

# Survival of the forests and the common property in the highlands of Chiapas, Mexico

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## Introduction

Since year 2000 a research has been conducted to determine the magnitude and causes of deforestation in the highlands of Chiapas, Mexico. This economic region consists of 17 municipalities and is located in the central part of the state of Chiapas (Figure 1). This zone is important for biodiversity conservation in Mexico and is principally inhabited by Indian Maya people since pre-Columbian times (Collier et al. 1994; Rus, 1995).

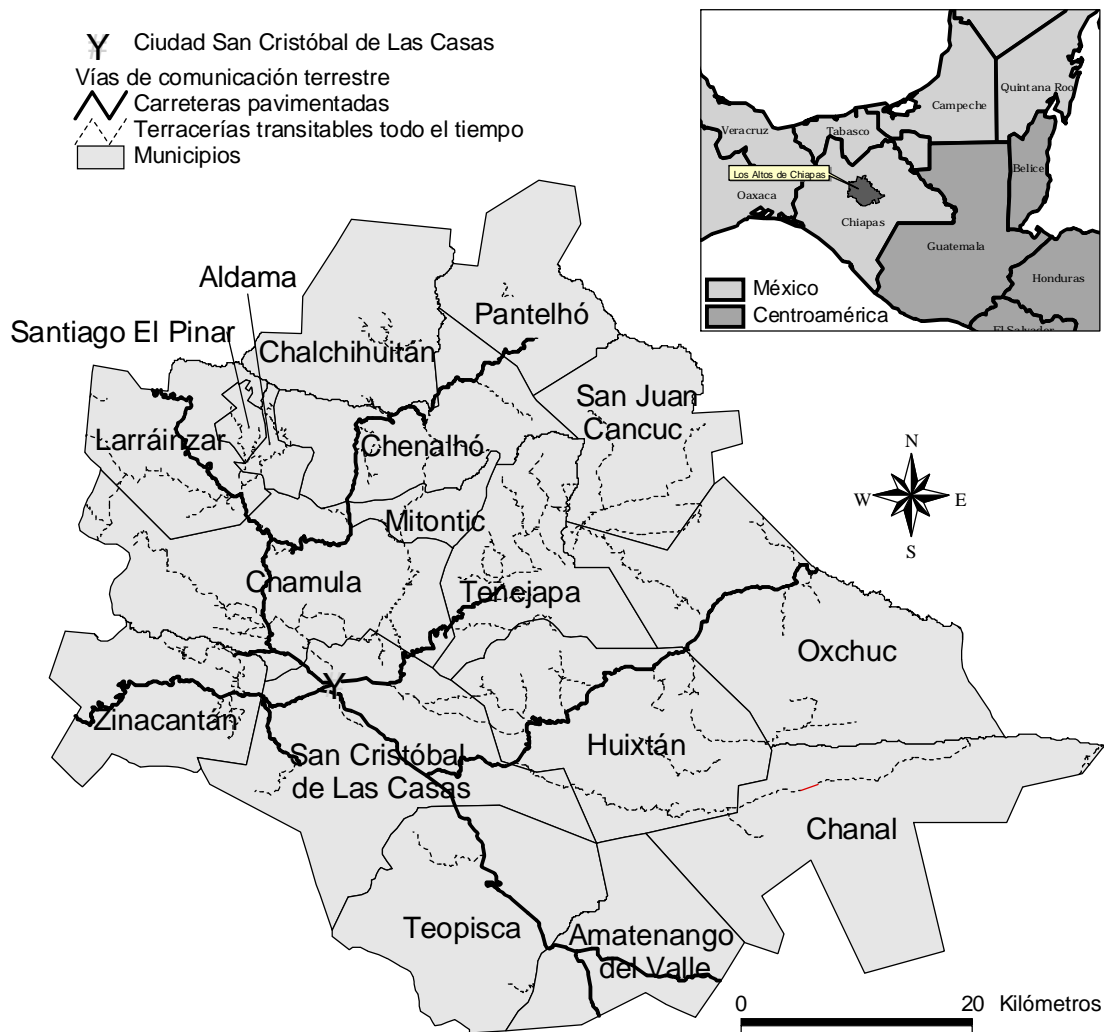


Figure 1. The highlands of Chiapas economic region.

Los Altos de Chiapas = Highland Chiapas; Ciudad = city; municipios = municipality boundaries; carreteras pavimentadas = paved roads; terracerías = dirt roads.

Annual deforestation rates for 1974-1984 and 1984-1990 were 1.6 and 2.1% respectively, in the central highlands of Chiapas (Ochoa y González, 2000). These rates are higher than the rates estimated for Mexico: 0.5 to 0.8% (Masera, 1996).

