

MARKET INSERTION OF FOREST COMMUNITIES IN SOUTHEASTERN MEXICO: THE RELEVANCE OF FOREST ENDOWMENT AND ORGANIZATION

R.A. Forster

F.J. Guemes-Ricalde

J.L. Zapata

Universidad de Quintana Roo, Departamento de Ciencias Económico-Administrativas, Chetumal, Quintana Roo, Mexico

Abstract

In Mexico, rural communities own more than 80% of the total forest area, but less than 30% of these communities are involved in forest management activities. It has been shown that markets represent a critical incentive for the development and consolidation of community forestry. Despite that, little is known about the factors that enable certain communities to successfully insert into markets and prevent others from doing so. This paper examines factors that enable communities to insert in markets. The focus lies in two important community-specific variables: forest endowment and community organization.

Information on market insertion was gathered through a survey of fifty-three communities in southern Quintana Roo, Mexico. The survey was complemented with expert interviews and the use of Geographic Information Systems (GIS). Findings indicate that forest endowment strongly determines market insertion. Community organization seems to have a reinforcing relation with market insertion, thus not allowing for unilateral causality. Among other aspects, the results indicate the existence of high market entry barriers to enter forest production and marketing, such as costly legal preconditions.

Keywords: Marketing in developing countries, forest product marketing, Mexico, forestry

Introduction

Worldwide, the total area of forests under the control of rural communities has been constantly increasing in the last forty years, covering

almost 400 million ha by the turn of the century (White and Martin 2002). Community forestry, as forest management by local communities is known, has demonstrated to be a feasible way to simultaneously achieve the conservation of forest resources and deriving economic and social benefits for the local population. As a consequence, a growing number of countries are issuing specific laws and policies to support community forestry, and this issue has become a high priority in many development agencies (Arnold, 2001; Johnson, Sarre, Molnar, Martin, & Liddle, 2007; Poffenberger, 2006).

Nevertheless, the practical implementation of community forestry has encountered many obstacles. Often, specific characteristics of a community hamper the development of arrangements that are suitable for community management. At the level of governmental organizations, several problems regarding the implementation of community forestry policies may arise. The factors that determine the feasibility of community forestry have not been exhaustively studied, thus reducing the possibilities of developing adequate governance instruments (Glasmeyer & Farrigan, 2005; Kellert, Mehta, Ebbin, & Lichtenfeld, 2000).

Markets have been identified as a critical external incentive for the establishment of community forestry. The monetary incomes that come with market insertion are the motor that may spur overexploitation, but can also facilitate the establishment of forest management practices. At the same time, markets represent discriminative social entities that exclude several potential producers from participation, because they are not able to provide required qualities, volumes or prices (Donovan *et al.* 2008). Excluded producers advance a forest management agenda without secured income. Market insertion is therefore a major concern for forestry practitioners (Gretzinger *et al.*, 1999; Scherr, White, & Kaimowitz, 2002).

Mexico offers instructive case studies of market insertion of forest communities. Mexico carried out a national agrarian reform program during much of the 20th century that considered agricultural as well as forest-covered lands. Beginning in the late 1920s and ending in the early 1990s, over 50% of the country's area was formally recognized as land grants to communities known as "*ejidos*" or "*comunidades indígenas*". An *ejido* is a formally recognized group of farmers that holds collective rights on the granted land. Today, more than 31,000 of these communities exist, and still are by far the most important land ownership category in Mexico (Instituto Nacional de Estadística y Geografía (INEGI) 2009). Of these *ejidos*, an estimated 7000 to 9000 have forested areas within their limits, thus making *ejidos* the largest forest ownership category. Mexico's forest sector is recognized as an important example for the viability of community forestry. Several publications have drawn attention to organizational and technical implementation, to the legal foundations and to the social and ecological

benefits of this activity (Antinori, 2000; Bray, Antinori, & Torres-Rojo, 2006; Bray & Merino-Pérez, 2004).

Despite the formal recognition of ejidos as forest owners, only a fraction of them, an estimated 20%, is currently managing their forests. While most forested ejidos informally use their forests for direct consumption, like firewood, construction materials and game among others, less than 2000 ejidos have established forestry as a community-based, formally acknowledged activity that involves delimitation, care and utilization of forests (Alatorre Frenk, 1998; Bray & Merino-Pérez, 2004).

This paper examines the factors that enable, constrain or prevent successful market insertion of forest communities as a central precondition for the establishment of forest management. The study advances understandings of the adoption process of forestry practices and other forest related institutions in communal operations. The study focuses on factors that are directly related to each ejido, specifically forest endowment and organization. Forest endowment refers to the resources a community controls, whereas organization refers to the internal agreements a community builds upon to start forestry, for example the support a community gives their community leaders. It is acknowledged that several external factors like the structure of extension services, forest-related policies, market dynamics and other macro-environmental variables play a decisive role, too. At the end of the paper, the study results are related to these external factors.

This paper aims at answering the following research questions:

- a) How are forest communities currently inserted in markets? In a first step, it was asked if a certain community is currently inserted in markets at all. In a second step, communities that currently are marketing forest products were divided in different subcategories.
- b) How is market insertion related to central community characteristics? Two central groups of factors were analysed. First those related to the forest resource itself, and second, those related to the community organization.

