



# Community Forest Enterprises as Entrepreneurial Firms: Economic and Institutional Perspectives from Mexico

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**Summary.** — Few examples exist in the common property literature of community-managed forestry enterprises (CFEs) operating in competitive markets. Yet, in Mexico, there are hundreds of such examples at varying levels of vertical integration. At a time when devolution of rights to forests is expanding worldwide, collective management of timber operations presents an emerging community forestry policy option. CFEs have unusual institutional features that force a reconsideration of theories of the firm, unique management tensions, varieties of possible institutional arrangements governing stocks, and flows of the natural resource, and may have special importance in delivering both economic equity and environmental protection.

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## 1. INTRODUCTION

Community market-oriented enterprises, particularly those based on a common property natural resource, are historically rare birds. However, a large community forest enterprise (CFE) sector in Mexico that emerged in the last three decades, and currently emerging CFEs elsewhere in the world, highlight the importance of understanding the theoretical implications and empirical impacts of this rather dramatic rearrangement of traditional community institutions. CFEs as productive organizations have unusual institutional and economic features that force a reconsideration of theories of the firm, highlight the varieties of possible institutional arrangements over stocks and flows of the natural resource, and may have special importance in delivering both economic equity and environmental protection. However, in most times and places, it would appear that

the costs of collective action in mounting market-oriented enterprises administered by communities, particularly impoverished communities in less-developed countries, are greater than any perceived benefits. This would appear to be particularly the case with community *forest* enterprises dedicated to the commercial production of timber. Commercial timber production at its simplest requires substantial investments and the administration of complex

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industrial processes. Despite these daunting challenges, Mexico presents a still little-known case where there are hundreds of such CFEs (Antinori, 2000; Bray *et al.*, 2003).

The potential significance of CFEs is large when one considers the current worldwide trend toward devolution of forestlands to local communities (White & Martin, 2002). Communities managing forests for timber production would seem to be the next step that could help alleviate poverty, promote economic development, and provide incentives for forest preservation (Wunder, 2001). Clusters of CFEs are emerging in many different places in the world (Cortave, 2003; Gill, 2002; Nolan, 2001; Scherr, White, & Kaimowitz, 2003). There is also a much older, but little documented sector of community-managed commercial forests in Europe (Jeanrenaud, 2001). Given the challenges in the sector, there are also increasing accounts of failed CFEs (Irvine, 2000; Smith, 1996).

Mexican common property, community forestry, and CFEs have three unusual features. First, the Mexican common property system may be unique in the world in that it is a massive, state-directed and regulated system that has emerged and been consolidated since the third decade of the 20th century (Bray & Merino-Pérez, 2002). With varying rhythms throughout most of the 20th century, large transfers of natural forest assets were made to local communities from state and private hands (Klooster, 2003), leading to a democratization of ownership of natural assets (Boyce & Shelly, 2003). This transfer laid the foundation for the emergence of Mexico's community forestry sector. In the course of the 20th century, Mexican forest communities and urban allies, alternately hindered and supported by official policy, have had to struggle against logging bans, concessions, and corruption to achieve more autonomous management of their forests, with CFEs emerging as a significant, initially state-supported sector in the mid-1970s (Bray & Wexler, 1996; Klooster, 2003). Given the demands of the CFE organization, they were seldom entirely "self-organized," but depended heavily on state and civil society support (Bray & Merino-Pérez, 2002; Ostrom, Burger, Field, Norgaard, & Policansky, 1999). Second, well over 50%, possibly as high as 80%, of Mexican forests belong to communities as a result of agrarian reforms (Bray *et al.*, 2003), the second highest percentage in the world after Papua New Guinea (White & Martin, 2002). A new

national study is underway to document how many communities in Mexico have logging permits and thus some form of CFE (Antinori, Magaña, Torres Rojo, Segura, & Bray (ms)). Third, the Mexican experience is showing that CFEs can combine community governance traditions and enterprise forms to successfully compete in international markets, and that neither traditional culture nor common property are necessarily a hindrance in doing so (Bray & Merino-Pérez, 2002; Bray *et al.*, 2003).

Most experiences in community management of natural resources have focused on individual subsistence or small-scale market production using the common property resource and, in forest situations, on nontimber forest products (NTFPs) (Arnold, 1998; Ostrom, 1990). As well, a worldwide trend of devolution is paralleled by another forestry trend away from large-scale industrial forestry to landholder-based and community forestry that encompasses more multiproduct based objectives and smaller-scale timber production (Harrison, Herbohn, & Niskanen, 2002). These tendencies occur at a time when doubts have been raised about the degree to which NTFPs and payments for environmental services can alleviate poverty or promote economic development (Richards, 2000; Wunder, 2001). This convergence of new research and policy trends has placed more attention on the real and potential role of communities in producing timber, since as Wunder (2001) suggests, "rents in the timber business can be large, so if decentralization and devolution of property rights to communities succeeded in redistributing just a minor amount, poverty-alleviation potentials could be significant."

