Chapter 12

COMMUNITY FORESTRY AS A STRATEGY FOR SUSTAINABLE MANAGEMENT

PERSPECTIVES FROM QUINTANA ROO, MEXICO

David Barton Bray

The most sustained case against the ecological and economic feasibility of sustainable management of tropical forests has been developed by researchers associated with Conservation International (CI) (Reid and Rice 1997, Rice et al. 1997, Bowles et al. 1998, Hardner and Rice 1999, Rice et al. 2001a, 2001b). These authors argue that efforts to promote sustainable forest management (SFM) have been largely futile because it will always be more profitable to harvest as many commercial-sized trees in the shortest possible time and invest the profits in other sectors.

The CI group has further argued that policies that promote SFM are doomed to failure because they typically

- Promote the use of lesser-known species (LKSS). But neither prices nor growth rates are any more favorable for LKSS than they are for more commercial species.
- Promote more efficient logging. But industrially efficient logging could also be highly unsustainable.
- Promote tenure security (equated to longer concession durations or private property) but do not improve the financial disincentives for SFM and may even encourage rapid liquidation of the resource.
- Ban log exports, promote value-added processing and more government taxes (rent capture), practices unlikely to contribute to SFM.
- Promote timber certification, which will never add enough marketing value to compensate for the much higher costs of SFM.

Close examination of this literature reveals that this generalization has been made almost entirely on the basis of SFM under one kind of land tenure and contractual condition. The potential for SFM under alternative forms of land tenure and institutional arrangements is barely considered. This chapter provides a contrasting example based on initial evidence from the experience in tropical forest management by communities in Quintana Roo, Mexico. Community forest management under secure tenure arrangements, with community forest enterprises (CFEs) managing logging, presents a completely different set of conditions for SFM than logging by private enterprises on public lands under concessions. On a conceptual level, CFEs are only one aspect of a multifaceted relationship between a community and its forests; as a result, traditional discount rate calculations fail to capture decision-making processes on forest use in communities and CFEs.

Mexico contains the fifth-largest forest area in Latin America, and most of its forest lands are in the hands of local communities, with hundreds of communities managing their own CFEs (Ward and Bihun 2001, Bray et al. 2003). Although Mexico may be unique in the amount of national forest lands in community hands, increasing global trends toward decentralization and devolution of forest management and the emergence of neo–common property forms suggest that Mexico may be the face of the future rather than a unique case (Arnold 1998, White and Martin 2002).

The phenomenon of communities managing common property forest for commercial timber production raises questions not asked in the CI literature. Do communities managing tropical forests under secure tenure arrangements respect management plans and overharvest? Do they make the same financial calculations as private sector loggers on public lands? Are intergenerational values factored into implicit financial calculations? Given that community forests are almost by definition multiple-use forests, what values other than timber are generated, and how do all uses contribute to sustainable rural livelihoods? In the following sections I explore some of these questions using data from Quintana Roo and a conceptual framework that describes some of the economic and ecological dimensions of forest management by communities in the state.

COMMUNITY FORESTRY MANAGEMENT IN QUINTANA ROO

The tropical forests of Quintana Roo are classified as medium height and semideciduous. Annual precipitation is around 1300 mm, and 75 percent of the rain falls between May and October. There are an estimated 102 tree species, with an average hectare having up to 30 species:

> The forests of Quintana Roo provide a challenge to those who wish to define some benchmark of "native" biodiversity against which to measure anthropogenic change. The forest community one sees today is the product of more than three thousand years of often substantial human use and intervention, and of infrequent but severe natural catastrophic events in the form of hurricanes and fires. (Kiernan and Freese 1997:97)

The history, problems, and achievements of the Plan Piloto Forestal (PPF), the government program that promoted community forestry in Quintana Roo, have been extensively reviewed elsewhere (Bray et al. 1993, Kiernan and Freese 1997, Flachsenberg and Galletti 1998, Galletti 1998, Vargas-Prieto 1998, Armijo Canto 1999, Taylor and Zabin 2000, Bray 2001). Despite this literature, the PPF is often misunderstood. The prospects for environmentally sound forestry in Quintana Roo have been questioned, but on a mistaken assumption about the logging cycle (Southgate 1998). Community forestry in the state has been equated with industries having agreements with communities to use their forests (Hardner and Rice 1999), when in fact it is a case of communities with their own CFE logging their own forests, a crucial distinction.