As a result, the study provides an analysis of the current market insertion and of the role that resource endowment and organization play in this insertion.

Study region

The study region covers the southern part of Quintana Roo state in Mexico. It was formally delimited as the forest management unit (UMAFOR) no. 2301 established by the National Forest Commission. The region ranks among the most productive tropical timber producers in Mexico. It is also a region where community forestry has a long tradition, with several ejidos involved in this activity for more than seventy years,

having started with a non-timber product: chicle tapping⁸⁷. Some ejidos in this region were among the first community operations certified worldwide and have served as an example for many other initiatives in Latin America (Galletti, 1993; Janka, Galletti, & Lobato, 1998).

Ejidos in the study region were established in two different phases: the first from 1929 to 1945 and the second from 1964 to 1995 (Careaga, 1990). Between 1945 and 1964, no lands were granted to ejidos in Quintana Roo. The land granting in these two phases followed two different rationalities and conditions, leading to specific ejido characteristics: with few exceptions, ejidos granted before 1945 were conceived for forest use and therefore obtained large extensions with a high per capita land allotment. Ejido members were forest workers and dwellers that knew the forests and the profitability of their exploitation. By contrast, ejidos granted after 1964 focussed on agriculture or cattle ranching. Total and per-capita-areas were smaller, and the provenance of settlers was different. As a consequence, differences in the material endowment go along with differences in the history of ejidos and the culture and expectations of ejido members (Forster et al., 2003; Argüelles *et al.* 2004).

In the present study, all ejidos claiming forest areas within their boundaries are considered forest ejidos. This denomination does not imply an assertion about the legal status of the forests. As it turned out in the survey, all study ejidos except a pro forma ejido established 60 years ago on what is now Chetumal, the state capital, own lands that are acknowledged as forests by the ejido members⁸⁸ and to a large extent would also qualify as forests according to the Mexican law or more recent FAO definitions (FAO 2000)⁸⁹. Thus, the total pool of 54 ejidos in the study region only was reduced by one to 53 ejidos.

Conceptual and methodological approach

For the purposes of this study, we define market insertion as all formally acknowledged forest product marketing activities of forest operations. As such, market insertion always presupposes certain formal steps to legally enable the extraction: the establishment of a management plan and an annual operational harvesting plan, among others. It also

⁸⁷ Chicle is the sap of *Manilkara sapota*, and was widely used for the elaboration of chewing gum.

⁸⁸ Very few ejidos have formally delimited forests in their boundaries, as this is only required if an ejido is interested in formal forest management. For ejidos, there are strong incentives not to acknowledge the existence of forests.

⁸⁹ Mexican laws as well as newer FAO forest definitions exclude surfaces with tree cover from the forest definition if they are part of an agricultural system, for example shifting cultivation, a common practice in the study region.

presupposes internal coordination and consensus about the activity within the community. Among ejidos that sell timber, different forms and degrees of market insertion are possible (Kaplinski & Morris, 2001):

- Point of insertion: ejidos may differ in the value they add to their products, and therefore, in the point of the value chain they access. In the most basic point, this means selling standing timber. Value added steps are the sale of logs, the sale of lumber, or the sale of secondary products.
- Number of species sold: performance in markets may lead to a different number of timber species sold. Low performing ejidos might concentrate just on the most commercial species, whereas higher performing ejidos could be able to sell a significant number of lesser-commercial species.
- Timber volumes sold: timber volumes, as related to the authorized volume, are another indicator for market insertion performance for ejidos currently marketing.

In 2009 and 2010, all fifty three ejidos were visited and a survey carried out through a formal questionnaire presented to the ejido president. This questionnaire covered issues of general land use, reforestation, forest areas, the legal status of forests, ejido organization, history of forest use, and general ejido indicators. The duration of each interview was between 60 and 90 min. Data were analyzed with descriptive and inferential statistics. For the present study, the factors related to forest endowment and organization were selected for further analysis.

To determine forest endowment, three variables were used: forest surfaces, per-hectare standing timber volumes, and total yearly production potential. The measurement of each variable involved several methodological challenges:

- Forest surface: determining the forest area in each ejido is difficult, because no formal delimitation data exists at the community level. Existing geographical information may provide some clues on the general forest cover, but provide little information about the current use of forests. In view of this, an estimation of the ejidatario president was requested and related to other area information of the ejido, for example regarding areas devoted to cattle ranching. In a second step, the information was verified with data coming from geographical information systems.
- Per-hectare standing timber volumes: as most ejidos have not been under forest management in the last years, there is no forest inventory data for most ejidos. Moreover, the inventories from some of the ejidos are not directly comparable. Therefore, it was necessary to build on data from the national forest inventory (CONAFOR 2009),

which provides compatible data for all ejidos in the region. Due to the design characteristics of this inventory, these data could only be used grouping several ejidos to form subareas of research. The ejidos were grouped following geographic vicinity, market insertion patterns, and the knowledge of differences regarding the history of ejidos, leading to five areas to be analysed through the national inventory data base (see Figure 3):

- i. Ejidos established before 1945 in the north of the study region
- ii. Ejidos established before 1945 in the southern part of the study region
- iii. Ejidos established before 1945 that converted large tracts of forest to sugar cane
- iv. Ejidos established after 1964 in the northern part of the study region
- v. Ejidos established after 1964 in the southern part of the study area

These areas are selected in a way that the ejidos with similar market insertion status were grouped in a similar area. Areas 1 and 2 mostly contain ejidos currently involved in forest product marketing, whereas in areas 3, 4 and 5, only a small minority are inserted in forest product markets.