Communities gaining access to forestlands, as *de jure* or *de facto* common properties, for commercial timber production raises the virtually unexplored issue of communities forming enterprises based on a common property natural resource asset, that is, the community becoming a type of business (Antinori, 2000). As the new global alternative of CFEs emerges, it becomes important to understand how they arise and how they function as possibly unique economic institutions. Given the historical evolution of Mexican CFEs, the large amounts of forest resources under their control, and a state-regulated common property system, an analysis of Mexican CFEs sheds light on key questions with global implications: Do community forestry operations combine democratic participation and economic efficiency? Do they

have advantages in achieving multiple objectives such as poverty alleviation, economic equity and development, and effective environmental stewardship? Can they survive and even prosper within a market economy predicated on conventional capitalist firms?

In this paper, we will take an institutional perspective to suggest how CFEs in general and Mexican CFEs in particular are distinct from other forms of enterprise organizations. By an institutional perspective, we mean an analysis of the pattern of ownership and control rights as manifested under agrarian law and expressed through collective decision-making processes and the distribution of benefits. An institutional perspective differs from neo-classical economics, which focuses on the technological basis for why and where production occurs. In contrast, institutional economics focuses on contractual arrangements and governance modes among buyers and sellers, and owners, managers, and workers within an institutional environment of legal rules and customs. The theory of the firm is a large body of literature within institutional economics which analyzes the internal workings of productive organizations. We apply this theory in an introductory fashion to describe CFEs' structures for coordinating production and allocating costs and revenues. By laying out the details of its institutional structure, we identify it as a distinct case of enterprise organization. Ostrom (1990) has correctly critiqued the theory of the firm as not providing an explanation for how groups of individuals can solve the collective action problem. Its usefulness for our purposes is in addressing the different but related question of governance in the firm and in CFEs.

We find that the decades of experience of Mexican CFEs provide a rich empirical base to analyze CFEs as a collective organizational effort that combines business with community participation, and as a "social firm" whose features we contrast with more frequently studied production organizations. The emergence of enterprises from a matrix of community governance can create tensions between democracy *versus* hierarchy, managerial efficiency *versus* representativeness and traditional customs, and management for conservation *versus* timber production. It generates a wide variety of locally designed institutional arrangements over management of the stocks and flows of the common property resource to create unique enterprises that can compete in world markets

or, alternatively, can result in conflictual situations that lead to the deepening of economic inequities and forest degradation (Guerrero, 2000; Klooster, 2000; Merino, Alatorre, Cabarle, Chapela, & Madrid, 1997). The environmental dimensions of any form of forest management are essential and, although this paper does not focus on that issue, in our conclusions, we will briefly discuss some of the environmental impacts of community forest management.

Thus, our paper is outlined as follows: Section 2 briefly notes the scant attention afforded to collective, community enterprises despite its relevance to research and current trends in development. Section 3 introduces the theory of the firm as a starting point for more systematically understanding the nature and challenges of CFEs. In this section, we offer a definition of CFEs as "social firms." Section 4 discusses Mexican CFEs' emergence and current tensions between traditional community governance and enterprise management. Section 5 presents a variety of locally designed organizational choices in the control of resource stocks and flows, while Section 6 describes CFE performance and distribution of benefits. Conclusions on the theoretical and empirical significance of CFEs for economic equity and development and environmental management are given in Section 7.

## 2. COMMUNITIES, ENTERPRISES, AND COMMON PROPERTY

Communities are not often analyzed as economic entities outside of the household and small private enterprise strategies pursued by its inhabitants. A recent deconstruction of the concept of community as used in the phrase "community-based conservation" argues for a focus on competing institutions and actors rather than harmonious communities, and proposes federations of communities as a strategic need, but does not recognize the issue of community enterprise formation (Agrawal & Gibson, 1999). The common property research agenda seeks to explain how groups of individuals solve the collective action problem, otherwise known as the "tragedy of the commons," and maintain common property resource management regimes. Some of Ostrom's (1990) design principles relate directly to institutional features that will be addressed in this paper. Yet, placing organizations for the *collective*

appropriation as opposed to *individual* appropriation of commons into the marketplace introduces additional governance issues. Whether a traditional rural community can organize itself as a commercial enterprise depends upon pre-existing forms of land tenure, social organization, experience, and resources. For example, most recent efforts to promote CFEs in the Amazon Basin among indigenous peoples with mixed subsistence economies of farming, hunting, and gathering have failed. In these cases, most prerequisites for effective community forest management had to be accomplished in an extremely compressed time period: development of a road infrastructure and management plans, securing of land titling, and development of new forms of social and enterprise organizations, all with no prior experience or training in commercial logging (Irvine, 2000). Indigenous peoples in the Amazon also have few institutions that prepare them for genuine collective management of a common property resource (Smith, 1996).

