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Forest Governance at the Household Level:A Case Study from the Lower Amazon Region

by

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ABSTRACT

Community-based management of natural resources has been one of the central concerns in the conservation of ecosystems. However, rural communities are very often composed of households that vary in their social and economic attributes and in the governance of natural resources. In particular, households might differ in their governance patterns of forest systems depending upon their reliance upon a resource and upon their social bonds with one another within a community.

A community from the Brazilian Amazon in which most of the households have experienced the same change in land tenure of forest will be studied. This community is composed of 39 households and the villagers are native peasant, who are related through strong kinship ties and a co-parenthood system. Before privatization, these people had access to the forest ecosystem but not control over it. By 1987, when the forest officially became a private area, each household had gained legal access and control over a forest lot and each of them had also developed its own governance system. The goal of this study is to analyze whether rules of use and rules of access among households differ depending upon: (i) household economic reliance upon a resource; and (ii) social ties within and between households. Household interviews were administered to collect information about both socio-economic attributes and sets of rules for forest use.

The analysis focuses on four main consumptive products from the forest: a native fruit (*piquiá*), land for agriculture, timber, and land for pasture. Four levels of social ties among individuals within a community will be considered: Level 1--first degree of consanguinity (parents and children); Level 2--second degree of consanguinity (nephews, nieces, grandparents, aunts and uncles, in-laws); Level 3--co-parents (co-fathers and co-mothers); and Level 4--acquaintances.

Preliminary results indicate that rules of use and rules for resources are different depending upon degree of economic dependency on a resource and the degree of relationship among individuals. The boundaries of a user group will be more permeable when it deals with subsistence-oriented products (Levels 1, 2, 3, and 4). In contrast, market-oriented products will be related to a less permeable user group, composed mostly of household members, and in some cases, other kin-related members (Level 1 and eventually Level 2 but not Level 3 or Level 4).

Thus, variation in governance among households within a community is likely to occur not only because of individualization of a resource but also due to consumptive dependency on a resource and the degrees of social ties between and within households.

INTRODUCTION

Although community-based management has been a strong call for conservation issues, privatization of forest has been the main type of property right throughout the Brazilian Amazon region (May 1995). Usually, individualization of land means that each family or household holds a piece of forestland and controls it. Several studies have addressed types of governance at the community level, in other words, how rights and duties have been successfully created by the community members (Berkes 1989; Bromley 1992; McCay 1990; McKean 1982; Ostrom 1992; Tang 1992). Although an increasing number of studies on community-based management has shown the implications of privatization of forest (Ensminger 1996; McKean 1998, 1996; Jodha 1996; Vallejos 1995), governments worldwide are still keeping it as the main policy for regulating land tenure.

Ostrom (1990) argues that development of rules is a difficult, time-consuming, and trial-and-error process--no matter which types of institutional arrangements whether private, common, or public--as opposed to assumptions that private property can be crafted at low cost and it is easily enforced. Individuals must overcome provision and appropriation problems in order to design an institutional arrangement (Ostrom et al. 1994) at the community level or at any other group level such as the household. As in community life, the decision-making process within a household in regard to natural resources is also affected by a number of factors embedded in a particular cultural setting.

In an attempt to understand under which situation an individual makes decisions (focus arena) in regard to natural resources, Ostrom and her team (Ostrom et al. 1994) developed an analytical tool (IAD framework) that allows one to consider bio-physical and cultural aspects and working rules of a particular setting. In general, studies have been focusing on community forest governance rather than on household units.

In order to understand how rules are developed and executed at the household level, a community from the Brazilian Amazon in which most of the households have experienced the same change in land tenure of forest will be studied. Residents are native peasants who are related through strong kinship ties and a co-parenthood system. The goal of this study is to analyze whether rules of use and rules of access among households differ depending upon: (i) household economic reliance upon a resource; and (ii) social ties within and between households.

SOCIAL-CULTURAL SETTINGS

The study area is located 55 km east of Santarém (State of Pará, Brazil), the most important urban center in the Lower Amazon. Transport to Santarém is available by bus (six hours) or by boat (three hours). The area is part of a government-sponsored settlement project established in 1987 (Gleba Ituqui) which covers 16,589 ha and

encompasses seven communities. The study community, henceforth referred to as the Ituqui[2] community (Figure 1), has 39 households with approximately 200 inhabitants.

The residents are non-Indian Amazonian natives, called *caboclo*, who have inhabited this area since the early 1900s and are mostly related through kinship systems. The *caboclo* population originated primarily from miscegenation of Iberian and Amerindian people and the collision of native and European cultures (Parker 1989; Ross 1978; Wagley 1985). Later, the African component was also incorporated into this new peasant category. In Ituqui, there is only one family that is not kin-related to the other residents. This family moved to Ituqui in the early 1990s. The other 38 families or households are all kin-related either through blood or marriage. The main religion is Catholicism which was brought to the region by the Portuguese but was later mixed with many indigenous beliefs and concepts, most of which are of Tupian origin (Parker 1985). More recently, Evangelism has been introduced to *caboclo* communities (Parker 1985) and in the present case, some families (8) have been converted from Catholicism into the Evangelic Church since the beginning of the1990s.

