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Isabel Ruiz-Mallén
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# Community Action for Conservation

## Mexican Experiences

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*Editors*
Luciana Porter-Bolland, Ph.D.
Red de Ecología Funcional
Instituto de Ecología A. C.
Xalapa, Veracruz, Mexico

Claudia Camacho-Benavides, M.Sc.
Mesoamerican Regional Program
Global Diversity Foundation
Xalapa, Veracruz, Mexico

Isabel Ruiz-Mallén, Ph.D.
Institute of Environmental Science and Technology (ICTA)
Universitat Autònoma de Barcelona
Bellaterra, Barcelona, Spain

Susannah R. McCandless, Ph.D.
International Program
Global Diversity Foundation
Bristol, VT, USA

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# Foreword

## Mexican Lessons to Take to Heart: Traveling the Path to Biodiversity and Forest Conservation in Our Age of Global Change

As we move forward in this century of Global Climate Change and the closing of wide-open frontiers, locally generated conservation and management of forests and biodiversity is of increasing national and global importance. Yet, conflicts between local people's self-generated conservation of natural resources versus state and nongovernmental organizations' externally designed conservation programs have been documented and analyzed in innumerable papers and books over the past several decades.

Self-generated conservation arose locally—either over thousands of years, in which case conservation-supportive values are embedded in cosmological and customary patterns continually adapted to evolving situations; or recently, over the past few decades, as communities have recognized that new limits must be placed on exploitation of their environment. In response to new challenges, communities have increasingly created their own formal, internal regulations and attempted to defend their resources against more powerful outsiders.

In the best-case scenario, external actors (the state, nongovernmental organizations, and private sector) respond positively to "discovered" self-generated conservation and shape their activities, laws, and programs to respect local agency of communities to take decisions. They create governance frameworks and programs that enable and assist communities to defend their resources against outside interests. Mexico is an undisputed leader in this emerging arena of innovative design responses to "discovered" conservation.

As this book illustrates, the Mexican path of collaboration has not been easy but it can be achieved. Progress has largely been made due to an admirable long-term alliance between academics based in Mexican universities, people working in the field offices of national agencies, locally grounded NGOs, Mexican community leaders, and their organizations. Together they have demonstrated to national government the

paths forward when national politicians have lacked an understanding of rural realities or the political will to confront rural issues. To be sure, Mexican community-based conservation began with the advantage of collective tenure gained through policy reforms after land-grabs led to the Mexican Revolution. In many other parts of the world, in South America and Africa in particular, the pre-Revolution situation of land-grabbing is threatening communities' self-generated conservation and management of natural resources. Unclear carbon rights threaten local conservation in many countries, yet the success of Mexican community-based conservation is again manifest in the ways communities have entered the carbon market.

Two important keys to success are Mexican willingness to appreciate and support local diversity, and an understanding that future national resilience depends on maintaining local, self-generated resilience within supportive national frameworks. Ostrom's Law—"if it works in practice, it can work in theory"—is alive in Mexican initiatives, despite push-back and challenges.

This lively and deep-running book offers invaluable stories and analyses of the Mexican experience with conservation told by some of the key actors themselves, demonstrating the willingness of Mexico to respond flexibly to local conservation options that vary from place to place within the country. This Mexican book will serve as a beacon and touchstone for other countries to guide them as they design Nested REDD+ to meet dual goals—to sequester carbon in designed landscapes in compliance with the Climate Change treaty (UNFCCC) and to achieve the Aichi Targets of the Biological Diversity treaty (CBD).

Winnipeg, Manitoba, Canada Janis Bristol Alcorn

# Preface

Community conservation or community-based conservation is not a new subject in Mexico or the world, but it has recently gained importance given changes in the way biodiversity conservation is understood and addressed. The latter applies not only to changes regarding how nature–human relations are realized but also to changes regarding how natures' governance is evermore subject to interactions of different actors at varying scales. That is, the local is subject to different types of processes occurring at regional, national, and international levels through forces ranging from legislation, government programs, international treaties, and the market, among others. As this volume goes to press, these tensions are everywhere in evidence, since recent federal legislation has facilitated the privatization of ejidal land. Since it is at the local scale that resulting outcomes of this interconnections reflect decision-making (and affect environmental outcomes), understanding the role that local people play or could play regarding nature's conservation becomes relevant not only for the academic arena, but also for policy and human livelihoods.