The highlands of Chiapas are a mountainous region ranging from 1000 to 2900 meter above sea level, with a C climate according to Köppen climate classification. The forests are more important in the zone above 1800 meter, where they occupy 31% of the area; in the zone below 1800 meter forests are less important, occupying only 9% of the area (Figure 2). Deforestation is more significant in the higher zone. The most important forest formations in the region are oak, pine-oak, pine-oak-liquidambar, pine and evergreen cloud forest (Miranda, 1952; Breedlove, 1981; González et al. 1991 and Ochoa y González, 2000). The present landscape in the higher zone includes small plots of maize and rangeland mixed with young secondary forest and old-growth forest stands (Figure 3). The secondary forest is the result of the millenarian agricultural practice of shifting cultivation.

Forests are a very important resource for rural people. Current benefits comprise firewood, house-building materials and nonwood products such as medicinal plants. Forests are also an actual or potential source of monetary income for households (Alemán, 1989; Figure 4).

### **Common property in *ejidos***

We studied the nine municipalities that form the higher zone of the region. In these municipalities there are 39 *ejidos* and 11 agrarian communities that represent 73% of the area (Figure 5). The rest of the area is formed by private properties. *Ejidors* and agrarian communities are pieces of land given by government to groups of peasants after the Mexican 1910 Revolution (Alix-García et al., 2005). In the rest of this paper we only will use the term *ejidos* for both *ejidos* and agrarian communities given that the differences between these two types of property are not significant for the purposes of this study. The main distribution of land to the peasants took place from 1937 to 1944, but it continued until the early nineties.

In many of the *ejidos*, it has not been determined if this happened in all of them, the government distributed the land in two different types of property rights: individual parcels and common land. The former were to be used in agricultural production and the later to be used for livestock and forestry. Some *ejidos* have kept the common land until now, but some have transformed the

commons in individual parcels. So, the land under common property varies widely among *ejidos*, from 0 to 100%. *Ejid*os are the units of analysis of this work.

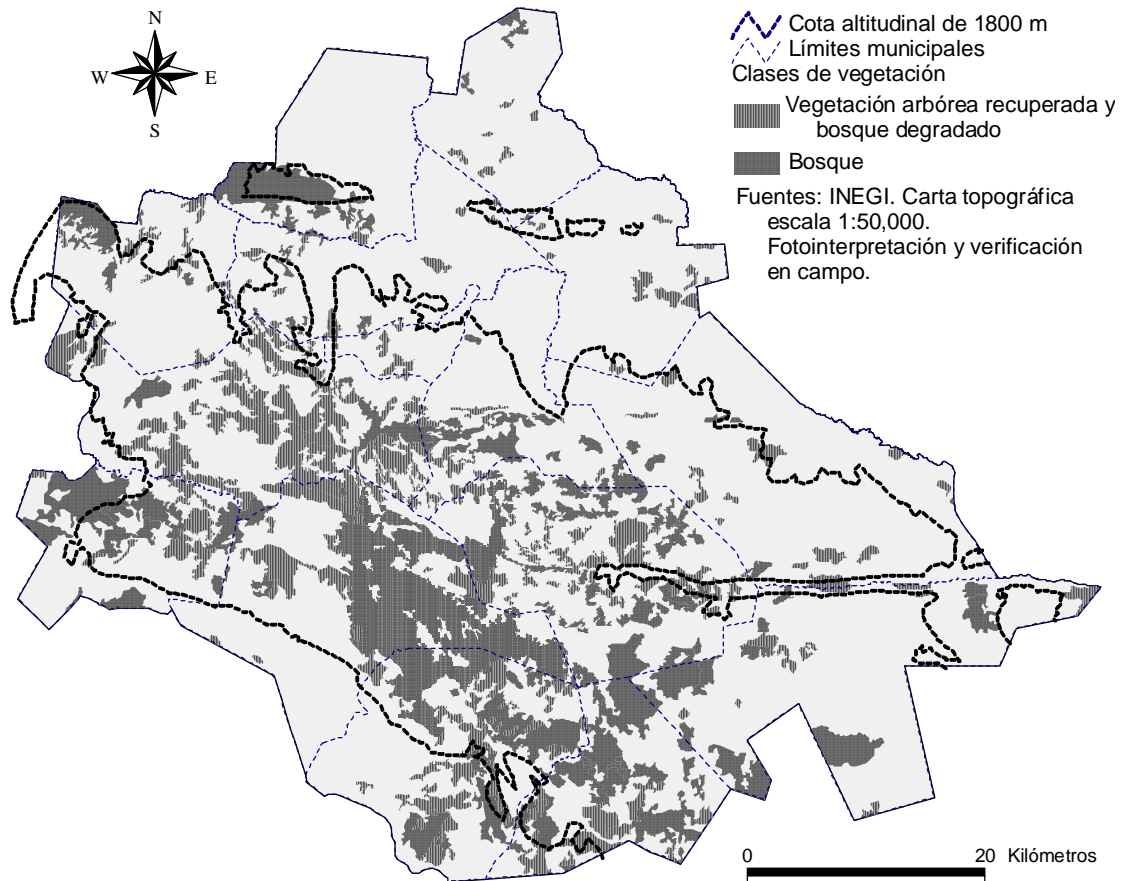


Figure 2. Forest distribution in the highlands of Chiapas.