The PPF takes place in the context of Mexico's *ejido* system. In common property terms, *ejidos* are both a common pool resource and a common property regime (Ostrom 1990). *Ejidos* are owners of their forests. They are not concessionaires, although their property may be regarded as a form of shared private property, which is not the same as a private enterprise (McKean 2000). Historically, they had to struggle against a government policy of concessions in order to be able to manage their own forest resources, but *ejido* rights over forests were solidified by modifications to the Mexican constitution in 1992 (Wilshusen 2002). The PPF, which emerged with the termination of concessions, was based on the establishment of forest logging estates on *ejido* common property forest, called permanent forest areas (PFAs), thought to be the first time in tropical America that communities declared an end to land use change on portions of their lands; the organization of CFEs using the *ejido* governance system as the organizational model; participatory inventories and the institution of permanent sampling plots (Lawrence and Sánchez-Román 1996); and the constitution of second-level organizations serving as assistance providers and political lobbying groups. There are five such

organizations that came out of the PPF process. Thus from the beginning the *ejidos* assumed organizational forms and forest management practices quite different from those described for private enterprises operating under concessions.

The management plans of the PPF communities are based on those inherited from the parastatal Maderas Industrializadas de Quintana Roo (MIQROO), the first management plan in tropical America (Snook 1993). This plan is based on a polycyclical system with a twenty-five-year cutting cycle and three turns for a total of seventy-five years, and a minimum diameter limit of 55 cm diameter at breast height. There were also early efforts to develop markets for LKSS but with little success. The PPF process has received significant subsidies over the years, both from federal and state governments and from international donors, although these have been highly variable by period and organization, with most resources being concentrated in only two of the organizations: the Sociedad de Productores Ejidales Forestales de Quintana Roo and the Organización de Ejidos Productores Forestales de la Zona Maya.

TRENDS IN TIMBER EXTRACTION

Figure 12.1 shows the volume of logged mahogany and cedar in Quintana Roo from 1938 to 2001. Three historical periods are reflected in this figure: 1938–1956, when logging was controlled by private concessionaires; 1956–1983, when MIQROO controlled logging in the south and private concessionaires continued in central Quintana Roo; and 1984–2001, the PPF period.

The figure shows little difference in the extracted volume in the concessionaire and the parastatal or private concessionaire period; the MIQROO management plan did not slow down harvesting. The peaks in the mid-1950s resulted from salvage logging after Hurricane Janet in 1954. As the figure makes clear, community management under the PPF process resulted in a dramatic reduction and stabilization of the mahogany and cedar harvest, in three stages. In the first stage, from 1984 to 1988, extracted volumes were 22 percent lower in the five-year period than in the last five-year period (1979–1983) under MIQROO. After this initial logging period, it was realized that there had been measurement problems in the first round of participatory inventories, and more careful participatory inventories were carried out, resulting in further reductions in extracted volumes. Between 1993 and 2001, the average mahogany logging volume was 9904 m^3, a 78 percent reduction from the last five years under the parastatal. This had serious economic impacts at