- Total yearly timber production potential: closely related to the second variable, this measure was mainly used to compare those ejidos that are involved in forest management and have established management plans. Information came from official data of authorized yearly felling volumes. This information was contrasted with information about extracted volumes, described below.

Organizational performance refers to the capacity of a community to establish an organizational base for the implementation of executive activities. This includes the communities' support to their representatives, its decision procedures, and the history of internal cooperation. The following variables were established:

- Frequency of assembly meetings: as a measure of decision procedures. Community assembly meetings have the function of discussing common assembly projects. While monthly assembly meetings were legally prescribed a few years ago, today every community decides on the frequency. As such, the need of assemblies can be seen as an indicator for the organizational strength of communities.
- Community support to representatives: the community as a whole may support its representatives through the payment of a salary, or

through the payment of perdiem. Also the hiring of supplementary personnel may be a support measure.

- History of community initiatives: in all communities, specific plots for women’s groups were established. While in many communities these initiatives thrived, in others they failed. This is taken as another indicator for the organizational capacity of communities.

Based on these variables, six indicators were established: the regularity of assembly meetings, the existence of an income for the ejido president, the availability of travel allowances for the president, the existence of permanent ejido employees (e.g. a secretary), the current activity on the women’s plot⁹⁰ and the existence of regular external ejido incomes coming from any entrepreneurial ejido activity. As these indicators were not easily compatible or measurable, each indicator was given a binary scale, summing them up to a single scale going from zero to six, zero indicating a lower and 6 indicating a higher organizational level.

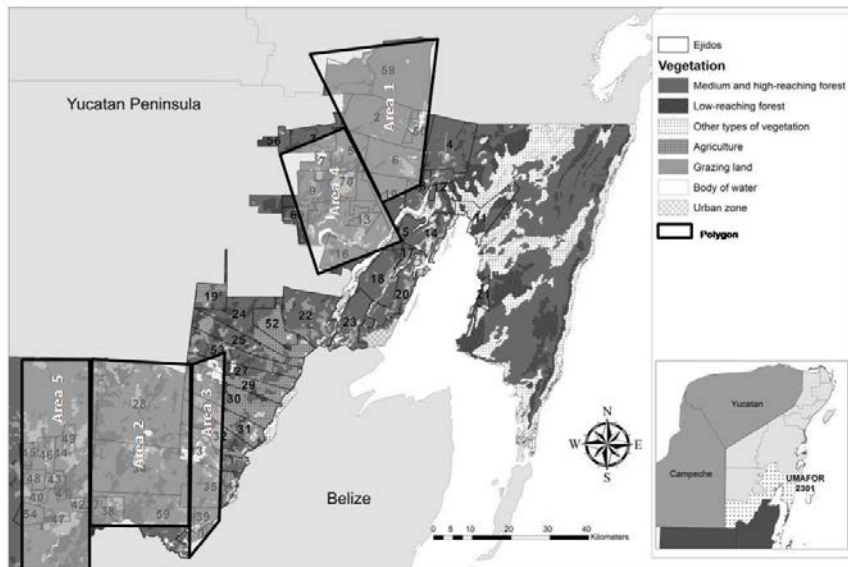


Figure 1 Study region with five clusters in national forest inventory
Source: (CONAFOR 2009) and CIG-ERF2301.

For ejidos active in forest product marketing, supplementary indicators were used:

- Value chain access point: the point in the value chain ejidos access was determined in the survey. Here, both the products sold and the

⁹⁰The Unidad Agricola Industrial de la Mujer (UAIM) is a promotional program directed at ejidatario wives and daughters to provide them with incomes or allow them to enter agriculture. A condition was the organization of women in groups. As these groups depend on the ejido assembly for support, their existence reflects a certain level or organization in the ejido.

processing infrastructure were registered, as it is possible that ejidos have the processing infrastructure (eg sawmills) but do not use it.

- Produced timber volumes: information came from survey and official production reports, and was contrasted with the officially granted volumes.
- Number of species sold: as a measure of market insertion performance, this variable was registered through the survey.

These variables were used selectively depending on the analytical requirements.

Results

Market insertion of ejidos

The ejidos granted before 1945 have larger total and per capita surfaces than more recent ones. In table 1, it can be seen that the median surface of the older ejidos is more than four times the more recent ones. As their total size is smaller, ejidos established after 1964 sum a smaller total area despite their larger number. Concerning their forest cover, recent ejidos have smaller areas both in absolute and in relative terms, whereas the per capita area devoted to agriculture and livestock farming is similar.