Cota altitudinal de 1800 = altitudinal limit of 1800 m; límites municipales = Municipality boundaries; clases de vegetación = vegetation types; Vegetación secundaria recuperada y bosque degradado = secondary forest and degraded forest; bosque = conserved forest; fuente = source; fotointerpretación y verificación en campo = fotointerpretation and field survey.



Figure 3. Landscape of the highlands of Chiapas.



Figure 4. An oven for charcoal production.

### **Relationship between forest area and common property area**

In the 50 *ejidos* of the study area the forest area represents 31% of the total area, but this percentage varies widely among *ejidos* (Figure 6). The more is the percentage of common property area in each *ejido* the more is the percentage of forest area; Spearman's  $Rho = 0.394$ , significant at 0.05 level (Figure 7).

Changes in forest area were measured in 24 *ejidos* using aerial photographs for the period 1973-1996. In consequence *ejidos* can be grouped in four types (Figure 8).

- a) Those that lost an important forest area in the period.

- b) Those that conserved a considerable forest area.
- c) Those that recovered a significant forest area (Figure 9).
- d) Those that were deforested at the beginning of the period and continued deforested at the end of the period.

The percentage of deforested area is inversely correlated with the percentage of common area; Spearman's Rho = -0.613, significant at 0.05 level.

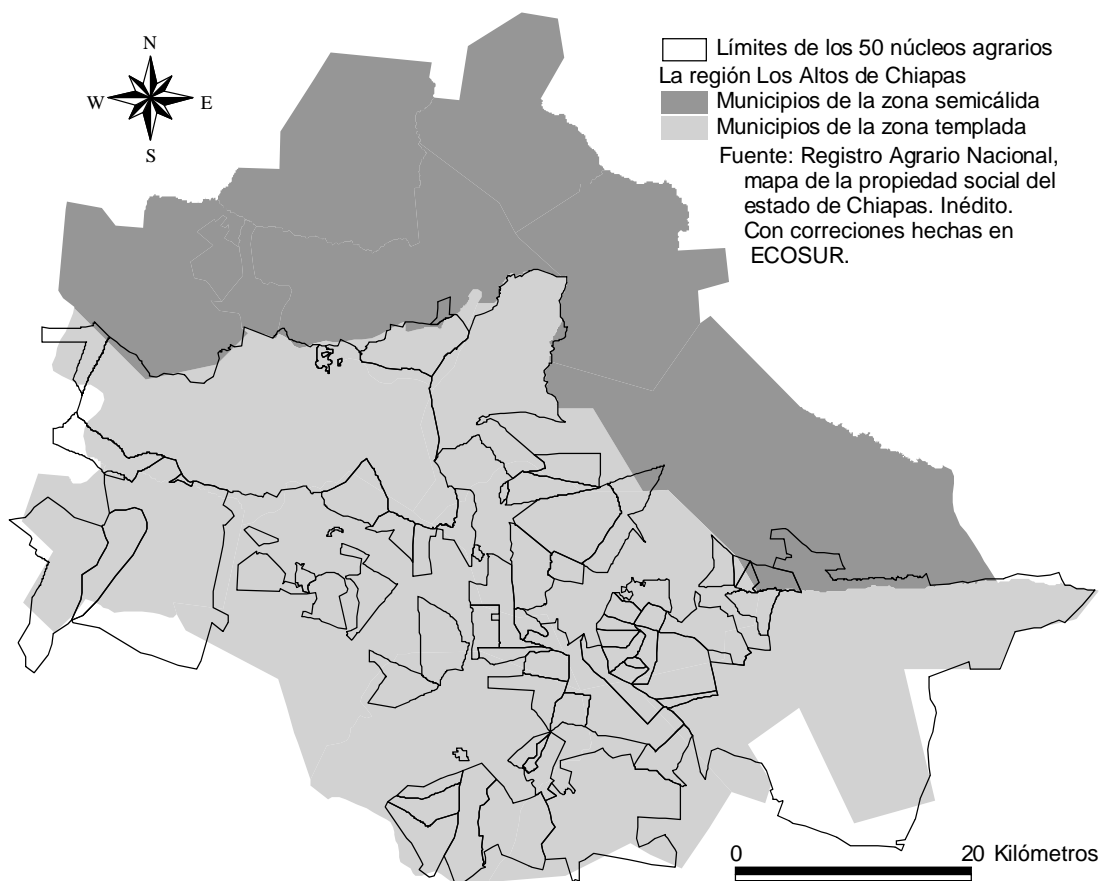


Figure 5. 50 *ejidos* pertaining to the nine municipalities of the higher zone. Límites de los 50 núcleos agrarios = 50 *ejidos* boundaries; region altos de Chiapas = the highlands of Chiapas; municipios de la región semicálida = municipalities of the lower zone; municipios de la zona templada = municipalities of higher zone; fuente = source; correcciones hechas en Ecosur = corrections to the *ejidos* map were made in El Colegio de la Frontera Sur.

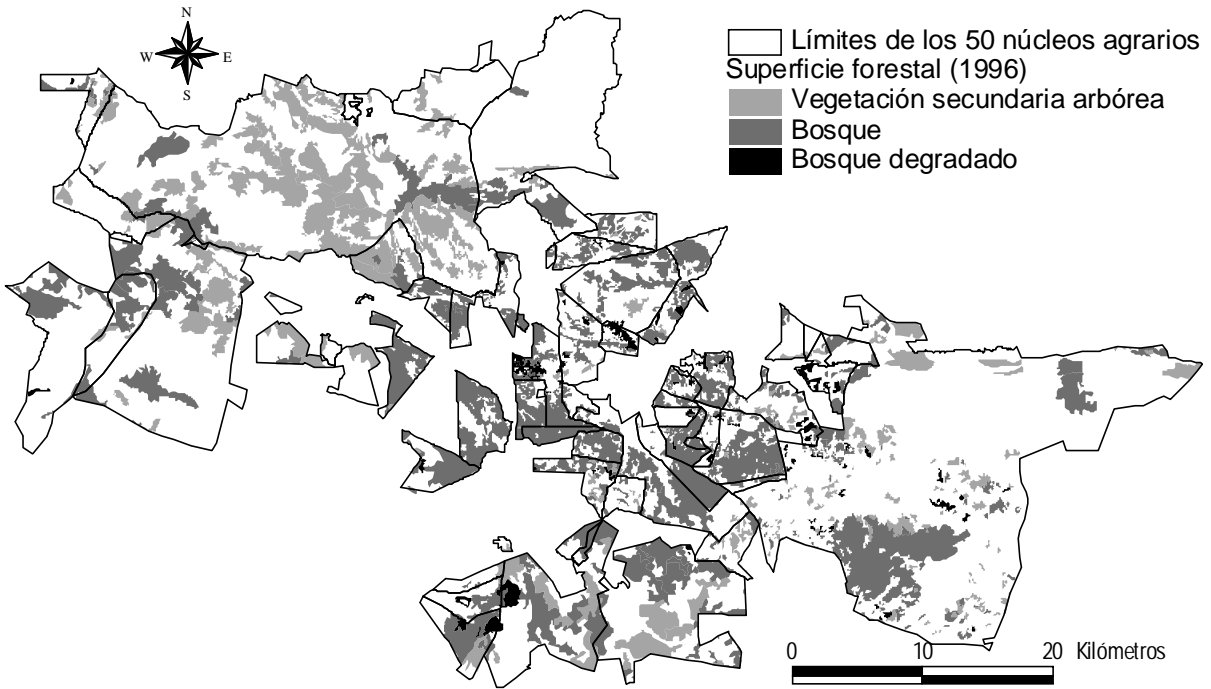


Figure 6. Forest areas in the 50 *ejidos* studied, year 1996.

Límites de los 50 núcleos agrarios = 50 *ejidos* boundaries; superficie forestal = forest area; vegetación secundaria arbórea = secondary forest; bosque degradado = degraded forest; bosque = conserved forest.