The purpose of this volume is not to provide a comprehensive overview of community conservation in Mexico, as the extent of Mexican territory and its contours, as well as the different issues regions face, are so diverse. Rather, we bring together several chapters reflecting examples or cases illustrating some of the issues at stake, hoping to stimulate the reflections of some of these matters, as well as communicate some of our research findings. The volume, written in English for an international audience, is also intended to bring the discussion of community conservation in Mexico to a supranational level, because many of the issues that are raised echo shared realities in other countries. The Mexican case stands out in the annals of community conservation for reasons explained hereafter. Transmitting the relevance of the Mexican case to a national audience is also a goal of the text.

The endeavor of writing the volume was born from the collaboration of most of the authors in an international and interdisciplinary project addressing community conservation in Mexico. We decided to make use of the opportunity of writing a first book together to integrate research mostly from previous work. We also invited a few external colleagues to join the effort. As only few of the authors in the volume speak English as a first language, its completion represented a real challenge, which

extended the process of its creation to more than 2 years. We hope that its contents serve to provoke debate and further inquiry regarding the issues addressed.

We would like to acknowledge the anonymous comments of two external reviewers on the initial proposal for the volume, which helped us to design the final direction it would take. We would also like to give special recognition to Gary Martin, who contributed greatly in the initial phase of putting the volume together, and to Emily Caruso, who assisted in the editing process. We are also grateful for financial support for the CONSERVCOM project (through Fondo de Cooperación Internacional en Ciencia y Tecnología UE-Mexico—FONCICYT Project # 94395) and grants from the Programa de Cooperación Inter-Universitaria e Investigación Científica, Ministerio de Asuntos Exteriores y Cooperación (A/023406/09 and A/030044/10) and Fundació Autònoma Solidària-UAB (XXVII and XXVIII), which supported the work of several of the authors and editors of this volume during the book's development. We give special thanks to rural and indigenous communities in Mexico for their lessons and efforts concerning biodiversity conservation.

Xalapa, Veracruz, Mexico Luciana Porter-Bolland

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# Contributors

**Martha Bonilla-Moheno, Ph.D.** Instituto de Ecologia, A.C., Xalapa, Veracruz, Mexico

**Claudia Camacho-Benavides, M.Sc.** Mesoamerican Regional Program, Global Diversity Foundation, Xalapa, Veracruz, Mexico

**Andrés Camou-Guerrero, Ph.D.** Escuela Nacional de Estudios Superiores Unidad Morelia, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

**Antonio De la Peña, Ph.D.** Department of Anthropology, Universidade Federal da Integração Latino-Americana, Foz do Iguaçu, Paraná, Brazil

**Eduardo García-Frapolli, Ph.D.** Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

**Martí Boada Juncà, Ph.D.** Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

**Diego Varga Linde, Ph.D.** Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

**Maria Elena Méndez-Lopez, M.Sc.** Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

**Victor Manuel Toledo Manzur, Ph.D.** Laboratorio de Etnoecologia, Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

**Susannah R. McCandless, Ph.D.** International Program, Global Diversity Foundation, Bristol, VT, USA

**Leticia Merino-Perez, Ph.D.** Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México, Mexico City, Mexico

**Helen S. Newing, Ph.D.** Durrell Institute of Conservation and Ecology, School of Anthropology and Conservation, University of Kent, Canterbury, Kent, UK

**Jorge Odenthal, M.Sc.** Investigaciones Aplicadas en Ciencias Ambientales y Sociales A.C., Patzcuaro, Michoacán, Mexico

**Daniel Ortiz-Avila, B.Sc.** Investigaciones Aplicadas en Ciencias Ambientales y Sociales A.C., Michoacán, Mexico

**Tamara Ortiz-Ávila, M.Sc.** Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

**Luciana Porter-Bolland, Ph.D.** Red de Ecología Funcional, Instituto de Ecología A.C., Xalapa, Veracruz, Mexico

**Diana J. Pritchard, Ph.D.** Department of Global Studies, University of Sussex, Brighton, UK

**Gabriel Ramos-Fernández, Ph.D.** Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional (CIIDIR)- Unidad Oaxaca, Insituto Politécnico Nacional, Oaxaca, Mexico

