# Challenges to sustainable forest management and stewardship in Mexico

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## Summary

Mexico's forests, cover 56.5 million hectares characterized by high biological diversity and biological productivity. Forest regions nationwide are home to 14 million people, 28% of whom speak an indigenous language, half of them live in extreme poverty. Forest communities own 80% of the country's forest lands and produce 80% of its´ timber production, their share of the harvest of non-timber forest products is even larger. Community forest management in Mexico is the result of different processes and policies: the Land Tenure Reform carried on from the 1930 to the 1970 and various forest policies that for the last 25 years, that have seek to promote a sustained forest use.
Some of communities have achieved remarkable conservation gains: the largest and best preserved area of cloud forest in the country is located in community-protected areas. 46% of the forest communities of Mexico's main temperate forest states have areas devoted exclusively to conservation. No other country in the world has as much community-managed forest land, neither a similar extent of community forest land certified as managed in a sustainable manner.

About 12% of the country is included in the federal government´s Natural Protected Areas System.18% of the forestland is under forest management and/or other land use planning schemes, in these last cases forest owners have incentives to maintain and protect their forests, as well as institutional and technical tools to do so. These communities are found mainly in temperate forests and at a lesser extent in humid rain forests. The main social and ecological challenges are faced in communities outside management schemes, still the majority of the country. In such cases the contribution of forestry to local employment and income is lower than those of agriculture and cattle-raising. Deforestation, forest fires, illegal cutting occur mainly in contexts of poor social capital and scare opportunities of economic viable legal forest use.

The lessons learnt by the community forest management experience in Mexico show that local communities have key impacts in the conditions of the forests. The development of incentives, the strengthening of collectivities and local rule are imperatives for sustainability. In Mexico there is an important body of

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experience that supports the viability of local stewardship of resources and ecosystems of high public value.

## Introduction

The National Forest Inventory of 2000[i] reported that Mexico´s forestland had an extension of 56.5 million hectares. Mexico is a mega-diverse country whose biological diversity occurs in a wide variety of forest ecosystems: tropical humid forests and tropical dry forests, temperate forests of pine, pine-oak and fir types, as well as cloud forests and dry lands are present within the national territory. Biological productivity is another key feature: forests of Northern Mexico reach annual growth rates of 5 m3/hectares, while pine forests of Central Mexico reach growth rates of 15 m3/hectares per year.

Mexico´s forest regions, as many other forest regions of the developing world have been historically inhabited, managed and used. Population of these regions has been estimated as 14 million inhabitants who live in nearly 8,500 communities[ii]. They are often indigenous communities: an indigenous language is spoken in 28% of them[iii], but if one uses a broader definition of ethnic affiliation considering features such as traditional governance practices the weight of indigenous presence is much larger. Another pattern that Mexico´s forest regions share with other forested developing countries is the deprived living conditions of a large share of their people, these conditions vary depending upon various factors among which the forest extension and the value of forest assets are relevant ones[iv]. The National Population Council (CONAPO) estimates that in 2000, 50% of the inhabitants of forest communities lived in conditions of extreme poverty[v], 50% of them did not have schooling beyond elementary education and 37% of those older than 15 years were illiterate. These conditions undoubtedly affect the way forest are perceived and used as well as the perspectives for sustainability.

## Community Forestry in Mexico, its uniqueness, gains and challenges

Until the late 1980 Mexico was the only country in the world where community property was legally recognized[vi]. As a result of an extensive land tenure reform enforced from the 1930 to the early 1980 (Warman, A., 2000) 80% of the country´s forestland is owned by local communities, private property accounts for the 15%, while public forests represent 5% of the total. Land tenure patter has created opportunities as well as challenges for sustainability: it is true that in important number of forest communities collective property, together with public policies failures, has had its share in what one of Garrett Hardin´s latest works characterized as “The Tragedy of the Unmanaged Commons”[vii], nevertheless in a meaningful number of cases property rights enable a long time perspective of forest use while collective property has created incentives and restrictions that

favor social capital and consensus on the use and protection of forest commons[viii].