### 3. CFES AND THEORIES OF THE FIRM

Definitional issues have long been debated in theories of the firm. Coase (1937) and Williamson (1975) treat the firm as a hierarchical authority relationship among managers and workers designed to economize on transaction costs of continuously negotiating, monitoring, and enforcing contracts. Alchian and Demsetz (1972) define a firm as a “nexus of contracts” among individuals rather than as an authoritative scheme, where the manager receives a portion of the residual profits and thus has an incentive to monitor workers. As we open the “black box” of the firm further, we find tensions over who makes decisions. Jensen and Meckling (1976) argue that it is misleading to identify the firm as an individual and speak of a “firm’s objectives” when decisions come about by a more complicated process than individual decision making. They retain the assumption of a profit-maximizing individual stockholder, but suggest that the “firm” is not necessarily profit maximizing. The agency theory emphasizes costs of incomplete information where there is a separation of ownership by “principals” who bear the risks of management decisions and control by “agents” who make daily decisions in the firm. These costs are balanced against the benefits of hiring specialized expertise. Whether the emphasis is on contracts

or legal rules, institutional economics and extension theories of the firm are fundamentally a study of collective action (Williamson, 1975) where the distinctions of ownership and control are a defining aspect of individual economic interrelationships.

Table 1 compares CFEs to other forms of production. The first column lists the basic features of productive organization according to Fama and Jensen’s (1983) concept of the separation of ownership and control. Owners are entitled to receive the residual profit stream after all costs and debts have been paid but also bear the risks of the decisions taken. Decision management refers to those who initiate proposals and implement decisions. Decision control is held by those who ratify and supervise decisions. We also specify regulatory framework and objectives stated in the literature. Variations within each organization abound, so we present only the most general versions here.

The second to sixth columns pertain to distinct forms of organization under which forestry-related operations can occur. Starting with the second column, private individuals or organizations operating what are known as Non-Industrial Private Foresters (NIPF) own forestland but do not own or operate wood processing facilities. Some may hire logging contractors every year while others harvest only occasionally. With individual ownership, the NIPF combines the role of risk bearing, decision control, and decision management. In the USA, this group accounts for 60% of all forestland (Klemperer, 1996) and displays multiple objectives (Tiles, 2004).

The third column describes the conventional investor-owned firm. While an array of compensation schemes for managers and employees exist, most separate the tasks of risk bearing, decision management, and control. In publicly traded companies, stockholders are the general public who allow the board of directors and managers to control and implement decisions, respectively. A distinct feature is that shares are defined and tradeable in the market so that a price mechanism acts as an external check to ensure that managers are maximizing returns to capital. While economists recognize that investor-owned firms may have various objectives, assuming that these firms seek to maximize profits has had a wide application and been useful in explaining firm behavior (Tirole, 1998).

Industrial cooperatives (fourth column) restrict ownership to worker members who own

Table 1. *Ownership and control in production organizations*

Institutional component	NIPFs	Conventional firm	Cooperatives		Mexican CFEs
			Industrial	Agricultural	
Owner(s)	Individual or organization	Shareholders, investors	Labor	Land held by public, community or individual with sales to farmer-owned enterprise	Official members of the community
Decision management	Owner	Managers	Management committee elected by workers	Management committee elected by producers	CBC/CBE elected by members
Decision control	Owner	Executive officers, shareholders, auditors	General Assembly of workers, auditors	General Assembly of producers, auditors	General Assembly of local community members
Legal system	Land use, tax, environmental laws	Land use, corporate and tax law	Land use, corporate and tax law	National and state cooperative laws	Agrarian, forestry, and environmental law
Objectives, assumed or stated	Profit, amenities, NTFPs, bequest	Profit, return on investment	Dividends per worker	Unit price, producer and consumer surplus, services to members	Profit, amenities, NTFPs, bequest, jobs, public goods and services

capital assets in common (Jones & Svejnar, 1982). Issues akin to the collective decision-making processes of CFEs arise as members strive to elect a representative management committee and a board of directors. However, the labor-managed firm, unlike a CFE, has defined ownership shares so that members can usually redeem a specified amount of shares if they leave the cooperative after a certain period of time, thereby leveraging some control on the appointed decision makers. The objectives have been characterized as maximizing dividends to the worker, leading to specific theoretical implications, such as the “perverse supply response” (supply moves in the opposite direction to output price) and a higher reliance on debt to finance growth (Bonin & Putterman, 1987).

Agricultural cooperatives are commonly based on individual production from private property, with a focus on collective action in marketing, purchasing, services, or negotiating with external agents, but often seek to provide other benefits, for example, community devel-

opment, lobbying, and member education (Lerman & Parliament, 1992). Decision control and management functions are allocated in a fashion similar to that of industrial cooperatives, though objectives are characterized as maximizing the price of the unit sold and maximizing the sum of producer and consumer surplus (Lerman & Parliament, 1992). The lack of a commonly held land resource as a basis for membership distinguishes most agricultural cooperatives from the CFEs. Perhaps Israeli agricultural cooperatives, that is, the *moshav* and the *kibbutz*, are the closest analogies to CFEs, although they are currently undergoing dramatic transformations (Zusman, 1988). *Moshav* residents may have private property and generate income individually while the village council provides public goods, with some collective activities. The *kibbutz* is much more comprehensive in collective ownership and structure and indeed goes beyond Mexican communities in the number of collective activities. The model closest to CFEs may be to US

Native American logging operations, and further research is needed on this phenomenon from the kinds of perspectives suggested here (Davis, 1993, 2000; Jorgensen & Taylor, 2000).

