sustainable harvesting, the location of communities and further contradictions between legal frameworks and management plans. Drafts of a new Forest Law and the Environmental Organic Code have been presented to the Assembly. They are an attempt to solve these issues and include regulations regarding financial mechanisms, legal frameworks for ecosystem services, among others.

The buffer and transition zones that surround the core zone are meant to mitigate external pressures, especially those coming from human activities. Prioritized uses in these mainly indigenous territories are conservation, ecotourism and sustainable agricultural production. In the last years, evidence of the presence of Tagaeri-Tanomenane and violent encounters with illegal loggers, farmers and other IP has brought attention to the necessity of enhancing protection in the buffer zones of the ZITT. Together with local governments, indigenous groups living in this area should seek sustainable development according to their traditional practices and soil conditions. Extractive activities (mining, logging and oil extraction) should be regulated according to the actual legislation. In the buffer zone, human settlements, productive activities, services and infrastructure are permissible. These areas should be a priority for mitigation strategies like REDD+.

Contradicting plans and legal frameworks make inter-institutional coordination challenging. Main ministries involved in the YBR are the MAE for its protected area status, the Ministry of Justice, Human Rights and Cults for the ZITT, and the Ministry of Energy and Mines for the supervision of non-renewable resources. Additionally, IP' territories and communities are under the administration of the Ministry of Agronomy (MAGAP) whereas private properties are under the local administrative entity. Inter-ministerial coordination is difficult and requires lengthy procedures. In the majority of cases, in the end the extraction of non-renewable

resources is prioritized, leaving little room for arguments. In fact, oil exploitation plans, even in protected areas, have practically always been approved (MAE 2006). And despite the fact that mitigation initiatives such as REDD+ are under MAE's jurisdiction, oil blocks might frequently be implemented in areas with jurisdictional and institutional overlap. Therefore, it is necessary that additional governmental entities are incorporated in the discussion and definition of REDD+ guidelines, measures and actions, especially in areas with non-renewable resource extraction.

4.6. Legal and institutional framework for REDD+

The MAE is the national institution in charge of climate change mitigation and adaptation strategies, policies and programs in the country. It is supported by the Inter-institutional Committee on Climate Change (CICC), where several ministries and governmental institutions are involved in the coordination of the National Climate Change Strategy (Executive Decree 495-2010).

Additionally, the MAE is the National Authority for REDD+ (ANREDD+) (Ministerial Agreement 033-2013) and is in charge of the National Strategy for REDD+ (ENREDD+) (Ministerial Agreement 095-2012). The new REDD+ Action Plan will be launched in September 2016. It sees REDD+ as an umbrella instrument to integrate and stimulate sustainable development and forest conservation across national public policies and strategic sectors. This novel approach is based on several analyses regarding deforestation drivers, socio-economic and political feasibility, and a legal-political institutional framework (MAE 2015). The REDD+ Action Plan considers different implementation mechanisms in six prioritized areas or homogenous deforestation processes zones, located in the Amazon region, northern coastal areas and the semi-dry forests in southern Ecuador. It has five main components: i) land use and policies that enable institutional management; ii) transition to sustainable productive systems (other than the forest); iii) forest value increment and forest management; iv) restoration, conservation and connectivity; and v) monitoring, safeguarding and knowledge management (UN-REDD Programme 2015, Serrano 2015).

Table 4.3 Legal, institutional and regulatory frameworks of REDD+ in Ecuador

	Climate Change Mitigation	**Human and Indigenous Peoples Rights**	**REDD+**
International	Kyoto (1999) and Post-Kyoto Agreements	ILO 169 (art. 13,14,15)	Bali Action Plan (UNFCCC Conference of the Parties COP13-2007)
	UNFCCC (1992)	United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (2007) and ILO Convention 169: free, prior and informed **consent** (FIPC)	Copenhagen Accords (2009)
	UN-REDD (2009)		Cancun Agreements (COP16-2010)

<table>
<tr><td rowspan="5">National Constitution (2008)</td><td colspan="3">art. 1: Non-renewable resources are a national priority
art. 313: Biodiversity is considered a strategic sector and the State reserves the right to administer, regulate, control and manage it
art. 407: Prohibits non-renewable extraction in protected areas and intangible zones. Exception for national priority resources, considers popular consultation if necessary</td></tr>
<tr><td>art. 414: Climate Change Mitigation</td><td>art. 56: Collective rights recognition</td><td rowspan="4">art. 74: Government regulates the production, provision, use and exploitation of ecosystem services</td></tr>
<tr><td>art. 14: Sumak Kawsay</td><td>art. 57: Prior, free and informed consultation (§7 and §17)</td></tr>
<tr><td>art. 71: Environmental Protection</td><td>art. 257: Indigenous Territorial Circumscriptions</td></tr>
<tr><td>Forest Law (Registro Oficial 418-2004)</td><td>art. 84: IP’ right to use, usufruct, administer and conserve natural renewable resources located on their lands</td></tr>
<tr><td rowspan="6">Plans, Strategies, Agreements</td><td>Plan para el Buen Vivir (§5.1 §7.10 for Climate Change Mitigation) (2013-2017) and creation of the National Environmental Plan</td><td>Plan para el Buen Vivir (§1.8 for a plurinational State, §1.9 public participation) (2013-2017)</td><td>art.133: REDD+ Registration 1st Phase (2013)</td></tr>
<tr><td>Executive Decree 1815: creates the National Strategy for REDD+ (2009)</td><td rowspan="2">Precautionary Measures Plan to protect the Tagaeri-Taromenane IP (MC-91-2006)</td><td rowspan="2">art. 033: REDD+ Implementation and Regulation (2013)</td></tr>
<tr><td>art. 104: Administrative reorganization for climate change consolidation (2009)</td></tr>
<tr><td>Executive Decree 495: creates the National Strategy for Climate Change (2010)</td><td colspan="2">art. 128: REDD+ Consultation and Requisites procedures (2013): prior, free and informed consultation</td></tr>
<tr><td>art. 033: National Strategy for Climate Change (2012)</td><td rowspan="2">RE-010-MAGAP: Land tenure regulation the buffer zone of the Tagaeri-Taromenane Intangible Zone (2014)</td><td rowspan="2"></td></tr>
<tr><td>art. 089: Nationally Appropriate Mitigation Actions (NAMA) Register (2014)</td></tr>
</table>

The ENREDD+ is part of MAE’s Climate Change Mitigation Plan, mandated by the National Plan for Good Living (2009–2013 and 2013–2017), Ecuador’s main governing guide that aims to reduce deforestation, manage natural resources sustainably and progressively substitute the current oil-dependent economy with a productively-diverse, knowledge and innovation-oriented one (Tab. 4.3). Moreover, REDD+ will be financed through governmental contributions, bilateral, multilateral and private funds, as well as “result-based payments” under the UNFCCC. Without international REDD+ financing and technical support it would have been difficult to promote these environmental reforms and processes in a country with other urgent political priorities. REDD+ is guaranteed by the Constitution and has had a great participation of civil society sectors.

The Constitution states that the Ecuadorian government has exclusive competences over forest resources (art. 261) and that ecosystem services are not susceptible to appropriation; the Ecuadorian state shall regulate its production, provision, use and exploitation (art. 74). In accordance with this, the MAE, as ENREDD+, regulates REDD+ implementation in Ecuador through several instruments. All mitigation initiatives and projects are obliged to be registered and approved by the MAE (Executive Decree 495-2010 and Ministerial Agreement 033-2013). The first guidelines for the registration of REDD+ initiatives are taken into consideration in Ministerial Agreement 102-2013 and the prerequisites and procedures for consultation in Ministerial Agreement 128-2013. REDD+ in Ecuador will be implemented on a national scale (art. 1 Ministerial Agreement 033-2013). However, REDD+ initiatives can be proposed at the national and project level (Ministerial Agreement 033-2013). The MAE will establish baselines, methodologies and safeguards. Project developers cannot own property rights of Certified Emission Reduction units (CERs), they can only have indirect access rights. This means approved REDD+ projects can access non-monetary and monetary incentives according to the national benefit sharing mechanism, which has not yet been released. However, the ban of the direct commercialization of CERs might discourage private initiatives.
Moreover, according to the new legislation the MAE can also implement REDD+ activities, also inside protected natural areas (Patrimonio de Areas Naturales del Estado). It is still unclear how this will pose further issues, especially regarding additionality and consultation (see below). REDD+ projects implemented in buffer zones of protected natural areas will have additional prerequisites for their approval (Ministerial Agreement 033-2013, art. 10.2). However, if each country has its own REDD+ national framework that differs from the international agreements, this might lead to differences in carbon prices and low negotiating power. Despite the great progress in the construction of a national REDD+ framework, the MAE is still preparing the guidelines for benefit sharing, monitoring, sanctions in case of non-compliance of REDD+ projects and dispute resolution procedures.

The national conservation incentives program Sociobosque is expected to be one of the REDD+ implementing partners to support the National Strategy. Without doubt, Sociobosque has provided lessons and contributions to the ENREDD+ design. Moreover, Sociobosque provided the opportunity to discuss various aspects that certainly improved the National REDD+ system. One contested aspect is the need of equality between the signatory parties. In case of noncompliance of contracts or misuse of incentives in the Sociobosque agreement, the MAE can initiate administrative and legal actions, either civil or criminal (MAE 2012b). The contracts can be concluded before time if the MAE' payments temporally fail in three occasions. There is no clear procedure or penalty if the institution in charge (in this case MAE) fails to meet the periodic payments either partially or completely (Davalos 2011). However, communities and farmers are forced to a binding participation because of the contract's long term and repayment obligation (Ramos 2010). Other associated discussions are

the disputes over uneven benefit sharing among involved communities (CONFENAIE COICA 2011), participation and consultation mechanisms. A dispute settlement mechanism is planned to be issued as a response to these and other potential issues, according to Ministerial Agreement 33-2013.

4.6.1. Participation and consultation

The Ecuadorian Constitution (2008) is the supreme legal body of the country. Infra-constitutionally, there are several international agreements that further guide and guaranty IP' rights. Since 1989 (ratified in 1998) Ecuador is signatory of the Indigenous and Tribal Peoples Convention (No. 169) of the General Conference of the International Labor Organization (ILO). Especially important are art. 13, 14, and 15 on land tenure, natural resources, and spiritually and culturally associated values. Another important agreement is the United Nations Declaration on the Rights of Indigenous Peoples (2007). Significant are art. 3 and 4 about the IP' right to self-determination and art. 32 that dictates rights for territorial ownership. It also mandates the right of consultation and free, prior and informed consent (FIPC) decision-making in case of relocation, prior to any measure that affect their territories and resources, as well as before interventions that lead to loss of cultural and intellectual property.

Despite achieved privileges and rights of IP at the national and international level, participation and consultation has dramatically been reduced when it comes to decision-making for non-renewable resources. Art. 1 of the Constitution declares mining and oil extraction activities a national priority and, if decreed by the Executive, all rights are assigned to the central government. In accordance with international agreements (ILO 169, art. 15.2), the Constitution mandates a prior, free and informed consultation – not consent – before any prospection, exploitation or commercialization plan of non-renewable resources in indigenous lands (art. 57). However, de facto power differences between IP and private and state-owned extractive companies, limit IP' ability to effectively contest such plans or have a major impact on defining guidelines for non-renewable resources exploitation. This shows just how fragile the role of the MAE is in the authorization of permits for non-renewable concessions (Davalos 2011). Even to this day, the Sociobosque program does not provide any guarantees regarding non-renewable resources concessions that might occur in areas of conservation (CONFENAIE COICA 2011). However, a re-arrangement of borders and project limits could be contemplated. As dictated by law, in the case of REDD+ actions and projects and any other intervention, affected areas and people shall receive financial rewards according to the Environmental and Social Reparation Program (PRAS – Programa de Reparación Ambiental y Social, Inter-ministerial Agreement 001-2012). However, it does not consider leakage especially in the case of road construction and other infrastructural plans.