Table 1: General characteristics of forestry ejidos in the study region

Years of ejido establishment	1929 - 1945	1964 - 1997	Total
Total area granted (ha)	471,261.37	197,171.95	668,433.3
Total medium & high semi-evergreen forest area (ha)	304,526.77	118,655.56	423,182.33
Total low semi-evergreen forest area (ha)	59,613.88	42,164.92	101,778.79
Total number of ejidos granted	21	32	53
Number of currently extracting ejidos	7	3	10
Total number of ejido members	940	2,161	3,101
Median of the ejido's total area (ha)	18,653.85	4,619.50	10,477.00
Median of the medium and high forest (ha)	11,949.02	2,726.47	4,513.04
Median of the forest cover (%)	78.04	85.94	85.13
Median of the granted area per capita (ha)	440.50	92.11	166.67
Medium and high forest per capita (ha)	323.96	54.91	136.47

Source: elaborated from survey, PHINA, SEMARNAT, and SIG-UMAFOR 2301

According to the survey applied to the ejido president, 10 ejidos, 20% of all forest ejidos in the study region, are involved in forest extraction and marketing. Half of the ejidos extracted in the past but abandoned the activity, and a third of ejidos have never extracted any trees from their forests (Table 2). Of the ten ejidos currently engaged in timber extraction, two are selling lumber, whereas eight sell logs. Three of these eight ejidos own sawmills and rent them or offer sawing services. No ejido is selling lumber at landing.

There are no ejidos currently involved in any secondary processing activities⁹¹.

Table 2 Market insertion of ejidos

Category	No of ejidos
A) Selllumber	2
B) Sellroundwood/ ownsawmill	3
C) Sell round wood: standing or at felling site	5
D) Has abandonedforestextraction	27
E) Has neverextracted	16
Total	53

Source: Survey

These groups have specific characteristics. The two ejidos currently selling lumber were established before 1945 and were among the ejidos located in a large state-owned forestry concession (Maderas Industrializadas de Quintana Roo - MIQRO). Both ejidos have date back to the times of chicle tapping. They own more than 15,000 ha of productive forest. While one ejido might pass as the “typical” vertically integrated community enterprise, with control over silviculture, harvesting, transport and primary processing, in the other ejido, control of the value steps is dispersed: some of the value steps have been delegated to varying degrees to internal groups or individuals.

The second group comprises ejidos that have “downgraded” their production(Gereffi, 1999; Kaplinski & Morris, 2001), losing control over certain processing steps to internal or external entrepreneurs, but maintaining ownership of the sawmill. These ejidos are very similar to those of the first group in terms of history and present forest endowment, but differ in terms of productive organization. In these ejidos, the comisariadoejidal (community leader) does not control round wood or lumber marketing anymore, leaving this task to each individual ejidatario, who may receive between 3 and 5 m³ of mahogany and 5 to 15 m³ of other species each year. While these ejidos have maintained sawmills, their control over sawing is limited: two sawmills have been rented year round to large customers and the third offers sawing service⁹². The five other ejidos that are currently marketing leave most of the operative tasks to external firms, this is, they are rentistejidos that never possessed extraction machinery or processing facilities.

⁹¹ By contrast, in most lumber producing ejidos, several family carpentry shops have appeared that are integrated in the formal forest production (this is, they buy the lumber from the sawmill, not from informal motor sawyers).

⁹² Refers to processing the logs without owning them, just charging for the sawing service.

The ejidos that at some point extracted timber constitute by far the largest and most heterogeneous group. This group contains large ejidos that receive their main incomes from sugar cane production and abandoned forestry long time ago, very old ejidos close to the state capital that have become suburbanized, and smaller ejidos that stopped producing timber in the last thirty years due to several problems. The category of ejidos that never have extracted timber is mainly composed by ejidos that were established after 1980 and with small areas. Most of its inhabitants practice agriculture.

Market insertion and resource endowment

The relevance of forest areas

The situation for all ejidos

Area is a basic characteristic of forests. It is evident that this variable should have a large impact on the decision of engaging in forestry, as it may have an influence on revenues as well as on the relation of fixed to variable costs. From the survey data, clear differences appear among ejidos inserted in markets and those that are not inserted. Ejidos with market insertion have an average area of 19,784 ha, whereas the ejidos not inserted in markets average 5,111 ha. If establishing size categories, a similar picture appears: more than 66% of ejidos with a forest area beyond 9,000 ha are inserted in markets, as opposed to the ejidos smaller than 9,000 ha, where only 6% of ejidos are.

