

Inside the Polygon: Emerging Community Tenure Systems and Forest Resource Extraction

Tom Ankersen¹ and Grenville Barnes²
University of Florida³

1. Introduction

*Tenure is not the 'silver bullet.' But because it is the factor most often neglected in addressing forestry issues, it requires immediate and careful attention in the development of forestry policy and programs.*⁴

Formal tenure systems have generally focused on defining the outside boundary of community tenure systems resulting in a homogeneous polygon that is treated as communal property by the formal legal system. In fact, if one looks inside this polygon, most of these “communal” tenure systems are a complex web of individual and shared rights that deal with the use and allocation of community resources. In this chapter we describe three community tenure systems and delve into the tenure system operating inside the polygon.

Many valuable forested areas in developing countries fall under a community tenure system. The traditional approach towards formalizing these areas is to grant a communal land title or concession transferring exclusive use rights to the forest dwellers. The title or concession defines the perimeter of the area (outside polygon) and serves to register the rights to the titled territory in the name of the group. In this way the formal tenure system divides up these territories into a set of polygons in space. The formal document may specify broad limits on deforestation and require some form of land use plan, but in many cases it does not really address the de facto land tenure and resource management structure inside the polygon. The result is a de jure “tenorial shell”⁵ which should facilitate interactions outside the polygon, but which in many instances actually constrains such interactions. We contend that as community tenure systems come under increasing pressure, internal as well as external, it will be necessary for these communities to improve their local land administration capabilities and maintain more detailed tenure information if they are to be sustainable across generations.

Bromley and Cernea (1989, p. 15) have defined common property regimes (CPR) as:

... corporate group property. The property-owning groups vary in nature, size, and internal structure across a broad spectrum, but they are social units with

¹ Director, Conservation Clinic, University of Florida Levin College of Law, Gainesville

² Associate Professor, Geomatics Program, University of Florida, Gainesville

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⁴ Bruce and Fortmann 1992, p.496

⁵ This term is used by Alcorn and Toledo (1998) to describe the community-based tenure system in Mexico

definite membership and boundaries, with certain common interests, with at least some interaction among members, with some cultural norms, and often their own endogenous authority system.

Much of the mainstream literature on CPR focuses on the “critical enabling conditions” for sustaining common property systems.⁶ While sharing the ultimate goal of sustainability, we approach CPR or community tenure systems, from a somewhat different perspective. By focusing on the land and resource tenure system we seek to understand the current situation with respect to the allocation, use, transfer and control of forest and other resources inside the polygon. In analyzing this de facto tenure system, we also compare it with the external de jure system to identify inconsistencies and possible areas of conflict. Given the dynamic nature of both tenure and resource systems, we are also concerned with identifying and managing the information requirements to support sustainable extractive practices across generations and between parties inside and outside the polygon.

2. Overview of the Case Studies

To pursue our investigation we selected three case studies in which communities in tropical regions of Latin America are managing forest resources under some form of community tenure regime. These regimes include the community concessions of the Maya Biosphere Reserve in Peten, Guatemala, the extractive reserves of Brazilian Amazonia, and the forest *ejidos* of Quintanaroo, Mexico.

The communities managing forest resources within these community tenure regimes share certain characteristics. Each involves closely-knit multiethnic communities, the majority of whose members (or their descendents) migrated to frontier forests in response to emerging markets for non-timber forest products and in search of opportunities for land and livelihood. In each case, the opportunity presented was principally the extraction of latex-based, non-timber forest products by ranging within a standing forest and collecting resin from living trees, a process known as “tree-tapping.” In each case, the latex products have suffered steep market declines due to the development of synthetic substitutes for chewing gum and rubber. Each case study can also be traced to some extent to social movements which coalesced around issues related to social justice and land reform and, subsequently, sustainable development. Each community now has a delineated external polygon registered by the national land registry within which some form of community forest management occurs. In addition, each community must demonstrate some form of community governance authority that is subject to state approval.

These community tenure regimes also diverge at a fairly fundamental level. In the case of the community concessions and extractive reserves of Guatemala and Brazil, the form of land tenure is limited and contingent. The land underlying the polygon remains in the public domain (*dominio publico*). The usufruct rights granted to the community are limited to a specific duration (25 and 30 years respectively, or approximately one

⁶ see Agrawal 2001, Ostrum 1990.

generation), with a right of renewal, and it is contingent upon performance and a fee schedule. In the case of Mexico, on the other hand, the community is granted full ownership (*dominio pleno*) over the land. In addition, certain individual rights can be established within the polygon under circumstances specified by national law. The extent to which the communities are engaged in the harvesting of timber differs in each case. The tenurial shell provided by each of these systems also varies substantially in terms of its security, marketability and in the rules that control property transactions both inside and outside the delimited polygon.

3. Case Studies

Case 1: Community Concessions of Guatemala

The “Maya Forest” refers to the contiguous forest that covers parts of Southern Mexico, Belize and the Northern Guatemala Department known as “*El Peten*.” (Nations, et al.1998). Once densely settled with the pre-Colombian Maya civilization, the forest closed in over ancient Maya ruins and the Guatemalan Peten was a nearly forgotten frontier until late in the twentieth century. Like the legal Amazonia, the Peten has in the past been accorded special status, including a period of quasi-autonomy under military control. Land administration north of the 17th parallel was governed by an autonomous institution known as FYDEP⁷ (Beavers, 1995, Kaimowitz, 1995). Land that was not doled out to large private interests was retained by the state.