Consultation generated a lot of debate during the design phase of the National Strategy for REDD+ in Ecuador. As a response, Ministerial Agreement 128-2014 mandates obligatory consultation and consent prior to any REDD+ project or action in IP' and other collectives' territories. In accordance with international agreements (ILO 169, art. 6.1 and UN's IPD art. 19), MAE consulted and constructed the REDD+ consulting mechanism (FPIC National Guide). The guide was elaborated with IP' leaders and UN OHCHR assistance, before formalizing it as part of Ecuador's REDD+ legislative framework (Santillan 2014) (Figure 4.4). However, it is yet to be seen how MAE will guard and guarantee IP' rights and national and international law compliance since consultation responsibilities will be mostly assumed by the proponent developer. This means that the consultation procedure will be designed for each initiative and until now there is no mandate of rules of procedure for the consultation process other than that it be agreed on by the affected community. Moreover, who will act as guarantor of rights when MAE is in charge of observing the consultation process but can also act as project implementer.

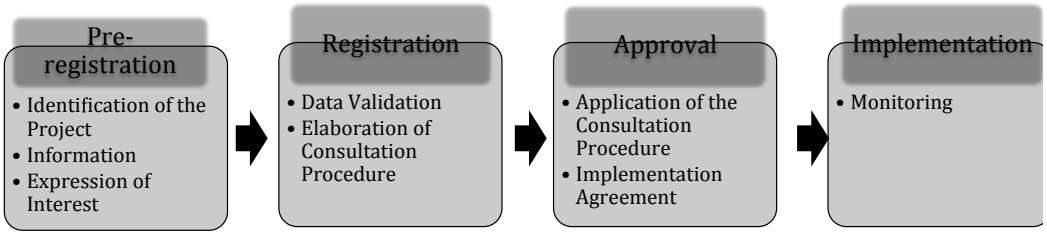

Figure 4.4 REDD+ Project Cycle in Ecuador (adapted from Santillan 2014)

The Confederation of Indigenous Nationalities of Ecuador (CONAIE), the overall IP' organization, has expressed his concern against the implementation of REDD+ in Ecuador (CONAIE 2011). Along with them, some NGOs have opposed REDD+, fearing the loss of rights over indigenous territories and resources, as well as a potential multiplying effect of poverty (CONFENAIE COICA 2011; CONAIE 2011).

Should IP be unwilling to participate in mitigation mechanisms, this could threaten REDD+ implementation, since they own the majority of the country's primary forests (Reed 2011). However, IP in Ecuador have different positions regarding REDD+ and some groups support REDD+ implementation. For example, the Coordinator of Indigenous Organizations of the Amazon River Basin (COICA) promotes Indigenous Amazonian REDD+ (REDD+ RIA, for its initials in Spanish REDD+ Indígena Amazónico) and is an active participant at the UNFCCC negotiations. REDD+ RIA proposes legal frameworks suited for IP and enhances the institutional participation, monitoring and non-market financing (COICA 2014). Also, COICA proposes "free, prior, informed and binding

consultation and consent regarding REDD+" as a prerequisite to securing rights (COICA 2014). Nevertheless, 10,167 km2 belonging to all the different ethnicities that populate the Ecuadorian Amazon have joined Sociobosque (Lopez et al. 2016), which can be at least partially comparable to REDD+.

As a consequence and as part of the readiness phase, the MAE, with the UN-REDD Programme's technical assistance, created a REDD+ Working Table (MdT) to involve local stakeholders into the National REDD+ Program. It was originally formed by seven representatives from the civil society and three from the IP', Afro-Ecuadorians' and other communities. Civil society was represented by one member from the academic sector, two from the private sector, two national NGOs (one social and one environmental), one youth group and one women's group. Additionally, three IP' organizations participate, one each from the Amazon, the Andes and the Coast (Panigua 2015). Nevertheless, it is highly debatable whether the organizations involved were representative for a whole sector and if they had the ability to exchange information with their bases at the rate that the construction of REDD+ required, especially when we consider the extreme differences among IP regarding participation and decision-making arrangements (Loaiza et al. 2016). Space for debate and involvement of civil society in Ecuador has been severely curtailed, remarkably after the establishment of Executive Decree 016 in 2013 that restricts NGOs' activities in issues of public concern (Lopez et al. 2016). Therefore, to persuade IP and other civil groups to participate can be challenging, particularly after the decree that have left them weakened and divided. The MAE originally contemplated the participation of 15 groups identified as key stakeholders, but after little response to the open invitation, lobbying had to be done to promote participation (Panigua 2015). Recently the MAE announce forming of a new REDD+ Working Table, that presumably took measures to increase participation, receiving a much larger application response.

Geographically remote areas like the Ecuadorian Amazon pose great challenges for REDD+ socialization, capacity building and, when required, consultation. Language diversity, gender inequalities, transportation costs, great travel distances and scattered households hinder socialization. Difficulties in conveying climate change and carbon sequestration concepts as well as the top-down flow of information seem to be primarily challenges (Reed 2011). COICA and indigenous leaders also agree that communication with the indigenous base groups must be strengthened.

MAE prepared REDD+ informative booklets for communities (REDD+ en Ecuador: Material Informativo para Comunidades, MAE & GIZ 2012) with the ANREDD+'s pedagogically mediated official message about REDD+. The need for a precise and culturally appropriate, translation into the two officially recognized native languages in Ecuador (Kichwa and Shuar) was since identified. Using the first Kichwa draft in the field revealed that technical-scientific concepts have not yet been fully incorporated in this native language and that literal translation may be leading to misunderstandings, hindering the comprehension of this complex subject. The harmonization of the technical-scientific concepts with the possibilities offered by the native languages has since been done and native speakers have checked the texts. In its final version, words have been kept in Spanish when a translation to Kichwa or Shuar would hinder comprehension, and local uses of the language, even dialectal terms, were incorporated when its contribution to the understanding was significant, while respecting the orthographic and grammatical rules of the unified languages. Ex profeso, self-explanatory illustrations were prepared bearing in mind that Amazonian IP favor orality and many members lack access to written messages. Characteristics of each ethnic group were included to represent their collective and cultural identity. A balance of representation in terms of gender and generations was aimed at, while promoting dignity and identity. These texts represent Ecuador's first reference documents on a scientific subject that have been validated by IP and approved by the REDD+ national authority (Borja 2013). Yet, to curb the historical trend that disproportionally affects IP through the lack of materials in their native languages to support decision-making processes, systematically marginalizing them from policy-making processes, will require great efforts, as definitions of the REDD+ approach can greatly vary and texts can quickly become out of date.

Key Challenges for the REDD+ implementation in Ecuador

- Indigenous Peoples Autonomy (Constitution art. 171) and Special Territorial Circumscriptions (art. 250) can collide with REDD+ frameworks, especially concerning resource use and management
- Prioritization of non-renewable resources extraction (art. 1)
- Governmental Carbon Credit Ownership (art. 74)
- Unclear land tenure
- Uneven contract responsibility between government and indigenous communities
- Opposition of Ecuador's major IP' organization CONAIE
- Persistency of agricultural expansion policies
- '*Kichwization'* of legal and management frameworks and homogenization of IP

4.6.2. Box 4.1 Challenges of REDD+ implementation – the case of the Yasuní Biosphere Reserve (own elaboration)

At the time that this study was undertaken, a written consent of the community council was a requisite prior to the execution of any REDD+ (pilot) project. This was also the case with the studied REDD+ pilot project. Nevertheless, according to our data, only 20% of interviewed households confirmed that all members in the community were consulted. The majority of households that confirmed that they had been informed belong to the Colonists and the close-to-market Kichwa. Especially low were the rates of the Shuar, where according to our survey only two households said that they were consulted about the REDD+ project. This, however, contradicts the fact that many families in each community were involved in the productive activities of the REDD+ pilot project and they could identify the organization and technicians. Moreover, in the same questionnaire almost all interviewed household heads responded that communal decisions are taken in general assemblies and that they are considered to be fair (Loaiza et al. 2016). It seems that pretending to not have been properly informed may be used by some as a strategy to avoid responsibility if goals are not reached. It may also show that formal authorities and hierarchies may hinder full participation, especially of women (Krause et al. 2013, Loaiza et al. 2016).

Participation in assemblies and activities does not directly mean understanding. The analysis of the interviews shows that all interviewees lacked an understanding of the connection of the REDD+ Project with climate change mitigation. Although project developers invested time and resources familiarizing people with REDD+ concepts, only 28% of the interviewed households involved

in the REDD+ pilot project said that they are familiar with the term “REDD+”. From this 28%, less than 8% of the household heads had understood at least some basic aspects of REDD+ and climate change. Almost all participants said that they engaged in REDD+ because of the financial incentives and as a way to consolidate lands. This is also true for Sociobosque, where the majority of households involved lacked understanding of the contractual terms (Krause & Dan Nielsen 2014).

Most of the interviewees confused REDD+ with Sociobosque. After the differences were explained, Sociobosque seemed to remain as the more attractive solution for local communities. There are various reasons for this: quick procedure (from the moment the project starts to the first payment), simplicity to select lands, fair community monitoring and benefit sharing frameworks and stability of payments (personal observation). As one interviewed head of household stated: “Sociobosque is faster. We have seen results, and additionally, payments are per hectare not per tC, which makes the process more understandable.”

4.7. Land use change dynamics and spatial configuration

Small farmers’ livelihoods and land use practices in the Amazon cannot be explained through traditional land use decision-making criteria (Pichon 1997a). Land use is highly variable among the Ecuadorian Amazon. This results from differences in tenure, market access, infrastructure, biophysical conditions, and other demographic and environmental features (Gray et al. 2008). Traditional knowledge, ethnicity and social structure can also affect land use (Gray et al. 2008, Loaiza et al. 2015). Other important considerations are policies in form of credits and incentives that stimulate and shape land and forest use (Pichon 1997a). Recent road enlargement and off-farm employment constitute critical transformations (Loaiza et al. 2015). Other changes in livelihood strategies may have been reinforced by the provision of health and educational services, low mortality rates, the establishment of national parks and legalization of indigenous territories (Gray et al. 2008).

Closed frontiers in the Ecuadorian Amazon created a ‘multiphase response’ phenomena characterized by land intensification, forest fragmentation, and off-land migration (Barbieri et al. 2005). Increasing immigration and high fertility rates increase the demand for land and further division of existing areas (Barbieri et al. 2005, Morales et al. 2010). This ‘multiphase response’ is highly influenced by the legacies of past agrarian reforms that together with the current legal frameworks shape current land configuration of the northeastern Amazon lowlands (Loaiza et al. 2016). Despite the fact that nucleation (households in the settlement form a cluster) might increase control over ancestral territories (Lopez et al. 2013b), privatization and parcelling of community lands is raising the pressure on existing territories (Loaiza et al. 2016). In the past 30 years, the surveyed communities experienced an exponential population growth from

17.6% to 56%. For example the close-to-market Shuar community had two households in 1987, seven in 1990, 12 in 2001 and 35 in 2014 (Loaiza et al. 2015, Loaiza et al. 2016). According to the community management plans, IP should maintain a portion of the communal lands as a reserve. However, once pressure on lands increases, reserves are used to allocate new families.
During the planning and definition of project boundaries, future REDD+ initiatives should leave enough room for future families and for the practice of sustainable livelihood activities. This includes allowing not only hunting, fishing, gathering of forest resources and firewood extraction, but also shifting cultivation and sustainable timber withdrawal. For Amazon communities shifting cultivation and selective wood cut are especially important, since environmental income still represents an important portion of their livelihoods, even in households with high cash income (Loaiza et al. 2015).

It is hard to define the minimum sustainable orchard size for an Amazonian family. First attempts, like the man-land ratios (Bayliss-Smith 1980) and carrying-capacity formulas for shifting cultivation societies (Brush 1975) have demonstrated that only focusing on agriculture is wrong especially for Amazonian groups where hunting and fishing resources are highly important (Loaiza et al. 2015). The simplification of carrying-capacity calculations can bring erroneous data concerning the appropriate number of inhabitants that an ecosystem can support (Fearnside 1997). It is necessary to find more simple human-carrying capacity models to design development plans in the Amazon (Fearnside 1997). Especially important for the Ecuadorian Amazon is that, as demonstrated, current policies still set farm sizes of 50 ha per household. Moreover, this should also be taken into account by REDD+ project developers when defining project boundaries, since many communities will continue subdividing land if the above described trends continue.