This discussion makes it possible to distinguish some of the unique characteristics of CFEs as firms, as presented in the last column. Only official members of the community, normally by birth, can be owners. CFEs do not have well-defined shares to trade or sell. All community members share risks equally, but those who leave the community forfeit their right to any residual profit sharing, which could be a deterrent to exit. Cooperatives restrict ownership benefits to producer/consumer members, whereas all CFE community members have access to resource stocks and benefits. They are also owners of the natural forest resources, on which the CFE is based by virtue of the historical, legal, and institutional process which created Mexico's rural common property sector.

In terms of decision management and control, there are analogies between the other enterprise forms, where assemblies of stockholders or General Assemblies may also make policy decisions. In both cooperatives and CFEs, there is possible confusion over the relative weight or role of these different functions. Decisions over the flow of benefits are particularly important, and, in many cases in Mexico, a significant amount of the benefits from a CFE may accrue to community members as public goods. This is similar to the idea of "collective consumption" engaged in by labor-managed firms (Vanek, 1970). All forms of enterprise exist in a regulatory environment with respect to legal frameworks related to labor, production, and environmental issues. In Mexico, agrarian law plays an additional role in shaping CFEs. CFEs are similar to NIPFs and cooperatives in terms of having multiple objectives, although the community, which owns the forest and the CFE, typically has a wider range of objectives in forestry management.

To summarize, we suggest a definition of a CFE as a business based on collective ownership or secured access to a forest resource by a community, with governance derived from or influenced by local community traditions, where tensions between direct "democratic" community control and hierarchical management structure are present, and which typically have multiple functions with profits as only one of many goals. As an economic development strategy, CFEs may be regarded as either a var-

iant of corporate private property (e.g., "the community as entrepreneurial firm" (Antinori, 2000)) or a "third way" between private and public sector production. In the following sections, we will discuss some of the empirical patterns of ownership, decision management, decision control, and objectives evident in Mexican CFEs, and the variety of forms that CFEs can take in their management of the stocks and flows of the common property forest resource.

#### 4. CFE EMERGENCE AND TENSIONS OF COMMUNITY GOVERNANCE AND ENTERPRISE MANAGEMENT

Mexico is rich in indigenous forms of communal organization. These institutions were overlaid and imitated by the agrarian reforms arising from the Mexican Revolution (1910–20) and enshrined in Article 27 of the Constitution of 1917. The resulting agrarian law led to the implementation of two forms of common property, *ejidos* and *comunidades*,<sup>2</sup> which now cover about half of the national territory. Executive power, acting through the Secretary of Agrarian Reform, created corporate entities with specific membership rules and governance system organized around a land base (Ibarra Mendivel, 1999). *Ejido* and *comunidad* governance derive from more ancient indigenous institutions and thus do not have classically capitalist roots. The agrarian sector was reformed in 1992, giving local community members the opportunity to privatize individual land use, but privatization of common property forests is still prohibited (Ley Agraria, 2002). The 1992 reforms may be thought of as a form of devolution or decentralization of control over natural resources of the kind occurring elsewhere (Arnold, 1998, 2001), but marked by the unique agrarian history of Mexico and its early, massive, state-directed effort to create common property within a capitalist economy.

The traditional *ejido* and *comunidad* governance systems and subsequent reforms provide the social matrix for the emergence of CFE management institutions. Logging communities in Mexico range from traditional indigenous communities with precolonial agrarian claims, typically *comunidades*, to much more recently organized nonindigenous *ejidos* with few communal traditions (Bray & Merino-Pérez, 2003). Many *comunidades* in particular practice a system of rotating civic and religious responsibilities among registered community members

based on merit accumulated by service in a rising hierarchy of civic positions, called *cargos* (Segura, 1998). Votes on major decisions affecting the community are taken in the General Assembly in which each registered member of the community, called an *ejidatario* or *comunero*, has one vote. Voting can be by consensus or majority rule and elections to office are held every three years, or more frequently. Common property management responsibilities fall to authorities named in the agrarian law, the *Comisariado Ejidal* (Ejido Supervisor) or *Comisariado de Bienes Comunales* (Supervisor of Community Assets). These offices are typically unsalaried and unspecialized toward forestry or any other management skill. Assemblies meet a minimum of twice a year, or more frequently depending on needs.