For most of Guatemala’s history the Peten has been viewed as a frontier suitable for only the hardest natural resource extractivists: *chicleros* who roamed the state forest extracting natural latex (*chicle*) for chewing gum; loggers high grading mahogany and cedar for the tropical timber trade; and looters sacking the region’s rich archaeological wealth (Schwartz, 1990). In this milieu, *chiclero* communities coalesced in the forest around informal “territories” based on their unique extraction needs (Dugleby, 1998). In the southern Peten, on the other hand, land was cleared by large cattle ranching interests and invaded by landless highland peasants.

In the latter half of the 1980s international and conservation groups grew alarmed over the rapid rate of deforestation in the Department as well as a road construction proposal certain to spur colonization (Ponciano, 1998). Competing visions of the Guatemala frontier vied to become state policy. A 1989 National Geographic article describing the “Ruta Maya” captivated the international community and introduced tourism as a policy alternative for development in the region (Garrett, 1989). International NGOs extolled the potential of “non-timber forest products,” the most important of which included *chicle*, *xate*, an ornamental palm used in flower arrangements, and *all-spice*, a fragrant seed used in cooking. In addition, the entire Peten basin was overlain by oil concessions and drilling was under way in the Xan field of Laguna del Tigre, Central America’s largest wetland (Bowles et al., 1999). Forestry remained commercially important and subsistence agriculture and hunting also contributed to the local economy.

⁷ FYDEP is the Spanish acronym for Institute for the Promotion and Economic Development of the Peten .

In 1990, backed by international donors, especially USAID, the Guatemalan government created the Maya Biosphere Reserve, encompassing most of the remaining forested land in the northern Peten. The Reserve was divided into three zoning units based on a protected areas paradigm promoted by UNESCO known as the Biosphere Reserve (Dyer and Holland, 1991). These units include core areas of strict protection, a multiple use zone where ecologically consistent resource extraction is permitted, and a buffer or transition zone where human development is expected to be more intense. The legal framework for reserve administration is hierarchical and based largely on the western protected areas management model. A framework law and subsidiary regulations governs the management of the Reserve as a whole and authorizes a Reserve-wide regulatory master plan.⁸ The Master Plan calls for unit-by-unit long-term management plans and annual operational plans for individual management units (CONAP, 1996a). In practice, the buffer zone is largely deforested and colonized. The remaining forested areas are found in the core and multiple use zones. It is in the multiple use zone where Guatemala's experiment with forest management based on community resource tenure has been launched and where the MBR departs from most western forest management models.

During the MBR's formative period, a logging ban was instituted while governmental and non-governmental institutions wrestled with how to administer forestry in the region. Continued illegal logging increased the pressure on the Guatemalan government and the NGOs to formalize tenurial arrangements within the multiple use zone. International NGOs promoted community forestry and non-timber forest product extraction based on principles of natural forest management and modeled after the extractive reserve paradigm (Gretzinger, 1998). These interests ultimately prevailed.

The Guatemalan National Protected Areas Council (CONAP) charged with implementing the Reserve's management plan established a regulatory process through which the communities within the multiple use zone could petition to receive twenty five year exclusive forest use concessions (CONAP, 1994). The concession process requires a boundary demarcation and a management plan, both of which are incorporated into a binding agreement signed by CONAP and the legal representative of the community. The legal representative of the community must be officially sanctioned by the municipality and the governor of the Peten. The concession boundary must be registered with INTA⁹ the national land titling agency.

Land ownership in the concession areas is expressly reserved by the state, but the communities gain exclusive use of surficial forest resources subject to the management plan and the Reserve's legal framework (see Figure 1). Subsurface exploitation rights are retained by the state subject to a provision authorizing payment for natural resource damages caused by exploitation. Agriculture is only permitted in already cleared areas. The public is given the right to pass and to use existing roads. Community members are permitted to exercise their "traditional and customary laws," which must be negotiated between the community and the municipality and incorporated into the management plan.

⁸ Decreto 5-90 (Reserva de la Biosfera)

⁹ Instituto Nacional de Transformación Agraria

Communities must pay a concession fee to the government of Guatemala which has the effect of requiring that some income must be derived from the forest (CONAP, 1996b).

The legal framework for the MBR recognizes that humans settled the Peten prior to the Reserve's establishment. Human settlement is addressed in different ways depending on zoning category. No new properties may be individually or collectively titled in the MBR. Pre-existing private property in the multiple use zone, e.g. property where a legal title has been conferred, must be registered with CONAP and a management plan for the property must be approved. The property owner must maintain the boundaries and report land invasions to CONAP. Sale of the property must be reported to CONAP and a management plan from the subsequent land owner must be accepted by CONAP.

Untitled settlements in the multiple use zone are also addressed. This category includes historic *chiclero* communities, like Uaxactun and Carmelita, within the community concessions. In this case the community must present CONAP with a list of male inhabitants with their national identification numbers, and the name of the spouses and names and ages of the children. No additional persons or families are permitted to settle in the community and the sale, rental or subdivision of property is prohibited. Each family is entitled to use a maximum of forty-five hectares for agroforestry purposes only. Cattle farming is expressly prohibited. Subsistence hunting is permitted as provided for in the concession management plan (CONAP 1996b).