There are only a few studies in the Ecuadorian Amazon about the sustainable size of a household area. According to Lopez et al. (2013) in a study with Shuar communities in southern Ecuador, to sustain IP' livelihoods in a customary extensive production system, an area of 125–1050 ha per household are required. Conversely, a study in the Yasuní area by Rodriguez & Castillo (2005) consider that 0.95 ha are necessary to cover basic needs per inhabitant/year, without taking into account hunting and gathering areas. It might be erroneous to draw practical conclusions on the average land needed per household upon this insufficient data pool, considering how greatly these ranges vary. However, in Tab. 4.4 we show current and future land sizes in the studied communities. If current patterns of land division continue, this will lead to further deforestation and forest fragmentation in the future, threatening the livelihoods of the communities. Deforestation, fragmentation, overpopulation, acculturization and market integration can have consequences over the regional climate, prey populations and soil fertility and consequently can affect traditional livelihoods creating nutritional deficiencies (Fearnside 1997).

Table 4.4 Land configuration and population growth: projections*

	La Reina	Union Lojana	Tiguano	Ruminahui	Mandarina	Sinchi Napo
Total area (ha) (recognized)	1437.0	1269.0	1394.0	235.0	3076.0	8420.0
Total area (ha) (claimed)	1437.0	1269.0	2894.0	235.0	5076.0	16420.0
Total farm areas (ha) (including fallow)	242.5	255.7	235.7	48.0	112.6	151.1
Number of families	41.0	28.0	35.0	13.0	34.0	38.0
Density inhabitants/km^2	11.5	6.9	8.8	23.4	4.2	2.3
Available land (ha)/ household/year 2014 (recognized territories)	35.0	45.3	39.8	18.1	90.5	221.6
Available land (ha)/ household/year 2014 (claimed areas)	35.0	45.3	82.7	18.1	149.3	432.1
Available land (ha)/ household/year 2034 (population growth rate of 3% for 2020)	19.3	32.1	52.1	9.5	87.5	185.0
Available land (ha)/ household/year 2044 (population growth rate of 3% for 2020)	14.4	23.8	38.8	7.1	64.9	137.4

* Projections based on the population growth rate of the Ecuador National Statistics Institute (Instituto Nacional de Estadística y Censos INEC 2012)

IP' lands have demonstrated that they conserve forest resources in their lands more efficiently than other forms of land tenure (Hayes & Murtinho 2008). Although there is always the risk that this trend might change, as forest resources are being depleted in non-IP areas and the agricultural frontier is moving closer to IP lands. This dynamic socio-economic and cultural process should be guided by land-planning policies that promote ethnic diversity and conservation. Moreover, efforts should focus on ethnic groups and protect the most vulnerable ones. For example, protection and secure land tenure in Shuar territories in southern Ecuador might decrease migration and consequently reduce the pressure on territories in the YBR.

Ecuador has 12 IP' groups living in the Amazon, the majority are Kichwa (51%, or 124,942 habitants) (INEC 2012). This diversity is emphasized in the Constitution (2008) that defines Ecuador as a plurinational and intercultural state. However, de facto, prevailing legislation and land planning policies still promote homogenization, assimilation, and 'kichwización' of the Amazon. 'Kichwización' refers to the expansion and assimilation of the Kichwa language, values and culture by other IP. Colonizers and evangelizers promoted the use of the Kichwa language as a form of economic control, evangelization and domination (Little

2000, Moya 2000). This has been enhanced by migrations and the frequent interethnic matrimonial alliances (Moya 2000). For example, Kichwa words define land-planning policies along the Constitution and other legal frameworks. For instance, the terms pacha mama (Kichwa for 'mother earth') (Chapter 7 Constitution) and sumac kawsay (Kichwa for 'the good living' or el buen vivir in Spanish) guide conservation and territorial planning. Other examples include the text related to the creation of the Indigenous Territorial Circumscriptions: "[T]he principles of the Indigenous Territorial Circumscriptions that have been proposed by the Indigenous Organizations are: ama killa, ama llulla, ama sua" (Kichwa for 'do not lie, do not steal, do not be lazy,' own translation) (Instituto para el Ecodesarrollo Regional Amazonico 2015). Additionally, ayllus (Kichwa for 'settlement where the extended family is established,' own translation) are considered as form to designate IP' communities. Also, art. 10 of the COOTAG (2010) promotes territorial planning for the Amazonian ecosystem according to sumac kawsay. Despite the fact that many IP' groups, such as the Shuar, also use these definitions, probably as a strategy to gain rights in the political arena, the 'kichwización' can have an impact on their own identities and trigger the homogenization process even more.

IP' heterogeneity and diversity can bring higher transaction costs and complexity to REDD+ frameworks. However, a uniform system for decision-making and participation that fairly involves all IP' ethnicities and potential REDD+ participants should be developed, otherwise the Ecuador National REDD+ framework might prove to be too difficult to implement. The revolutionary outlook of Ecuador's REDD+ Action Plan (not launched yet) and REDD+ National Strategy tries to solve many issues presented in this paper, serving as a transversal mechanism by elevating itself to policy level and seizing current institutions and existing national programs as implementing partners. This, along with the new strategic planning for the Amazon that takes restoration, conservation and connectivity as well as monitoring and safeguards into account could find new forms of development. However, this ambitious plan should be taken into account in the national budget and in the international agenda along with other climate change mitigation initiatives such as NAMAs. Moreover, breaking down a legacy of mainframe-based systems and the lack of effective inter-ministerial coordination can be highly challenging. Additionally, long-term financing of mitigation and adaptation projects (over 20–30 years agreements) is highly dependent on geopolitics and climate change agreements and negotiations, which can have a direct impact over local populations.

4.8. Final remarks and moving forward

IP play a key role in safeguarding existing forests, providing important ecosystem services beyond carbon storage, such as water provision which is key for food production and climate regulation worldwide. IP and small farmers are highly vulnerable to the effects of climate change and they are at a great disadvantage when it comes to incorporating solutions at an individual level. IP can contribute

with the scientific and international community to find solutions to mitigate and adapt to climate change. The strengths of local knowledge along with traditional customary laws are perhaps the most effective means for a global mechanism to be successfully implemented in high biodiverse forested countries. Full and effective participation of IP and forest governance need to be promoted in local communities. This will help locals to participate in the monitoring of carbon sequestration and accounting of GHG inside REDD projects.

Furthermore, the inclusion of IP in REDD+ initiatives would increase their engagement and interest, possibly enhancing their actual living conditions by bringing aggregate values like food security, diversification of income and strengthening of land tenure. In the best-case scenario, if IP are involved in REDD+, this could empower local organizations, and at the same time the customary decision-making procedures of IP can be adopted in REDD+ to make them compatible. Optimistically, it could promote local communitarian organization's reinforcement and the assessment and adaption of IP's customary decision-making procedures to REDD+ compatible structures. There is a necessity to link these relatively new global climate mitigation frameworks with national, subnational and local governance levels. Without a doubt, only multi-scalar structures – from international levels to national legal bodies up to strong communitarian institutions – and clear resource use rules in common property lands will definitively determine the success of REDD+ projects and other mitigation frameworks.

4.9. Acknowledgments

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Chapter 5

Synthesis

5. Synthesis

Without a doubt, biodiversity and sustainable livelihoods should be key components of the diverse climate change mitigation and adaptation initiatives, including REDD+. Conserving existing forests can safeguard important flora and fauna species and at the same time maintain the provision of different ecosystem services. Moreover, forests provide vital means for forest dependent people, enhancing climate change adaptation and carbon sequestration. IP and forest dwellers can significantly contribute to managing and protecting endangered tropical rainforest ecosystems. Integrating them into conservation frameworks is the only way to ensure long-term sustainability to initiatives.

5.1. Implementing the Livelihood Framework for REDD+

There are multiple concerns regarding the potential impacts REDD+ might have over forest-dependent communities. Worries include weakening of land and resource rights, as well as impacts over food security and agricultural production. On the other hand, it has been argued that REDD+, if implemented at the national scale, can support forest conservation policies and provide means for income diversification. Sustainable agriculture, diversification of food and income sources as well as conservation of forests can lead to sustainable rural livelihoods. Therefore, understanding and analyzing forest dependent livelihood strategies is crucial to assess what positive or negative impacts REDD+ could have. Once again, to achieve long-term sustainability and the protection of existing forests we need to prioritize forests owners. Along the present manuscript, three studies have been presented with the aim of contributing ground-level data to this discussion. Hereafter, the three publications are combined to present an overview of the implications of REDD+ implementation on the livelihood of the studied communities. Accordingly, to evaluate the repercussions of REDD+ within the Livelihood Framework an analysis of the Capital Assets as well as the Contextual Aspects related to social relations, institutions, organizations and vulnerability is needed.

5.1.1. Capital Assets

As presented in Section 1.2 the Sustainable Rural Livelihood Framework encompasses five capital assets: human, natural, social, physical and financial capital. According to this theoretical framework all capital assets are owned and controlled by the households. Main findings are presented in Table 5.1.

Human capital especially related to quality health and education access remains a major issue in all studied communities. The majority of educational and health

centers are located far away from the studied communities and most of the time there is a lack of resources and conditions to deliver an adequate service. Local knowledge represents a very valuable asset in local communities. Not only knowledge about plants and animals, but also expertise of the terrain and other geographical features is invaluable. Additionally, studied communities are hardworking people, where all family members participate in activities becoming a significant labor force. These are important issues for REDD+ since locals can become experts for monitoring and reporting activities. Moreover, once in the project they can carry out regular patrols and safeguard the protected areas.

For natural capital, land holding is highly variable among communities but is still higher than the national average. Moreover, despite the fact that many species of flora and fauna are declining, environmental resources such as fish, wild animals, wood and others can still be found in the area. Water quality can be highly variable, and might be especially low close to extractive industries. Furthermore, despite selective wood extraction, forest resources are well preserved, especially in the extensive and far-from-market communities. Although baselines about predicted deforestation show a diminishment, experience indicates that changes in policies or new non-renewable resources concessions can boost deforestation again. Additionally, REDD+ conservation can not only secure carbon but also keep forests in good quality preserving the diversity of species.

Physical capital depends on access and market closure. Overall far-from-market communities have a wider extension of productive lands when compared to those communities located close-to-markets. On the other hand, far-from-market communities have better roads and communication means than those most isolated. The same applies for water supply and access to energy. Regarding housing, when compared to other studies, brick houses might not be a good indicator since locals prefer wood houses. This is because they are fresh, affordable and accessible. Moreover, accessibility whether by land or water plays an important role on commercialization, education and health. The latter is also influenced by weather conditions and seasonality. Physical capital can be important for REDD+ if seen in the form of instruments for carbon measurement, Global Positioning Systems (GPS), and monitoring devices.

Financial capital is highly variable among community members and most of the time it is dependent on the oil industry. It includes not only wages coming from oil-extraction labor, but also from livestock sales as locals raise chickens and pigs to commercialize them with the backing of these companies. In general, access to credit, savings and pensions is extremely limited, which in turn can affect REDD+, because there is a reduced culture of accounting, savings and managing accounts. Direct cash payments from mitigation initiatives can easily be underused if not envisaged in the project. However, access to cash can be important to solve emergencies, buy school supplies, travel and medical implements.

Social capital as a communal entity seems to be stronger in the Kichwa communities, especially when referring to norms and sanctions. Also, the Shuar have deep relations of trust, reciprocity and exchanges. Social capital, one of the major study goals of the present work, is extensively discussed in Chapter 3.

However, social relations are more significant in far-from-market communities. In all the communities we studied, access to wider institutions of society is limited. The Shuar and Kichwa share bonds with other organizations of the same ethnicity, but Colonists are not part of any form of association. Social capital is extremely important for REDD+ purposes, from the very beginning for the consultation and agreement, through the implementation and finally the monitoring phases. All members should and can be included in a fair and equitable way to ensure the successful accomplishment of the project goals.