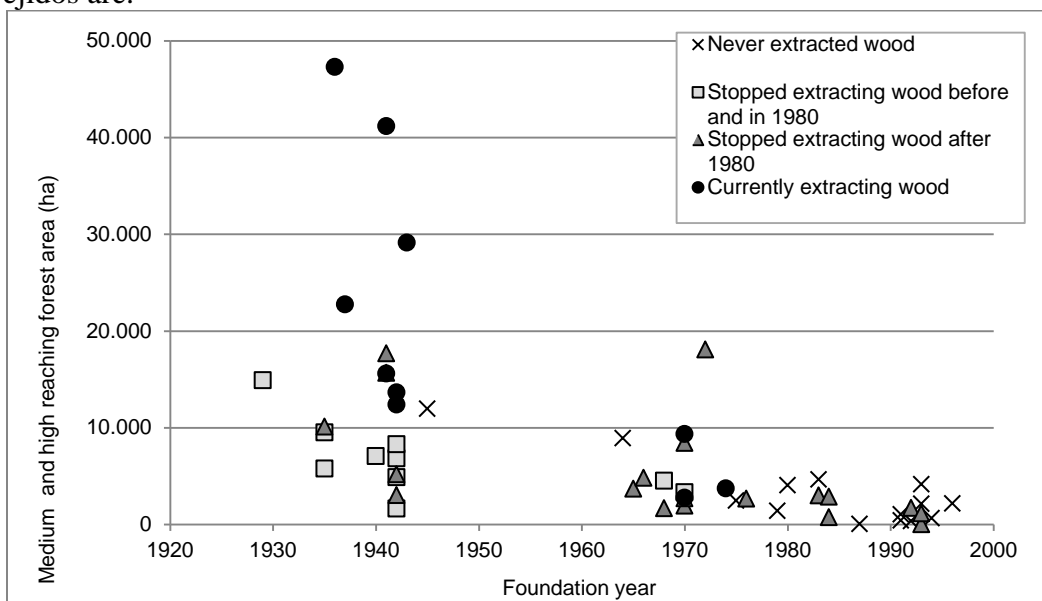


Figure 2 Forest area, granting year, and market insertion

Ejidos which extract wood (N=10, black circle), ejidos which stopped extracting wood before or during 1980 (N=10, light-grey square), those that did so after 1980 (N=19, grey triangle) and ejidos which never extracted wood (N=14, cross). Source: survey.

As in the study region, forest areas closely related to the year the ejido was granted, both factors have been considered in Figure 2. From that figure, the importance of the early granting in ejidos for market insertion becomes clear. The ejidos that left timber marketing in the past are also set apart quite clearly. The ejidos that left timber marketing before 1980 generally are ejidos established before 1945 and that have less than 9000 ha of forest area. Most of them are the Rio Hondo ejidos that were affected by a hurricane Janet in 1955 and in the 1970s lost important forest areas due to several large state sponsored agricultural programs. Ejidos that stopped extracting after 1980's are mostly ejidos established after 1964 and with areas less than 9000 ha. The ejidos that have never extracted timber are concentrated in the cluster of ejidos established after 1975.

Table 3 Indicators for ejidos currently marketing timber

Ejidos	Market insertion group*	Forest area [ha]	No. of species sold	Authorized wood volumes		Extracted wood volumes	
				m ³	m ³ /ha	m ³	m ³ /ha
Petcacab	B	47,290	13	21,803	0.71	7,943	0.26
Caobas	A	41,179	10	12,187	0.37	1,819	0.06
Tres Garantías	B	29,128	8	12,568	0.39	2,419	0.07
Noh-Bec	A	22,750	10	19,551	1.15	6,085	0.36
Chacchoben	C	15,617	3	8,457	0.45	525	0.03
San Francisco Botes	B	13,649	5	9,757	1.33	903	0.12
Buena Vista	C	12,399	1	186	0.04	48	0.01
Los Divorciados	C	9,341	7	2,197	0.44	523	0.10
Tomas Garrido C.	C	3,714	2	1,000	0.67	461	0.31
La Buena Fe	C	2,769	1	132	0.11	45	0.04
Correlation coefficient**	-	1.00	0.87	0.83	-	0.74	-

*) The market insertion group refers to the groups determined in table 2.

**) Correlation coefficient refers to Forest Area vs. other variables.

The shade marks ejidos that own sawmills. Ejidos sorted by total extracted volumes. Source: elaborated from survey and SEMARNAT 2007.

The situation of ejidos currently commercializing timber is similar to that of the entirety of ejidos. To compare the currently producing ejidos regarding their forest extension, the indicators used were production volume (cubic meters of timber extracted from the forest), production per hectare and the number of species extracted, and the market entry point. These indicators can all be said to support the basic hypothesis that large forest areas go along with a higher market insertion. Ejidos with large forest areas produce larger

volumes (Corr. Coef. = 0.74) and process a larger amount of species (Corr. Coef. = 0.87) (see Table 3).

In sum, it can be said that there is a clear relation among forest size and market insertion. Ejidos with larger forests are much more often involved in forest product marketing. Also, larger ejidos clearly sell more timber than smaller ejidos and are able to market more species.

The relevance of standing timber volumes

Standing timber volumes may impact market insertion through differences in total revenues and per hectare extraction costs, also having an impact on the unitary costs. As mentioned in the methods section, it was not possible to gather ejido-specific data on per hectare standing timber volumes. For this reason, the total standing timber volume per ejido was also impossible to report, and was restricted to ejidos currently marketing. Instead, ejidos were grouped to form five clusters, and the measurement limited to per hectare volumes. The areas established broadly delimit ejidos currently inserted in markets from those that aren't. Cluster 1 and 2 are areas where most ejidos are currently marketing timber, whereas in the other three clusters; only few ejidos are marketing. The results for these clusters are presented in **Table 4**. The volumes above industrial cutting diameters of the most commercial species are enlisted separately, as they most probably are central to the decision to start wood extraction. Mahogany was listed also in the category of 35 to 55 cm dbh, as the expectations of future harvests may also be relevant.

Overall, it can be stated that there is a relationship among per hectare standing timber volumes and market insertion. The two areas were most currently marketing ejidos are located (cluster 1 and 2) clearly are silviculturally richer than clusters 4 and 5, where only few ejidos are currently marketing. For example, regarding highly commercial species, clusters 1 and 2 almost duplicate clusters 4 and 5.