By the end of the 1990s virtually all of the multiple use zone of the MBR had been partitioned into forest use concessions under the control of communities within the forest. Uaxactun (83,000 hectares) and Carmelita (53,000 hectares), both centers of chicle production, are the largest of the community concessions. These concessions, however, are smaller than the chicle extraction territories suggested by Dugelby (1998) for these communities.

By most accounts deforestation had slowed considerably as communities exercised their right to exclude non-community members from the concession areas. Anecdotal evidence even suggests that one community evicted a community family for violations of the management plan and it is reported that efforts by non-community members to settle in some concessions have been repulsed by communities jealously guarding their exclusive use rights.

Case 2: Extractive Reserves of Brazil (GB)

The extractive reserve tenure model, as the name implies, is an attempt to establish a tenure system that explicitly balances economic development goals with environmental conservation goals. This tenure model was first proposed in Brazil in 1985 by the National Council of Rubber Tappers as a strategy for gaining greater tenure security for this group of extractivists. In response to repeated challenges to their land by colonization schemes and the expansion of cattle ranching across the western Amazon, their leader Chico Mendes championed the idea of extractive reserves as a viable

alternative to the conventional rectangular subdivision and privatization of land rights (Mendes 1989).

Extractive reserves are built around former rubber estates¹⁰ established in response to the rubber boom in the late 1800s. Rubber barons created expansive rubber estates (*seringais*) in the western Amazon and imported workers, mainly from Northeast Brazil, to carry out the labor-intensive job of extracting latex from the rubber trees. With the decline in the rubber market, and increased competition from Malaysia, the rubber barons lost interest in their estates and left the workers to their own devices. Many *seringueiros* stayed on the land and, in addition to continuing to extract latex, they began to harvest Brazil nuts and other forest products. Although there has been out-migration, the *seringueiros* encountered in today's extractive reserves are largely the descendents of these earlier pioneers (Schmink and Wood 1992, Melone, 1993).

Initially, "extractive settlements" were created through the agrarian reform agency, INCRA, in accordance with an administrative directive passed in 1987.¹¹ This marked a significant departure from the conventional settlement model in that (a) the community as a whole was given use rights, and (b) the concept of sustainable development, incorporating goals of both economic development and environmental protection, was incorporated into the government strategy for agrarian reform (ELI, 1995). Building on this experience, the Brazilian government passed a decree in 1990 to establish and create "extractive reserves."¹² This law gave the environmental protection agency (IBAMA) the responsibility for supervising and operating these reserves and specifies the organizational structure and approach for managing the reserve. In 1996 a further administrative decree¹³ was passed providing for "agro-extractive reserves" which ***

The fundamental tenure characteristics shared by both models of the extractive reserve are as follows (see Figure 2)

- The federal¹⁴ or state government sets aside and owns the land of the Reserve
- The community acquires a concession for joint usufruct rights¹⁵ over the extractive reserve (usually for 30 years)
- Use rights are transferable by inheritance
- A Utilization Plan, laying out how the community will manage their resources in a sustainable manner, must be prepared as part of the concession (ELI 1995)

IBAMA has established guidelines¹⁶ for creating and legalizing an Extractive Reserve that includes substantial details on the utilization plan, including (a) the prohibition of commercial hunting, (b) the recognition of common areas, such as rivers, lakes, pathways, beaches, bank and jointly managed areas in the reserve, (c) timber may be

¹⁰ The Chico Mendes Extractive Reserve, for example, incorporates 19 former rubber estates.

¹¹ Portaria INCRA No. 627 of 30.07.87

¹² Decree No. 98,897/90

¹³ Portaria No.268 of 23.10.96

¹⁴ Either through INCRA, the agrarian reform agency, or IBAMA, the environmental agency.

¹⁵ Concessão do Direito de Uso.

¹⁶ Portaria IBAMA No. 51 of 11.05.94.

extracted for commercial purposes, but the extent of this extraction will be specified in the utilization plan and a management plan prepared and approved by the residents association or union or IBAMA.¹⁷ The utilization plan of most Reserves prohibits residents from deforesting more than 10% of their family holding.

Extractive reserves are composed of a complex distribution of individual and community rights that are most often dictated by the spatial distribution pattern of the resource as opposed to a homogeneous geometric pattern typically used in other tenure regimes. Each family on the former rubber estates occupies an area known as a *colocação* which contains the rubber trails or *estradas de seringa*. An average family usually works three trails, each of which could contain as many as 150 rubber trees. The resource rights in this case are therefore defined initially by the location of the rubber trees and then by the trails that link them. The *seringueiros* allow others to pass freely through their *colocação*, but the areas encompassed by the trails are regarded as relatively exclusive. In addition, each family has a cleared area where they live, cultivate a few subsistence crops and raise small animals (Murrieta and Rueda 1995). Brazil nuts constitute the second most important extractive product and the trees are generally regarded as being the “property” of a particular *colocação*. The same is true for individual trees with value, such as cedar and mahogany. The *seringueiros* also exercise hunting rights over particular areas of the forest.