**Isabel Ruiz-Mallén, Ph.D.** Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

**María Consuelo Sánchez-González, Ph.D.** Centro de Investigaciones Históricas y Sociales, Universidad Autónoma de Campeche, Campeche, Mexico

**Constanza Monterrubio-Solís, M.Sc.** Durrell Institute of Conservation and Ecology, School of Anthropology and Conservation, University of Kent, Canterbury, Kent, UK

**Roser Maneja-Zaragoza, Ph.D.** Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

# Chapter 1
# Introduction: Biocultural Diversity and the Participation of Local Communities in National and Global Conservation

**Claudia Camacho-Benavides, Luciana Porter-Bolland, Isabel Ruiz-Mallén, and Susannah R. McCandless**

Much of the world's biodiversity is found in areas of human settlement, where people are highly dependent on natural resources for their subsistence. In 1995, more than one billion people were living in 25 biodiversity hotspots of priority for conservation [1, 2]. However, the global tendency has been for official biodiversity conservation measures (i.e., protected areas) to often exclude communities from decision-making or consider their participation and presence as detrimental. Some authors follow this conventional approach, supporting the strict protection of areas important for biodiversity and ecosystem services against people's intervention [3–7]. In contrast, other authors argue that rural and indigenous communities have developed a cumulative body of local ecological knowledge, beliefs, and practices important for biodiversity conservation and sustainable use of natural resources [8, 9]. Along these lines, a new paradigm for understanding and implementing conservation measures considers the concept of "biocultural diversity," which links linguistic, cultural, and biological diversity. In practice, biocultural diversity refers to the need to sustain both biodiversity and culture, because the two are interrelated and mutually supportive [9]. Based on this approach, as well as evidence showing that strict protected areas have not always been as

C. Camacho-Benavides, M.Sc. (✉)
Mesoamerican Regional Program, Global Diversity Foundation, Xalapa, Veracruz, Mexico
e-mail: claudia@globaldiversity.org.uk

L. Porter-Bolland, Ph.D.
Red de Ecología Funcional, Instituto de Ecología A. C., Xalapa, Veracruz, Mexico

I. Ruiz-Mallén, Ph.D.
Institute of Environmental Science and Technology (ICTA),
Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

S.R. McCandless, Ph.D.
International Program, Global Diversity Foundation, P.O. Box 194, Bristol,
VT 05443, USA

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successful in reducing deforestation and forest degradation as intended [10, 11], some authors argue that a global conservation strategy based on the "fines and fences" or "fortress conservation" approach puts both local communities' subsistence and biodiversity at risk [12].

The academic debate regarding the effectiveness of strict protected areas versus community natural resource management and conservation initiatives continues and is also evident at a policy level. In Mexico, for example, there are policies at the national level that continue to consider human activities as threats to forests and biodiversity. This is illustrated by the fact that, in December 2010, during the celebration of World Forest Day, as part of the 16th Conference of the Parties to the UN Framework Convention on Climate Change in Cancun, Mexican President Felipe Calderón attributed deforestation in Mexico to traditional forms of agriculture of indigenous peoples and smallholders, along with illegal logging. He also affirmed that the integration of rural people into financial mechanisms that would allow them to receive economic compensation instead of continuing to cultivate their land was on the national environmental agenda [13].

At the same time, community-based conservation is gaining currency. The participation and importance of indigenous and local communities, including their traditional management practices, in biodiversity and landscape conservation, has been increasingly recognized both in national and international policies. Community-based conservation, for our purposes, refers to any voluntary initiative of "natural resources or biodiversity protection conducted by, for, and with the local community" [14]. This broad definition includes a great variety of initiatives ranging from self-regulated strategies for natural resources and territorial management to collaborative actions for conservation between communities and external actors. These initiatives may include a variety of objectives, governance types, and levels of local decision-making power [15].