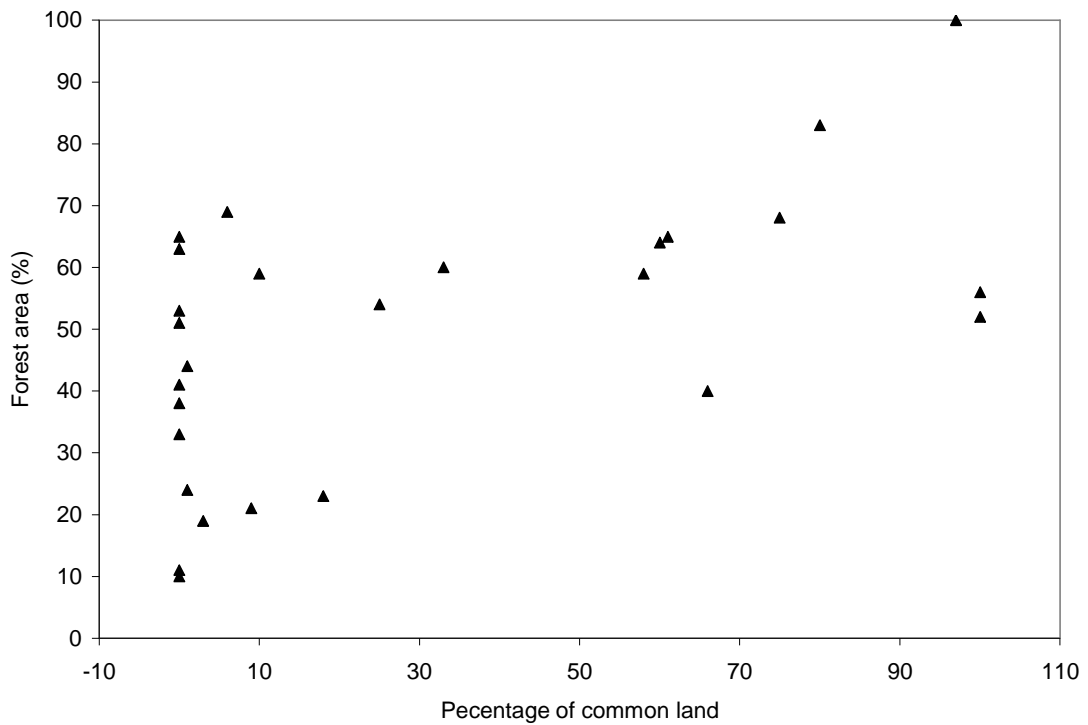


Figure 7. Relationship between the percentage of forest area and the percentage of common use land in 50 *ejidos*.

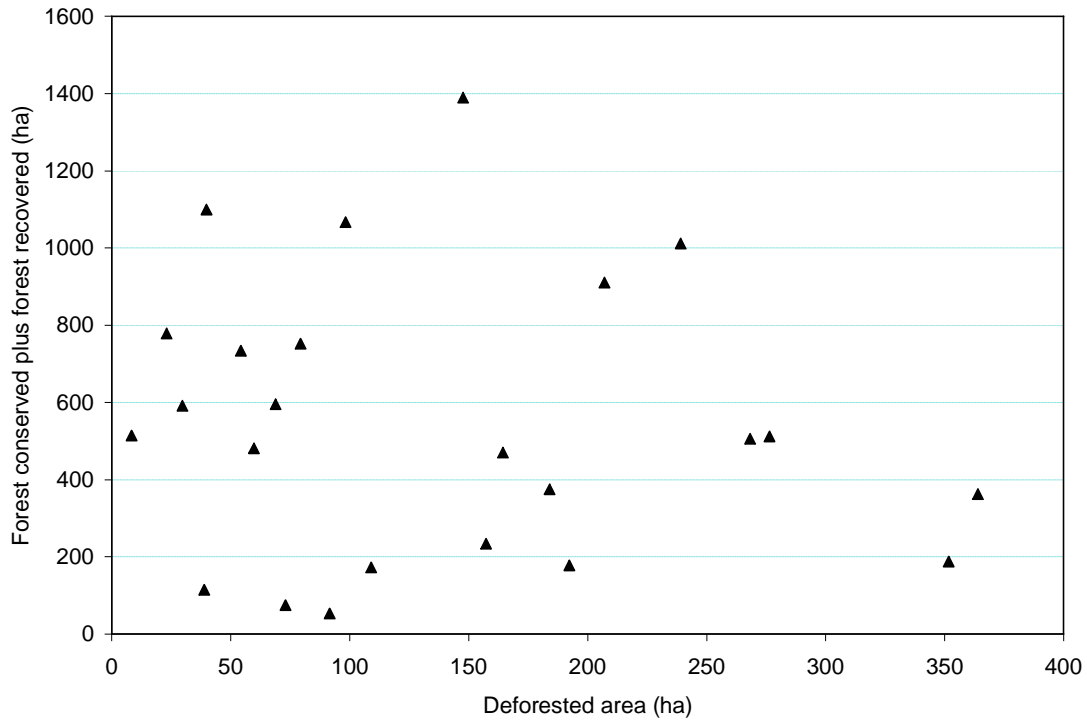


Figure 8. Forest area conserved plus forest area recovered versus deforested area in 24 *ejidos* in the period 1973-1996.