These resource-driven (as distinct from land-driven) rights result in a complex spatial pattern on the ground: linear in the case of rubber trails, polygonal in the case of hunting, and a series of points for the cases of brazil nut and other trees. This is a far cry from the simplicity of conventional land parcels which are typically bounded by a simple geometric figure and encapsulate a homogenous tenure system. In western Brazil each rubber trail is estimated to contain 100 hectares, but in reality the boundaries of the *colocações* are not known. This means that it is impossible to determine whether or not individual *seringueiros* have exceeded the 10% deforestation limit. Current estimates are based on general measurements for the whole *seringal* divided by the number of *colocações* and this indicates that in some instances they are fast approaching the legal limit (Gomes 2000).

In a study of land use dynamics in four *seringais* with the highest deforestation rates in the Chico Mendez Extractive Reserve, Gomes (2000, p. 113) concludes that “key household characteristics have influenced land use strategies suggesting that attention needs to be placed on the household level factors affecting different land use activities.” Moreover, there is a proposal to introduce timber extraction in the Reserve even though this is presently forbidden by the Utilization Plan. The younger generation in the Reserve tend to be less interested in rubber tapping and some recognize that cattle provide a more liquidable asset that allows them to obtain cash during emergencies. Maintaining the forest while at the same time improving the economic situation of the *seringueiros* remains the central challenge amongst the extractive reserves.

¹⁷ Art. 8.3.2, Portaria No. 51

Case 3: Ejidos of Mexico

The Southern Mexican state of Quintanaroo also lies within the bioregion referred to as the Maya Forest. Indeed, the forest culture of this state has as much in common with the peoples of the contiguous region in Guatemala and Belize as it does with Mexican states to the North. Like Guatemala, Southern Mexico's frontier history was dominated by the extraction of forest products, including tropical timber and chicle. Large concessions were given over to foreign firms who paid the Mexican government for the privilege of extracting timber from the Yucatan peninsula. Communities within the region received work but little more in exchange for the extractive activities (Snook, 1998).

Southern Mexico differs dramatically from its Southern neighbors in terms of the way in which agrarian reforms were carried out however. The 1917 Mexican revolution paved the way for the consolidation of the *ejido* system as the primary means of land distribution to the rural poor throughout Mexico. Under the ejido system title to land is vested in communities to be managed as inalienable common property. According to most estimates, at least 50% of all the lands in Mexico were distributed in this manner; and as much as 80% of the Mexican forest estate is ejidal. Among the largest ejidos in all of Mexico are those conferred to several communities in the Maya Forest. One reason for this is that the basis for the creation of ejidos, such as Noh Bec (24,215 ha) and Las Caobas (70,000 ha) in the state of Quintanaroo, stemmed from the reliance of these communities on the extraction of chicle from the Maya Forest. The area for these *ejidos* was determined by multiplying an average hectarage estimated for a chiclero to sustain his family by tapping chicle trees (approximately 450 hectares) by the number of chicleros in a community. Even so, in the Southern Mexican states the reality was that these distributions were often ignored, at least in terms of conferring rights to the resources within the ejidos. Most ejidos were never formally demarcated and logging continued. Around 1947 the foreign concessions were suspended and a single Mexican firm took over logging in Quintanaroo. The ejidal communities noticed little difference, receiving a small stumpage fee set by the Mexican government (Snook, 1998).

In 1983 the Mexican firm's Quintanaroo concession expired and Mexico's experiment with community forestry, Plan Piloto Forestal, was launched (Galleti 1998). Under this plan, participating ejidal communities assumed full responsibility for forest management and could determine allowable cuts and set prices. One of the first steps participating communities took was to declare an area of the ejido off-limits to agriculture and other incompatible activities – the forest reserve. A management plan divided the forest reserves into 25 blocks based on a 25 year cutting cycle. Chicle and other non-timber forest products could still be extracted from the forest reserve. Economies of scale dramatically changed ejidal production capacity due to the decentralization that the conversion to ejidal management implied, making it more difficult to compete in open markets. In the early 1990s the ejidos of Las Caobas and Noh Bec were certified by the Forest Stewardship Council, a private entity that provides consumers a guarantee that timber harvested from the forests it certifies complies with a set of standards designed to ensure the social and environmental sustainability of the forest.

1992 was a watershed year in *ejidal* history. Mexico approved a sweeping reform to Article 27 of its Constitution, which provides the legal basis for ejidal ownership (De Aguinaga 1993). In the interest of modernizing the Mexican agricultural economy and preparing Mexico for its entrance into the North American Free Trade Agreement (NAFTA), the Article 27 reforms provided a means for *ejidos* to enter into property transactions with outside investors, and in some circumstances, to privatize land within the ejido. Permanent forest lands, may not, however, be alienated. Fundamental policy decisions concerning the ejidal land base are first made by the ejidal assembly, comprising all of the ejido members.

A new agrarian law was passed to implement the article 27 reforms and a government program set up to go about the process of demarcating and regularizing ejidal land titles. The law creates a special office, the *Procuraduría Agricultura*, to assist with land registration. Ejidal titles, defining the external polygon, must be registered by the ejidal assembly in the property registry. A separate land registry, the National Agrarian Registry, addresses tenure issues internal to the polygon. This registry records the names of ejidatarios and documents the distribution of the land base within the ejido.