The land tenure reform created two types of collective property: the *ejidos*, the dominant collective property type, where the government granted property rights to a group of solicitors and the *comunidades agrarias* where the government recognized traditional rights[ix] to communities that proved to have historically occupied the land. Today the most meaningful difference between these two types is the fact that agrarian communities are free to decide on the inheritance patterns to follow and can incorporate as right holders as many new members as they decide, while ejidos´ members can only transmit their rights to one heir. As life expectancy increased during the XXth century, ejidos became an exclusionist model[x], more prone to ageing and migration appears to have stronger impacts in the perspectives of generational replacement. (Martínez and Merino, 2005; Meyerson, Merino and Durand, 2007).

Now days Mexico is the country in the world with the largest share of forests under community management: 18% of the country´s forests are directly managed by local communities. In global terms this is a pioneering experience that is being replicated in different latitudes (Bray, Merino and Barry, 2006) it is also an outcome of forest policies, that for the last 30 years have skeet to incorporate local communities in forest management as an alternative to forest vans and forest concessions to private and state owned companies, previously applied with dubious results (Merino, 2004; Merino and Segura, 2002). Pro-community forest policies were designed as alternatives to land use change in decades when deforestation reached impressive rates. These policies were engaged in the development of economic incentives for local communities and were primarily oriented around logging[xi]. Communities became an option to forest concessions as providers of forest goods, after the environmental, political and social costs of concessionaries´ management proved to be unviable. In the mid 1990 and early 2000 two new pro-community programs: the Programa de Conservción y Manejo Forestal (PROCYMAF[xii]) and Conservación Indígena de la Biodiversidad (COINBIO) were created by the Ministry of Environment and Natural Resources and the National Forest Commission. Among their more interesting goals it is worth to mention: the development of local technical and administrative capacities required by forest production, conservation and management, the development and enforcement of social capital for forest management, the development of “linking” social capital among forest communities at regional levels, the diversification of forest production and the promotion of participative land use planning[xiii].

Community forestry in Mexico has proved to be an important development strategy. As in other developing countries forests are sources of fuel, food and medicines used for domestic consumption, but in those cases where community forestry has developed forests assets are the base of community enterprises that provide local employment and income. The country´s timber production was 8

million of m3 in 2006, 80% of it is produced by communities. Non-timber forest products make a similar contribution to rural employment and income. Tourism and environmental services have appeared in increasing number of cases[xiv]. The profits of communities´ enterprises are often invested in the development of communities´ infrastructure and services. This investment is particularly important in regions where public investment tends to be scare.

Through community forestry local societies have achieved other less tangible gains of no lesser importance. On social terms management of a common resource is largely based on previous social capital, this is relations of trust and cooperation within communities, when this process is successful it enlarges and enhances social capital and local institutions[xv]. Collective management of common forests also demands and promotes human capital. Various authors (Bray teal. 2006; Merino et.al. 2007) show that experiences of community forestry are associated with high levels of organization and institutional development, in this sense community forestry contributes to a key public good: the possibility of local governance.

Community forestry has also made important contributions to conservation: the largest and best- preserved area of cloud forest in the country is located in community-protected areas in the southern state of Oaxaca. Merino and collaborators survey (2007) found that in five of Mexico's main temperate forest states 46% of communities have created areas devoted solely to conservation. 12.5% of Mexico´s territory is included in the governmental Natural Protected Areas System, placed fundamentally in communities´ land, 30% of the forestland of the country are under community forestry schemes, 800 thousand hectares of which have been certified as well managed by the Forest Stewardship Council. These areas still face important economic, political and environmental challenges: successful cases are largely constrained to temperate forests with more abundant resources of commercial value, regional markets for most of tropical timber species are non existent, communities` business have to compete in global markets without access to proper founding and insufficient policy support, illegal logging has an important weight while there are not market instruments that enable consumers to identify timber legally produced, there is also a lack of public understanding of community forestry that posses a constant pressures on it. Nevertheless forest owners have incentives to maintain and protect the forests they own, as well as some institutional and technical tools to do so (Merino, Martínez and Arias, 2007).