One aspect of the Catholic religion which plays a substantial role in the *caboclo* economic and kinship system is the *compadrio* system--or co-parenthood (Gentil 1988; Futemma 1995; Wagley 1976; Weinstein 1985). The co-parenthood system allows for an extension of relationship beyond the kinship circle. The parents of a child invite a man and a woman to serve as sponsors[3] at their child's baptism. Although it is a fictive kinship, it assures individual *caboclos* of bonding and mutual dependence.

Historically, joint efforts within and between households has been a common practice in the Ituqui community. Collective works vary from church construction to clean up dirty roads to farming tasks. In the case of farming such a collective effort is called locally *puxirum*. *Puxirum* is a form of cooperative farming work among households and it is one example that illustrates the social ties within the kinship system. This contributed to minimizing the lack of labor by sharing labor efforts and allowed for more equal distribution of land because no one permanently owned a piece of land. Rights before privatization of upland (see section of Environmental Setting and Land Tenure) were based upon "first come first served" followed by rights of usufruct. It is an informal contract among households in a community which involves reciprocal exchange of labor force (Castro 1999). This working group effort is used to develop tasks that demand a higher labor input than is available in a single household. Activities such as sharing labor and the exchange of food and products all contribute to building some form of trust among members and maintaining mutual commitment. Trust and commitment, in turn, contribute to lower transaction costs and control opportunistic behavior such as free-riding and cheating. In addition, internal social sanctions help to keep social order inside community.

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2 In order to protect the community's and individuals' identities, fictitious names are used.

3 "The sponsors become godfather and godmother to the child, and the same rite establishes a strong relationship not only between the godchild (*afilhado*) and its godparents but also between the parents of the child and the godparents, who become co-mothers (*comadres*) and co-fathers (*compadres*) to each other." (Wagley 1976:150).

(Figure 1 about here)

ENVIRONMENTAL SETTING AND LAND TENURE

The region is characterized by a high but extremely variable annual precipitation rate with 1,000-3,000 mm of rainfall concentrated in March (358 mm) and April (361.9 mm) and an average temperature of 26°C (Junk 1984; RADAMBRASIL 1976). The river level fluctuates within a range of five meters between the peak of the dry season (July to December) and the flood season (January to June). The Ituqui community is located between upland and floodplain ecosystems. For the purposes of this analysis, the focus is on upland ecosystem (see Futemma et al.1998 for more details on floodplain). The upland ecosystem can be divided into two zones according to land use history--bottomland zone and plateau zone.

Upland Ecosystem

The upland ecosystem is characterized by moist tropical forest. The bottomland zone is mostly covered by secondary vegetation due to its older land-use history. It is a 600-hectare (ha) strip of land 1,200 meters (m) wide and is located along the river adjacent to the floodplain ecosystem, where the houses are built. The plateau zone covers 1,700 ha and is dominated by mature forest with numerous valuable wood species (Pitt 1969; RADAMBRASIL 1976), including a few areas from which timber has been removed and some areas of recently established farmland. The distance between the bottomland and the plateau is about 200 m at a slope of approximately 50°. The predominant soil type is yellow latosol, i.e., highly acidic, nutrient-poor soil (RADAMBRASIL 1976). This is interspersed with patches of anthropogenic black soil (terra-preta do índio), which exhibits high fertility.

Upland Tenure

Ituqui has experienced four main phases in its social organization history. In the 1920s, a few families came from floodplain areas nearby and settled in individual houses in the region. During the 1960s, the Catholic Church developed a local political structure by transforming the cluster of families into a community-based settlement**.** In the mid-1980s, the settlement was officially recognized by the government as part of a settlement project (Gleba Ituqui) and local residents gained legal rights to land through agrarian reform.

The private property regime in the upland ecosystem can be traced back to a series of four single landowners since the time of *sesmarias,* in the nineteenth century. A s*esmaria* is the land title issued by the Portuguese Government that assigned land rights to the local elite. Although the human occupation of the Ituqui region goes back a thousand years (Roosevelt 1994), current Ituqui families have lived in the area only since the beginning of this century—around the 1920s. Until 1987, Ituqui residents had no

legal rights to land, even though they always had access to land. Residents' rights to land changed when the Brazilian government established the settlement project (Gleba Ituqui). In the mid-60s, a single large ranching company bought the land and planned to clear the area to sell the timber and cultivate pasture for cattle ranching. The plan of the ranching company to expel people from the region triggered a land conflict between local residents from the Ituqui region and the cattle company. Supported by several institutions such as the Rural Workers Union (STR), the Catholic Church, the Federation of Agencies for Social Work and Education (FASE), and the Movement for Brazilian National Education (MEB), local residents learned how to claim rights to their land (Leroy 1991).