The law recognizes three primary bodies for the internal administration of the ejido.¹⁸ The Assembly, comprised of all the ejidatarios, is the ultimate authority in the ejido. The ejidal *Comisariado* is the executive arm of the ejido, responsible for implementing agreements made by the Assembly as well as general administration of the ejido. Amongst other functions, the *Comisariado* is required to maintain a registry book noting the names and “basic identification data” of the ejidatarios.¹⁹ The *Consejo de Vigilancia* acts as a “watchdog” council for *Comisariado* governance.

Three different categories of land are recognized within the polygon (see Figure 3):²⁰

- Land for residential purposes (*asentamiento humano*)
- Land for common use (*uso común*)
- Land that is subdivided into parcels (*parceladas*)

A different form of land tenure applies to each of these categories. Land designated for residential purposes cannot be sold or mortgaged and is not subject to prescription. House lots (*solares*) on this land are assigned without cost to ejidatarios and any remaining lots may be rented out or alienated in favor of persons who wish to become residents of the ejido.²¹ House lots can be sold to others within and outside the community.

The individual interest in common use areas is provided through an agrarian use right (*derecho de uso común* or *derecho agrario*) that consists of an indivisible share, represented as a percentage that is based on the number of hectares in common use divided by the number of ejidatarios. The ejido may transfer part of the area under *uso*

¹⁸ Art. 21, Ley Agraria

¹⁹ Art. 22

²⁰ Art. 44

²¹ Art. 68

común to social or business subgroups within the ejido, such as chicleros.²² The common use area may include public space and buildings as well as permanent forest estate. Land under forest or tropical jungle cannot be divided into parcels.²³ In many ways this property regime resembles the western model of a condominium, where one owns a unit privately and holds an indivisible share in the common areas.

Parcelas remain communally owned but individual use rights apply, usually based on historic cultivation by individual ejidatarios. *Parcela* use rights may be transferred within the ejido, but no ejidatario may own more than 5% of the total ejido land area. *Parcelas* may also be mortgaged or rented to third parties within or outside the *ejido*, without the need for Assembly approval.²⁴ Ejidatarios may, upon agreement of the ejidal assembly, convert their *parcela* use rights to full ownership (*dominio pleno*).²⁵ In these cases the title is issued by the Registro Agrario, but registered in the general *Registro Publico de la Propiedad*. It does not appear that the transfer of a *parcela* diminishes the percentage share accorded to the ejidatario. Furthermore, if an ejidatario sells to an outsider (s)he does not lose his/her rights as an ejidatario unless (s)he has no further legal interest in the community.²⁶

While the law appears to contemplate entry of new landed ejidatarios into the ejido, our interviews revealed that community members believe that the number of ejidatarios was fixed on the date of registry and cannot be increased. Part of this belief may be based in the legal requirement that inheritance rights transfer to only one successor, who could be the spouse, common-law partner, a child, a relative or someone who was economically dependent on the deceased ejidatario.²⁷

Within the new ejidal community tenure regime, property rights are being unbundled and redistributed both internally and externally. In the case of the Noh Bec ejido, the total area available through the *derecho de uso comun* is 110 hectares, most of which is forested. *Ejidatarios* are contemplating internal regulations that would cap the size of any individual agricultural *parcela* at 35 hectares. Few ejidatarios currently cultivate this maximum. This would enable the ejido, through its forestry cooperative, to buy back the uncultivated land rights within the 35 hectare maximum and retire it to the permanent forest estate.

4. Evolving Tenure Scenarios

The increasing complexity of community tenure regimes suggests a need for better managed tenure information. The community tenure regimes we observed belie the traditional conceptions of common property as “indivisible, inalienable and incapable of being encumbered.” We noted increasingly sophisticated formal and informal land and

²² Art. 75

²³ Art. 59

²⁴ Art. 79

²⁵ Art. 81

²⁶ Art. 83

²⁷ Art. 18

resource transactions occurring within communally owned or managed property, and at the same time we noted that external influences are driving a greater demand for information certainty. In our research we identified a number of instances where a system providing such certainty may be warranted and speculate below on how such scenarios may arise in the future.

Scenario 1: “Conservation Easements” in Guatemala

An international conservation organization wishes to purchase timber harvest rights from a communally managed concession and retire these rights to prevent them being exercised.

Recently an international conservation organization presented the community forest concessions in Guatemala with an intriguing possibility. The organization is considering offering to buy and retire all, or a portion of, a community’s right to harvest commercially valuable trees. Termed a “conservation incentive,” the proposed acquisition of an exclusive use right begins to resemble the contemporary “conservation easement,” or “*servidumbre ecologica*,” as it is referred to in Latin America. In both common law and civil law jurisdictions these kinds of easements are generally regarded as perpetual, running with the land. Nonetheless, there are examples of “limited duration” easements which run for a person’s lifetime or for some specified period (Gustanski and Squires 2000). In the Guatemala scenario, the conservation incentive concession holder would be the legal representative of the community that signed the community concession agreement. Because the concession is given by the government for the 25 year duration, the government may also have to consent to the agreement, and may even be a necessary third party to the agreement, especially if the conservation organization wished to retire the right in perpetuity.