These forms of organization have been adapted to the creation of a CFE in stages corresponding to their particular circumstances and the degree of vertical integration along the production chain from stumpage to transformed wood products (Antinori, 2000; Antinori & Rausser, 2003). Therefore, enterprise forms are grafted onto community governance where, for example, (1) the *Comisariado* is the enterprise manager and all administrative posts are treated as community service assignments, integrated into the *cargo* or *ejido* system, (2) managers are appointed from the community to auxiliary positions not part of traditional structures but responsible to them, (3) professional managers are hired from outside the community, (4) paid administrative positions exist on a semipermanent basis and are not part of the rotational *cargo* system, and/or (5) experienced or respected members of the community form a sort of “Board of Directors” with General Assembly meetings as “shareholder’s meetings” (Antinori, 2000; Bray & Merino-Pérez, 2002). The “Board of Directors” function can be filled by the *Consejo de Caracterizados*, as in Oaxaca, or more recently invented forms like the *Consejo de Principales* in El Balcon, Guerrero (Bray & Merino-Pérez, 2003), composed of respected elders who have passed through the entire traditional governance system, and increasingly some younger people.

Conflicts over decision management and control are common, leading to a “permanent tension” (López Arzola & Gerez Fernández, 1993) between community traditions and emerging CFEs. Below, we briefly summarize the primary manifestations of this tension: (a)

hierarchical relationships *versus* “democratic” foundations of community governance, (b) the so-called “inefficiencies” in the interplay between traditional and enterprise structures, (c) accountability and corruption, and (d) conflicts over objectives.

(a) *Hierarchy versus community governance*

Community general assemblies may not understand the technical, financial, and management issues involved in the CFE, yet they make key decisions. Community members who are also employees may not appreciate the demands of the job. This point has been a formidable obstacle in other resource-based cooperatives, such as the Basque Mondragon system (Taylor, 1996) and Native American enterprises (Jorgensen & Taylor, 2000). In Mexico, most commonly, the locus of the tension is between the General Assembly, individual community members, and the *Comisariado*, which has a degree of legal authority, but may be given little space to operate in practice. As one frustrated CFE authority noted, “For example, I’m the Forest Foreman. That gives me authority over you, and I yell at you. Then, you say to me, listen, don’t yell at me, this is my enterprise too” (Gijbers, ms). The more vertically integrated communities have greater delegation from the General Assembly, empowering their managers to manage (Antinori & Rausser, 2003; Bray & Merino-Pérez, 2003). There are also serious limits to “democratic” governance within the General Assembly, since, for example, few women are legal community members and therefore do not vote in general assemblies.

(b) *“Inefficiency” of traditional practices*

Governance posts must legally and most commonly change every three years, although some communities change CFE managers in an even less time (PROCYMAF, 2001). While short terms are regarded as an important measure against corruption, they also have costs as experienced people leave, and inexperienced and sometimes incompetent people enter.

(c) *Corruption and mismanagement*

It can be easy for political elites in the community (*caciques* in Mexico) to manipulate and dominate the General Assembly and thus carry out a “covert privatization” of the

enterprise (Klooster, 2000). Lack of training can lead to poor book-keeping and money management, creating confusion and suspicion even where corruption has not occurred. In applying the theories of the firm, it may be said that a possible reason for the incidence of covert privatization is the lack of effective, credible, and legitimately based controls on management. CFEs' internal mechanisms of control depend on the community's overall governance structure and may not be strong enough if local elites dominate the political sphere.

(d) *Multiple objectives*

Voting members of the community are individuals who vary by age, gender, income level, and migration history and thus may weight objectives differently. Many see the CFE as a source for jobs and profit sharing and not as a profit-maximizing enterprise. Tensions over wage policy have also been reported. Some communities pay by volume produced, encouraging productivity, while others pay a daily wage, making some workers to reduce their productivity (Alatorre Frenk, 2000). Emerging groups in many communities see conservation as a primary objective, and object to logging (Bray & Merino-Pérez, 2002). The community owns both the forest, which is used for more than timber, and the CFE, which may be specialized in logging. Thus, there may be conflicts between management for multiple uses and management for timber.

## 5. CFE ORGANIZATION AND STOCKS AND FLOWS

The broad range of different organizational forms and rules enacted by forest communities may be viewed as different ways to address these tensions over ownership and decision making, with distinct impacts on the allocation of stocks and flows of the common property resource (McKean & Ostrom, 1995). In Mexico, access patterns range from extensive individual appropriation of timber to entirely communal appropriation. Examples from specific Mexican communities follow.

(a) *El Balcón (Guerrero)*

In El Balcón, the forest common property is not divided in any way, and a CFE has been formed to administer the flow of timber from

the resource. Both the stock and the flow are considered as communal property, and the flow is divided among community members in a monetary form only after the sale (Bray & Merino-Pérez, 2003).

(b) *San Juan Nuevo Parangaricutiro (Michoacan)*

Here, a CFE has been erected on the basis of individually appropriated parcels in the forest. In the 1940s, before community logging appeared, forests were divided for pine resin extraction, effectively privatizing the forest. However, in the early 1980s, leaders convinced landholders to follow a community timber management plan and allow logging on their lands in exchange for being treated as private property holders, through the payment of a stumpage fee. Thus, the stock is privatized for the flow of resin, but the timber stock and flow are communalized (Bray, 2002).