After two decades of fighting, INCRA (National Institute for Colonization for Agrarian Reform)—the governmental office in charge of agrarian reform—expropriated the land in 1987 and established a large settlement project in the region.[4] The upland ecosystem was divided into 28 parcels of approximately 50 hectares, and every family or single male older than 18 years were given rights-of-use. Yet, according to INCRA policy, the landholders are allowed to occupy and use the land but they may not sell it.

After the privatization, households with no land emerged—Landless—as a result of two factors. First, children who were younger than 18 years old at the time of privatization did not receive any land; now they are older than 18 and most of them are married with no land. Consequently, they have to use their parent's private upland property to provide food and cash income for their families. Second, families from outside Ituqui have recently moved into the community and they have no private land either. Therefore, the privatization event created two distinct groups of households: Landholders and Landless. Currently, there are 24 Landholder households and 12 Landless households.

INSTITUTIONAL ANALYSIS

The main theoretical tool used in the present analysis is the Institutional Analysis and Development (IAD) framework, which offers tools to analyze cultural aspects, bio-physical conditions and the working rules[5] in which decision making takes place (Ostrom et al. 1994). Because decision making occurs at the household level in the Ituqui case, the focus arena of the present study is the household unit rather than the community. As

[4] The land was expropriated by decree 94.169 and the settlement project (*Gleba Ituqui*) was created by decree INCRA/no. 806/87 on 19 September 1987. The settlement encompasses seven communities: Ituqui do Ituqui, Pau D'Arco, Cabeceira do Marajá, Serra Grande, Santana do Ituqui, Nova Esperança and Núcleo (Serviço Público Federal 1994).

[5] Definition of rule as borrowed from S. Crawford and Ostrom (1993): "Rules are prescriptions that define what actions are required, prohibited, permitted, and the sanctions authorized if the rules are not followed." Ostrom et al (1996:38) "Rules provide information about the actions an actor 'must' perform (obligation), 'must not' perform (prohibition), or 'may' perform (permission) if the actor is to avoid the possibility of sanctions being imposed."

previously mentioned, each household holds a private forest lot, with the exception of the Landless group.

Two of rules that were identified by Ostrom et al. (1994: 41-42) were also observed in the present case: boundary rules and authority rules.

> Boundary Rules: "specify how participants enter or leave these positions." That is, these rules specify who can have access to and use a resource and the qualifications that individuals must have to be considered eligible to use a resource.
> Authority Rules: "specify which set of actions is assigned to which participant." These rules specify how much of a resource an user can withdrawal, when and how (technology).

Likewise, in order to analyze rights that are held within and between households in the Ituqui community, categories proposed by Ostrom and Schlager (1996: 131-132) will be considered in the present study:

> Rights of Access: "The right to enter a defined physical area and enjoy nonsubtractive benefits."
> Rights of Withdrawal: "The right to obtain the resource units or 'products' of a resource."
> Rights of Management: "The right to regulate internal use patterns and transform the resource by making improvements."
> Rights of Exclusion: "The right to determine who will have an access right, and how that right may be transferred."
> Rights of Alienation: "The rights to sell or lease either or both of the above collective-choice rights."

Rights of access and rights of withdrawal specify which actions an individual may take at operational level. At collective-choice level, an individual holds the rights to define and/or change ways of using a particular resource (rights of management) and s/he may also determine who is allowed (rights of exclusion) to enter and harvest a resource which determines rights of access and rights of withdrawal. Finally, rights of alienation allow a person to transfer a property to others at the collective-choice level and they can be defined at constitutional level (Ostrom 1992; Ostrom 1990; Ostrom et al. 1994).

Within bio-physical and cultural contexts, two factors affect decision making among the Ituqui households, and as a result affect types of rules-in-use. First, the distribution of forest resources across lots is not uniform in that some resources are cluster distributed while others are more scattere. Hence, each lot varies in types of fruits, game, timber, soils, and so forth. Some lots are located at the bottomland and others are up on the plateau area. The bottomland area has a long history of land use (Futemma et al. 1998) which has contributed to a dominance of secondary forest with no more valuable timber, fruits, and decreasing number of game. This differential distribution of resources determines different patterns of forest use and how each household governs its

own forest. In addition to ecological variation, the degree of social ties among households also differs within the community. As described before, kinship and co-parenthood are two important social systems.