One approach to this scenario would be to have the conservation incentive agreement mirror the 25 year cutting cycle established for the concession in its management plan. Thus payments would be paid out for each forest block as it comes on line for harvesting. Restrictions could also be placed on how the money would be used as it is paid out, in order to provide guarantees that it would contribute to the community’s sustainable development.

In order to insure that once conserved, timber harvest rights subject to the agreement will not be exercised, it may be necessary to georeference and record individual trees or blocks of trees. This would be particularly true if this form of “easement” became perpetual. Already, trees subject to harvest each year in the community concessions are georeferenced and marked for cutting. However, in a long term situation where the intent is to maintain the tree for its biodiversity value, both the marking of the tree or tree block and the recording of the tree use rights transferred would require a more robust information system, especially in an intergenerational context.

Scenario 2: “Transfer of Deforestation Rights” in Brazil

Colocação A seeks to expand cattle production by trading for Colocação B's 10% deforestation rights.

Transfer of development rights, or TDRs, was first introduced as a means of averting development that would negatively impact or destroy the aesthetic value of historic buildings in the US.²⁸ In simple terms it involves taking the development right out of the bundle of rights attached to a parcel of land (or historic building) and transferring that right to another parcel of land in another location. The primary motivation behind TDRs is to preserve a certain area (known as the sending zone) by exercising the development rights in an area designated for development (known as the receiving zone). In addition to preserving historic buildings, TDRs have been used extensively to preserve farmland and threatened natural resources.²⁹

Although this mechanism for protecting community resources has been used for over 30 years in the US, it is a device that challenges the mainstream view of property as a unified bundle of rights that are permanently affixed to a piece of land. In TDRs the landholders in the protected or sending zone split off their development right from the full bundle of rights and recoup the value of this right by selling it as “development credits” which can be exercised in the receiving zone. Deed restrictions, or conservation easements, are placed on the properties in the protected zone, ensuring that they are only used for activities that would not alter the predominant land use. Developers who purchase development credits are permitted to implement higher density development projects in the receiving zone than their counterparts who choose not to purchase these credits. This provides the incentive for an active market in development credits.

Turning to the situation in Brazil, we envisage a scenario in which a family in *Colocação A* wishes to expand its pasture land to accommodate more cattle. Let us assume that they have already reached their 10% deforestation limit and so are restricted by the utilization plan from clearing more forest. Immediately adjacent to *Colocação A* lies *Colocação B*, which has pristine forest on all but 2% of their land. Family A approaches family B with an offer to purchase their remaining “deforestation rights” (8%) and transfer these to *Colocação A*. In exchange, family B commits to no further deforestation on their *Colocação*. The result of this arrangement is that the total area deforested is no more than that allowed by the utilization plan over the whole Reserve or Seringal.³⁰

The advantage of the TDR arrangement is that it provides greater flexibility for accommodating differences in natural resource stocks, differences in economic activities, and differences in capabilities (labor and capital) between different seringueiros, while retaining the same overall limit on deforestation. The difficulty, as was mentioned earlier, is defining the *colocação* boundaries, monitoring activities within this area, and

²⁸ See *Penn Central Transp. Co v New York City*, 438 U.S. 104, 98 S.Ct. 2646, 57 L.Ed.2d 631 where the New York City Landmarks Preservation Law of 1965 was challenged as being unconstitutional by Penn Central Transportation Co. The court held that the law was constitutional and did not constitute a taking of property.

²⁹ See [this website](http://www.plannersweb.com/tdr.html) for a list of TDR projects in the US - <http://www.plannersweb.com/tdr.html>

³⁰ The Utilization Plan (Art. 16) of the Chico Mendez Agro-Extractive Reserve in Cachoeira specifies 10% of the area of the *colocação* which cannot exceed 30 hectares.

enforcing the new limits conveyed by the TDR. A scenario like this is particularly challenging in the frontier context of the Brazilian Amazon.³¹

Scenario 3: Tenure Conversions within the ejidal polygon in Mexico

The ejido wishes to acquire the rights to individual agricultural parcels and redesignate it permanent forest estate.

Ejidal leaders have expressed a desire to increase the area of community forestland by acquiring all or portions of usufruct tracts allocated to individual ejidatarios for conversion to agricultural parcels. This is particularly desirable where the soil is no longer suitable for agriculture or where *ejidatarios* are allocated their indivisible share of agricultural land but only need a portion of this to conduct their enterprise. Since the agricultural parcels are subject to a different set of tenure rules than the forest area (see Table I), this will involve a tenure conversion between these two categories. Essentially, the Ejido Assembly would use profits from the existing forestry enterprise to buy back the undeveloped agricultural usufruct and return it to the permanent forest estate, thereby expanding the forest area available for commercial forestry. This scenario creates an internal market in property use rights in what, from the perspective of the National Property Registry, is a common property regime. As a result, it too suggests the need for an increasingly sophisticated community land information system.