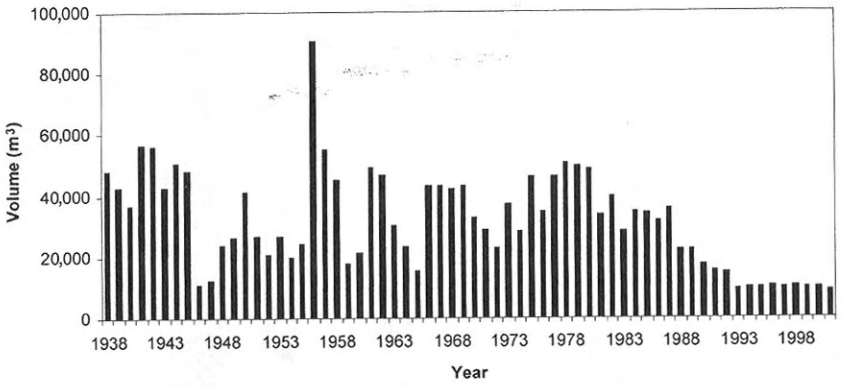

Figure 12.1 Total harvested volume of mahogany (*Swietenia macrophylla*) and cedar (*Cedrela odorata*) in Quintana Roo, Mexico (1938–2001). *Sources:* Dachary and Arnaiz B. (1983), Coldwell (1987), INEGI (1990), Argüelles Suárez (1999), SEMARNAP (2001).

the community level, as communities such as Noh Bec and Laguna Kaná reduced their logging volume by 29 percent and 37 percent just in the first reduction period, despite the fact that logging was a key source of community income, a decision a private logger working on public lands would be unlikely to make.

It has been argued that "most logging companies in the tropics engage in the rapid harvest of a limited number of valuable tree species because it is profitable" (Rice et al. 2001b:171) and that in Bolivia extracted volumes greatly exceeded those in the management plan (Hardner and Rice 1999). This is not reflected in the pattern of logging by Quintana Roo communities. It appears that the sixty-one communities with logging permits in Quintana Roo generally follow the law, respect inventories, and have taken steps toward a more sustainable harvest by reducing their logging volume steadily over time (Bray 2001). LKSS have also been harvested for decades, but current data are highly fragmentary. The LKS harvest rose dramatically in the first years of the PPF process under a state-mandated SFM program but dropped again quickly when it became apparent that markets were insufficient. Although market demand for LKSS has been growing in recent years, the amount of LKSS logged is always far below the authorized volume. For example, for 1999 and 2000, Quintana Roo communities logged 89 percent and 99.5 percent of their authorized volume of mahogany but only 14 percent and 18 percent of their authorized volume of LKSS. This casts doubt on one of the arguments of the CI researchers, that SFM will be more destructive to

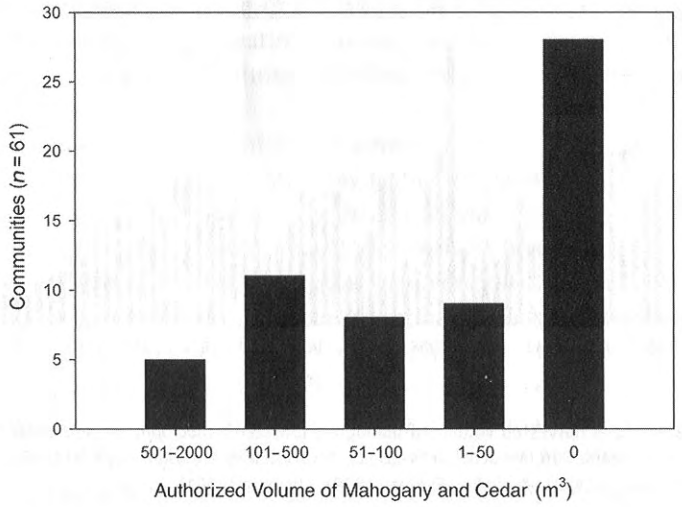

Figure 12.2 Quintana Roo forest communities by authorized extraction volume (m^3) of mahogany (*Swietenia macrophylla*) and cedar (*Cedrela odorata*), 2000. *Source:* SEMARNAP (1999), with permission.

the forest because of the high volume of LKS extraction. Although it was proposed as a component of SFM in Quintana Roo, current markets severely limit this option, making it a questionable assumption with which to challenge community SFM.