Table 5.1 Some capital assets in the six studied communities

Community		**La Reina^**	**Unión Lojana**	**Tiguano^**	**Rumiñahui**	**Mandarina**	**Sinchi Napo^**
Ethnic Group		**Mestizo (Colonists)**		**Shuar**		**Kichwa**	
Asset	**Statistic**						
Human Capital							
Total HH Size	Average number	4.0	3.1	3.5	4.2	3.8	5.2
Education level of HH head	Weighted Average	20.0	16.5	23.5	15.0	17.0	18.5
Education and Health Facilities	Weighted Number	1.0	0.0	0.3	0.3	0.3	0.8
Natural Capital							
Area farmed	Average area in ha	29.0	25.8	28.7	11.7	51.7	46.2
Available land (ha)/household/year 2014 (recognized territories)	Average area in ha	35.0	45.3	39.8	18.1	90.5	221.6
Available land (ha)/household/year 2014 (claimed areas)	Average area in ha	35.0	45.3	82.7	18.1	149.3	432.1
Financial Capital							
Household Income	Average Monthly in US$	619.5	524.8	662.5	377.0	420.0	494.2
Livestock holding	Weighted Number	801.0	524.0	699.0	233.0	645.0	1156.0
Physical Capital							
Households with electricity	Percentage	90.0	0.0	80.0	30.0	0.0	0.0
Households cooking with LGP	Percentage	95.0	80.0	90.0	27.0	25.0	10.0
Brick or concrete houses	Percentage	5.0	5.0	5.0	0.0	0.0	0.0
Transportation Access	Weighted Facilities	1.0	0.7	0.9	0.1	0.2	0.4

5.1.2. Transforming processes and vulnerability context

Household decision-making and thus the livelihood framework are dependent on external aspects that bring more complexity to the frame here presented (Figure 5.1). Contextual aspects can be called transforming structures and processes. They include social relations, institutions, organizations and vulnerability, among others. Institutions and policies can trigger and define access to assets and transform them. For example, in our study we show that the agrarian reforms still have a profound impact over land configuration, or the governmental stimulus on oil exploitation. According to the DFID (1999), transforming structures and processes can create assets, determine access and influence rates of accumulation. In this context, REDD+ seen as a national strategy for forest conservation can have a deep impact over safeguarding natural resources and can become a transformative process. Moreover, REDD+ forest governance and financial incentives can significantly increase conservation but also people's well-being if well implemented.

Through chapter 3 on Common Property Management Regimes and resource use rules, and chapter 4 on legal systems and land arrangements, analyses of the interrelations between institutions were presented. The latter has a strong influence over decision-making structures at the intra-community level as well as IP´s and Colonists organizational networking. Despite great advancements on creating a national structure for the implementation of REDD+ in Ecuador, the country still has a long road to effectively include community-based organizations. The future mechanisms to define decision-making and participation can transform and have an impact on existing processes. In general there is a need to reappraise the role women have in these ever more merchandised societies, where male household heads are constantly absent. Moreover, other aspects like spirituality and religion should also be taken into account. Without any doubt, connections and relations with other communities but also with higher hierarchical institutions might define information transparency on REDD+.

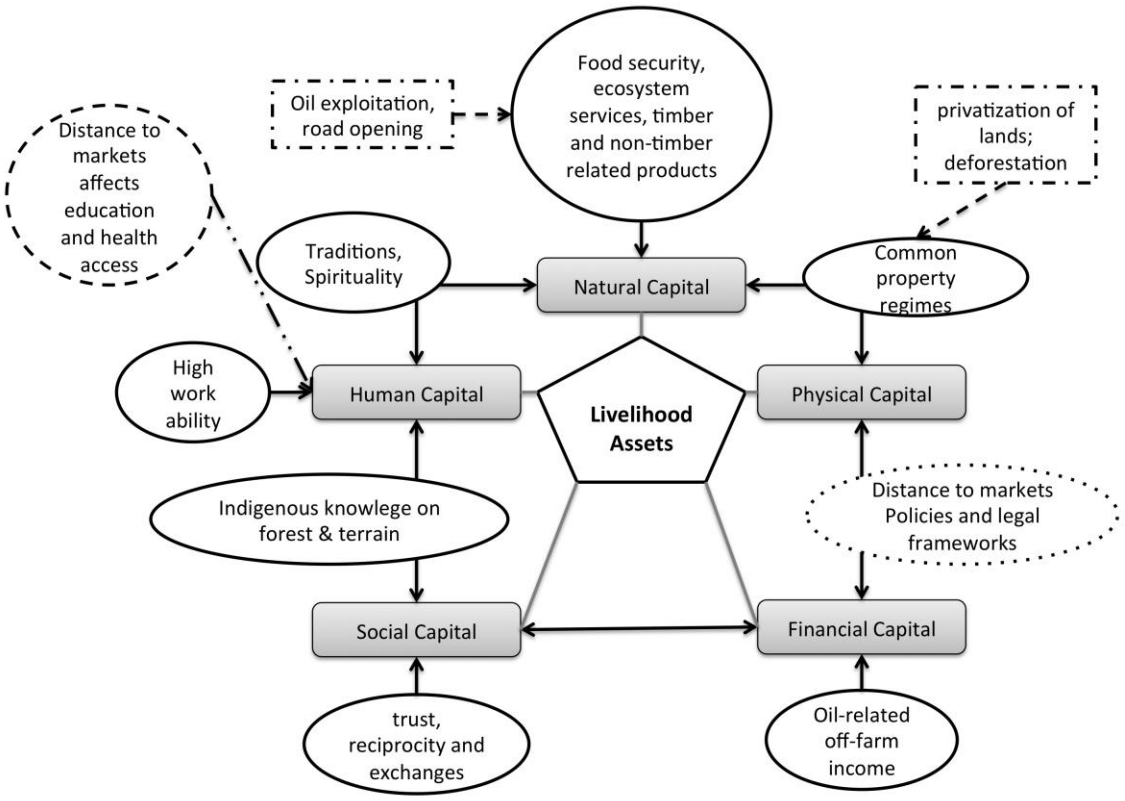

Figure 5.1 Capital Assets and the Livelihood Framework applied to the Yasuni Biosphere Reserve case study[4]

5.1.2.1. Vulnerability Context

The livelihood vulnerability context in our case study is strongly related to deforestation. Forest degradation and deforestation might constitute one of the principle threats to forest dwellers, especially those who are dependent on environmental resources (Table 5.2). Rich forests are associated with ecosystem services (like increased water and air quality), access to prey, soil fertility, regional climate regulation, etc. Another aspect that increases vulnerability is land insecurity. The latter includes not only the recognition of legal land tenure but also the control and management abilities of claimed territories. And the last crucial point that has been identified is the fluctuation of agriculture prices and limited access to commercialization of farm products. Finally, it should be noted appointed that despite seemingly highly protective legal frameworks regarding diversity and IP, observations over recent years have demonstrated that the right to oppose has been breached. Moreover, it alludes to a governmental strategy designed to weaken ground-associations.

[4] modified after Carney 1998 and Sherbinin 2006

Table 5.2 Main components and concerns of the Vulnerability Context

Component	**Key Issue**
TRENDS	
Population growth	Migration and high fertility rates
Deforestation	Deforestation and forest degradation as well as biodiversity loss
Insecure land tenure	Lack of legal recognition and management rights
Land fragmentation and parcelization	Agrarian reforms legacies and population growth
Crop price fluctuation	Undeveloped value chains, poor markets and limited transportation services
Water and land contamination	Oil spills, old oil landfills and lack of sanitation
Reduced energy access	High dependence firewood
Non-renewable resources exploitation	New concessions, road opening
SHOCKS	
Climate change	Rainfall variability, flooding risks, changes in seasonality
Interethnic conflicts	Increased competition for scarce resources, cultural differences

5.1.3. Livelihood Framework Analysis

Following Ellis's (2000) Tanzanian case study, a Livelihood Framework Analysis for the studied communities was prepared. It is a theoretical approach that can be used to recapitulate the three papers presented throughout the dissertation. According to the graphic; transportation and energy access, education and land recognition remain as critical issues (Figure 5.2). However, indicators do not provide enough information to effectively compare the studied communities. In any case, Rumiñahui appears to be the most vulnerable community. It has limited land resources, no transportation possibilities and high dependency on environmental resources. Additionally, the river close to the community is contaminated and fishing has become scarce. Nevertheless, the livelihood framework could be used to measure REDD+ impacts in the communities when used with adequate indicators.

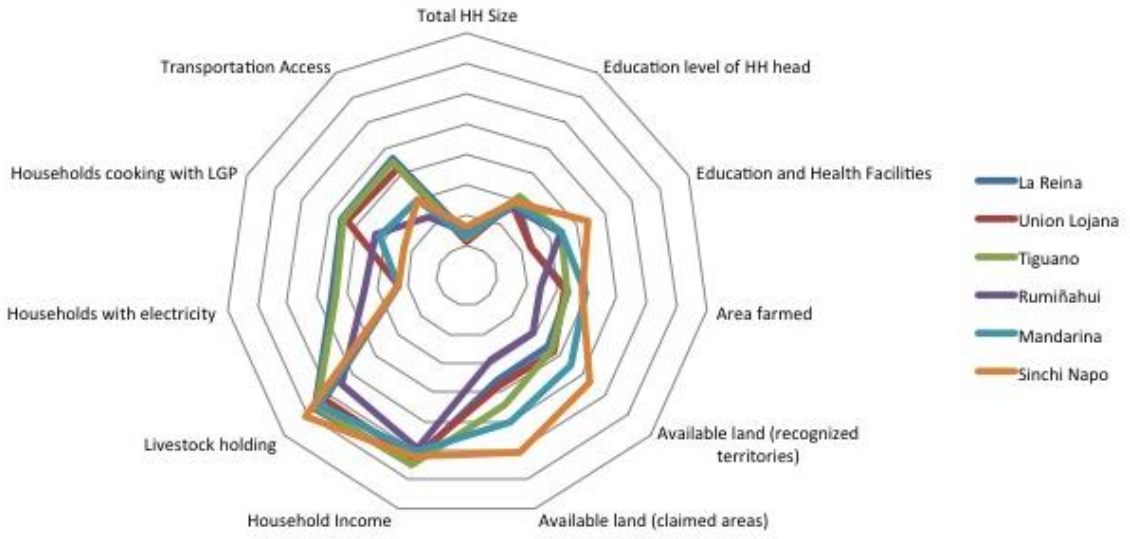

Figure 5.2 Livelihood Framework Analysis

5.2. Methodological limitations

Despite the great effort to map and account farm and environmental resource use in the studied communities, there are still some important methodological caveats that should be taken into account. For logistical and financial reasons, all data concerning income generation, including cash and non-cash income was extrapolated to one calendar year. The latter was done to incorporate data about perennial crops such as coffee, cocoa, maize and rice as they represent important sources of yearly income. The same is true for oil related wages. However, some inconsistency may have occurred due to the variability of oil-exploration and labor related exploitation. It can be very variable over the years. Moreover, data linked to wages might be overestimated because of the new oil boom. Another important point is the one related to environmental income. Interviewees had difficulties remembering and accounting for forest products such as seeds, insects, etc. Additionally, other family members such as children might be considered important forest gatherers who with some difficulty might have been included in the surveys. Moreover, phenological cycles in the tropical rain forests can be highly variable and the latter has an influence over fruit, seeds and other environmentally related products.

To avoid possible data interference, interviews were done in the presence of both household heads when possible. Moreover, data was correlated through regular visits to the farms, cross-checking information with other communities and supporting the project's technicians. Additionally, data was discussed with experts in the area for validation.

Chapter 6

Conclusions and Outlook

6. Conclusion and Outlook

Our results show that all communities in the study receive high off-farm revenues from unskilled labor provided by oil-companies and external aid. However, indigenous communities have a higher degree of forest-dependency and higher environmental income compared to Colonists. This temporal cash income can explain the reduction of deforestation rates in the study area. Nevertheless, dependency on agriculture and forestry is only temporarily reduced. Probably, once oil companies leave the area, locals will return to their traditional practices. Under current circumstances, REDD+ seems to provide only a weak financial incentive.

As a result of agrarian reforms and legal frameworks for communal organization, indigenous groups Common Property Management Regimes (CPMRs) are becoming increasingly similar to those of the Colonists. This homogenization process of the spatial and institutional dimension along with the privatization of farms inside CPMRs is causing further forest fragmentation and deforestation. However, there is still an overlap of traditional forms of organization under legal structures as well as *de jure* and *de facto* rights that hinder efficient and transparent forest governance and REDD+ implementation. The latter, along with population growth and resource exploitation is becoming a threat to the livelihood of the Indigenous Peoples living in this area. The cost-opportunity of oil-related off-farm income cannot compete with any other income alternative. Moreover, households willing to engage in REDD+ activities have high off-farm income and might not directly depend on forest income for cash income generation.