At the international level, in 1992, the Convention on Biological Diversity (CBD) recognized the importance of local communities' rights and decision-making in management in article 8(j), which states that official policies on biological conservation must consider traditional ecological knowledge and practices, as well as promote their wider application, with the approval and involvement of local communities [16]. Thereafter, the CBD Program of Work on Protected Areas recognized the importance of equity and Indigenous peoples' rights in conservation (Target 2.2) [17, 18]. Subsequent international agreements have also included recognition of the role of local people in biodiversity conservation, such as the Universal Declaration on Cultural Diversity of the United Nations Educational, Scientific and Cultural Organization in 2001, the GEO-4 report of the United Nations Environment Program in 2007 [19], and the CBD's 2010 Biodiversity Target [20].

One of the most advanced forms of official acknowledgement of community-based conservation initiatives is the recognition by the International Union for Conservation of Nature (IUCN) of Indigenous People's and Community Conserved Areas and Territories (ICCAs). During the fifth World Parks Congress (Durban 2003), the role of indigenous peoples and local communities in conservation was explicitly recognized. This status was further developed during the World Conservation

Congresses of 2004[1] and 2008[2] with the formal inclusion of ICCAs in its protected area matrix as a distinct governance category that crosscut the more commonly known management types, which range from Strict Nature Reserves to Managed Resource Protected Areas.

Such international policy development has led Mexican national policies to follow suit. Despite the comments of its past president, Mexico stands out on the international scene [21, 22] as an important trailblazer for community-based conservation, due to its legal achievements and local experiences. Mexico has been an early adopter, at the national and constitutional level, of enabling policy frameworks for community-based conservation [23]. The scope of the laws that grant and govern community-based rights over natural resources is varied, and these laws have their limitations. To begin, the postrevolutionary 1917 Constitution, reformulated in 1992, recognizes collective land and resource ownership in both *comunidades* and *ejidos* in Article 27 and in the current Mexican Agrarian Law.[3] More recent subsequent national legislation affecting community governance of natural resources has followed in the same vein, both enabling and regulating community-based natural resource management. Since 1996, Mexico's General Environmental Law (Ley General del Equilibrio Ecológico y la Protección al Ambiente, or LGEEPA) has allowed private owners and social entities (such as rural communities) that designate land for conservation to receive recognition by the National Commission of Natural Protected Areas (Comisión Nacional de Áreas Naturales Protegidas, or CONANP) [24]. A program of certification of community and ejidal reserves formally started in 2003, and in 2008 the LGEEPA was reformed adopting the new federal protected area category of Voluntary Conserved Areas (in Spanish Áreas Destinadas Voluntariamente a la Conservación -ADVC) that includes community as well as private areas voluntarily designated for conservation [24]. There are other national laws that regulate or allow the formalization of community-based conservation initiatives, such as the Mexican General Wildlife Law (Wildlife Law) (Ley General de Vida Silvestre) [25], which since 1997 has allowed private owners and rural communities to officially establish wildlife management areas (UMAS, by their Spanish acronym). In addition, the Mexican Law on Sustainable Forest

[1] World Conservation Congress, Bangkok, 2004. Resolution 3.012 ("Governance of natural resources for conservation and sustainable development"); Resolution 3.049 ("Community Conserved Areas"); and Resolution 3.081 ("Implementation of principle 10 by building comprehensive, good governance systems"). Accessed 20 Sept 2012, at: http://cmsdata.iucn.org/downloads/wcc_res_rec_eng.pdf

[2] World Conservation Congress, Barcelona, 2008. Resolution 4.048 ("Indigenous Peoples protected Areas and implementation of the Durban Accord"); Resolution 4.049 ("Supporting Indigenous conservation territories and other Indigenous peoples and community conservation areas") and Resolution 4.050 ("Recognition of Indigenous conserved territories"). Last accessed 10 Oct 2012, at: http://www.iucn.org/congress_08/assembly/policy

[3] *Comunidades* are "pre-existing corporate entities in which community members can demonstrate long-standing communal use of land and resources, whereas *ejidos* are collectives of campesinos (peasants) granted access to land and resources for which they have no prior legal claim" (Martin et al. 2010, 196; Ruiz Massieu M (1987) *Derecho Agrario Revolucionario.* México, DF: Porrúa).