For purposes of analysis, kin-members are categorized into two groups: (1) first degree of consaguinity (parents, children, and siblings) and (2) second degree of consaguinity (in-laws, nephews, nieces, grandparents, grandchildren, aunts and uncles). In regard to kinship, households that are related through the first degree of consaguinity have a stronger connection than households of second degree of consaguinity. Co-parenthood presents weaker ties than kin-folk but stronger than acquaintances; yet, both non-kin attachments provide some strength of relationship between households. Household interviews were administered to collect information about both socio-economic attributes and sets of rules for forest use.

CUSTOMARY RULES VERSUS FORMAL RULES

Despite a recent history of land tenure changes (see section on the Upland Tenure), households have been trying to create some informal and unwritten rules in order to regulate the use and access to upland forest products. This arrangement has been developing as long as they have experienced situations that require some norm of conduct in that they have to establish ways of regulating residents' behavior in regard to use forest resources. The Brazilian government also provides the society with an environmental policy and a land tenure policy that regulate land and renewable natural resources at federal, state, and municipal levels.

Household Governance

With individualization of a forest, the distribution of resources varies across lots in the Ituqui forest ecosystem, as previously mentioned. In addition, because of the long-term land use history of the bottomland area, timber is now completely wiped out as well as some valuable fruits such as *piquiá*. In this case, households that hold private land in the bottomland need to obtain timber or fruits from someone else's lot. In addition to a differential distribution of resources, several households (15) that were formed after privatization are now landless and also must use someone else's lot. Landless households are mostly (9) composed of married children of Landholders.

In an attempt to govern their forest lots, Landholders have created some rules at the collective-choice level which specify forest users' actions at the operational level. Although each Landholder makes his/her own decision, a pattern of set rules can be observed throughout the community, or the selection of criteria to establish those rules is similar. At present time, rules that are more clear and well-defined are related to rights of access and rights of withdrawal. In order to restrict someone else's entrance, Landholders have established a type of verbal permission that gives another household those rights to a certain product. There are few cases of married children who take care of their parents'

forest lot (especially in cases of an elder female head of a household). Thus, children act as actual landholders by making decisions regarding forest governance or at least play an active role in influencing their parents on how to use and control the lot.

Two factors affect a household's decision regarding regulation of forest resources: social ties and degree of dependence on a resource. This analysis focuses on four main consumptive products from the forest: a native fruit (*piquiá*), land for agriculture, timber, and land for pasture. Four levels of social ties among individuals within a community will be considered: Level 1--first degree of consanguinity (parents and children); Level 2--second degree of consanguinity (nephews, nieces, grandparents, aunts and uncles, in-laws); Level 3--co-parents (co-fathers and co-mothers); and Level 4--acquaintances.

Despite *piquiá* being considered a kind of delicacy among local residents, it is not an essential subsistence product nor it is a highly valuable commodity. Overall, everyone is allowed to harvest *piquiá* for both consumption and for trading. In fact, kin-members (Levels 1 and 2) may harvest without asking permission (free access) as opposed to non relatives (Level 3 and 4) who must ask for permission from a Landholder. Table 2 illustrates that in 54% of the cases are the Landholders who harvest fruits from their own lot for both subsistence and market, 11% and 14% are relatives of first degree who collect fruits for subsistence and subsistence-market, respectively. Twenty percent are acquaintances who collect only for consumption.

Due to its high value as a commodity in the local market and to the fact that it is easy to trade--logging companies cut and transport timber from the forest community--timber holds more restricted rules of access and use (Table 1). If timber is for subsistence purposes, such as building houses or fences, relatives of first and second degrees may harvest wood and poles but they have to ask for permission. Only children, parents, or siblings (Level 1) may harvest for selling if they need cash, but they must ask permission from the Landholder. Kin-members of second degree, co-parents and acquaintances, are not allowed to cut timber for market purposes. In fact, if co-parents or an acquaintance need timber for subsistence, they must either buy it or negotiate with the landholder; it is not as simple as the transaction for kin-folks. Table 2 shows that almost half of the total wood extraction is carried out by Landholders either for subsistence or market. Thirty percent is harvested by their relatives of first degree for subsistence and 13% is for selling. The remaining 12% of the cases are households that belong to Levels 2, 3, and 4 and that harvest only for consumption. In fact, they cut only poles, firewood, and sticks. They may not extract wood.

(Table 1 about here)

Farming is an important source of residents' staple food, manioc flour. They both consume it and sell it as the main source of cash for the household economy. For these reasons, the access and use of forestland for farming purposes are more flexible among all levels of social relations (from Level 1 through Level 4). However, everyone must ask for permission in order to clear a forest and cultivate. While parents, children, and siblings (Level 1) may grow perennial crops, other households (Levels 2, 3, and 4) may

cultivate only annual crops such as manioc and corn, because permission is temporary rather than permanent. Every household is allowed to grow for commercial purposes; in many cases they are sharecroppers, i.e., a Landholder lends a piece of land to a Landless who, in turn, cultivates it. More than half of the cases are Landholders who are using land for subsistence-oriented and market-oriented farming systems (Table 2). Twenty-two percent are used by households of first degree of consaguinity who grow for both subsistence and market. As mentioned, farming output is an important source of food and cash for these native people, hence results show that 5%, 6%, and 8% are relatives of second degree, co-parents and acquaintances growing crops for both food and income, respectively.