For the successful implementation of REDD+ at the ground level, clear rules and recognized rights as well as secure land tenure are needed. The latter is magnified through the overlapping and lack of clarity regarding institutional responsibilities. Additionally, decisions regarding oil and mining concessions and prospects, and REDD+ carbon credits should be clarified. For Indigenous Peoples and small farmers it will be difficult to directly engage in REDD+ as the central government owns carbon rights. Imposing REDD+ frameworks that are contrary to customary traditions can endanger and weaken traditional social structures besides forests conservation. Despite great advancements of the Ecuadorian government, implementing equitable methods for participation and consultation is still challenging in a pluricultural nation. Empowering forest owners through community-based forest management might be the best way to protect forests, especially in countries like Ecuador, where IP already have tenure rights over forests. We also found that culture and ancestry aspects remain present, but policies tend to homogenize IP.

The primordial role of IP and small farmers is to safeguard existing forests and provide important ecosystem services worldwide. In the face of their ever

growing vulnerability to the impacts of climate change, IP can contribute to the scientific community by offering solutions to mitigate and adapt to this global threat. Moreover, the strengths of local knowledge along with traditional customary laws incorporated into REDD+ can lead to success in protecting existing forests. IP full and effective participation along with governance should be reinforced in order to acknowledge successful participation in monitoring and accountability of REDD+ projects. Furthermore, the inclusion of IP in REDD+ will increase their engagement and interest, as well as enhance their actual living conditions, by bringing aggregate benefits such as food security, diversification of income and land tenure rights. Optimistically, it could promote local community organization's reinforcement and the assessment and adaption of IP's customary decision-making procedures to REDD+ compatible structures.

There is a necessity to link these relatively new global climate mitigation frameworks into national, subnational and local governance levels. Without a doubt, only multi-scalar structures, going from international levels to national legal bodies up to strong community institutions and clear resource use rules in common property lands will definitively determine the success of REDD+ projects and other mitigation frameworks. Associations with REDD+ guidelines might be important to implement pro-poor policies including water quality and energy (solar) access, along with stable markets. Furthermore, it might be a key factor in reducing IP migration, especially from the Southern Amazon (Shuar).

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Appendix

Appendix A: Household Questionnaire

Cuestionario Hogares 1
Información de Control

Objetivo	**Fecha(s)**	**Quién?**	**Status OK? Si no, comentarios**
Entrevista			
Revisión del cuestionario			
Codificación del cuestionario			
Ingreso de datos			
Revisión y aprobación de datos			

A. Identificación

1. Identificación and localización del hogar.

1. Nombre y código	**(nombre)*	
2. Asentamiento y código	**(nombre)*	
3. Zona y código	**(nombre)*	
4. Nombre y código del entrevistado primario	**(nombre)*	
5. Nombre y código del segundo entrevistado	**(nombre)*	
6. Localización GPS del hogar	*UTM*	
7. Distancia del hogar al centro de la comunidad (en *minutos a pié* y en *km*)	*1.* *min*	*2.* *km*

B. Composición del Hogar

1. Quiénes son miembros del hogar?

1. Número de Identificación Personal (NIP)	*** Nombre del miembro**	**2. Relación con el cabeza de familia[1)]**	**3. Año de Nacimiento** *(xxxx)*	**4. Sexo** *(0=mas 1=fem)*	**5. Educación[2)]**
1		Jefe de familia = código 0			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

1) *Códigos: 1=esposa (casado o en unión libre); 2=hijo/a; 3=nuero/a; 4=nieto/a; 5=padre/madre; 6=suegro/a; 7=hermano/a; 8=cuñado/a; 9=tío/a; 10=sobrino/a; 11=hijo/a adoptado; 12=otra familia; 13=no relacionado.*
2) *Códigos: 1=Ninguna; 2=Primaria; 3=Secundaria: 4= Superior*

2. Algunas preguntas al jefe de familia.

1. Hace cuánto tiempo se formó el hogar?	*años*
2. Familia nuclear o extendida?	
3. El jefe de familia nació en esta comunidad? *En caso de 'si', ir a la pregunta 5.*	*(1-0)*
4. **En caso de 'no':** Hace cuánto tiempo vive la familia en la comunidad?	*años*
5. A qué grupo étnico pertenece la familia?[1)]	*(1-0)*
6. Qué lengua(s) habla(n) la familia? [2)]	

1) *Códigos: 1=Shuar; 2= Kichwa; 3= Mestizo; 4= Otros, especifique:*
2) *Códigos: 1=Español; 2= Kichwa; 3= Shuar; 4= Otros, especifique:*

C. Tierras

1. Por favor indicar la cantidad de tierras (en hectáreas).

Categoría	**1. Área** *(ha)*	**2. Tenencia[1)]**	**Controlado por el Hogar**		**No controlado por el Hogar**	
			Área usada	**Área arrendada**	**Área subarrendada**	**Comunitaria**
Bosque:						
1. Bosque natural						
2. Vegetación secundaria						
Áreas agrícolas:						

3. Cultivos						
4. Pastizales						
5. Agroforesteria						
6. Silvipasturas						
7. Rastrojo						
8. Otro tipo de vegetación- usos (residencial, humedales, etc.)						
9. Área total (1+2+3+…+8)						
10. Tierras arrendadas (**incluido** en 1-8)						
11. Tierras rentadas (**no incluido** in 1-8)						

1) 1=Privado (titulo de propiedad); 2= privado, sin título de propiedad; 2=tierras comunitarias; 4=Otros, especifique:

D. Posesiones

1. Por favor indique el tipo de casa posee

1. Usted tiene casa propia? [1)]	
2. De qué material es la (mayoría) pared(es) ? [2)]	
3. De qué material es (mayoría) el techo ? [3)]	
4. Cuántos m^2 aprox. Tiene la casa	*m^2*
5. Qué usa para cocinar?[4)]	

1) Códigos: 0=no; 1=propia; 2 =arrienda; 3=otro, especifique:
2) Códigos: 1=adobe; 2=madera; 3=zinc (metal); 4=ladrillo o bloques; 5=fibras; 9=otro, especifique:
3) Códigos: 1=paja/fibras; 2=madera; 3=zinc (metal); 4=cemento; 9=otro, especifique:
4) Códigos: 0=leña; 1=gas

2. Ahorros y deudas

1. Tiene la familia ahorros en algún banco o institución financiera?	*$*
2. Tienen deudas?	*$*

E. Recursos Forestales

1. A qué distancia esta su casa del bosque más cercano que usted puede colectar recursos?	1. … medido en distancia (línea recta)?	*km*
	2. … medido en tiempo (en minutos a pie)?	*min*

	1. En qué tipo de bosque se extrae el producto?	2. Localización del área en los mapas	3. Situación de tenencia del bosque	4. Miembro colector[1)]	5. Frecuencia[2)]
2. Leña					
3. Madera uso propio					
4. Madera venta					
5. Alimentos					
6. Medicinas					
7. Caza					
8. Otros					

1) Códigos: 1=sólo/principalmente las mujeres adultas de la familia; 2=adultos hombres y mujeres participan igualitariamente; 3= sólo/principalmente los hombres adultos de la familia; 4=sólo/principalmente las jóvenes (<15 años); 5=solo/principalmente los jóvenes (<15 años); 6=sólo/principalmente los niños (<15 años), y niños y niñas participan igualitariamente; 7=todos los miembros de la familia participan; 8=ninguna de las anteriores.
2) Códigos: 0=nunca; 1= diario; 2=semanal; 3= mensual; 4= cada 6 meses; 5= una vez año o menos

9. Hay algún tipo de reglas dentro de la comunidad para el uso de estos recursos? *Códigos: 0=no, muy pocas; 1=si, pero no son claras; 2=si, existen reglas claras*	
10. **En caso de 'si'**: estas reglas son respetadas por todos los miembros de la comunidad?	
11. Colectan leña en su hogar?	*(1-0)*
12. **En caso de 'si'**: cuantas horas semanales invierten los miembros de su familia colectando leña? (tiempo del adulto; niños = 50 % del tiempo de adultos)	*(horas)*
13. Su familia necesita más tiempo para colectar leña ahora que hace 5 años? *Códigos: 1=más; 2=igual; 3=menos*	
14. Cómo ha cambiado la disponibilidad de leña en los últimos 5 años? *Código: 1=disminuido; 2=igual; 3=aumentado*	

F. Organizaciones Comunitarias (OC)

1. Es usted o alguna persona de su familia miembro de un organización? *En caso de 'no', ir a la 9.*		*(1-0)*
2. Cuales son la/s organización/es a las que la familia pertenece?		
3. Algún miembro de su familia participa de las reuniones normalmente-regularmente? *En caso de 'no', ir a la 6.*		*(1-0)*
4. Que medios de información usan para comunicarse?		
5. **En caso de 'si'**: en su familia, quién asiste y participa de las reuniones? *Código: 1=sólo la mujer; 2=ambos, pero principalmente la mujer; 3=ambos participan igualitariamente; 4=ambos, principalmente el hombre; 5=solo el hombre; 6=principalmente hijo(s); 7=principalmente la(s) hija(s); 8=principalmente el hombre e hijo(s); 10=principalmente mujer e hija(s); 9=otros miembros.*		
6. En caso de consultas con relación a toda la comunidad, como se toman las decisiones?		
7. Usted considera justo y democrático ese sistema de consulta?		
8. En general, las organizaciones de manejo de recursos del bosque que impacto han tenido en su familia? *Código: 1=gran efecto negativo; 2=poco efecto negativo; 3=no tiene efecto; 4=poco efecto positivo; 5=muy positivo.*		
9. **Si usted no**	**Razón**	**Rank 1-3**

participa en OC, porqué? *Haga un ranking de las principales razones, máx. 3*	1. No existe un OC en la comunidad	
	2. Soy recién llegado	
	3. Los miembros del OC pertenecen a otro tipo de asociación (étnica, política, religiosa, edad, etc.)	
	4. No tengo tiempo	
	5. No puedo pagar los aportes	
	6. OC reducen la recolección de productos del bosque	
	7. No creo que son efectivo en el manejo del bosque	
	10. No me interesa	
	11. Corrupción	
	12. Tengo interés pero poca información	
	13. GUB existe, pero no se conoce	
	9. Otras, especifique:	

B. Crisis y gastos imprevistos

1. Cuáles han sido las principales motivos de crisis y gastos imprevistos en los últimos 12 meses?

Evento	**1. Grado de severidad** [1)]	**Como hizo para hacer frente a la crisis?** *Rank máx. 3*[2)]		
		2. Rank1	**3. Rank2**	**4. Rank3**
1. Pérdida de cosechas				
2. Enfermedad de algún familiar				
3. Muerte de algún miembro de la familia				
4. Pérdida de tierras (expropiación, etc.)				
5. Pérdida de ganado (robo, etc.)				
6. Pérdida de activos importantes (robo, inundación, etc.)				
7. Pérdida de empleo				
8. Casamiento o otros evento social importante				
9. Otros, especifique:				

1) Códigos gravedad: 0=no crisis; 1=si, moderada; 2=si, severa.