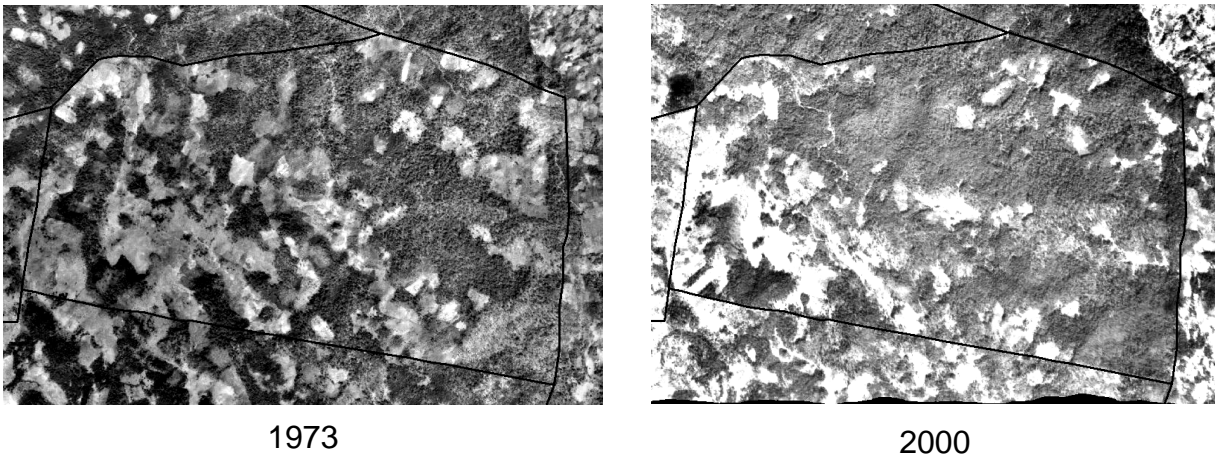


Figure 9. Changes in an *ejido* of the highlands of Chiapas. The forest area has increased by 200 ha in 27 years. The black line represents the boundary.

### Forest policies

In official documents of two new created *ejidos* published in 1940 and 1941, is established that forest should be conserved by *ejidatarios* and used in a communal form. It was forbidden the intervention of alien forest companies. The exploitation of the forest would be authorized when the Minister of Agriculture would have created a forest cooperative in each *ejido*.

These purposes were not supported for the forest policies of the next decades (Merino, 2001). Forestry law of 1947 forced *ejidatarios* to cede their forest resources to private companies. The *ejidatarios* received indirectly in exchange few benefits. Muench (1982) considers that this situation conducted to forest degradation, because of the firms mined the forest.

This policy was hold until the eighties when the state government bought some private forest companies and created a public forest company (Villafuerte et al., 1997). Then, forestry was regulated by the Minister of Agriculture. Technical studies were done by professional foresters employed by government. Government gave the permit for logging. In this period most of the 50 *ejidos* were involved in commercial forest activities directed by government foresters. The state government wanted that most part of the richness generated in forest exploitation were transfer to *ejidatarios*, but the later did not happened. Nevertheless, field data indicate that some *ejidos* began to receive more money for the commercial logging. They used the money to buy pieces of land in the lowlands of Chiapas.

At the end of the 1980 decade the new state government decided to forbid many of the forest exploitations, creating in fact a forest prohibition. Many sawmills were closed (Villafuerte et al., 1997; Montoya, 1988). As many as 5,000 forest jobs were lost and the *ejidatarios* lost a source of income. This situation contributed to increase the discord between the communities and the government.

After the Zapatista rebellion (in 1994) the policies changed again. The government began to authorize commercial timber production in *ejidos* of Chiapas. But this time the international and national context was different. In the government of president Carlos Salinas (1988-1994) the following important changes took place (Merino, 2001):

- a) The decrease of the personal in the public forestry sector, which cause a weakening in the institutional action.
- b) Liberalization of the forestry services. One of the effects of this measure is that *ejidos* with forest potential are not attractive to foresters.
- c) With the reforms to the 27 Article of the Constitution the communities have now more autonomy, but more abandonment.



- d) Reduction of public investment in the rural areas, with less public funds going to productive projects, credits, technical assistance and *ejidatarios* training in management.
- e) The opening of timber market therefore and an important increase in timber importation that cause a diminution of lumber prices.
- f) The disappearance of regulations that forced *ejidatarios* to save part of the forest revenues.

Since 1996 the federal budget to Mexican forest management has increased (Bray y Merino, 2004). The Forestry Development Program (PRODEFOR), launched that year, has benefited few *ejidos* of the highlands of Chiapas subsidizing the costs of management plans.