Development (Ley General de Desarrollo Forestal Sustentable) [26] regulates the use of national forests and requires communities to design forest management plans in forests managed for timber production; these plans can include the designation of some forested areas for conservation [23].

Setting aside legal developments, more important are the multitude of local experiences that constitute community-based conservation in Mexico. This country is one of the world's 17 most megadiverse [27, 28], and an estimated 75 % of forests are held communally (Chap. 3, this volume) through the land tenure systems of comunidades and *ejidos*. Given that in Mexico indigenous populations constitute about 60 % of the comunidades [29] and 20 % of the *ejidos* [30, 31], these forms of communal organization represent a highly diverse cultural and linguistic heritage encompassing most of the nation's 68 official indigenous language groups [32]. Recognized under the current Law of Linguistic Rights of Indigenous Languages [33], these language groups represent the most direct indicator of Mexico's high cultural diversity.

The experiences of community-based conservation in Mexico reflect this biological and cultural diversity, including heterogeneous approaches and levels of community participation. As in other countries, there are two major trends. The first is for grassroots, self-regulated initiatives that foster sustainable resources use and lead to the conservation of biodiversity, ecological functions, and associated cultural values [15, 17]. The establishment or perpetuation of ICCAs that are "natural and/or modified ecosystems containing biodiversity values, ecological services, and cultural values, voluntarily conserved by indigenous and other communities through local or customary laws," fit into this tendency [34]. The second trend is the implementation of conservation activities originally proposed, promoted, and decided by external actors, mainly nongovernmental organizations (NGO), government institutions, and international agencies, which involve local people in decision-making around natural resource use. This includes, for example, the comanagement of protected areas or externally-driven programs established as a means to reclaim ownership of land foreseen as having conservation value under national policy (Chap. 5, this volume).

Although both trends coexist and interrelate in real life, the chapters in this volume show their effects on level of participation and decision-making power and the sustainability of the conservation outcomes. This is especially true because one of the defining characteristics of the grassroots, self-regulated strategies such as ICCAs is that communities hold *de jure* or de facto power in deciding, implementing, and enforcing management decisions [34]. ICCAs themselves constitute only a sampling of the diversity of experiences in Mexico, as these range from localized sacred sites to vast expanses of territory, and from secret to widely publicized areas. They can be categorized broadly into five types, with different degrees of official recognition [35]: (1) government-certified areas, (2) community protected areas without official recognition, (3) protected areas with a forestry certification, (4) natural sacred sites, and (5) wildlife management units. Community-based conservation promoted by external actors can also include actions such as setting land aside for conservation in exchange for monetary resources without selling the land (e.g., conservation easements and usufructs), areas established for Payments for

Ecosystem Services (PES), and establishment of conserved areas after conducting community territorial planning, among others. In an unpublished report by some of the authors of this volume, prepared for the United Nations Development Program in 2010 [36], 312 ICCAs were identified in part of the Southeast of Mexico,[4] corresponding to more than 1,100,000 ha. These areas included 146 government-certified areas, 121 community protected areas without official recognition, 38 protected areas with a forestry certification, three examples of natural sacred sites, and four examples of wildlife management units.

This volume addresses some of the issues facing community-based conservation through specific cases within Mexico, with a particular focus on the southeastern portion of the country. It presents examples and reflections on diverse community initiatives for conservation that range from ICCAs to comanaged areas and related issues affecting local participation in conservation. We also include several chapters that focus on methodological aspects for understanding participation or addressing other aspects of community-based conservation. The contributions presented herein are addressed to policymakers, NGOs, academics, and practitioners interested in the broad subject of conservation conducted by, for, and with local communities. They add to the debate regarding the effectiveness of different conservation strategies and sustain the argument that, in a changing world, the need to incorporate a locally based approach to the protection of nature becomes a global imperative. Yet community-based conservation initiatives need to be documented and analyzed.