Table 4: Standing timber volumes per hectare

m ³ /ha	Cluster 1: Before 1945 North	Cluster 2: Before 1945 South	Cluster 3: Before 1945 SugarCane	Cluster 4: After 1964 North	Cluster 5: After 1964 South	Total Area
<i>Swieteniamacrophylla</i> > 55 cm	0.43	1.21	1.14	0	0	0.43
<i>Metopiumbrownei</i> > 35 cm	1.24	0.37	0.97	0.58	0.19	0.44
<i>Dendropanaxarboreus</i> > 35 cm	1.49	1.64	2.28	0	0.07	0.85
<i>Lysilomabahamensis</i> > 35 cm	2.52	0.81	0.50	1.27	0.75	1.46
<i>Lonchocarpuscastilloi</i>	0	0.63	0	0	0.43	0.20
Sum	5.68	4.66	4.89	1.86	1.44	3.39
<i>Manilkarazapota</i> > 35 cm	8.71	2.36	1.12	0.36	6.36	3.28
Otherspecies 35-55 cm	23.21	12.23	8.96	4.51	9.04	9.61

Industrial Total	37.61	19.25	14.97	6.73	16.84	16.28
<i>Swieteniamacrophylla</i> 35-55 cm	4.01	0.09	0.29	0.51	0.55	0.92
Otherspecies< 35 cm	80.09	44.65	61.67	49.38	39.73	52.82
Total Volumes	121.70	63.99	76.92	56.61	57.13	70.02

Source: based on data from CONAFOR 2009

The situation of cluster 3 is different. In this area, only one of nine ejidos is currently producing timber. This area has to be considered separately, as it nowadays is devoted to sugar cane planting, obtaining important revenues for this crop. As forest areas are located far from roads, the interest of communities in forest management activities is low.

If looking at individual species in the industrial cutting diameter, cluster 1 has advantages in all five listed species, while cluster 2 is only clearly superior to clusters 4 and 5 with regards to *Swieteniamacrophylla* and *Dendropanaxarboreus*, while *Lysilomabahamensis*, certainly the second species after *Swietenia* in terms of demand, has higher volumes in cluster 4.

Summarizing, the clusters where the main forest producers are located show higher per-hectare-volumes than the rest, exhibiting evidence that market insertion is steered, at least in part, by the per-hectare-volumes of commercial species.

The relevance of total authorized volumes

As an alternative of the indicator to measure forest existences for ejidos currently involved in timber marketing, it was decided to use the yearly authorized volumes. The relation among forest existences (as represented by authorized volumes) and production holds true at the level of the individual marketing ejidos. Strong differences exist depending on the indicators used:

- The total authorized volume and the total produced volume are narrowly related (Corr. coef. 0.88). Furthermore, the ratio among produced and authorized volumes increases with increasing authorized volumes. Figure 3 shows this: the ratio of produced to authorized volumes is low for Chacchoben (6%), and high for Petcacab (40%). Ejidos with very low authorized volumes are an exception of this rule, perhaps because of different inventory and authorization procedures⁹³. In any case, if small ejidos are left out of

⁹³In order to understand the high extraction percentage of the smallest ejidos, the authorization process must be considered. It is SEMARNAT that authorizes the yearly harvesting volumes. SEMARNAT does so based on the management plans submitted by the foresters in charge for every ejido forest. To do this management plan, every forester is required to carry out a forest inventory with his or her team. Therefore, there is a conceptual link between the forest existences and the authorized volume. Nevertheless, this link does

the analysis, a very high correlation among the ratio of produced to authorized volumes and the authorized volumes themselves exist. Therefore, it is not only “The more ejidos have, the more they sell”, but also “The more ejidos have, the higher percentage of it they sell”.

- The relation among total production and per-hectare existences is weak (corr. coef. 0.39). This means that ejidos with high per-hectare existences do not get a “bonus”. The total offered volume is more important than its concentration.

Taking currently commercially active ejidos as a whole, an important fact is the low level of overall extraction. Extraction, as conceived by the total produced timber volume divided among the total declared forest area, ranks between 0.02 and 0.36 m³/ ha and year, an extremely low number for international standards (Wadsworth, 1997).

Nevertheless, it can be stated that an indicator of forest endowment, in this case, the total authorized volumes, is clearly impacting the market insertion of each ejido.

Market insertion and organizational capacity

Organizational/ institutional factors are alternatives to forest endowment in understanding the basic market insertion of ejidos, this is, the question of why, at all, ejidos are selling wood⁹⁴. The corresponding supposition would be that only with a certain organizational capacity market entrance barriers can be overcome. This relation cannot be understood as a unilateral causality, this is, organizational capability may not be a fixed precondition of market insertion. Organization may become established as a requirement of market insertion. In other words, it is not clear if organizational capability causes market insertion, or the expectation of market insertion allows the development of organization.

not always hold. The forester and his team normally work as a private company and need to adapt to the financial constraints of their customers, and if the customer's means are reduced, the quality of the inventories diminishes, focussing mainly on the species that are most commercial. In this case, the authorized volume would be below the real existences. This seems to be the case especially in the case of the smaller ejidos.

⁹⁴ A third group of factors, those related to marketing relationships, was deemed too difficult to handle in the context of the survey.