2) Códigos:

1. *Recolección de otros productos del bosque*
2. *Venta de caza*
3. *Incrementar los cultivos*
4. *Usar ahorros*
5. *Vender activos (tierra, ganado, etc.)*
6. *Hacer trabajo extra*
7. *Ayuda de amigos y familiares*
8. *Ayuda de ONG, gobierno, organización comunitaria, etc.*
9. *Obtención de un crédito de alguna institución financiera.*
10. *Reducción del gasto en el hogar*
11. *No hizo nada en particular*

19. Otros, especifique:

C. Servicios Forestales

1. Su hogar ha recibido en los últimos 12 meses algún tipo de pago relacionado a servicios forestales?

Objetivo principal	**1. Ha recibido?** *(1-0)*	**2. En caso de 'si', cantidad (valor)** *($)* *(en caso de ningún, colocar '0')*
1. Turismo		
2. Proyectos de carbono		
3. Proyectos de protección de fuentes de agua		
4. Conservación de biodiversidad		
5. Otros, especifique:		

D. Tala de bosque

1. Se han abierto parcelas de bosque en los últimos 12 meses? *En caso de 'no', ir a la 9.*		*(1-0)*		
En caso de 'si':	2. Cuántas hectáreas?	*ha*		
	3. La tierra va a ser usada para: *Códigos: 1=cultivos; 2=pastizales; 3=vivienda; 4=otros, especifique (Rank máx. 3)*	1.Rank1	2.Rank2	3.Rank3
	4. Qué tipo de bosque?			
	5. Cuál era el estatus de tenencia de la tierra? *(código tenencia)*			
	6. A qué distancia del hogar esta localizado el parche?	*km*		
7. Se ha abierto claros de bosque en los últimos 5 años? *En caso de 'no', ir a la 9.*		*1-0*		
8. **En caso de 'si':** cuantas (aprox.) en los últimos 5 años? *Nota: no incluye el área de la pregunta 2.*		*ha*		
9. Cuantas hectáreas de la familia han sido abandonadas en los últimos 5 años (re-vegetación natural)?		*ha*		

E. Precepciones de bienestar y capital social

1. Cuán satisfecho está usted con su vida en los últimos 12 meses? *Códigos: 1=muy insatisfecho; 2=insatisfecho; 3=ni satisfecho ni insatisfecho; 4=satisfecho; 5=muy satisfecho*		
2. La producción de alimento de su hogar ha sido suficiente durante los últimos 12 meses para cubrirlas? *Códigos: 1=no; 2=suficiente; 3=si*		
3. Comparado con otros hogares (o comunidades), cómo es el bienestar en su familia? *Códigos: 1=peor; 2=similar; 3=mejor*		
4. Cómo es su situación actual comparada hace **5 años?** *Códigos: 1=peor; 2=igual; 3=mejor* *En caso de 1 o 3, ir a la pregunta 5. En caso de 2, ir a la 6.*		
5. **En caso de peor *o* mejor:** cual es la	**Razón: Cambios en …**	**Rank 1-3**
	1. empleo no agrícola	

	principal razón de cambio? *Max 3.*	2. tenencia de tierra (ej., compra/venta)	
		3. recursos forestales	
		4. precios de venta (forestal, agric,…)	
		5. apoyo externo (Gob., ONG,..)	
		6. remesas	
		7. costo de vida (ej., inflación)	
		8. inseguridad	
		9. conflictos en la comunidad (no-violentos)	
		10. cambios en la situación familiar	
		11. enfermedad	
		12. acceso (ej. nueva carretera,…)	
		19. otro (especifique):	
6.	Considera su comunidad un buen sitio para vivir? *Códigos: 1=no; 2=parcialmente; 3=si*		
7.	En **general** confía en las personas de la comunidad? *Códigos: 1=no; 2=parcialmente; 3=si*		
8.	Podría usted recibir ayuda de la comunidad en caso de necesidad? *Códigos: 1=no; 2= algunas veces; 3=si*		

C. Cuestionario Análisis de Renta

A. *Nota: Se preguntaran ingresos del último mes (últimos 30 días), excepto para las últimas secciones de cultivos, ganadería donde los periodos son de tres meses.*

Ingresos Forestales Ambientales Directos (renta de productos forestales no procesados)

1. Qué cantidades y valores de productos forestales colectaron los miembros de su familia en el **último mes**?

1. Producto forestal	**2. Colectado por?[1)]**	**Colectado donde?**		**5. Cantidad colectado (7+8)**	**6. Unidad**	**7. Uso propio (incl. regalos)**	**8. Venta**	**9. Precio por unidad**	**10. Tipo de Mercado**	**11. Valor Bruto (5*9)**	**12. Costos de transporte (total)**	**13. Inversiones & mano de obra contratada**	**14. Ingreso neto (11-12-13)**
		3. Tipo *(código)*	**4. Tenencia** *(código)*										
Troncos													
Madera aserrada													
Leña													
Carbón													
Forraje													
Resinas													
Paja													
Lianas													
Plantas medicinales													

Comer: vegetales													
Comer: frutas													
Comer: hongos													
Comer: nueces													
Minerales/piedras													
Otros													

1) Códigos: 1=solo/principalmente las mujeres adultas de la familia; 2=adultos hombres y mujeres participan igualitariamente; 3= solo/principalmente los hombres adultos de la familia; 4=solo/principalmente las jóvenes (<15 años); 5=solo/principalmente los jóvenes (<15 años); 6=solo/principalmente los niños (<15 años), y niños y niñas participan igualitariamente; 7=todos los miembros de la familia participan; 8=ninguna de las anteriores.

C. Ingresos forestales derivados (ingreso de productos forestales procesados)

1. Cuántos y qué cantidad de productos forestales procesados produjo su familia durante el **último mes?**

1. Producto *(código)*	**2. Quien hizo el trabajo?[1)]**	**3. Cantidad (5+6)**	**4. Unidad**	**5. Uso propio**	**6. Venta (incl. trueque)**	**7. Precio por unidad**	**8. Mercado**	**9. Valor Bruto (3*7)**	**10. Inversiones & mano de obra contratada**	**11. Costos de transporte (total)**	**12. Ingreso neto (9-10-11)**

1) Códigos: 1=solo/principalmente las mujeres adultas de la familia; 2=adultos hombres y mujeres participan igualitariamente; 3= solo/principalmente los hombres adultos de la familia; 4=solo/principalmente las jóvenes (<15 años); 5=solo/principalmente los jóvenes (<15 años); 6=solo/principalmente los niños (<15 años), y niños y niñas participan igualitariamente; 7=todos los miembros de la familia participan; 8=ninguna de las anteriores.

D. Pesca y Acuacultura

1. Cuánto pescó su familia **exclusivamente de la naturaleza** (ríos, lagos) durante **el mes pasado**?

1.Tipo de pez	**Colectados donde?**	**4. Captura**	**5. Uso propio**	**6. Venta (incluido**	**7. Precio por kg**	**8. Valor bruto**	**9. Costos**	**10. Ingreso**

(nombres locales)*	**2. Tipo de bosque** *(código)*	**3. Tenencia** *(código)*	**total (kg) (5+6)**		**trueque)**		**(4*7)**	**(inversión, mano de obra)**	**neto (8-9)**

2. Cuánto pescó su familia **de piscinas (acuacultura)** en el **último mes**?

1. Tipo de pez (nombres locales)*	**2. Dónde?** [1)]	**3. Captura total (kg) (4+5)**	**4. Uso propio**	**5. Venta (incluido trueque)**	**6. Precio por kg**	**7. Valor bruto (3*6)**	**8. Costos (inversión, mano de obra)**	**9. Ingreso neto (7-8)**

1) Códigos: 1=Piscina propia; 2=Piscina de la familia y de un grupo de miembros de la comunidad; 3=Piscina de la comunidad; 4=Piscina privada pero se puede comprar derechos de pesca (incluir costos en el 7); 9=Otros, especifique:

E. Ingresos Ambientales no-forestales

1. Además de los productos forestales anotados en la tabla anterior, cuales y cuantos **otros productos silvestres** colecto su familia **en el mes pasado**?

1. Tipo de producto *(código)*	**Colectados donde?**		**4. Cantidad colectada (6+7)**	**5. Unidad**	**6. Uso propio**	**7. Venta (incluido trueque)**	**8. Precio por unidad**	**9. Valor bruto (4*8)**	**10. Costos (inversión, mano de obra)**	**11. Ingreso neto (9-10)**
	2. Lugar *(código)*	**3. Tenencia** *(código)*								
Animales medicinales										
Comer: mamíferos										
Comer: Aves										
Comer: peces										
Come										

r: reptiles/anfibios										
Mamíferos										
Aves										
Reptiles/anfibios										

1) Códigos: 1=solo/principalmente las mujeres adultas de la familia; 2=adultos hombres y mujeres participan igualitariamente; 3= solo/principalmente los hombres adultos de la familia; 4=solo/principalmente las jóvenes (<15 años); 5=solo/principalmente los jóvenes (<15 años); 6=solo/principalmente los niños (<15 años), y niños y niñas participan igualitariamente; 7=todos los miembros de la familia participan; 8=ninguna de las anteriores.

F. Salarios

1. Algún miembro de la familia ha recibido dinero por algún trabajo remunerado en el **último mes**?

Nota: una misma persona puede ser anotada por varios trabajos.

1. Miembro (NIP)	**2. Tipo de Trabajo**	**3. Días trabajados ultimo mes**	**4. Pago diario**	**5. Ingreso total (3*4)**

G. Ingresos de agricultura

1. Qué cantidades y valores de cosecha ha cultivado en los **últimos 3 meses**?

1. Cultivos *(código)*	**2. Área de producción** (m^2)	**3. Producción total (5+6)**	**4. Unidad (de producción)**	**5. Uso propio**	**6. Ventas (incluido trueque)**	**7. Precio por unidad**	**8. Valor total (3*7)**

2. Qué valores y cantidad de insumos de cosecha han tenido en los **últimos 3 meses** (referente a gastos agrícolas)?

1. Insumos	**2. Cantidad**	**3. Unidad**	**4. Precio por unidad**	**5. Costos totales (2*4)**
1. Semillas				

2. Fertilizantes				
3. Pesticidas/herbicidas				
4. Abono				
5. Energía				
6. Mano de obra				
7. Maquinaria				
8. Transporte				
19. Otros, especifique:				
20. Pago por arriendo de tierras				

H. Ingresos de ganadería

1. Cuantos animales ADULTOS tiene su hogar, cuantos ha vendido, comprado, matado y/o perdido en los **últimos 3 meses**?

1. Ganadería	**2. Número (hace 3 meses)**	**3. Venta (incl. trueque), vivo o sacrificado**	**4. Sacrificado para consumo propio**	**5. Pérdida (robo, muerte,..)**	**6. Comprado o recibido**	**7. Nacido**	**8. Numero total (actual) (2-3-4-5+6+7)**	**9. Precio por animal adulto**	**10. Valo fina tota (8*9**
1. Vacas									
2. Cabras									
3. Ovejas									
4. Cerdos									
5. Burros									
6. Patos									
7. Pollos									
8. Caballos									
9. Otros, especifique:									

2. Qué cantidad y valor de productos animales ha producido durante los **últimos 3 meses**?

1. Producto	**2. Producción (4+5)**	**3. Unidad**	**4. Uso propio**	**5. Venta (trueque)**	**6. Precio por unidad**	**7. Valor total (2*6)**
1. Carne						
2. Leche						
3. Huevos						
4. Cueros y piel						
19. Otros, especifique						

3. Qué cantidades y valores de insumos uso en ganadería durante los **últimos 3 meses**?

1. Insumos	**2. Unidad**	**3. Cantidad**	**4. Precio**	**5. Costos**

			por unidad	totales (3*4)
1. Alimento				
2. Arriendo de tierras pastoreo				
3. Medicinas, vacunas y servicios veterinario				
4. Costos de cercas, limites, etc.				
5. Mano de obra contratada				
6. Insumos de la propia finca				
9. Otros, especifique:				

I. Otras fuentes de Ingresos

1. Anote las fuentes de ingreso del hogar durante los **últimos 3 meses**.

1. Tipo de Ingreso	**2. Cantidad total en los últimos 3 meses**
1. Remesas	
2. Apoyo del gobierno, ONG o alguna institución (bono de pobreza)	
3. Apoyo de la familia	
4. Jubilación	
5. Pagos de servicios de conservación	
6. Pagos de servicios de alquiler	
7. Compensación de compañía minera o maderera	
9. Otros, especifique:	

Appendix B: REDD+ Perception Questionnaire

Cuestionario de Percepción REDD+

Información de Control

Objetivo	**Fecha(s)**	**Quien?**	**Status OK? Si no, dar comentarios**
Entrevista			

A. Identificación

1. Identificación and localización de la casa.

1. Hogar y código	*(nombre)	
2. Asentamiento y código	*(nombre)	
3. Distrito y código	*(nombre)	
4. Miembro entrevistado[1)]		
5. El cuestionario fue rechazado temporalmente o permanentemente?	*(1=temporal; 2=permanente; 3=indeciso)*[2)]	