(c) *Petcacab (Quintana Roo)*

In Petcacab, a previously existing CFE has been dissolved, and, in its place, approximately 10 "work groups" or subcommunal enterprises have been formed. These work group enterprises divide up the annual authorized logging volume from the management plan on a proportional basis. Thus, the forest stock remains as common property held by the community, but the flow is divided up into the work groups, and finally individually, which has led to a "futures market" in timber (Wilshusen, 2005).

(d) *Unión de Ejidos Forestales de Tamaulipas*

In at least four ejidos of this organization, the forest remains a common property, but the flow of timber is divided up in two different forms. Approximately half the members of the communities divide the annually authorized volume into proportional amounts, which is then individually logged, while several "work groups" manage the remainder of the volume. Thus, the stock as a whole remains communal, but the flow is both individually and work group appropriated (Bray & Merino-Pérez, 2002). Like an agricultural cooperative, the union itself allocates costs of technical services and education among its members. The general subject of CFE unions, an important phenomenon in Mexico, will be considered in a future paper.

(e) *Cuauhtémoc (Quintana Roo)*

In this community, the forest has been internally and informally parceled among the *ejidatarios*. Each ejidatario can now individually appropriate the timber on his or her land. However, they operate under a single community management plan coordinated by a professional forester. The authorized flow represented in the management plan is proportionally divided. Thus, both the stock and the flow have been individually appropriated.

From the perspective of the firm, these variations may have both equity and efficiency consequences, and are likely to have an effect on the creation and conservation of forest stock and the distribution of benefits it generates. This variety of institutional regimes indicates there is no one right way to manage a common property forest resource, assuming the observed governance choices represent a local social optimum. Each variant emerges as a creative response to local problems.

## 6. THE ECONOMIC PERFORMANCE OF CFES AND THE DISTRIBUTION OF BENEFITS

There has been a tendency to regard Mexican CFEs as constantly teetering on the brink of collapse because of mismanagement, high costs, inefficient sawmills and other industries, and exploitation by outside forces. It has also been argued that capital and labor can more freely shift in the private sector to more profitable sectors while peasant industries do not have that choice (Aguilar, Madrid, Merino, & Gutiérrez, 1990). However, CFEs also have unrecognized strengths. For example, it can simply sit on its natural asset, exploiting other means of subsistence, until prices or technology change in favor of using it again. Forest capital, in contrast to other physical capital, which typically depreciates, maintains its value or appreciates (Klemperer, 1996). The traditional governance practices of CFE administration can also bring about cost savings, due to using the cargo system for administration (Aguilar *et al.*, 1990).<sup>3</sup> Survey data on revenues and costs suggest that CFEs at all levels of integration can be economically feasible in the sense that cash inflows more than cover cash outflows (Antinori, 2000). In a first-order approximation, it was calculated that in four categories of CFE vertical integration, the gross margin (sales less

labor and materials) ranged from 32% in secondary product communities to 54% in stumpage communities (Antinori, 2005).<sup>4</sup> These data indicate a reason why few CFEs go out of business entirely.

We identify at least four streams of benefits generated by the CFE: (a) employment (wages and benefits), (b) public goods investments in community infrastructure and social welfare programs, (c) profit sharing, and (d) capital investments in the enterprise. Economic diversification is a fifth benefit considered elsewhere (Antinori, 2000).

(a) *Employment (wages and benefits)*

CFEs can generate jobs for very high percentages of the community labor force. At one extreme, there are “full employment” CFEs where nearly everyone in the community who wants a job gets one, ranging from San Juan Nuevo Parangaricutiro in Michoacan, with some 900 full-time jobs, to Rosario del Xico in Veracruz with 24 jobs (Bray & Merino-Pérez, 2002; Merino *et al.*, 1997). At the other extreme, there are stumpage communities where almost no one is employed in forest extraction. In a study of 42 CFE communities in Oaxaca, the percentage of community members receiving income from the CFE on a regular basis was 15% in stumpage communities, 19% in roundwood and sawnwood communities, and 26% in secondary product communities (Antinori, 2000). This suggests that most CFEs can only generate employment for a quarter or less of the community labor force, although without CFEs there would be few local opportunities. The stumpage group has the largest percentage of outside workers, perhaps due to lack of skill or interest in the community or less bargaining power with contractors. However, the 26% employment level in secondary product communities may exhaust the community labor supply interested in working in the CFE, since 63% of the secondary product communities hire outside workers compared to 11% of the sawnwood communities (Antinori, 2000). Most of the more integrated and prosperous CFEs also support various fringe benefits, such as health coverage and accidental death benefits (Bray & Merino-Pérez, 2002).