Over the time Forest Ecology -particularly Sylviculture- has made substantial contributions to the development of forest sustainability. Sylviculture has supported commercial forestry largely based in knowledge and practices introduced and adopted by communities over the past 30 years. In recent years in the most developed and participative communities, adaptive management is emerging, participative land use planning is taking place and management follows multi-purpose strategies that include: sustainable harvest of timber as

and non timber forest products, conservation of biodiversity, environmental services and eco-tourism. No other country in the world has as much community-managed forestland, and no other country has as much community forest land certified as managed in a sustainable manner.

Now day Mexican forest areas live through a process of change that implies traditional challenges as well as new scenarios for sustainability: subsistence agriculture has been and still is the main economic activity of forest communities, cattle-raising is also present and has gained importance through the long time presence of favorable subsidies. Migration is an increasing phenomenon, whose consequences on forest management and conditions are not fully understood. The results of a recent survey carried on by Merino and collaborators[xvi] shows that migration has already an important impact on communities´ age structure, community members, property rights´ holders in particular are ageing. Even if up to now, in most of the cases migration has not diminished the number of property rights holders, it may impact generational replacement, as those who migrate tend to be the youngest members who will not access property rights until the right holders within their family die, or may not access property rights at all (Warman, 2001). Further more population ageing certainly has an impact on forest management practices and production, reducing their perspectives for development.

Following the approach of the so called theory of the Forest Transition[xvii] one could suppose that forests areas will recover and increase as human population density declines. Even if that may be the case as a general trend further research is needed in order to understand the impacts of migration on areas where local communities have meaningful roles as stewards of the forests. The mentioned survey shows that old agricultural plots and even forest lands are often converted in pastures as migrants´ remittances are frequently invested in the acquisition of life-stock. A viable hypothesis is that population loss may reach a certain point at which social capital and local institutions weaken, communities capacities for forest governance and stewardship diminish, and forest resources loose social value. Collective forest management tends to be substituted by land uses which demand less labor and transaction costs and imply few or non restrictions on resource use nor investments in their maintenance. These are often activities that provide quick returns at the expense of the natural assets, such as cattle-raising and even illegal crops.

The main social and ecological challenges are faced by communities outside management schemes, still the majority of the country. The most endangered forest types are cloud forests and dry forests, rich in biodiversity, but poor in resources valued in regional markets. In these communities the contribution of forestry to local employment and income is lower than those of agriculture and cattle-raising. We have already mentioned the correlation existent between successful collective forest management and high level of social capital and strong local institutions. But the opposite is also true, as a general trend

deforestation, uncontrolled forest fires and illegal cutting occur mostly in contexts of poor social capital and scare opportunities of economic viable legal forest use.

Finally we would like to stress that public policies do have important impacts of forest management, forest conditions and local social capital. Ten year of the last pro-community forest policies have had an impact in the communities where they have been applied. The comparison of communities who have worked with PROCYMAF with those where this program has not been present show clear differences in variables such as: forest protection, pressures on forests, local organization and institutional development around forest management.

## Conclusion

The 25 year experience of community forestry in Mexico has produced important elements for social learning and policy making: it shows that the development of economic incentives, the strengthening of collectivities and local rule are imperatives for sustainability. Forest conservation requires the development of local capacities for forest management, forest economy and local governance.

Ecological knowledge has also an important roll to play: as commercial extractive uses develop, and management evolves towards sustainable harvest and sustainable landscapes.

Local communities have key impacts in the conditions of the forests. In Mexico there is an important body of experience that shows the viability local stewardship of resources and ecosystems of high public value. The sustainability of community forestry in Mexico requires the support of both well crafted policies and markets able to recognize and value environmental and social costs. The creation of new type of market requites a coordinated intervention of the state and the civil society.

