Forest Policy and Economics 28 (2013) 44–51

Contents lists available at SciVerse ScienceDirect

Forest Policy and Economics

journal homepage: www.elsevier.com/locate/forpol

From wild harvesting to agroforest cultivation: A *Chamaedorea* palm case study from Chiapas, Mexico

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ARTICLE INFO

Article history:
Received 23 April 2012
Received in revised form 2 October 2012
Accepted 17 December 2012
Available online 7 February 2013

Keywords:
Chamaedorea Palm
NTFP
Livelihood
Cultivation
Mexico

ABSTRACT

Non-timber forest products (NTFP) commercialisation usually modifies the livelihoods and economic strategies of forest people to make room for NTFP cultivation systems. This paper analyzes livelihood changes, new production techniques and future challenges of a case study in a South-eastern Mexican community where *Chamaedorea* palm cultivation is displacing wild harvesting. The results illustrate the fast adoption of palm plantations due to salient improvements in the economic return to effort. The change was led by richer households, although communal structures have allowed the middle income households to participate in the process. While palm producers do not tend to have beans and corn subsistence plots, landless poorer members have been left out of palm activities, basically remaining as subsistence farmers.

1. Introduction

Non-timber forest products (NTFPs) have been seen as a strategy to harmonize development and nature conservation in poor rural areas (Myers, 1988; Panayotou and Ashton, 1992; Plotkin and Famolare, 1992). According to Arnold and Ruiz Pérez (1996) this is due to the fact that NTFPs contribute much more than timber to the livelihoods and welfare of adjacent forest populations, because their exploitation is less ecologically destructive than timber and because its harvest should add value to the perceived significance of tropical forests, thus increasing the incentive to maintain forest resources. Moreover, as NTFPs do not usually require complex technology, they tend to be more accessible to small communities (Evans, 1993).

The use of NTFPs has been strongly associated to forest populations (Godoy and Bawa, 1993; Ticktin, 2004), having a great impact on poor rural households (Falconer, 1990; Kumar and Saxena, 2002; Neumann and Hirsch, 2000). Their commercial applications became the main strategy to integrate conservation and development after the 1980's (Belcher and Schreckenberg, 2007). This initial enthusiasm soon declined, because NTFPs did not turn out to be as successful as initially expected (Godoy et al., 2000; Sheil and Wunder, 2002; Shackelton et al., 2011; Simpson et al., 1996).

NTFP commercialisation changes the opportunities and strategies of forest dwellers (Ruiz Pérez et al., 2004). Two basic strategies tend to emerge: intensified management of naturally regenerating wild resources and cultivation, with the latter usually receiving higher incomes (Belcher et al., 2005). Homma (1992) theorised a dual process: a) substitution-abandonment of wild NTFP extraction in case of excessive pressure on the resource, often resulting in overexploitation (Cunningham, 1993; Rawat, 1997; Rebelo and Holmes, 1988; Ticktin, 2004; Tiwari, 2000) and biodiversity loss (Freese, 1996; Ruiz Pérez et al., 2004); and b) intensification–cultivation eventually leading to market specialisation if demand grows and no cheaper alternatives are found.

Specialisation can be a dangerous process for small producers, because market forces usually require taking greater risks and there is a tendency to saturation if the NTFP production expands to other areas, forming 'boom and bust' downward cycles (Homma, 1992; Neumann and Hirsch, 2000). These risks may limit their development because risk aversion is negatively associated with the adoption of new techniques (Abadi Ghadim et al., 2005; Marra et al., 2003 but see Shapiro et al., 1992). The length of time that profits take to be realized when wild species are domesticated and cultivated is also relevant in relation to risks (Franzel and Scherr, 2002). Better-off households are less exposed because they have more options for smoothing income and consumption (Feder et al., 1985; Mercer, 2004; Shively, 2001), tending to be early

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http://dx.doi.org/10.1016/j.forpol.2012.12.004

adopters (Mercer, 2004). This usually leads to NTFP's capture by local elites (Arnold and Ruiz Pérez, 2001; Dove, 1993; Gray, 1990; Iversen et al., 2006) that co-opt the resource for themselves, leaving the poor without its benefits.

NTFPs are therefore not a "magic bullet" for the achievement of conservation and development (Belcher and Schreckenberg, 2007). They tend to have higher impacts on the livelihoods of forest people than on environmental conservation. However, NTFPs still have the possibility of achieving 'win-win' situations, but they require "a long-term and multidisciplinary approach that ranges from providing support to both the technical and social aspects of natural resource management to understanding how markets function from local to international level." (Belcher and Schreckenberg, 2007, pp. 372).

In this paper we analyze the adoption and social differentiation dynamics around a NTFP, *Chamaedorea* palm, in a community placed in La Sepultura Biosphere Reserve, Chiapas, Mexico. The study, conducted over a three-year period, provides an analysis of the livelihood changes, including stakeholders' perception, accrued with the shift from wild extraction to cultivation of palm.

2. *Chamaedorea* Palms in Mexico

Palms constitute an important component of tropical forests because of their abundance and impact on forest structure and dynamics (Bacon and Bailey, 2006), being also important for the livelihoods of rural people (Balick, 1988). Mexico holds 95 species of palm (Quero, 1994) and hosts fifty of the more than a hundred *Chamaedorea* palms present in America (Uhl and Dransfield, 1987). *Chamaedorea* are among the world's most endangered palms, with around 75% of the species threatened (Walter and Gillett, 1998). Main threats to palms are rainforest destruction and large scale exports of leaves and seeds (Bridgewater et al., 2006; Current and Wilsey, 2002; Johnson, 1997; Vovides and García Bielma, 1994) that has resulted in palm overharvesting and natural populations decrease (Endress et al., 2004).