(b) *Public goods investments*

Many communities invest significant funds into public goods such as public infrastructure

Table 2. *Distribution of CFE profits by level of integration to public goods, profit sharing, and reinvestments in CFE (in 1998 pesos), N = 42*

Public goods investments	Percent contributing	SE	Number of observations
Stumpage	88	.08	16
Roundwood	82	.12	11
Sawnwood	88	.12	8
Secondary products	100	0	6
Profits distributed to members > 0	Average, in pesos		Number of observations with profit sharing
Stumpage	10,194	9,390	4
Roundwood	814	548	5
Sawnwood	2,333	1,155	3
Secondary products	2,250	2,411	3
Reinvestment in ongoing operations	Percent contributing		Number of observations
Stumpage	38	.50	16
Roundwood	83	.39	12
Sawnwood	88	.35	8
Secondary products	100	0	7

Source: Antinori (2000).

and retirement pensions, services that are normally the responsibility of the government. Communities may construct or restore churches, municipal buildings, public lighting, potable water systems, clinics, and schools.<sup>5</sup> As Table 2 shows, almost all 42 communities in the Oaxaca study channeled CFE revenues to social services in the year of the survey (Antinori, 2000). Some communities support retirement pensions for elderly members or widows and one community with one million dollars in annual profits invests 60% of it in community public goods (Bray & Merino-Pérez, 2002).

#### (c) Profit sharing

Communities may also decide to distribute all or part of the profits on a proportional basis to all legal members. Distribution of most profits may result from lack of trust, poverty, or low probability of investing in downstream processing. Amounts of annual profit distribution may range from less than one month's average income to greater than full average annual rural incomes. One Quintana Roo study of five communities showed an average of 13.5% and a high of 30.3% of household income coming from profit sharing (Armijo Canto & Robertos Jimenez, 1997). Table 2 shows that less than half (15 of 42) of the Oaxaca study communities distribute profits.

#### (d) Reinvestment and vertical integration

Profits may also go to asset maintenance such as constructing or maintaining logging roads for equipment that permits vertical integration. Most communities made such investments, although more vertically integrated CFEs did so at higher rates. Successive steps in vertical integration typically go from using extraction equipments such as cranes, to trucks for transporting the logs, and then to sawmills and other processing facilities. Logging can be profitable enough to generate the funds to acquire more productive assets for the CFEs. This is quite common in the Oaxacan CFE Study. Table 3 shows the degree of asset ownership in CFEs at the four levels of integration, who owns the equipment, and when and how it was acquired. The community forestry industry represents a sizeable amount of capital assets. Individuals often own trucks used for transporting logs. The incidence of collective truck ownership increases with integration level. Cranes require more specialized skills, and fewer are needed than trucks to meet production goals. Of particular note here is that in the great majority of cases, assets were purchased with community funds with little reliance on outside debt, suggesting barriers to credit, a bias against debt, or lack of need for debt financing at that point.

Table 3. *Capital asset ownership in Oaxacan CFEs, N = 42*

	Trucks				Cranes				Sawmills	
	Stumpage	Roundwood	Sawnwood	Secondary products	Stumpage	Roundwood	Sawnwood	Secondary products	Sawnwood	Secondary products
	<i>n</i> = 15	<i>n</i> = 13	<i>n</i> = 8	<i>n</i> = 7	<i>n</i> = 15	<i>n</i> = 11	<i>n</i> = 7	<i>n</i> = 7	<i>n</i> = 8	<i>n</i> = 7
<i>Average number used for harvest</i>	10	10	13	14	1.75	1.7	1.5	2.9		
<i>Distribution of ownership (number of communities)</i>										
Community owned	1	8	6	7	0	6	7	7		
Total individually owned, comuneros	4	7	7	4	1	3	0	0		
Total individually owned, noncomuneros	11	9	2	4	0	0	0	1		
Buyer owned	7	1	1	0	14	4	1	0		
<i>Average year first bought, if community owns</i>	1993	1991	1989	1980	1994	1995	1991	1986	1993	1986
<i>How bought first, if community or comunero owned<sup>a</sup></i>										
Community funds	1	7	5	4	1 <sup>b</sup>	4	5	6	6	6
Government assistance	0	0	0	1	0	0	0	2	1	0
Bank credit	0	1	1	0	0	0	0	1	1	1
Agreement with private company	0	0	0	2	1 <sup>b</sup>	4	1	1	1	4

Source: Antinori (2000).

<sup>a</sup> Numbers do not always add to sample totals due to multiple responses per community.

<sup>b</sup> Refers to acquisition by community members.

## 7. CONCLUSIONS

Mexico has been historically in the vanguard in developing a large and relatively mature sector of communities managing their forests for the commercial production of timber (Stone & D'Andrea, 2001). As such, it provides key elements for both a re-conceptualization of theories of the firm and empirical lessons about their institutional characteristics and economic benefits. Mexico, due to its agrarian revolution early in the 20th century, intermittently supportive government policies, community mobilizations, civil society support, and reforms to the Mexican constitution in 1992, advanced in its devolution of control over forest resources to local communities, and thus provides a laboratory test of the costs and benefits of such a policy. The evidence from Mexico suggests that unique characteristics of CFEs in general, and Mexican CFEs in particular, make them unusually resilient. Few ever go out of business despite international competitive pressures. They are a vehicle for forest management that potentially delivers a significant measure of economic and social benefits. However, it is important to note for collective action theories that few CFEs are fully "self-organized," and that state and civil society actors have generally played an important role in their formation.