The volume is divided into three parts. Part I presents two chapters that provide a general approach to the context of community-based conservation in Mexico. Victor M. Toledo begins his contribution, *Community conservation and ethnoecology*: *the three dimensions of local-level biodiversity maintenance*, by situating his work at the local level within the complex realm of biodiversity conservation. In this realm, he explains, citing Berkes' work, a multitude of actors and institutions interact at different levels (i.e., global, regional, and local). At the local scale, Dr. Toledo points to the prominent role of rural communities and within these the role of indigenous people in conservation, both in Mexico and throughout the world. To frame this position, he defines three main characteristics of indigenous groups that are relevant: *kosmos* (belief systems), *corpus* (knowledge systems), and *praxis* (management systems). He provides several case examples of indigenous groups throughout Mexico, making particular emphasis on the Maya. These examples provide descriptions of current management systems in which local beliefs, knowledge, and practices contribute greatly to the production and reproduction of biodiversity. This multicultural aspect of Mexico endows the country with valuable characteristics for community-based conservation that should be recognized and valued.

The next chapter (Chap. 3), by Leticia Merino-Perez, *Conservation and forest communities in Mexico: Experiences, visions and rights*, focuses on aspects that relate tenure history with forest management and conservation. Dr. Merino explains

[4]The review included the states of Distrito Federal, Estado de Mexico; Guerrero; Hidalgo; Michoacán; Morelos; Puebla; Querétaro; San Luis Potosí; Tabasco; Tlaxcala; Oaxaca Veracruz.

the distinctive character of Mexico in which, after Mexican Revolution, agrarian policy favored communal forest tenure. The latter has made rural communities the predominant forest holders in the country. This makes the local participation in forest conservation particularly important. Nonetheless, history indicates that forest tenure has been accompanied by restrictions on communities' forest use rights, rendering local inhabitants, for the most part, historically excluded from forest stewardship and management. In her contribution, Dr. Merino reports that although sustainable forestry is only present in a small minority of Mexican forested regions, many communities are involved, to different extents, in forest protection. However, the challenges inherent in potentiating their participation in conservation include tenure conflicts, poverty, and the need to strengthen local institutions, among others. Dr. Merino also explains that one of the biggest challenges is the way environmental policy favors an official discourse (reflecting global trends) in which conservation and forestry agendas remain separate, rather than bridging the gap between forest management and conservation. In her words "'No use' nowadays, appears to be the ideal management strategy, and empty territories the preferred conservation landscape" (p. 25, this volume). This exemplifies the contentious context underlying issues inherent in community-based conservation in Mexico.

Part II presents a series of case studies regarding local participation in conservation. Although these case studies are not comprehensive of all issues facing community-based conservation in the different regions of Mexico, they represent examples of some of the contested issues at stake. We favored case studies in the southeast of Mexico and particularly the Yucatan Peninsula not because they proved more relevant, but rather because of personal bias, given the authors' work. However, it is important to highlight that the southeastern region of the country has some of the nation's highest proportions of speakers of indigenous languages and the highest floral diversity in the country. Specifically, the state of Oaxaca alone, a leader in community-based conservation, had 43 registered community conservation initiatives in 2010, in addition to many others that decided not register their conservation areas [35].

Chapter 4, *Community Conservation Experiences in Three Ejidos of the Lower Balsas River Basin, Michoacán*, by Andrés Camou-Guerrero, Tamara Ortiz-Avila, Daniel Ortiz-Avila, and Jorge Odenthal, discusses their experiences in the formation of community-based conservation areas in three *ejidos*. The *ejidos* participated in an internationally funded but nationally administered project called Conservation of Biodiversity in Indigenous Communities (COINBIO). In their chapter, the authors provide an analysis of the elements that both supported and limited the establishment of community conservation areas. They explain how the process of creating the conservation areas was based on the reconstruction of the territory's socio-ecological history. The authors found that all three cases showed that the establishment of community conservation areas promoted collective action, caused people to reflect on their perspectives concerning the mid- and long-term use of their territory and its natural resources, and strengthened the search for productive alternatives. Among the limitations was the initiatives' lack of coordination with regional

processes of biodiversity conservation promoted by governmental agencies, such as the creation of the Zicuirán-Infiernillo Biosphere Reserve, putting both local and national efforts at risk of failure.