Pasture is strongly related to the market, hence it is a highly valuable commodity. In addition, it is not a subsistence-oriented product and it was recently introduced in the Ituqui community in the early 1990s. In case in which cow serves for pulling a cart, each household has only one or two cows (Futemma et al.1998). For commercial purposes, each household raises more than two heads. Only relatives of the first degree of consaguinity may open pasture but with permission. Kin-members of second degree either ask for permission to open or they form a partnership. Partnership is also frequent among co-parent households. More restricted, acquaintances only have access through renting transactions. Sixty-seven percent of pasture areas are opened by Landholders, 20% are opened by relatives of second degree who raise cattle as partners, and 14% are acquaintances who rent pasture area (Table 2).

(Table 2 about here)

Boundary and Authority Rules

There are two types of rules that are more clearly-defined among the Ituqui households: boundary and authority rules. Boundary rules and authority rules differ depending upon degree of economic dependency on a resource and the degree of relationship among individuals (Table 1).

Taking into account the strength of social ties among households, Landholders determine who may have rights of access and rights of withdrawal to a forest product (boundary rule). The amount of a resource that can be withdrawn is based upon dependency on a resource whether for subsistence or market purposes (authority rules).

In sum, Table 3 shows that the boundaries of a user group will be more permeable when it deals with subsistence-oriented products (Levels 1, 2, 3, and 4). In contrast, market-oriented products will be related to a less permeable user group, composed mostly of household members, and in some cases, other kin-related members (Level 1 and eventually Level 2 but not Level 3 or Level 4).

(Table 3 about here)

Formal Rules

Despite local and informal rules and/or norms that were created by households (local residents), there are two governmental agencies at the federal level that are in charge of environmental policy—IBAMA (Brazilian Institute for Renewable Natural Resources)—and land tenure policy—INCRA (National Institute for Colonization and Agrarian Reform).

The Brazilian Land Tenure Policy

In regard to land, Ituqui landholders are classified as proprietors (Ostrom & Schlager 1996) because they may use the land (operational level) and they also may decide land use patterns as well as who may have access and use the land (collective-choice level). Each landholder holds an authorization of occupation until they receive the legal and definitive title of land (INCRA, Decree No. 806/87). Thus, they are not an owner, because they may not transfer (sell) the land (rights of alienation). INCRA is the Brazilian government agency in charge of land tenure issues and its functions are to regulate land tenure, to enforce those regulations, to monitor them, and to punish any infractors (Serviço Público Federal 1994).

The Brazilian Environmental Policy

The Brazilian environmental policy went through major changes with the new Constitution in 1988 (Machado 1989) and forest regulation at national level is based upon Forest Policy 1965 but currently is going through a process of reformulation of rules (IBAMA 2000; ISA 2000). IBAMA is the Brazilian agency responsible for all renewable natural resources within the Brazilian territory. IBAMA is in charge of implementing environmental policies, enforcing the rules, monitoring them, and punishing any rule breakers (Machado 1989; IBAMA 1999). Because environmental policy regulates resources at federal, state, and municipal levels (Constitutional level), the existence of informal household governance contributes to fulfilling lacunae left by the general system of law. In addition, these *de facto* rules are more suited for ecological and social-cultural contexts, and they are more flexible to adjustment if changes occur. Thus these rules crafted at local level are more diversified that *de jure* rules established by the government in order to accommodate social and ecological diversities (Agrawal 1996; Ostrom et al. 1994; Tang 1992).

As Ostrom (1990) points out that institution is a nesting of rules in that rules are related to deeper level rules at operational, collective-choice, and constitutional levels. Although *de facto* rules usually do not contradict *de jure* rules established at constitutional level, a more diversified set of operational and collective-choice rules are

observed. Similar diversity of rules at local level was observed by other scholars (Agrawal 1996; Ostrom et al. 1994; Tang 1992).

In regard to some forest products, such as vines, roots, and fruits, there are no federal rules restricting either their consumption or their trade, therefore, they are exempt of license[6], authorization, or permission. Timber harvesting is more restricted than fruits. To sell timber an individual must have a license from IBAMA (Decree No.302/88, 011/89, and 732/91), but extraction of timber for subsistence and/or artisanal activities is fully exempt. Timber has more restricted rules in both formal and customary arrangements (Table 1).