On the other hand State forest policies have support forest nurseries for reforestation and the vigilance and punishment for clandestine logging. These measures look insufficient to stop deforestation and forest degradation. The punishment has provoked arguments and conflicts with several communities.

The best indicator of the failure of forest policies to achieve a sustainable forestry development is the fact that only seven of 50 *ejidos* have a forestry management plan authorized by the Minister of Natural Resources. Four more *ejidos* have a forestry plan temporally suspended. It was found that 17 *ejidos* pertaining to the group without management plan have an average forest area equal to the 43% of their total area, with a minimum of 25% and a maximum of 76%. Parts of these forests are degraded by past mismanagement, and they do not meet the minimum requirements for commercial logging, but they could be restored under a well designed program. But this possibility looks remote because these *ejidos* and the government do not work together. Clandestine logging is practiced in several *ejidos* without forestry permit provoking disputes with government authorities. Some of this *ejidos* do not want to apply for forestry permits to reinstate logging legal contracts with small firms.

Many of the *ejidos* with more conserved forest area and less deforested area have forest management plans and logging permits (Figure 10).

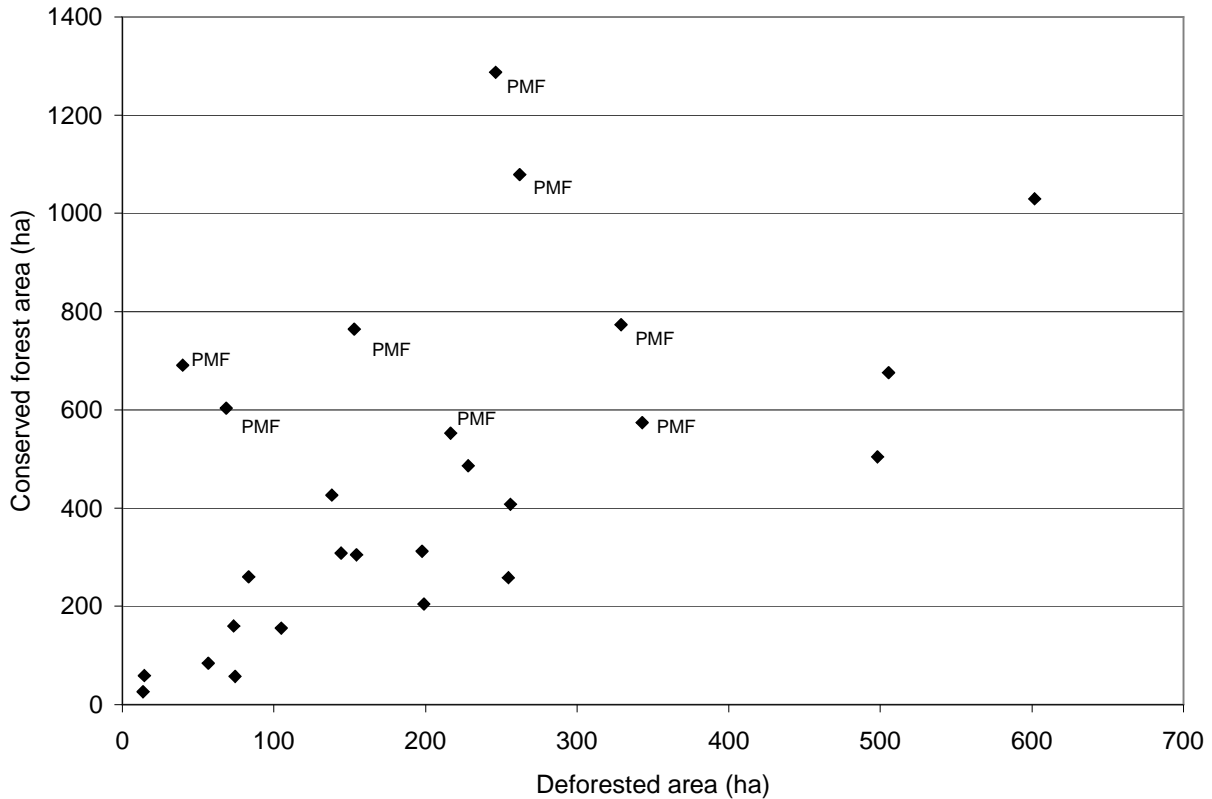


Figure 10. Relationship between conserved forest area and deforested forest area in 26 *ejidos* of the highlands of Chiapas, 1996-2002 period. PMF = forest management plan authorized by the Minister of Natural Resources (SEMARNAT).