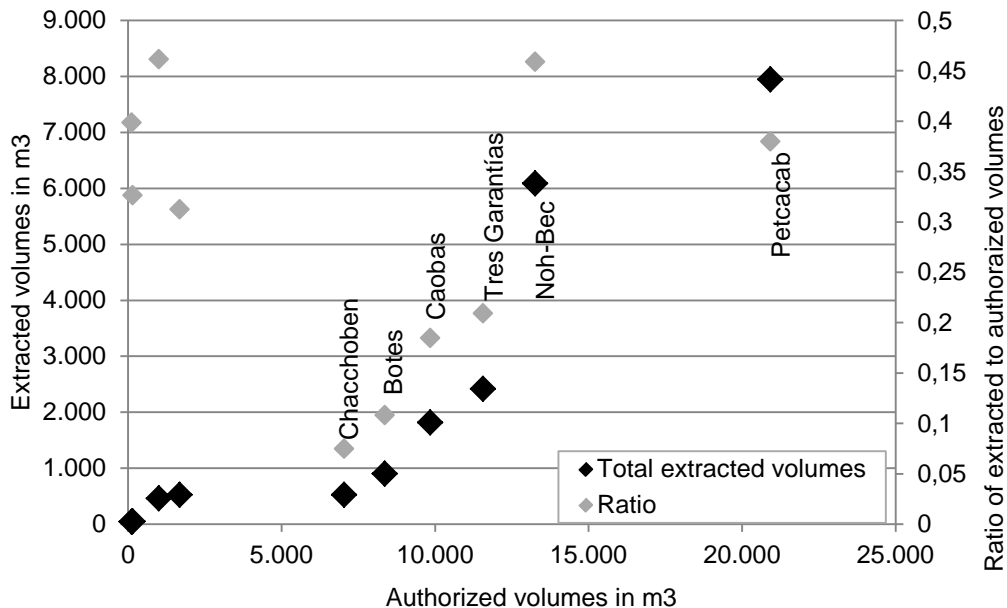


Figure 3 Total extracted volumes and market insertion indicators

Total extracted volumes of woods in m^3 (left scale, black diamonds) and ratio of extracted volumes to authorized volumes (right scale, gray diamonds) in function of authorized volumes in m^3 of commercial species and poles and posts. Elaborated from (SEMARNAT 2006).

In all ejidos, the basic organizational structure is the same. The highest ejido authority, the ejido full assembly, traditionally comes together every month. Every three years, this assembly elects an executive group (*comisariadoejidal*) and a supervising/ arbitrating group (*consejo de vigilancia*). Together, these groups have traditionally managed all organization tasks in the ejido, like the allotment of lands, the organization of ejido meetings, the process of acceptance of new ejido members or the dismissing of absentejido members, the relationship with governmental entities, especially the administration of financial support by government agencies and NGOs, and all legal ejido procedures. The ejido executive is also responsible for the management of ejido businesses in case there are some, for example, if the ejido is selling timber or other community goods. Despite the group character or the *comisariadoejidal*, in most ejidos, executive functions rest solely with the president of this group.

This basic ejido organization was altered with a new set of laws in the early 1990, focussed on making the ejido structure more flexible. While the reforms of rights and attributions of the ejido occurred in the early 1990s have not brought the collapse or disappearance of the ejido, as many observers had feared (Perramond, 2008; Barnes, 2009) it is empirically

evident that in many ejidos, governance institutions have weakened (Argüelles, 2003). Full assemblies are not held monthly, but in longer intervals, often with the argument that there is too little to inform about. The funds available to the comisariado are reduced. Attributions of the general assembly have weakened, for example relating to the dismissal of absent ejido members.

While ejidos were not expressly conceived as enterprises (Simpson 1937), ejidos have been taking over entrepreneurial functions in several community businesses, normally working with the existing ejido organization or slightly modifying it. Mexican law is ambiguous concerning the entrepreneurial activities of ejidos. Ejidos are legally only allowed to enter business fields related to their original function (Mendoza, 2010), but in these business fields, they get some advantages over the most common enterprise legal figure, the *Sociedad Anónima*,⁹⁵ for example with respect to paying certain taxes.

As described in the methods section, an organizational capacity scale was developed to classify ejidos. This scale is composed of six indicators that sum up to a scale from zero (no indicator is present) to six (all indicators are present), six being the highest organizational level. As can be seen from Table 5, more than 75% of ejidos range in categories 0 - 2. Twelve ejidos are in the lowest level (level 0): they held assemblies every two months or more, have no income at the ejido level, pay no salaries or travel allowances, have no employees, and the women have ceased to work on their common parcel. By contrast, only 1 ejido achieves all indicators (level 6). This ejido, Noh Bec, has more employees, pays more salaries and has more incomes at the community level than any other ejido in the region⁹⁶.

Table 5 Ejido organization and market insertion

	Lower organization level (0-1-2)	Higher organization level (3-4-5-6)	Total of ejidos
Currently selling timber	2	8	10
Currently not selling timber	36	5	41
Total general	38	13	51

Source: survey

In the study region, 14 ejidos, roughly a quarter of ejidos studied, had incomes from entrepreneurial activities in 2008. Of these, 10 were connected to forest production, while four have incomes from calcareous material mining operations.