Cutting trees from any type of vegetation in the Amazon region (falls into IBAMA's category of deforestation), an individual must have an authorization if clearing reaches up to 20 hectares per year (Decree 449/87). The government has control over deforestation in general, but it does not distinguish types of clearings, whether is for annual crops, permanent crops, pasture, or agroforestry purposes. Local residents create different regulations depending on if soil is for farming or for pasture due to time of occupation that each land use requires. Pasture presents a more long-term occupation than an annual fieldcrop, which is a short-term land use pattern.

Enforcement, Monitoring, and Sanctioning

Empirical evidence shows that in cases where there exist well-defined boundary and authority rules as well as effective monitoring of rules and strong sanctioning system, successful institutional design and better outcomes are observed (Ostrom et al. 1994). In the Ituqui case, there are two rules that are better specified—boundary and authority-- but there is no such a well-defined monitoring and sanctioning systems. They rely chiefly upon social sanctions and mutual commitment in order to prevent users from breaking rules.

Besides degree of reliance on one product and degree of social ties, physical attributes of a resource affect monitoring activities among Ituqui households. Schlager et al. (1994: 308-309) have classified resources into two types according to their physical characteristics: stationarity and storage[7]. Although *piquiá* fruit is stationary, the cost of monitoring it is high because anyone who passes by a tree can simply pick the fruit from

6 License: This is an individual's right to execute (at the operational level) a particular activity under certain conditions that s/he must meet. Permission: This is an individual's right to execute an activity on behalf of a public service or rights of use of a particular public good. Authorization: This is legal approval for an individual to carry out a particular activity. Authorization differs from license, in that in the latter an individual receives a legal right to carry out an activity whereas in the former s/he does not (Machado 1989:368-369).

7 S*tationarity* is related to those resources units that "remain spatially confined prior to harvest, or at least travel so slowly as to be fixed for all practical short-term purposes." (308), for instances forest products, grasses, fish). S*torage* is related to "existing physical capacity of a resource to collect and hold resource units." (309). Instances of resources that are more difficult to be keep storage such as forest products other than timber and grazing areas (Schlager et al. 1994: 309).

the ground and eat it behind the landowner's back. Similar to fruit, game is difficult to monitor because it is a mobile resource which crosses forest borders, thus is harder to follow. Because of high cost of monitoring game and enforcing a rule, there are no restrictions on hunting at the household level; anyone may hunt in any lot. They mostly hunt for consumption; if they sell, it is to community members who do not hunt. However, in regard to formal system, game is similar to timber. It is mandatory to have a license for commercial purposes but one is totally exempt for subsistence (Cód. 3017). The non-existent of a clear rule for hunting is similar to cases in which users have designed rules related to resource facility for nonstationary resources rather than the amount that one can withdraw (Schlager et al. 1994). In cases of mobile resources, users might define which types of technology and/or equipments can be used in order to limit harvesting (Ostrom et al. 1994).

Clearance for farming or pasture or even the cutting of timber is easier to monitor and enforce. The noise of falling timber and the transport of a log from the forest lot are easier to observe and check, but it is even easier to catch someone using land for farming and pasture. Thus, rules can be more restricted and infractors are easier to be caught. Further, these levels of social bonds between households through trust and mutual commitment contribute to monitoring activities, that is, households look after each other's lots.

Empirical evidence show that graduated sanctions within a village work more efficiently rather than use strong punishment such as payment of fees or bring a case to court (Ostrom 1992; Ostrom et al.1994). Despite monitoring and enforcement of rules being not very clear, one can observe the existence of some form of graduated sanctions in the Ituqui community. If someone breaks a rule, s/he first receives a verbal warning to not breaking it again. If a second infraction occurs, s/he might receive a second verbal warning with a threat of losing rights of access and rights of withdrawal to a resource. If a third time infraction occurs, s/he is likely to lose her/his rights to a product temporarily or permanently depending upon degree of such an infraction.

IMPLICATIONS OF PRIVATIZATION OF A FOREST

Assigning a private piece of forest to an individual, family, or household becomes a puzzle with both positive and negative side effects. From the perspective of a recipient, private property means autonomy in terms of land use decision making and guaranteed land on which to produce and to transfer to their heirs or children. But from the perspective of a non-recipient (Landless), privatization generates inequality of assets (Ensminger 1996; Jodha 1996; Vallejos 1995). From the ecological perspective, it causes fragmentation (McKean 1998, 1996, 1995), which in turn may cause differential distribution of resources among Landholders.

In addition to availability of labor and economic inequality, cases from around the world show that governments have been imposing privatization upon existing customary land tenure. Such an imposition, in turn, has been causing social-economic and

institutional problems such as the cases of Kenya (Ensminger 1996) and Bolivia (Vallejos 1995), where land has historically been held communally. In the Ituqui case, privatization of land was an external decision (federal government) but a local movement for gaining rights to this land (see Futemma et al 1998) occurred and it lasted almost 20 years. This, for Ituqui residents gaining private rights means security of land which might have triggered Landlholders to create some rules in order to defend their own piece of land.