We have argued that CFEs and common property community enterprises in general require extensions in the theory of the firm. CFEs as firms share similarities with other production organizations, but also differ in important ways along the dimensions of ownership, decision control and management, and objectives. In ownership, CFEs originated because of a government created or recognized common pool resource, and all community members have a claim to resource stock and benefits. In decision control and management, CFEs, like cooperatives, characteristically experience confusion among shareholder, manager, and worker functions, and the sorting out of these roles can lead to intense community conflicts. CFEs work in forests which are used for logging, firewood, building materials, nontimber forest products, environmental services, and bequest values, and prioritizing these uses can be challenging. The CFE is not free to simply incorporate and establish itself as a private enterprise where it can equilibrate risk-sharing burdens through the public sale of stock. It must struggle to create market-oriented institutions out of a pre-

existing matrix of traditional community governance. Mexico's *ejido* and *comunidad* systems are different in its details from local governance systems elsewhere in the world, but the tensions between community and enterprise governance emergence are likely to be similar.

As communities grapple with these issues in the Mexican case, they have generated a wide variety of institutional arrangements for managing the stocks and flows of the common property resource, and thus the structure of the CFE. There would appear to be no one ideal form of a CFE organization. CFEs are capable of generating an array of benefits for forest communities, including wages and benefits associated with employment, investment in public goods and welfare programs, direct profit sharing, and capital investments in the CFE. For many CFEs with little or low quality commercial forests, forestry will be of only minor importance. But many CFEs demonstrate, as Wunder (2001) has speculated, that communities which directly control logging can use profits to both alleviate poverty and promote economic development. As well, demanding industrial skills and processes are not beyond the capacity of local communities, given appropriate levels of training, technical assistance, and contractual opportunities in the marketplace. There is much evidence of shortcomings of public and private sector logging in delivering benefits to local communities. Thus, CFEs may constitute a "third way" of economic development for countries with large rural populations with common property traditions and forest resources.

The issue of environmental sustainability has been mentioned throughout, but for reasons of space has not been discussed. However, since it is a key element in evaluating CFEs, it should be briefly noted that there is also emerging evidence that Mexican CFEs may also have some advantages in terms of good environmental stewardship, and some are collaborating closely with researchers to improve environmental management (Bray *et al.*, 2003; Velázquez, Bocco, & Torres, 2001; Velázquez, Torres, & Bocco, 2003). Regions dominated by community-managed forests have been shown to have the lowest rates of land use change in tropical Mexico and to compete successfully with protected areas in the maintenance of forest cover (Bray, Barry, & Merino-Pérez, *in press*; Durán, Mas, & Velázquez, 2005). Community logging in Quintana Roo has no impact on plant biodiversity (Vester & Navaro-Martinez, *in press*).

Snook (1998) has also argued with respect to Quintana Roo community forests that

...the many communities that own, utilize, and benefit from this forest also provide a context within which forest management can be practiced in a more holistic fashion than that defined by the limited demands of the timber industry... a diversified, peasant economy may provide the best framework for a kind of silviculture that works with the complexity of ...species-diverse tropical forests.

On the other hand, when community forest management is caught up in community conflicts, forest degradation is likely to be the result (Klooster, 2000).

In this paper, we have presented an analytical framework for CFEs based on an extension of theories of the firm to highlight tensions over ownership, decision control and management, stocks and flows, and economic benefits and distribution of the surplus. We also suggest, to refer to the questions posed earlier in this article, that CFEs are developing

new models for how communities can combine democratic participation, community management, and economic efficiency, with varying degrees of success and failure. They may have distinct advantages and resilience in achieving a balance of economic equity and environmental stewardship through a unique combination of enterprises, deeply rooted communities, and a common property resource. The experience of Mexico suggests that neither being community based nor a traditional institution is necessarily a hindrance to becoming competitive even in international markets, and may confer some competitive advantages. The special characteristics of CFEs also suggest that governments may want to begin developing specialized forms of legislation and support that meet their special needs and allow them to achieve their potential for equity, social stability, and better environmental management of local and global forest resources.

## NOTES

1. The authors' names are in alphabetical order. An earlier version of this paper, authored by David Barton Bray, was presented at the international conference on "Rural Livelihoods, Forests, and Biodiversity" organized by the Center for International Forestry Research and held in Bonn, Germany, May 19–23, 2003.

2. The literal translation of "*comunidades*" is "communities," but in Mexico, it is also a concept in agrarian law, meaning indigenous communities which demonstrated long occupation of the land, in contrast to *ejidos* which are based on a group's new land grant from land redistributed through the agrarian reform process. Hereafter, when referring to the specific Mexican agrarian legal term, we will use the Spanish term *comunidades*. When we use the term "communities" in English, we

refer to both *ejidos* and *comunidades* as a general category.

3. It is not specified in the study if the lower costs were reflected in the market price or the marketability of the CFE's product.

4. The four categories of CFE vertical integration refer to stumpage, roundwood, sawnwood, and secondary products.

5. Not all such investments are necessarily optimal ones. Some communities will invest large sums in a new municipal building when there are no computers in the community (López Arzola, personal communication).

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