For these ten ejidos, the relation of organizational/ entrepreneurial capacity with market insertion is high (Chi-square: $\alpha < 0.001$). Eight of

⁹⁵ Broadly equivalent to the Corporation in the United States

⁹⁶ This statement is true for ejido incomes, not for ejidatario incomes coming from community activities.

ten ejidos currently marketing wood are located in the upper middle of the organization index. As with the ejidos that do not market timber, of the five located in the higher organizational level, four have a calcareous construction material operation.

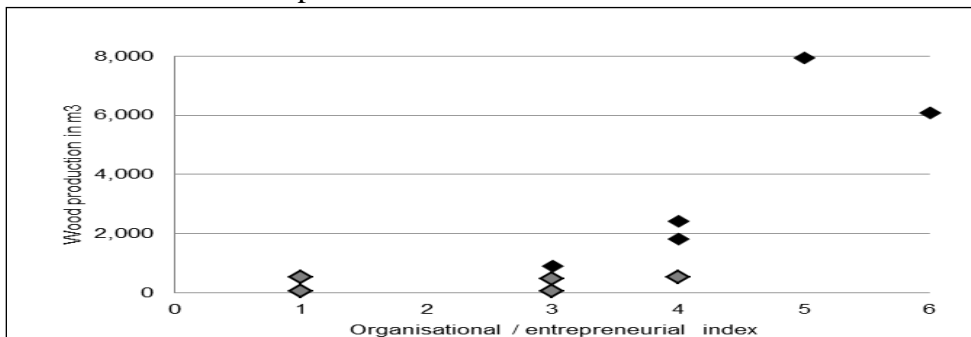


Figure 4 Organization level and wood production in ejidos currently involved in timber sales
Black diamonds mark ejidos that own sawmills. Source: survey.

Taking into consideration the wood production of currently marketing ejidos (Figure 6), a similar pattern appears. Ejidos with a high production clearly have a better organization than ejidos with a low production.

Discussion

The results of the study, both considering all ejidos in the region and considering only those ejidos that currently are involved in marketing, point in similar directions. In the first place, forest endowment is important to understand market insertion. In all alternatives tried, be it the forest area, the authorized volumes, or the per-hectare existences, forest endowment was a significant factor in explaining the degree in which communities are inserted in markets. In particular, the authorized volumes correlate highly with the extracted volumes. This means that the total timber volume an ejido has to offer is an important measure for the volumes it ultimately produces. Beyond that, ejidos with high authorized volumes are more effective in selling their timber than ejidos with low authorized volumes, this is, they are more successful in the marketing of lesser commercial species, not only in terms of sold volumes, but also in terms of the number of sold species.

Organization is also important: the index developed for assessing the organization of ejidos also showed a clear relation to produced volumes. The largest forest producers in the region also have the best organization, while small producers show weaker organizations. Ejidos with high forest endowments also have good organizations.

A way to understand the parallelism of forest endowment and organizational capacity is to drop the idea of organizational capacity as a

fixed determinant, instead understanding organizational institutions as tools a community uses to achieve certain ends. In this case, most communities that engage in activities that require community organization (forestry and mining) have maintained the organizational capacity, whereas in communities engaged in individually managed activities community organization has eroded after governmental aid stopped flowing through ejido organization.

In this sense, the results of the study can inform research that maintain that social capital is the central component in achieving community forest management (see among many others (Bray & Merino, 2004). This divergence may be explained through a larger diversity of observed communities in the present study. While most studies dealing with the impact of social capital on forest management rely on case studies (e.g. Merino, 2004) or establish their sample based on currently producing ejidos, the present study surveyed the totality of ejidos in the study region, thus being able to assess a much larger range of community characteristics, in which the natural capital forms the basic characteristic in which the possibilities of social capital become apparent. While communities with a small forest endowment/ natural capital may become engaged in forest management, under the present circumstances, even a high social capital may not suffice to achieve this goal, as the required investments in time, financing, and organization building may not be feasible regarding the high failure risk and the small profitability from the operation. These negative relations may be rooted in several different conditions. In the first place several entrance barriers may block the possibilities for small ejidos to market timber. Entrance barriers may be dictated by markets itself, or they may be dictated by governmental requirements. Another factor may be the existence of high transaction costs/ transaction risks for new market participants.

Another important result of the study is that instead of new entrants into forest management practices, ejidos have difficulties in maintaining their market insertion status. More than half of the ejidos in the region have abandoned forestry as an economic activity. This means that forestry as an activity is contracting, progressively being confined to those ejidos with the best preconditions for forestry, and that ejidos with less optimal conditions have not been able to take advantage of the larger forest ejidos' experience. As to the still active ejidos, many of them have worsened their market position, going from lumber producers to standing timber sellers. The degree and permanence of these downgrading and exit processes hints at important changes in the institutional environment that ejidos cannot surmount. These changes not necessarily are to be found in the direct marketing environment (competitive offers, changes in relevant markets), but may also be in the

institutional determinants for market entry barriers and operational costs, as might be increasing legal requirements for silvicultural measures.

In general, the study shows the impossibility of implementing “best practice” and “one-size-fits-all” approaches in the practical promotion of community forestry. Large ejidos clearly have different possibilities and potentials than smaller ejidos. Therefore, specific instruments for smaller ejidos have to be found if they are to be involved in community forestry.

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