The particular challenges of community SFM in Quintana Roo are compounded by the great variability in forest resources by the communities in the state. Figure 12.2 graphs communities by authorized amount of logging volume of mahogany and cedar, which closely tracks actual harvest. The figure indicates that only five communities with CFES in Quintana Roo have 501–2000 m^3 of annual authorized volume of mahogany and cedar. We may classify these in the state context as large-volume CFES, where the natural resource is sufficient to provide a significant amount of employment, capital reinvestments in the enterprise, and significant profit-sharing flows. Nineteen communities, those with 101–500 m^3 and 51–100 m^3, are classified as low-volume CFES, where community logging is only a minor component of overall income opportunities (Armijo Canto 1997), and the income flows do not encourage reinvestment in the forest enterprise. The nine communities with less than 50 m^3 and the twenty-eight that have logging permits only for LKSS and no authorized volume of mahogany and cedar may be classified as very-low-volume CFES, where the income is extremely minor, with implications for

the sustainability of forest management. Sustainable logging may occur at all levels of extraction, but the implications for institutional support and public policies may vary significantly between CFES.

A CONCEPTUAL FRAMEWORK FOR EXPLORING SUSTAINABLE COMMUNITY FOREST MANAGEMENT

In a research project currently under way, a team of an anthropologist, ecologists, and economists has been formed to study the sustainability of community forest management in Quintana Roo, taking several communities as case studies and analyzing existing data on forest production and management. This research project is using the conceptual framework presented here. We believe this framework can be usefully applied to most of the sixty-one communities currently logging in Quintana Roo. Although these communities vary significantly in terms of size, location, ethnic composition, and forest resources, the common structure of the *ejido* system and CFES that are the result of similar government programs has created similarities in the patterns of forest management.

Figure 12.3 shows a conceptual framework that will be used to explore the characteristics and sustainability of community tropical forest management in Quintana Roo, with implications for how it may differ from private exploitation.

A first important feature is the social capital (Dasgupta and Serageldin 2000) constructed by grassroots and government efforts in second-level organizations, represented by the Organización de Ejidos Productores Forestales de la Zona Maya oval on the far right of the framework. Nearly all of the sixty-one logging communities in Quintana Roo belong to one of five different second-level (intercommunity) organizations. Community participation in these second-level organizations has been an important source of social and financial capital for the communities, including subsidies from government and foundation sources, technical support in forestry, and support in price negotiations with buyers.

The framework represents the fact that the community and the individuals within it draw multiple values from the *ejido* territory. Unlike private enterprises, they have far more interests than timber. The *ejido* territory includes both a common property forest area (PFA) and agricultural areas, some of which may also be forested or in secondary succession, creating a managed landscape mosaic. The community and the individuals also draw on the forest and the entire landscape mosaic, but with a complex set of individual and communal appropriations of the *ejido* territory. In common property theory, the natural resources in the entire