There are 21 commercial *Chamaedorea* species. Their leaves are destined to the floral and horticultural industry, representing one of northern Central America's most important NTFPs (Current and Wilsey, 2002). Mexico is a leading exporter, supplying almost one third of the international demand (de los Santos et al., 2006). Chiapas and Veracruz are the main Mexican states in palm production, supplying up to 3000 t per year (de los Santos et al., 2004). Palms are sold in bundles, each one made out of hundreds of leaves (called stems in market transactions).

The U.S. is the main destination of *Chamaedorea* palms and the market operates on a weekly basis. Until the 1990s the market had an erratic trend with an average 350 million stems (Current and Wilsey, 2002), but in recent years it appears to be declining (Current, 2006; Sullivan and Kosidowski, 2010). In order to reverse this tendency and to help small palm producers, the Eco-palm initiative has been launched by The North American Commission for Environmental Cooperation (NACEC) and the University of Minnesota's Center for Integrated Natural Resources and Agricultural Management (CINRAM). Its aim is to ensure that palms distributed throughout the United States for Palm Sunday (March–April) from the forests of Mexico and Guatemala are harvested sustainably, although this period is the end of the dry season, when palms regenerate at a lower rate in the forest (Dahringer, 2010). The initiative reached 700,000 stems in 2010 (Sullivan and Kosidowski, 2010).

Uncertainty about market-grade leaves (markets require certain size and quality standards, discarded wild leaves reaching up to 60–70%) and a thrust for quantity versus quality led palm harvesters to cut down more palms than those being accepted by the market, resulting in the overexploitation of *Chamaedorea* populations (Bridgewater et al., 2006; Endress et al., 2006; Radachowsky et al., 2004). In fact Mexican *Chamaedorea* populations have followed a general pattern of uncontrolled overexploitation (1950s–1980s), exhaustion (1980s–1990s) and legal protection (1990s–2000s). As predicted by Homma's economic model, in the last decade traditional wild palm harvesting is being replaced by plantations (Bridgewater et al., 2006; Current and Wilsey, 2002; Geissert Kientzm and Pérez Portilla, 2006). This has allowed producers to harvest almost every week and to reduce the amount of discarded leaves to a mere 5% (Dahringer, 2010). Still, there is some concern about this process, because of market saturation (Sullivan and Kosidowski, 2010) and the cooptation of the market by big companies intensively producing palm out of the forests, leaving forest dwellers without that source of income (Wilsey and Radachowsky, 2008).

Certification has been proposed as a way to ensure that palm will be harvested by people living in the forest in a sustainable way (Wilsey and Radachowsky, 2008). However, certification can be a "mixed blessing" (Belcher and Schreckenberg, 2007), because it is a costly process that requires sustained technical and financial assistance (Shanley et al., 2008).

Mexico enjoys two main advantages regarding NTFP commercialisation: a very large proportion of communal land (*ejidos*) (Barnes, 2009) and a long tradition of forest resource management (Bray et al., 2005; Toledo et al., 2003; Wilshusen et al., 2002). Based on these experiences, the National Commission for Natural Protected Areas (CONANP) and the National Forestry Commission (CONAFOR) provide technical and/or financial support to community forestry projects. Other national programmes have fostered the commercialisation of NTFPs (Farías, 2001), that are generically regulated under conservation and wildlife laws even though there is no specific regulation for them (Marshall et al., 2006).

3. Study area

The research was conducted in Sierra Morena, an *ejido* in La Sepultura Biosphere Reserve, Chiapas, Mexico. Ejidos are communal land (Cornelius and Myhre, 1998) usually including two types of dwellers: *ejidatarios*, people owning the land and with full rights in the community's assembly, and *pobladores*, with no land (except for small plots sold or donated by ejidatarios) and no right to vote in the assembly. There are 26 families of ejidatarios and 10 of pobladores currently living in Sierra Morena.

Sierra Morena has 1750 ha of land, ranging from 700 to 1400 masl, what provides a variety of ecosystems from mixed pine-oak to cloud and subperennial forests. The most productive area (350 ha) was allocated individually, with the rest (1400 ha) remaining still as common property. This privatisation however has not been formally registered. Practically all communal land corresponds to natural forests covering the highest and steepest parts of the ejido, being partly included in one of the Biosphere Reserve's core zones.

The main cash generating activities are shade coffee and palm, along with payments for environmental services (PES) and small income from livestock and ecotourism. Non-market activities include corn, black beans, house-backyard chickens and vegetable gardens, and wild harvesting of non-commercial NTFPs, destined for self-consumption or sold within the community. Families with school-age children receive a social subsidy. Some people (mostly pobladores) occasionally go to the closest village to work.

The main palm species in the area's natural forests is *Chamaedorea quetzalteca*. Its harvesting dates back to the origins of the community in 1970, when communal forests wild palm gathering was the ejido's main income-generating activity. As in the general picture of palm populations in Mexico presented above, lack of control and experience resulted in a gradual decrease of palm (GUIASS and Pronatura, 2009). Coffee production in the ejido during the 1980s and a partial palm extraction ban by the Mexican Environment Ministry (SEMARNAT) decreased harvest intensity. In the mid 1990s some members of the community built a nursery, setting the beginning of the cultivation process. At that time few people joined the initiative, acting as a pilot group. In 2000, the year of the establishment of the first cultivated plots, a palm cooperative was created among all the ejidatarios. But strict membership conditions combined with internal conflicts led to a rapid decrease