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[i] National Forest Inventory of 2000, http://132.248.14.16/inventario.html
[ii] *Ibid*
[iii] Programa Nacional para el Desarrollo de los Pueblos Indígenas 2001-2006
[iv] Up to now an extensive study on the social conditions associated with poverty in forest communities has not been done. The results of the 2007 Survey of Forest Communities carried on by Merino, Martínez and Arias in 2007 suggest that: accessibility, remittances and public policies for poverty alleviation play a role, but the impact of forest assets associated with forest size and forest production development have at least a similar weight in living conditions than the first mentioned.
[v] In Mexico they are consider as those families whose income are less than the minimum wage ($7 US.dls per day in 2007).
[vi] During the 1990 different countries recognized property rights to local forest communities: More than 90% of the forests of Papua New Guinea is owned by communities, Bolivia and China have similar policies (Whyte and Martin, 2002; Who Owns the Worlds´ Forest, Forest Trends).
[vii] Garrett Hardin, 1999,
[viii] Different polices had negative impacts on forests: colonization policies of tropical forests implemented in the 1970 and policies that provided subsidies for cattle-raising and agriculture on previously forested lands of the tropical and mountainous regions.
[ix] The land tenure policy did not defined right holders as owners but as "users", nevertheless it granted them most of the rights traditionally defined as property rights: right of access and to exclude outsiders, right to use, to manage and to inherit. Until 1991 neither ejidos, not agrarian communities had rights to alienate the land. The 1991 reform to the Agrarian Law enabled ejidos to alienate the land with some restrictions.
[x] Now days in the majority of the ejidos, the majority of the families do not have access to property rights, and limited or no legal access to forest resources.
x The most relevant pro-community forest policies have been those promoted by the Dirección de Desarrollo Forestal from the mid-1970 to the mid 1980.
[xii] http://CONAFOR.gob.mx and http://coinbio.org
xiii To see more on the impacts of public policies on forest communities see Merino, L. and Segura, G., 2002; and Bray, Merino, Barry 2006.
[xiv] In 2004 CONAFOR started a policy of payment for environmental services that include hydrological services, biodiversity and carbon sequestration.
[xv] Following Ellinor Ostrom´s definition we define local institutions as rules in use for the governance of common goods (Ostrom,Elinor; 1990)

[xvi] The survey was applied in a sample of 130 forest communities with extensions of at least 300 hectares of temperate (pine, pine-oak and fir) forests in the states of Durango, Jalisco, Guerrero, Michoacán and Oaxaca, that together with the state of Chihuahua (not included in the sample) have the largest extensions of temperate forests and the largest proportion of their territories covered with this forest type. The sample was stratified (considering the share of each of the 5 states in the total number of communities) and had a level of confidence of 90% and a marginal error of 0.4.

[xvii] Theory of Forest Transition. The forest transition model aims to describe and to explain how a number of nations or regions, including many European nations in the nineteenth century, as well as north America, Japan and Korea for example, have passed through a stage of deforestation and forest degradation during the course of their economic development, in some cases running to a critically low level, and then succeeded in stabilizing and increasing their forest cover. Many of these countries have now recovered to their pre-industrial level of forest cover. Several factors are implied in this process. Some are technological and economical ones, other are institutional and cultural ones. The main processes implied are: agricultural intensification allowing to release land for reforestation, markets and transport networks allowing for a better spatial matching of the agricultural production with the capabilities of the land, urbanization and industrialization which allowed off-farm jobs that diminishes pressures on land for agriculture, sylvicultural improvements that permits to meet timber demands with a smaller pressure on forests, substitution of wood by another energy source (coal in the nineteenth century), policies and government involvement to protect forests, restrict its use, reforest and afforest, perception of a crisis at least among the decision-makers (two references for an overview of theory and a european case study: Thomas K. Rudel, et.al., 2005