5. The Community Cadastre: Improving Information Systems Within the Polygon

*The social norms of traditional forest cultures often support conservation practices. Increasing their tenure security and granting rights to manage trees generally enhances their capacity to maintain those practices.*³²

Management plans typically identify the resources in the community and then estimate sustainable harvest rates. Recognizing that sustainable harvesting is a function of both the resource and the people who have rights to the resources. We feel it is important to focus on this human-resource relationship which is encapsulated in the tenure system. In this section we make the case for developing a community-based tenure information system or cadastre.

The modern concept of a cadastre for maintaining land tenure information has been around since the Domesday Book was developed in the 11th century in England (Barnes 1990). In Latin America it is often interpreted as an information system for property taxation purposes, reflecting the early generation of cadastres designed for this purpose in Europe. But since those early times, the cadastre, or more specifically the legal cadastre, has come to mean a land information system that defines the legal dimensions and geo-location of the primary tenure unit – the parcel. It can be distinguished from a

³¹ This scenario was presented by Brazilian researchers during a workshop sponsored by the United States Agency for International Development in the context of large private Amazonian land holdings, where the deforestation limit is twenty percent for individual holdings.

³² Forster and Stanfield 1993, p. vi

Geographic Information System (GIS), commonly used in land and resource management, through the following attributes:

- It is updated transactionally not periodically, thereby remaining current
- It is linked to the property registry, which describes the formally recognized tenure rights
- It contains a complete record of all parcels in a jurisdiction
- The emphasis is on legal tenure information as opposed to natural resource information
- The basic spatial unit is the cadastral parcel

A cadastre has also been recognized as a device for organizing, administering, and controlling people by centralized state structures (Scott 1998). We accept that historically the cadastre has been used for social engineering, but in this chapter we view the cadastre as a community tool for understanding who holds what rights where. Furthermore, we do not see it as necessarily a “neo-liberal tool” for facilitating private, individual tenure, but rather as a means of improving land and resource administration within the increasingly sophisticated transactional environment that is occurring in a number of community tenure systems . Finally, we believe it is only an appropriate tool in community tenure systems in which there are property-based transactions going on inside these systems and where rights to resources are being divided internally. We argue that compiling geographic information on resources for purposes of land and resource management is only half the picture. As these system become more transactionally complex, often driven by the need for more perfect information both internally and externally, some form of “community cadastre” may be needed to provide the sort of tenure security that many accept as a sine qua non for intergenerational resource protection.

The question addressed in this section is: can we design a form of cadastre that will support and facilitate sustainable extraction? Cadastral initiatives in Latin America and elsewhere have promoted the decentralization of cadastral institutions, but this has typically only reached the county or municipal level. Furthermore, the focus has generally been on land under private, individual tenure not under community tenure. Cadastral experience in Latin America has shown that it is difficult to update the cadastral information and as informal transactions resume the formal cadastre will increasingly become out-of-date. This is particularly true in communities where there are small landholdings, often spread across several distinct parcels, and where land transactions are primarily limited to community members. In many of these cases the cost of formalizing a transaction may actually exceed the value of the land. We argue that in such cases the only viable option is to develop a community cadastre that is administered by the local community.

The three scenarios presented in the previous section of this chapter illustrate the need for more detailed tenure information. The concept of a “conservation concession”(Guatemala) requires information that supports the transfer of usufruct rights in individual trees, or at least small blocks of forest. This information is both spatial and

legal in nature. The “transfer of deforestation rights” scenario (Brazil) takes a specific right from one “bundle of rights” and transfers it to another bundle of rights in a different location. Keeping track of transactions of the individual sticks in the bundle, as opposed to the whole bundle, also requires more specific cadastral information. In addition, this information must be linked to land cover information if deforestation is to be properly monitored. In the third scenario (Mexico), the conversion of land under individual tenure to indivisible tenure requires cadastral information on specific parcels within the parcelized agricultural area of the ejido.

As the so-called bundle of rights in any individual property gets split apart and placed under different tenure regimes involving multiple parties, both inside and outside the polygon, the need for detailed cadastral information will increase. We believe the only realistic approach is to develop local capacity to manage this information within a community cadastre.

6. Summary and Conclusion

In this chapter we have examined three distinct tenure responses to the challenge of facilitating both conservation and development. Table I below summarizes the tenure characteristics of each tenure system and illuminates the fundamental differences between these three tenure systems.

The cases of the extractive reserves in Brazil and the ejidos in Mexico demonstrate that the inside of a communally owned or managed polygon is not a homogeneous common property, but a complex mix of individual and group rights that is becoming increasingly disaggregated. In the ejidos, transactions are allowed both internally and externally, involving third parties outside the polygon. These tenure arrangements play a crucial role in describing the social-ecological relationships within the community. They describe the institutions, rules, rights and obligations with respect to the use of forest and other land-based resources. However, land and resource tenure is dynamic and we have presented three scenarios which incorporate innovative tenure approaches towards emerging demands of conservation and development. These scenarios have already played out in developed countries like the United States and are being seriously contemplated in the tropical tenure systems described in this chapter.

Finally, we conclude that a community-based information system or cadastre would be a useful tool for conservation and development, particularly where resource rights are being actively disaggregated internally from a pure communal property situation and transacted both externally and internally. Information on resources alone is only half of the socio-ecological equation; what is lacking is valuable cadastral information that ties people, individuals or groups, to the resources and dictates how they use these resources now and in the next generation.