Chapter 5, *Challenges in ICCA governance: the case of El Cordon del Retén in San Miguel Chimalapa, Oaxaca*, is presented by Constanza Monterrubio-Solís and Helen S. Newing. With this example the authors bring to the discussion a conflictive case known for its resistance to externally imposed conservation measures. These are seen by local people as diminishing community control over natural resources and illustrate how official recognition of community-based conservation does not necessarily imply greater local autonomy and legitimacy. The authors point out this contradiction as one of the challenges being identified in ICCAs around the world. The case of *El Retén* shows the potential of formal state recognition to weaken community control over ICCA decision-making and management. Through the case study Ms. Monterrubio and Dr. Newing also illustrate the need for a broader landscape approach to find a way to engage with overriding local concerns. The authors explain that this means transcending an isolated protected areas framework by integrating them into a landscape approach, in which larger-scale patterns of tenure and use are considered. This case emphasizes the conservation importance of developing participatory, long-term, sustainable processes that focus not only on the market profitability of projects but also on transparency and cultural sovereignty.

The third of these case studies, *Local perceptions of conservation initiatives in the Calakmul region*, by Luciana Porter-Bolland, Eduardo García-Frapolli, and María Consuelo Sánchez-González, addresses the issue of local participation within officially established protected areas. The studied *ejidos* are located in the Calakmul Biosphere Reserve, one of the largest reserves in tropical Mexico, and the authors' analysis illustrates local perceptions of involvement (and limitations) for those living within a protected area. As in the previous case study, the chapter asserts the importance of viewing conservation not only within a local, delimited area, but also as a broader regional strategy in which livelihood production (including external opportunities regarding forest and agricultural development, private investment, and markets) align with environmental stewardship. Greater autonomy, participation in decision-making, and building up local institutions are crucial aspects for strengthening local involvement in protected areas, making long-term biodiversity conservation possible.

The last case study, *Community Conservation in Punta Laguna: a case of adaptive ecotourism management*, by Eduardo García-Frapolli, Martha Bonilla-Moheno, and Gabriel Ramos-Fernandez, is based on more than 30 years experience of community-based conservation based on ecotourism in the small Yucatec Mayan community of Punta Laguna. In their chapter, the authors explain how, at different moments during these three decades, the community has employed different ecotourism management approaches. These have driven a learning process that has led them to modify exclusionary behaviors, increase the importance of local decision-making, and implement entrepreneurial attitudes towards managing their community-based conservation initiative. The process, they explain, has been characterized

by complexity and conflict among community members and other stakeholders. The process has also been influenced by external disturbances such as hurricanes, global economic crises, and pressures resulting from changes in regional tourism development. From an adaptive management perspective, the authors show how learning occurs, adjustments are made over time, and new understandings are incorporated into the community's experience, strengthening the community initiative.

Part III, the last section of the volume, contains three chapters on methodology for understanding and strengthening community-based conservation and the way it is studied. First, Isabel Ruiz-Mallén, Antonio de la Peña, María Elena Méndez-Lopez, and Luciana Porter-Bolland, in their chapter *Local participation in community conservation: Methodological contributions*, point to different theoretical frameworks used for understanding and measuring participation. They refer to a dominant approach that understands participation as an intrinsic value within a community and measures it in terms of its social capital. In contrast, a second approach assumes that human individuals are hierarchically arranged into divisions of power and wealth within a community, determining their participation. Both theoretical frameworks use a variety of methods to assess different levels and types of local participation in natural resource management. In their chapter, the authors discuss the methodological implications of both approaches by reviewing evidence from research on participation in protected area management and conservation. They focus on previous literature based on research that draws on both qualitative and quantitative methodologies for assessing rural and indigenous community participation on environmental decision-making in developing countries. They also provide an example of a research design using aspects of both approaches for studying local participation in conservation in different areas of the Mexican southeast.