Furthermore, comparing the common property regime with private property, McKean calls attention to the importance of differences between goods and property and entities (for more details, see McKean 1998, 1996, 1995). She argues that the forest is a common good that should not be a private property. Parcellization of a forest creates several negative effects on both the ecosystem--disrupting composition, structure, and function--and the institutional structure. Despite all Landholders enjoying their private rights, individualization of a forest in the Ituqui community has caused inequality of resources among households, thus causing differential provision of food and income. Again, the development or adoption of some regulations is an attempt to minimize this distinctive availability of resources in that residents are more able to manage labor and exchange products within and between households.

CONCLUSION

Variation in governance among households within a community is likely to occur not only because of individualization of a resource but also due to consumptive dependency on a resource and the degrees of social ties between and within households. The boundaries of a user group will be more permeable when it deals with subsistence-oriented products (Levels 1, 2, 3, and 4). In contrast, market-oriented products will be related to a less permeable user group, composed mostly of household members, and in some cases, other kin-related members (Level 1 and eventually Level 2 but not Level 3 or Level 4).

Customary institutional arrangements have been created through trial and error. Despite being only less than 20 years of privatization of the Ituqui upland forest, crafting local institutional rules is still an ongoing process but it has helped to lessen some private effects. First, *de facto* rules have minimized social-political inequalities in terms of land distribution, access to formal farm credit, and labor force. Second, customary system appears to be composed of more appropriate rules according to local social-cultural and ecological settings.

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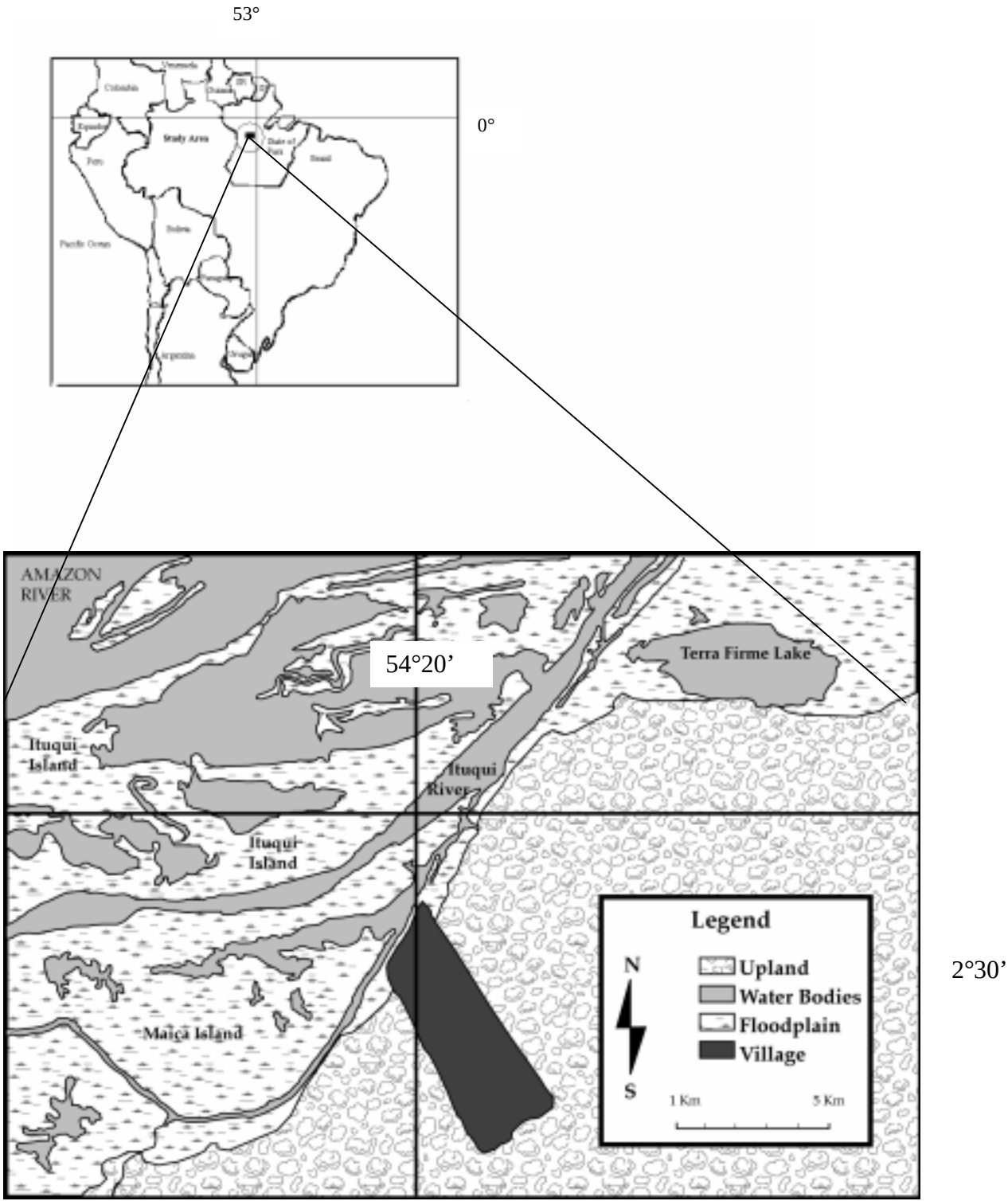
53°
0°
Study Area
Brazil
Peru
Bolivia
Pacific Ocean
Argentina
AMAZON RIVER
54°20’
Terra Firme Lake
Ituquī Island
Ituqui River
Ituquī Island
Maiçā Island
2°30’
Legend
N
S
Upland
Water Bodies
Floodplain
Village
1 Km
5 Km