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Table I. Comparison of Community Tenure Systems in Guatemala, Brazil and Mexico

Tenure Attributes	Community Concession	Extractive Reserve	Forest Ejido
Membership Eligibility	Resident within community	Resident within community	Ejidatarios residing in ejido (capped?)
Internal Organizations	Officially recognized community governance entity	Resident Association(s)	Assembly, Comisariado, Consejo de Vigilancia
Land Tenure	Land owned by government	Land owned by federal or state govt.	Land owned privately by ejido
Common Property	Exclusive use rights to forest resources for 25 years (renewable)	Joint use rights	Forest and other land held in undivided shares
Individualized Tenure	Sub-group use rights	“Authorization to use” contracts signed with each colocação	Agricultural parcels and house lots
Transfers Allowed			
- inheritance	N/A	Use rights may be transferred	Allowed to a single descendant
- sales (internal)	prohibited	Improvements can be sold with govt and resident association permission	Agricultural parcels and house lots
- sales (external)	prohibited	Improvements can be sold with govt and resident association permission	Agricultural parcels and house lots
Forest use restrictions	Subsistence use of timber allowed, commercial uses pursuant to management plan	Maximum of 10% deforestation allowed per family unit. Domestic use of timber allowed.	May not be subdivided, reserve set aside
Protected forest reserve	yes	no	yes

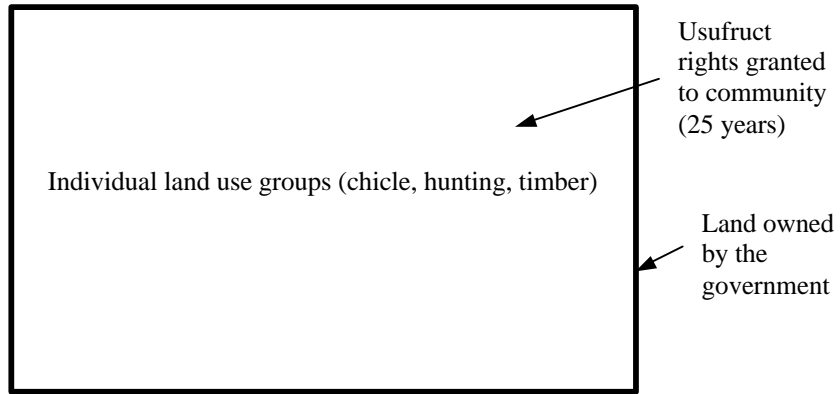


Figure 1. Tenure Structure of Guatemalan Concessions

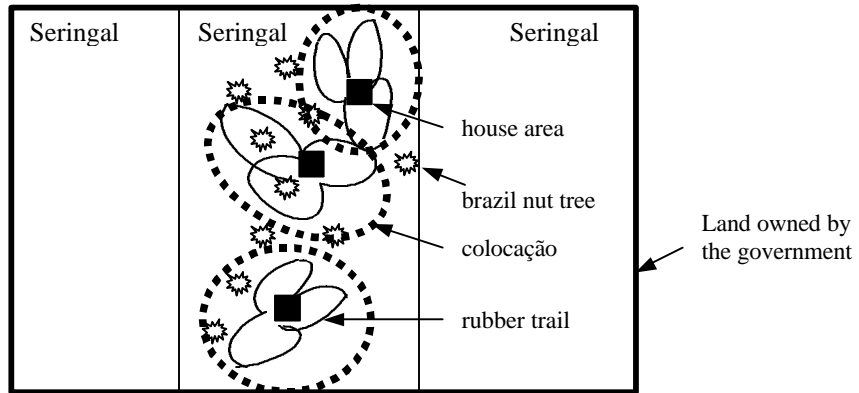


Figure 2. Tenure Structure of Brazilian Extractive Reserves

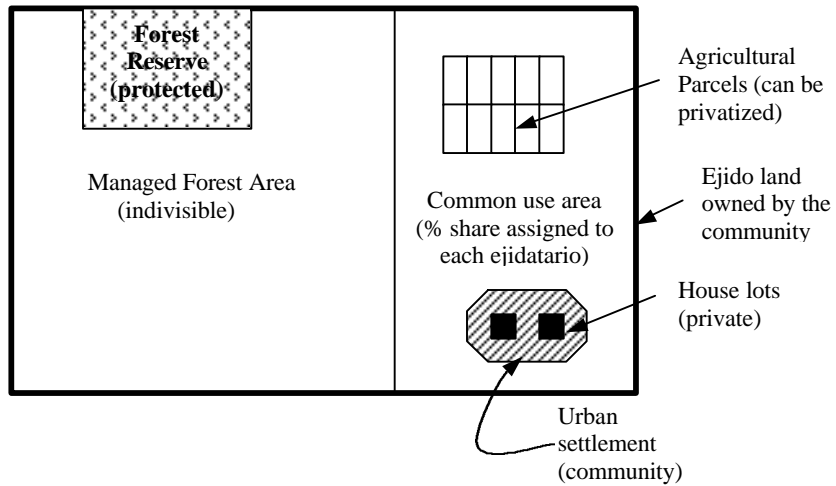


Figure 3. Tenure Structure in Mexican Forest Ejidos