1) Código: 1 = miembro(s) de la familia; 2 = vecinos; 3 = parientes; 4 = jefe del asentamiento/autoridades; 9=otros, especifique: _____

B. Percepción sobre REDD

1. Ha escuchado sobre REDD *Códigos: 0= no; 1= si*	
2. Quien le había informado sobre REDD principalmente *Códigos: 0= entrevistador; 1=líderes comunitarios; 2=medios; 3= de boca en la comunidad; 4= gobierno; 5=FEPP; 6=otros, especifique:*	
3. Que cree que es REDD? *Códigos: 1=proyecto/ley para reducir deforestación; 2=proyecto/ley para aumentar el bosque; 3= un proyecto/ley para guardar carbono; 4= un proyecto/ley para traer dinero de fuera; 5=proyecto/ley para que ingresos de la compañía; 6=una forma de evitar que los locales dañen los bosques; 7= que gente de fuera dañe el bosque; 8=otros, especifique:*	
4. Se ha consultado con todos los miembros de la comunidad sobre REDD? 5. *Códigos: 0= no; 1=si*	
6. Que se espera de REDD? *Códigos: 0=nada; 1= que mejore los ingresos; 2=que sea un ingreso adicional; 3= que proteja los bosques; 4= que evite el ingreso de grandes compañías; 5=que mitigue el cambio climático; 8=otros, especifique:*	
7. Que le preocupa de REDD? 8. *Códigos: 0=nada; 1= que disminuya los ingresos; 2=que no sea un ingreso adicional; 3= que no proteja los bosques; 4= que no evite el ingreso de grandes compañías; 5=que no mitigue el cambio climático; 8=otros, especifique:*	

9. Ha escuchado sobre SocioBosque? *Códigos: 0= no; 1= si*	
10. Quien le había informado sobre SocioBosque principalmente *Códigos: 0= entrevistador; 1=lideres comunitarios; 2=medios; 3= de boca en la comunidad; 4= gobierno; 5=FEPP; 6=otros, especifique:*	

Appendix C: Desertion Control Questionnaire

Cuestionario de Control de Deserción

Información de Control

Objetivo	**Fecha(s)**	**Quien?**	**Status OK? Si no, dar comentarios**
Entrevista			

A. Identificación

1. Identificación and localización de la casa.

6. Hogar y código	**(nombre)*	
7. Asentamiento y código	**(nombre)*	
8. Distrito y código	**(nombre)*	
9. Miembro entrevistado[1)]		
10. El cuestionario fue rechazado temporalmente o permanentemente?	*(1=temporal; 2=permanente; 3=indeciso)*[2)]	

1) Código: 1 = miembro(s) de la familia; 2 = vecinos; 3 = parientes; 4 = jefe del asentamiento/autoridades; 9=otros, especifique: _____

B. Motivos de deserción

1. Cual fue la razón para no responder el cuestionario?	**Razón**	**0-1 (pregunta. 1)**
	1. Cambio de casa permanente	
	2. Temporalmente fuera del asentamiento (trabajo, visitas, …)	
	3. Divorcio	
	4. Casamiento	
	5. Fallecido	
	6. Enfermedad	
	7. Nacimiento de hijo	
	8. Negado por ocupaciones	
	9. Rechazado por no dar información sobre la casa	
	10. Negado por el cansancio a responder el cuestionario	
	11. No se pudo ubicar la casa	
	19. Otro	
2. En caso de cambio de domicilio/migración (responder 1), dónde? *Código: 1=dentro del asentamiento; 2=asentamiento cercano; 3= un asentamiento más lejos (área rural); 4=a la ciudad más cercana; 5=ciudad más lejos; 9=otros:_____*		
3. En caso de cambio de domicilio/migración, cual fue la razón? *Código: 1=trabajo o búsqueda de trabajo; 2= (gobierno) servicios, incl. ejercito; 3=estudios; 4=cercanía familiar/esposo-a; 5=matrimonio; 6=separación/divorcio; 7= busca tratamiento médico; 8=conflictos dentro del asentamiento; 9=otros, _____*		

Appendix D: Communal Workshop Questionnaire

Cuestionario para Talleres Comunitarios

Se aplicará alguna técnica de trabajo y dinámica en grupos para obtener la información.

A. Uso de Recursos Forestales

		1. Leña o carbón	**2. Madera**	**3. Alimentos**	**4. Medicinas**	**5. Forraje**	**6. Otros[1)]**
1. Qué productos se extraen de las tierras comunitarias?							
3. Cómo ha cambiado la disponibilidad del producto en los últimos 5 años? *Códigos: 1=disminuido; 2=mantenido; 3=incrementado*							
4. Si la disponibilidad ha **disminuido**, anotar las razones. *Anotar las razones más importantes, máx. 3.*	**Razón**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**
	1. Reducción del bosque debido a parcelación de fincas						
	2. Reducción del área de bosque debido a grandes proyectos (plantaciones, asentamientos, etc.)						
	3. Se ha incrementado la tasa de recolección del producto por la comunidad						
	4. Se ha incrementado la recolección del producto por personas externas a la comunidad						
	5. Restricciones de uso por el gobierno central (áreas protegidas) y o comunitarias						
	6. Cercanía a concesiones petroleras y o mineras						
	7. Cambios climáticos (sequías, inundaciones, etc.)						
	9. Otros, especifique:						
5. Si la disponibilidad ha **aumentado**,	**Razón**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**	**Rank 1-3**
	1. Menos apertura de áreas boscosas						

anotar las razones. *Anotar las razones más importantes, máx. 3.*	2. Locales recolectan menos						
	3. Menos personas externas recolectan el producto						
	4. Reducción usuarios de proyectos de gran escala						
	5. Cambios en el manejo del bosque						
	6. Cambios climáticos						
	9. Otras, especifique:						

B. Productos Forestales en Tierras Comunitarias

	1. Leña	**2. Madera**	**3. Alimentos**	**4. Medicinas**	**5. Forraje**	**6. Otros[1)]**
1. En qué tipo de bosque se extrae el producto?						
2. Localización del área en los mapas						
3. Situación de tenencia del bosque						
4. Hay algún tipo de reglas dentro de la comunidad para el uso de estos recursos? *Códigos: 0=no, muy pocas; 1=si, pero no son claras; 2=si, existen reglas claras En caso de '0', ir a la 6.*						
5. **En caso de 'si'**: estas reglas son respetadas por todos los miembros de la comunidad?[1)]						
6. Tiene el *gobierno* participación en la regulación del uso del bosque? *Códigos: 0=no, muy poco; 1=si, pero no es claro; 2=si, hay reglas claras En caso de '0', ir a la 10.*						
7. **En caso de 'si' (códigos '1' o '2' anterior):** la reglas del *gobierno* son respetadas por la comunidad?[1)]						
8. Los pobladores necesitan algún tipo de permiso? *Código: 0=no; 1=si, se tiene que informar a las autoridades; 2=si, permiso por escrito.*						
9. En caso de 'si' (código '1' o '2' anterior): se tiene que pagar por el permiso?	*(1-0)*	*(1-0)*	*(1-0)*	*(1-0)*	*(1-0)*	*(1-0)*
10. **En caso de 'si'**: quien da el permiso? *Código: 1=cabeza de familia; 2=GUB; 3=Ministerio Ambiente; 4=Otra institución*						

de gobierno; 9=otros, especifique:						

1) Códigos: 0=no/muy poco; 1=hasta cierto punto por algunos miembros de la comunidad; 2=hasta cierto punto por todos; 3=si, pero sólo algunos grupos; 4=si, por todos; 9=no existen reglas específicas.

Appendix E: Community Leaders Questionnaire

Cuestionario Líderes Comunitarios

Información Colectada por el Investigador

Información de Control

Objetivo	**Fecha(s)**	**Quién?**	**Status OK? Si no, comentarios**
Reuniones con líderes comunidad			
Reuniones población/grupo foco			
Otras entrevistas			
Revisión cuestionario			
Ingreso datos			
Revisión & aprobación de datos			

A. Variables Geográficas y Climáticas

1. Nombre del asentamiento?	*1. (nombre)*	*2. (código)*
2. Cuáles son las coordenadas GPS desde el centro de la comunidad?		(UTM)
3. Latitud		*grados*
4. Longitud		*grados*
5. Altitud		*msnm*
6. Precipitación promedio		*mm/año*

Para Jefes Comunitarios

B. Datos demográficos

11. Año de creación de la comunidad	
12. Población actual	*personas*
13. Cual es el área total de la comunidad?	
14. Cuántas familias hay en la comunidad	*familias*
15. Qué grupos étnicos viven en el asentamiento?	
16. Cuál es el grupo étnico más representativo?	
17. Que lenguas se hablan en la comunidad?	

C. Infraestructura

1. Cuál es la principal fuente de energía?	
2. Cuál es la principal fuente de acceso a agua?	
3. Cuántas familias (aprox.) tienen acceso a créditos formales (gobierno o bancos privados)?	*familias*
4. Hay instituciones/personas informales que dan crédito a familias?	*(1-0)*
5. Hay algún centro de salud?	*(1-0)*

6. Hay algún centro de educación?				
7. Cual es la vía de acceso terrestre mas cercana? *(distancia en km y temporalidad).*		*km/temporalidad de uso*		
8. Cual es el río navegable mas cercano? *(distancia en km y temporalidad).*		*km/temporalidad de uso*		
9. Hay servicio telefónico móvil regular?				
10. Cuál es la distancia desde el centro de la población … (en *km* y en *minutos* por *el medio de transporte mas común*)		**1. km**	**2. min**	***3. código-transporte***
	1. Tienda			
	2. Mercado local			
	3. Mercado de venta de productos agrícolas			
	4. Mercado de venta de productos forestales			
18. Tienen planificado/previsto construir algún tipo de infraestructura				

D. Bosque, cobertura y uso de la tierra

1. Tipos de tierra en la población (área aprox. en hectáreas).

1. Tipo de Tierra	**2. Área total** (ha)	**Tenencia** (ha)			
		3. Estatal	**4. Comunitario**	**5. Privado**	**6. Libre acceso** (*de facto*)
Bosque:					
Bosque nativo					
Bosque secundario					
Tierras agrícolas:					
Área sin bosque:					
Humedal /pantano					
Otras, especifique:					
Área total					

2. Cuales son los principales tipos de bosque, usuarios y productos?

Nota: El área total de bosque debe ser igual al de la tabla anterior.

1.Uso de Bosque	**2.Tenencia**	**3. Reglas**	**4. Área aprox.** *(ha)*	**Usuarios principales[1)] (máx. 3)**			**Productos principales (máx. 3)** *(código)*		
				5.Rank 1	**6.Rank2**	**7.Rank3**	**8.Rank1**	**9.Rank2**	**10.Rank3**
Madera fin comercial									
Madera subsistencia									
Uso comercial de NTFP									
Uso									

subsistencia de NTFPs									
Cambio de uso de suelo									

1) Por "usuarios principales" se entiende aquellos que aprovechan al máximo el valor del producto forestal (subsistencia o ingreso económico) de un determinado bosque en los últimos 12 meses.