Table 1. Rights of access and rights of withdrawal among households in the Ituqui community according to degree of social ties and economic use of forest product. (n = 39 households).

Products	Degree of Social Relations[1]	For Subsistence	For Market
Piquiá (Fruit)	Level 1	Without Permission[2]	Without Permission
	Level 2	Free Access	Free Access
	Level 3	With Permission	With Permission
	Level 4	With Permission	With Permission
Timber	Level 1	With Permission	With Permission
	Level 2	With Permission	Not Allowed
	Level 3	Purchase/With Permission	Not Allowed
	Level 4	Purchase[3]	Not Allowed
Land-Farming	Level 1	With Permission	With Permission
	Level 2	With Permission	With Permission
	Level 3	With Permission	With Permission
	Level 4	With Permission	With Permission
Land-Pasture	Level 1	With Permission	With Permission
	Level 2	Partnership[4]	Partnership
	Level 3	Partnership	Partnership
	Level 4	Rent[5]	Rent

[1] Level 1: first degree of consaguinity (parents and children). Level 2: second degree of consaguinity (nephews, nieces, grandparents, aunts, uncles, in-laws). Level 3: co-parents (co-fathers and co-mothers). Level 4: acquaintances;

[2] Verbal permission (informal and unwritten);
[3] Users that belong to Level 4 group can either purchase or s/he can try to negotiate with the Landholder;
[4] Users that belong to Level 2 and Level 3 groups can form a partnership with the Landholder in order to have access to and use pasture area;
[5] Users that belong to Level 4 can only have access to and use pasture area through rent transaction, s/he can try to negotiate with the Landholder to create a partnership, instead.

Table 2. Distribution of forest use patterns of four consumptive products (land for pasture, land for farming, timber, and *piquiá* fruit) according to their economic use (for subsistence, for market only, or for both subsistence and market) and types of resource users (Landholder, relatives of first degree of consaguinity, relatives of second degree of consaguinity, co-parents, or acquaintances. (n = 39 households).

Resource Users	Economic Use	Land for Pasture (%)	Land for Farming (%)	Timber (%)	*Piquiá* Fruit (%)
Landholder	Subsistence	20	11	-	40
Landholder	Market	40	-	-	-
Landholder	Subsistence-Market	7	49	50	14
First Degree of Consaguinity	Subsistence	-	-	35	11
First Degree of Consaguinity	Subsistence-Market	-	22	15	14
Second Degree of Consaguinity	Subsistence	-	-	-	-
Second Degree of Consaguinity	Subsistence-Market	-	5	-	-
Second Degree of Consaguinity	Subsistence-Market (Partnership)	20	-	-	-

Co-Parents	Subsistence	-	3	-	-
Co-Parents	Subsistence-Market	-	3	-	-
Acquaintances	Subsistence	-	3	-	20
Acquaintances	Subsistence-Market	-	5	-	-
Acquaintances	Subsistence-Market (Rent)	14	-	-	-

Table 3. The boundaries of user groups within the Ituqui community according to rights of access and rights of withdrawal. (n = 39 households).

	Economic Use of Products	
Degree of Social Ties	Subsistence-Level 1* VERY PERMEABLE BOUNDARIES	Market-Level 1 PERMEABLE BOUNDARIES
	Subsistence-Level 2 PERMEABLE BOUNDARIES	Market-Level 2 LESS PERMEABLE BOUNDARIES
	Subsistence-Level 3 LESS PERMEABLE BOUNDARIES	Market-Level 3 STRICT BOUNDARIES
	Subsistence-Level 3 LESS PERMEABLE	Market-Level 4 VERY STRICT

BOUNDARIES	BOUNDARIES

* Level 1: first degree of consaguinity (parents and children). Level 2: second degree of consaguinity (nephews, nieces, grandparents, aunts, uncles, in-laws). Level 3: co-parents (co-fathers and co-mothers). Level 4: acquaintances.