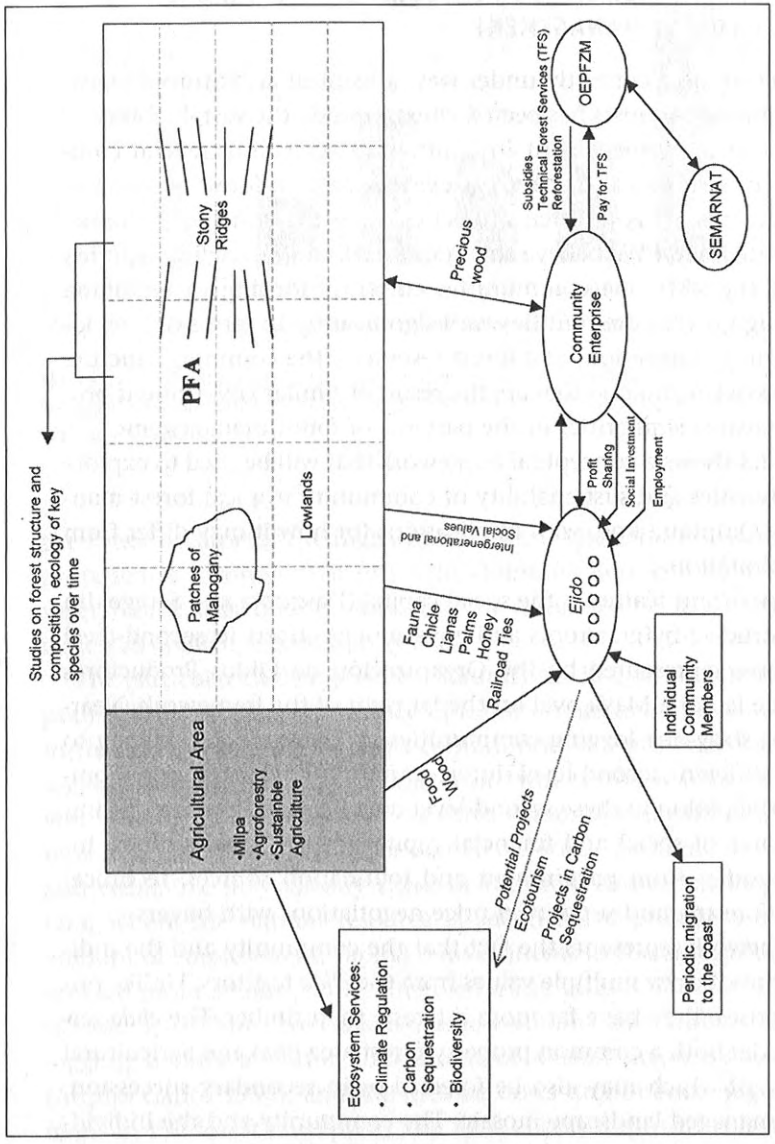

Figure 12.3 Conceptual framework of community tropical forest management in Quintana Roo, Mexico. OEPFZM, Organización de Ejidos Productores Forestales de la Zona Maya; PFA, permanent forest area. The name of the Mexican environmental agency, Secretary of the Environment, Natural Resources, Water, and Fisheries (SEMARNAP), was changed to Secretary of the Environment and Natural Resources (SEMARNAT) in 2000.

ejido territory may be thought of as a stock, with flows that are appropriated either communally (logwood by the enterprise) or individually (other timber products and nontimber forest products [NTFPS]), subject to rules of access (McKean 2000).

Thus the communities have a CFE, which is charged with logging. The community enterprise pays for technical forest services (*servicios técnicos forestales*) from one of the five second-level organizations. In many cases this payment does not entirely cover the costs of those services, with services for reforestation and forest enrichment and representational support subsidized by external support from government and private foundations.

As shown to the left of the CFE box, the CFE pays profit-sharing dividends in cash to community members, generates income through direct employment, and may invest in social infrastructure, pensions, and investments in the enterprise. In addition to common property logging, individual community members also draw multiple timber, nontimber, and agricultural products from the PFA and individual agricultural plots. From the PFA, many communities extracted ten LKSS that were used for railroad ties, although this market disappeared from 1997 to 2001, only to experience a new demand in 2002. More recently a new individually appropriated timber product emerged, the small-diameter timber known as *palizada,* used in tourism construction. Chicle was historically the most important NTFP, but it also terminated because of loss of markets in 1998, although chicle tapping also restarted in 2002. Beekeeping is another important economic activity that draws on the forest mosaic. In many communities there is a growing commercial extraction of palms (*Sabal mexicano*) used in the tourist zone. All community members have access to the forest to provide themselves with subsistence products such as bushmeat, firewood, and timber and palm for housing. Harvest sustainability of many these products has not been established. Notions of wildlife protection are still rudimentary, and local people occasionally kill jaguars who prey on sheep and goats introduced by recent government programs. In some communities, lianas and medicinal plants are also gathered for subsistence and commercial purposes.

