

## Analysis of a natural resources management system in the Calakmul Biosphere Reserve

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### Abstract

An analysis of the natural resource management system was carried out for the *ejido* X-kanha located in the northern part of the Calakmul Biosphere Reserve in Campeche, Mexico. Through field research using participatory rural appraisal (PRA), the activities carried out by different user groups were identified. Gender roles as well as age roles were analyzed. Results show that each family depends upon the diversification of productive activities in order to meet economic needs. Diversification of activities is carried out in both space and time, making use of different ecosystems during varied seasons throughout the year. Women's activities correspond to housekeeping and house administration; they take care of home gardens and are responsible for water collection and wood gathering. Men carry out the activities of working in the *milpa*, cattle raising, honey production, *chicle* collection, and wood felling.

A series of PRA activities carried out with the people of X-Kanha led to the identification of limitations to more optimal uses of natural resources. The characterization of limitations and associated alternatives is used to provide a guideline to aid the efforts of NGOs and other organizations interested in the conservation of natural resources, and for the well-being of the local population.

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**Keywords:** Calakmul Biosphere Reserve; Yucatan; Maya; Natural resources; PRA; Milpa; Chicle; Tropical forestry

### Extracto:

Se analizó el sistema de manejo de recursos naturales en el ejido de Xkanha localizado en la porción norte de la Reserva de la Biósfera de Calakmul, Campeche, México. A través de la investigación en campo utilizando metodologías participativas (participatory rural appraisal), se identificaron las actividades que se realizan en la localidad. Se hicieron diferenciaciones por género y edad. Los resultados muestran que cada familia depende de la diversificación de actividades productivas para solventar sus necesidades económicas. La diversificación de actividades se da tanto en el espacio como en el tiempo, utilizando diferentes ecosistemas durante las diferentes estaciones del año. Las actividades llevadas a cabo por las mujeres corresponden a actividades propias del hogar, incluyendo su administración, también son las responsables de atender el solar y de la colecta de agua y leña.

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Los hombres trabajan en la milpa, atienden ganado, son apicultores y trabajan en la extracción de chicle y la comercialización de madera.

Una serie de actividades participativas llevadas a cabo con la gente de Xkanha permitió identificar cuales son las limitantes para tener un uso más óptimo de los recursos naturales. La caracterización de las limitantes y las alternativas asociadas puede servir como herramienta para los esfuerzos de organizaciones no gubernamentales y gubernamentales interesadas en la conservación de los recursos naturales y el bienestar de la población local.

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*Palabras claves:* Reserva de la Biosfera de Calakmul; Yucatán; Maya; Recursos naturales; Métodos participativos; Milpa; Chicle; Manejo forestal tropical

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## 1. Introduction

Many tropical landscapes can be regarded as mosaics of forest patches that have “recovered” from different disturbances in which human societies have played a major role (Browder, 1996). Actually, in most “protected” tropical forests, archeological, historical and ecological evidence exists showing a high density of human population in the past and sites of continuous occupation over many centuries, and also intensively managed and constantly changing environments (Gómez-Pompa and Kaus, 1992). In that way, forest patches making up the tropical landscape are dynamic entities, where wildlife and vegetation are controlled and influenced by groups of interacting biotic and abiotic factors, of which historic and present land-use patterns are of great importance (Lyon and Horwich, 1996). Understanding the role of current human activity in this landscape is needed to understand how forests are changing over time and across space (McIntosh, 1981) and is critically important for the management and conservation of tropical forests.

Tropical forests in Mexico have been estimated to be amongst the highest in deforestation rates worldwide (Cairns et al., 1995). The causes of deforestation in Mexico are multiple, with forest conversion to agricultural uses, particularly cattle ranching, the leading factor. Gómez-Pompa and Kaus (1990) attribute the root causes of deforestation in Mexico not to population growth or shifting cultivation, but to government subsidies and other incentives that promote timber extraction, settlement by landless farmers from other regions, and conversion of formerly forested lands to pastures.

New approaches to tropical forestry must be developed that ensure the conservation of biodiversity. These approaches should be based on the actual needs of the local people and their development must begin with analyses of past and present tropical forest management, and of the interaction between tropical forests and local cultures (Gómez-Pompa and Bainbridge, 1995).

The Calakmul Biosphere Reserve, found in the Yucatan Peninsula, is the largest protected area of tropical forests in Mexico. It represents an ecological corridor between the humid tropics of Guatemala and the Lacandon region of southern Mexico, and the northern region of the Yucatan Peninsula and the Caribbean. It is rich in biodiversity as well as in cultural inheritance. This area has been inhabited for long periods of time by the Maya people, who in the past were able to support high population densities and at the same time protect certain forest species. Today's social conditions entail rapid changes, e.g., new settlements, opening of roads and communication networks, all of which need to be taken into account when seeking improved conservation of the area.

There are many organizations (governmental and non-governmental) now working in the Calakmul Biosphere Reserve area providing assistance for development and conservation efforts. According to Chapin (1991), development programs in general have been characterized by lack of coordination among funders and technical assistance agencies, poor understanding of the needs and concerns of rural people, and confusion over short- and long-term objectives. To reverse this trend, it is important to give attention to the development of organizational forms

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