Códigos: usar el más apropiado (se pueden usar varios):

1 = Usuarios que son miembros de la comunidad;
2 = Usuarios que no son miembros de la comunidad;
3 = Usuarios externos a la comunidad (indicar grupo étnico, tipo);
4 = O3tros, especifique:

E. Tierras comunitarias

1. Tipos de tierra en la población (área aprox. en hectáreas).

	1. Familiar	**2. Comunitario**	**3. Territorio**
1. Tipo de Tenencia de la Tierra			
2. Área total (ha)			
3. Localización			
4. Delimitación clara *Códigos: 0= no; 1= Si, personas de la comunidad conocen los limites; 2= Si, personas de la comunidad y de comunidades cercanas conocen los limites; 4=Si, personas dentro y externos a la comunidad conocen los limites; 5= Otros, especifique:*			
5. Número de familias que tienen acceso			
6. Titulo *Códigos: 1=Certificado de posesión; 2=Escritura*			
7. Estatus legal estatal *Códigos: 0= no está reconocido; 1= está reconocido totalmente 2= está reconocido parcialmente; 3= no tiene conocimiento; 4= otros, especifique:*			
8. Derechos de ingreso *Códigos; 0=nadie tiene acceso; 1= privado, en manos de algunos miembros de la comunidad 2= de libre acceso entre miembros de la comunidad; 3= de libre acceso para cualquier persona; 4= otros, especifique:*			
9. Derechos de uso de tierra/recursos *Códigos: 0= nadie tiene derecho de extraer recursos; 1= derecho de ingreso, pero no extracción (turismo, etc.); 2= derecho de extracción de recursos solo si es miembro de la comunidad; 3= derecho de uso de recursos de miembros de la misma etnia de comunidades adyacente; 4= derecho de uso de recursos de miembros de comunidades adyacentes; 5=derecho de uso general; 6=otros, especifique:*			
10. Derechos de manejo[1)]			
11. Derechos de exclusion[2)]			
12. Derechos de transferencia			

Códigos: 0=no puede transferir; 1=puede transferir a miembros de la misma comunidad; 2=puede transferir a miembros de la misma comunidad y de la misma etnia; 3=puede transferir a miembros de comunidades adyacentes de la misma etnia; 4=puede solo heredar; 5=es de libre compra/venta; 6=otros, especifique:			
13. Derechos de heredar *Códigos: 0=no puede heredar, la tierra regresa a la comunidad; 1= puede heredar*			

1) Códigos: 0=nadie tiene derecho 1=decisiones son tomadas en reuniones de consejo de la comunidad; 2= decisiones son tomadas en reuniones y por miembros de la misma etnia; 3=decisiones son tomadas a nivel gubernamental; 4=decide el jefe de la comunidad; 5= otros, especifique:
Nota: son los derechos de manejo del paisaje, planeación de uso, extracción de manera, plantación de árboles, etc.
2) Códigos: 0=no conoce; 1=decisiones son tomadas en reuniones de consejo de la comunidad; 2= decisiones son tomadas en reuniones y por miembros de la misma etnia; 3=decisiones son tomadas a nivel gubernamental; 4=decide el jefe de la comunidad; 5= otros, especifique:
Nota: Referente a quien decide quien puede usar o no los recursos.

2. Derechos

14. Porque personas que no son de la comunidad pueden acceder? *1= leyes no lo permiten;* *2= no se puede controlar los limites de la comunidad;* *3= algunos miembros de la comunidad permiten la entrada a externos;* *4= otras personas fuera de la comunidad también tienen derechos; 5=no hay sanciones especificas;* *6=otros, especifique:*	
15. Cual fue el ultima vez que personas no autorizadas entraron a la comunidad y si se los pudo sacar.	
16. Como se respetan las reglas con respecto al uso de la tierra *1= no se respetan;* *2= moderadamente;* *3= siempre o casi siempre;*	
17. Que sanciones existen? *0= no hay sanciones; 1= multa al estado; 2= multa a la comunidad;* *3= servicio comunitario; 4= perdida de derechos; 5= prisión; 6=otros (especifique)*	
18. Cumplimiento de las sanciones *0= no, casi nunca; 1= a veces; 2= casi siempre;* *3= siempre*	

19. Tipo de Usuario externo	**1. Usuario Actual**	**1. Tipo de permiso**

		Gobierno	Comunidad	No requiere permiso
1. Concesión maderera				
2. Compañía agro-industrial				
3. Plantación				
4. Concesión minera				
5. Minería pequeña escala				
6. Ganaderos				
7. Colonos				
8. Vecinos de otras comunidades				
9. Otros……				

F. Salarios y precios

1. Cuál es la ganancia diaria de un trabajador adulto agrícola temporal en la comunidad en los últimos 12 meses? *($/día)*		**Masculino**	**Femenino**
	Máximo	1.	2.
	Mínimo	3.	4.
2. Cuál es el valor comercial de una hectárea de tierra agrícola buena en la región (i.e., no degradada, poca pendiente y buena para cultivos comunes a alrededor de 1km de la carretera principal o asentamiento)		*$/hectárea*	

G. Servicios Forestales

1. Ha recibido la comunidad o individuos algún tipo de beneficio directo (especie o efectivo) por servicios forestales en los últimos 12 meses? *Código: 0=no; 1=si, directamente a las familias; 2=si, directamente a la comunidad; 3=si, familias y la comunidad*		
2. Si la población ha recibido algún tipo de pago (código anterior 2 o 3), por favor indique el valor.	**Pagos por:**	**Cantidad**
	1. Turismo	
	2. Secuestro de Carbono	
	3. Agua	
	4. Biodiversidad	
	5. Compensación por madereras	
	6. Compensación por mineras	
	7. Compensación por petroleras	
	8. Otros, especifique:	
3. Han recibido algún tipo de ayuda externa para aprovechamiento forestal (asistencia técnica, apoyos, etc.) del gobierno, donantes, ONG en los últimos 12 meses?	*(1-0)*	

G. Organizaciones

1. Información acerca de organizaciones y afiliaciones comunitarias

1. Cuál es la principal organización para tomar decisiones en la comunidad?	
2. Desde cuándo existe la organización?	ano
3. A qué organizaciones/federaciones externas pertenece la comunidad?	
4. Cómo se decide ingresar en la organización? *Código: 1=consulta a la comunidad; 2=el presidente decide; 3=no sabe; 4=otros, especifique:*	
5. Como se eligen a los líderes? *Código: 1=otras autoridades; 2= herencia; 3=consenso; 4=elecciones, especifique:*	
6. Cuántos miembros hay en el grupo?	
7. Cuántas veces al año se reúnen?	
8. Quién puede asistir a las reuniones? 9. *Código: 1=toda la comunidad; 2= todos los adultos; 3=los jefes de familia; 4=miembros del comité, 5= solo miembros de la etnia, 6=especifique:*	
10. Tienen memorias o documentos escritos de las reuniones?	*(1-0)*
11. Cuentan con estatutos?	

H. Precios

Instrucciones: En dondequiera que alguien venda este producto, en la comunidad,, indagar tres precios típicos de fuentes distintas (si es posible en las tiendas o preguntando a algunos informantes) para cada uno de los bienes abajo enlistados.

Bienes	**Descripción**	**Precio #1**	**Precio #2**	**Precio #3**
Motosierra	marca: tamaño:			
Semillas de arroz	peso/tamaño:			
Abono	marca: peso/volumen:			
Herbicida	marca: peso/volumen:			
Lata de atún	Lata			
Arroz para comer	Kilo			
Aceite vegetal para cocinar	Litro			

Observaciones del Encuestador. Comentar en el nivel de confianza en las respuestas:

1 excelente 2 bueno 3 satisfactorio 4 débil

Toa Loaiza Lange

Betzdorferstrasse 2-ITT, D-50679 Köln

Born on November 17th 1982 in Loja, Ecuador
Ecuadorian

Professional Activities

08.02.2016 → today
Bilateral and Multilateral Cooperation Advisor at the Ministry of Environment and Natural Resources, Viceministry of International Cooperation, Dominican Republic.

- International relations, coordination, follow up and management of projects, multilateral environmental agreements, donors and partners.

01.02.2011 → today
PhD candidate in a REDD + pilot project carried out by the german NGO Welthungerhilfe and Alliance2015 partners HIVOS and CESVI (European Commission).
University of Göttingen (Institute of Geography, Landscape Ecology) and Cologne University of Applied Sciences. Grant from the Center for Natural Resources and Development (CNRD)

- Participation and possible impacts of REDD+ implementation on local communities farmers and indigenous groups (Kichwa and Shuar) in the buffer zone of the Yasuní National Park
- Livelihoods in rural areas and forest dependency
- Institutions, legal framework: land tenure and carbon rights
- Workshops, interviews with key stakeholders, visits to communities and analysis of communication strategies between the different actors (18 months fieldwork)

07.2014-12.2014
Researcher within the Center for Natural Resources for a book publication on "Ecosystem-based DRR and CCA: guiding development policies in the 21st Century".
UNU, UNEP and CNRD
• Topics preparation, outreach, logistics, technical follow-up

09.2011-02.2012 und 09.2014-02.2015
Lecturer and tutor of Master students
University of Applied Sciences of Cologne- Institute for Technology in the Tropics and Subtropics
• Tutor in Scientific Work on Food-Water-Energy Nexus and Semester Project, Case Study: Biosphere Reserves in the Amazon basin.
• Master's thesis supervision

06.2011 und 05.2012
Technical Assistant for COICA (Coordinator of Indigenous Organizations of the Amazon River Basin), Bonn Climate Change Conference on the Framework Convention of the United Nations on Climate Change (UNFCCC)
• Preparation of meetings of the Group, translation work

01-30.06.2012
Researcher within a Mata Atlantica Project for “Integrated eco-technologies and services for sustainable rural development in Rio de Janeiro”
Intecral project (BMBF, Cologne University of Applied Sciences and local partners)
• Translation work, preparation of reports, research work

01.09-31.12.2011
Policy Paper on "The State of REDD + in Latin America".
Center for Natural Resources and Development
• Researching, writing the text and final editing

08.2007-03.2008
Research assistant at the Research Station Tiputini, Ecuador
University of San Francisco Quito

01-06.2006
Teaching assistant in biology, botany, ecology and conservation on the Galapagos Islands.
University of San Francisco in Quito, Ecuador

Professional experience

25.02.2010-06.06.2010
Master's thesis in the research project DINARIO (German-Brazilian cooperation: EMBRAPA and BMBF) Thema: „Potential Assessment of Land Use, Land Use Change and Forestry (LULUCF) Projects Under the Clean Development Mechanism (CDM) in the Mata Atlantica, Municipality of Cachoeiras de Macacu, RJ-Brazil“.

05.2005-09.2005
Bachelor thesis at Conservation International. Topic: "cultivation of organic shade coffee as a strategy for conservation of Scalesia pedunculata on the island of Santa Cruz, Galápagos".

09.2004-12.2004
Intern at Conservation International. Scientific Station Charles Darwin Galapagos. USAID Project for Governance, regionalizing, fishing and tourism. Galápagos Islands.

Further Education

04-14.05.2014
International Summer School "Biodiversity, Conocimiento local y Cambio Climático en la region Andino Amazónica: muchos Desafios un solo Objetivo". DAAD, Universidad Técnica del Norte-Ecuador and the University of Freiburg, Germany.

27-31.05.2013
Courses on Multidisciplinary Perspectives on REDD+ at the Centre for Development and the Environment (SUM), University of Oslo. Scholarshipholder of the University of Oslo

13-14.06.2012
REDD+ PhD courses at the Centre for Development and the Environment (SUM) and the University of Oslo. Scholarshipholder of the University of Oslo.

02-28.05.2008
Scholarship from the Study Abroad Program "International Conflict Resolution". Center for Mediation, Peace and International Conflict Resolution- University of Georgia, USA.

Studies

01.08.2008–29.08.2010
International Master's Programme in Environment and Resources Management.
Double degree at the University of Applied Sciences Cologne and University of San Luis Potosi Mexico. Scholarship from the DAAD (German Academic Exchange Service enabled) and CONACYT (Consejo Nacional de Ciencia y Tecnologia). Overall score: 1.2

01.2005-06.2005
Study abroad: winter semester at the University of Wisconsin-Madison.
Scholarship from the UW: International special student (UNIS-**9)**

09.09.2001–26.01.2008
B.Sc. Applied Ecology and Resources Management
B.Sc. Sustainable tourism, sub-specialization Biology
University of San Francisco in Quito, Ecuador
Magna cum laude

Education

08.2000-08.2001
Study abroad in Germany: exchange year
29.07.2000
High School High School Eugenio Espejo, Loja- Ecuador.
Award as the best student in branch Chemistry- Biology.

Other skills

Language skills

Language	Reading	Conversation	Writing
Spanish	Mother language		
German	1	1	2
English	1	1	2
Portuguese	1	1	1

French	2	1	1
Kichwa	5	5	5

IT skills

- Excellent in MS Word, Excel and PowerPoint
- Good knowledge in GIS (Geographic Information Systems) - ArcGIS
- Basic knowledge of Definiens
- Good knowledge in StatView
- Standard Internet applications

Publications

Loaiza, T., Nehren, U. and G. Gerold. 2015. REDD+ and incentives: An analysis of income generation in forest-dependent communities of the Yasuní Biosphere Reserve, Ecuador. Applied Geography 62 (225-236).

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