The value of the multiple commercial and subsistence uses of the forest accrue almost entirely to the local communities, with economic benefits that vary greatly based on authorized volume. In a high-volume community such as Noh Bec, with 1545 m^3 in authorized volume of mahogany and cedar in 1999, the CFE generates up to 130 full-time or nearly full-time jobs and a profit-sharing dividend of US$1895 per year. Profits are used to invest in community infrastructure, medical services, and

old-age pensions. At the other extreme, the community of X-Yatil, with only 24 m^3 authorized volume of mahogany, generates almost no employment and around US$80 of annual profit-sharing dividends from logging (Robinson and Gongóra 2000). Calculations derived from a study of a wider range of forest-based income in two communities in 1996 show that income (including both cash and subsistence values) from commercial timber, chicle, wildlife, and firewood in two communities with low and high authorized volumes of timber ranged from US$405 per community member to US$870 per community member. This compares with an average annual minimum salary of $884 per year if someone were fully employed at the 1997 prevailing minimum wage. This does not include any wage labor, which is also common (Negreros-Castillo et al. 2000). At all levels of forest-based income, all profits in various forms go to local community members with agrarian rights. Notwithstanding persistent problems with local-level corruption in some of the CFEs, this is a major step forward in equity and democratic management of natural resources, with consequences for social and political stability. In recent years, communities have also taken important steps toward reorganizing the CFEs to prevent corruption (Wilshusen 2002).

In addition to these cash and subsistence incomes from forest use, many of the sixty-one logging communities have been participating in agroforestry and sustainable agriculture programs subsidized by the federal and state government but often channeled by the organizations. Because of government subsidies, up to three-quarters of all members of many communities planted one or more hectares of *taungya* agroforestry. There have also been recent efforts to promote intensive agriculture that could greatly increase yields in smaller areas. *Taungya* agroforestry is intended to leave miniplantations of cedar, mahogany, and LKSS, which also appear to have some degree of volunteer biodiversity and create small forested islands in the agricultural areas (A. Racelis, pers. comm. 2003). Thus these projects tend to create more forested patches on the landscape and to reduce pressure from slash-and-burn agriculture, both steps toward more sustainable land uses. Pressure on forested areas from cattle raising varies from significant in some forest *ejidos* in southern Quintana Roo to insignificant in almost all Mayan *ejidos* in central Quintana Roo.

In addition to all these uses of the *ejido* territory, it appears communities impute an intergenerational value, possibly with other social and cultural values. The forest is seen as a resource to be preserved for their children, with other perceived social and cultural values. The comment of an *ejidatario* from the community of Laguna Kaná is typical:

> If we leave our patrimony degraded, we're going to go around begging. We have a firm floor here. It's the patrimony of our fathers. If we don't take care of it for our children, who is going to take care of it?

Current studies will attempt to quantify these expressions of intergenerational values. But this community member implicitly accepts very low discount rates and is untroubled by the low growth rate of tropical timber because the forest is a source of a wide range of values that will extend to future generations. Finally, still unrealized ecosystem service values through ecotourism, biodiversity protection, and carbon sequestration could be developed in the future.

THE ECOLOGY OF COMMUNITY FOREST MANAGEMENT

As one imperfect but significant measure of sustainability, eleven of the sixty-one logging communities have been certified by the Rainforest Alliance SmartWood Program and the Mexican Civil Council for Sustainable Silviculture. However, studies suggest that the current extraction volumes are not sustainable because the seventy-five-year cutting cycle is too short to ensure stocks of commercial-sized mahogany. It has been estimated that the growth rate of mahogany in these forests is only about half the rate necessary to maintain stocks of commercial-sized timber in the current cycle, and other concerns have been expressed about silvicultural and enrichment practices that do not ensure a continued stock of mahogany (Snook 1993, 1997, Negreros-Castillo 2000, Snook and Negreros-Castillo 2002). The current management plan also divides the forest into equal-sized blocks, and it has been observed that mahogany does not have an even distribution in the forest but rather occurs in patches, and communities have sometimes had to go beyond a given annual stand, not following the management plan, to meet the authorized volume for that year. Current trends in authorized logging volumes vary, partly because of local differences in forest ecology. After a decade of stability in mahogany volumes, statewide authorized volumes declined from 10,089 m^3 in 2000 to 8726 m^3 in 2001, but it is not clear whether this trend will persist. Several communities have experienced recent declines in their authorized volumes, after years of stability, but one large-volume community has seen its volumes increase. Current proposals to conduct forest enrichment in logyards, roads, and other large opened areas could maintain or increase harvest levels and reduce impact on the natural forest (Flachsenberg and Galletti 1998).