### Challenges to forest conservation and the keeping of common use

*Ejidors* face the following challenges to conserve their forest and the land under common use:

- a) The keeping of the common lands depends on the internal agreement within each community. The current agrarian law forbids the parceling of forested areas, but several *ejidos* have ignored this part of the law. It has been documented a case were *ejidatarios* decided to parcel the *ejido* area, after that they cut the forest that had been well conserved for decades (Figure 11).
- b) The population growth within the *ejidos*. The average number of children per family is 5.2. This situation produces a high demand of land coming from the youngsters. There is a case where the assembly made the decision of parceling the *ejido* forests that were used in common for decades. The youngsters were favored with this decision and they could cut forest to convert them to agriculture. So the youngsters need jobs, and the way out to

this difficult situation is temporal or definitive emigration. *Ejidors* that have conserved or recovered their forests have higher rates of emigration than *ejidos* that have deforested their lands.

- c) To increase the forestry revenues. Until now the *ejidos* sell untransformed logs to small private firms.

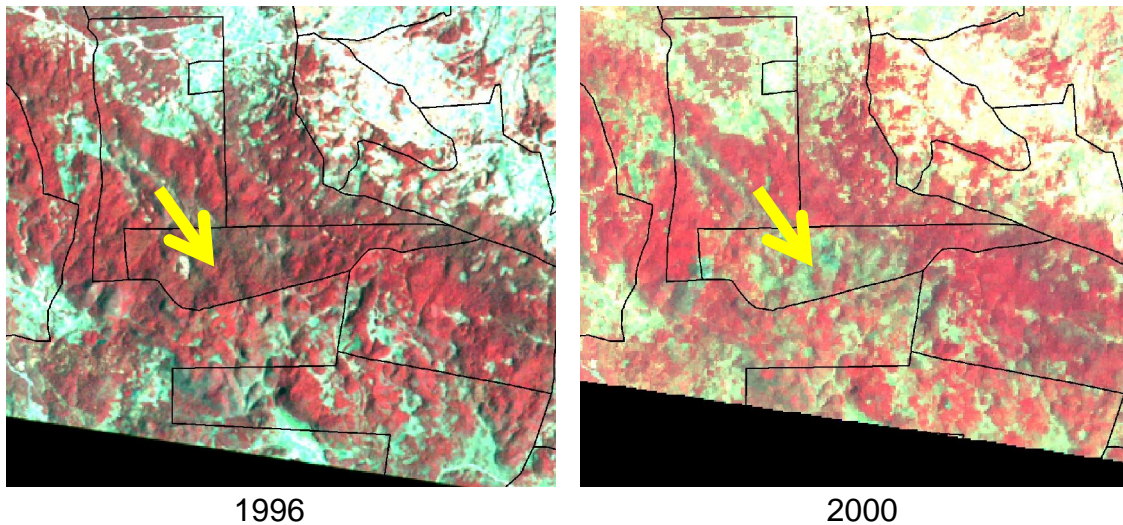


Figure 11. Deforestation in an *ejido* (yellow arrow). In only four year this *ejido* lost 60% of its forest area, since the owners decided to parcel land. Landsat TM images in a 4, 3, 2 arrangement. Black lines represent *ejido* boundaries. Forest area is in red color.

### **Recommendation for public policies**

If the purpose is that *ejidos* conserve their forest, then the most important recommendation from this study is that government should support forested *ejidos*. Training and advising would play a key role in the supporting. These processes should help *ejidatarios* to defend themselves from the kind of alien people that have contributed to the deforestation or degradation of forests.

### **Discussion**

It is surprising that forest and common property have survived decades of unfavorable forest agrarian policies. This fact only can be explained by the interest that communities have in their forest. But also agriculture is not an economic option in the highlands, where the lands have low temperatures during the winter and the soils are shallow and stony.

The *ejidos* of highlands of Chiapas are far from the development reached for *ejidos* such as Nuevo San Juan Parangaricutiro, where community-owned logging operations, sawmills and a furniture factory provide rural development benefits and employment for a majority of the community's 1200 male members (Klooster & Masera, 2000). But the organization in some highland *ejidos* to take care of forests and a growing ability to deal with firms are elements of an embryonic stage of forestry development.

## Conclusions

The common use of forest land and the forest have survived in many villages of the highland of Chiapas. The presence of common use and the magnitude of forest area are related.

The keeping of common use of forest land depends on the decision of the assembly of *ejidatarios*. But this decision is influenced by forest policies and population growing within *ejidos*.

The fact that there still are *ejidos* that conserve their forest means good news, but the fact that several *ejidos* have deforested and parceled their forest land should give the alarm to modify public policies in favor of community forestry. The owners of the forest and common land need support to avoid deforestation and degradation of their forests.

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