It is not known with any precision to what extent the decades of unsustainable logging, followed by nearly twenty years of more sustainable management by communities, has altered the structure and composition of these natural forests and how close to a sustainable harvest of some timber species current practices may be. Even less is known about harvests of some of the other timber species and NTFPs. But as noted earlier, the natural characteristics of these forests are that they have been highly disturbed for millennia by both natural and anthropogenic causes. In terms of the ecological impact of community logging on wildlife, one observation suggests that the probable reduction of large-diameter mahogany from the forest will affect some bird species (Kiernan and Freese 1997). However, another study found the impact of logging as practiced in Quintana Roo, on both resident and migrant bird populations, to be "benign" (Lynch and Whigham 1995). One of the few studies of the impact of railroad tie logging on the forests found that although it had contributed to a restructuring of the forest near towns and roads, the total gaps opened annually were equivalent to the rate of natural gap formation (Shoch 1999). Community forest management in central Quintana Roo also appears to be one factor that has led to very low rates of land use change over the last twenty-five years. Satellite images show that the landscape in this region is still dominated by a pattern of agriculture within an intact matrix of tropical forest (Bray et al. in press). Chazdon (1998:1296) notes that "a tropical landscape containing a matrix of old-growth forest fragments, second-growth forest, logged forest, and agricultural fields could conceivably protect most of the species present in the regional biota," a characterization that fits this community-managed landscape.

CONCLUSION

The case of community forest management in Quintana Roo suggests that communities and their CFEs are an entirely different scenario from private companies logging on public lands under concessions. These communities have an enterprise that logs the forest. They also have a community with multiple economic, social, cultural, and intergenerational relationships with the forest and its associated ecosystems in the *ejido* mosaic. For communities, the forest is not just a financial investment; it is a constellation of economic and cultural values. The CI arguments against SFM are based almost exclusively on a single scenario, private sector logging companies operating under concessions on public lands, and with only two possible outcomes: continued logging by the private company (under two possible scenarios of nonsustainable forestry or SFM forestry) or a protected area. I argue that other outcomes must be recognized and independently evaluated as to their sustainability. Furthermore, the economic benefits from community forest management flow in a far greater proportion to local communities, making significant contributions to social and political stability, economic development, and the democratic management of natural resources.

Hardner and Rice (1999:179) suggest that some of the difficulties "shared by . . . models of community forestry [include] . . . challenges in organizing the communities, ensuring that forest management is more economically attractive than agriculture to local populations, and reversing the negative sentiment about commercial timber producers." In the case of community forestry in Mexico in general, the communities are well organized, the communities have declared the PFAs, and the last stipulation is not relevant because the communities *are* the commercial timber producers, through their own community logging enterprises. CFEs in Quintana Roo have not made the decision to harvest as many commercial-sized trees in the shortest time possible. They accept the slow growth of their tropical timber because they know it will be there for their children.

Tenure options are not limited to concessions and individual private property. In common property forms of shared private property, different financial incentives operate, and very low discount rates are accepted (McKean 2000). Although timber certification eventually may be helpful in adding or maintaining value, communities do not need it as an additional economic incentive to maintain their forests. The effort to promote community forestry in Quintana Roo has had multiple subsidies over the years. But concessions on public lands, and consequent problems in revenue collections, imply very large public subsidies to this institutional arrangement (see chapter 21). Thus it is a matter of public policy choice as to whether governments want to use public resources to encourage overharvesting by private industries on public land or to encourage communities to embark on a more sustainable path under common property or co-management arrangements. Protected areas will also need substantial public investments to be viable, with perhaps more uncertain benefits for local communities. For many years, it could be argued that Mexico was a unique historical case and thus not a model. But the recent emergence of community forest management for timber elsewhere in the world (Becker and León 2000, Salafsky et al. 2001a, 2001b, Cronkleton 2002) suggests that Mexico is no longer a unique case but may represent the future of community forest management. Therefore it

suggests that CFEs may be a viable strategy for conserving forest cover and biodiversity and generating income for local communities.

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