The second contribution in this section is by Diana J. Pritchard. In her chapter *Community-based biodiversity monitoring in Mexico: Current status, challenges and future strategies for collaboration with scientists*, Dr. Pritchard discusses the potential for community-based monitoring to support the need for measurements of biodiversity status and trends, to fulfill a national and international demand by entities engaged in understanding and supporting conservation. She also lays out the potential role of monitoring for strengthening sustainable use of biological diversity; analyzing threats and the integrity, goods, and functions of ecosystems; documenting the value of traditional knowledge and practices; and facilitating access and benefit sharing. The chapter draws on cases from across the world to outline the merits of local involvement in monitoring relative to conventional monitoring. It also establishes a conceptual framework to distinguish the qualitative differences between different monitoring schemes that involve both scientists and communities. In her chapter, Dr. Pritchard characterizes existing monitoring activities underway in Mexico within the public and private sectors and among rural communities and sets out some strategies to promote engagement with community participation in monitoring activities.

Finally, in their chapter, *Drawing analysis: tools for understanding children's perceptions of community conservation*, Roser Maneja-Zaragoza, Diego Varga Linde, and Martí Boada Juncà provide methodologies for environmental education

that can improve knowledge of children's interests and perceptions regarding the environment. They use young people's drawings to understand their perceptions of their community as a basis for formulating educational and planning proposals to promote learning and action regarding local environmental issues in a regional and local context. These proposals can increase awareness of problems in the relationship between humans and nature and thereby the potential for positive social and environmental change. They conclude that pictorial representations of the environment represent an effective tool to reveal the perceptions and interests of new generations involved in spaces of formal and informal conservation.

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# Part I
# A General Approach to the Context of Community-Based Conservation

# Chapter 2
# Community Conservation and Ethnoecology: The Three Dimensions of Local-Level Biodiversity Maintenance

**Víctor Manuel Toledo Manzur**

## Introduction

Biodiversity conservation has largely relied on protected natural areas and national parks controlled by central governments, international agencies, and/or private institutions. On one hand, much of the world has adopted this approach as the primary way to carry out conservation. On the other hand, an alternative or complementary model, which emphasizes small-scale, community-based conservation, is gaining importance as studies demonstrate the key role of indigenous and local peoples in biological conservation [1–3].

Western and Wright [4] (p. 7) provided a seminal definition of community-based conservation, which "includes natural resources or biodiversity protection by, for, and with the local community" and where the main objective is the coexistence of people and nature. Thus, community conservation represents both the basis and the point of departure for any biocultural conservation approach where both nature and culture are two dimensions of the same conservation goal.

Following Berkes [5], three basic premises can be formulated about conservation of biological richness. First, biodiversity conservation can be treated as a multilevel commons problem: "Biodiversity is a global commons important for humanity as a whole, a regional commons important for ecotourism and other benefits, and a local commons that produces ecosystem services for human well-being at the community level" [5] (p. 15188). Second, therefore, as a multilevel commons, the ownership and control of biodiversity are complex, because the social systems involved in conservation are also multilevel, with institutions at various levels of organization from local to international. Because each level is distinct, the perspective from each level is also likely to be different. The global lens of biodiversity conservation

V.M. Toledo Manzur, Ph.D. (✉)
Laboratorio de Etnoecologia, Centro de Investigaciones en Ecosistemas,
Universidad Nacional Autònoma de México, Morelia, Michoacán, Mexico
e-mail: vtoledo@oikos.unam.mx

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(a global commons) is therefore different from the local lens on biodiversity (local commons for livelihoods). Finally, "This difference does not mean one perspective is right and the other wrong; they can both be correct from different points of view. Pluralism in perspectives is mirrored in pluralism in knowledge" [5] (p.15188).

At local, and perhaps at micro-regional or municipal levels, the main social actors in many tropical countries that are home to the richest biological diversity are rural communities, many of them belonging to indigenous people. Brazil, Colombia, Mexico, Indonesia, Australia, New Guinea, India, Peru, and other countries are examples of areas where the richest numbers of species overlap with indigenous territories [1].

The above is especially true in Latin America. In Mexico, for example, so-called social property includes more than 100 million hectares distributed among two kinds of social owners: *ejidos*, which are constituted by peasant family nuclei favored by the redistribution of land, and *comunidades*, primarily old indigenous communities that have been reestablished and federally recognized. In both cases property is of a social nature, regimented by rules of access, possession, and transmission based on the community and equitable use of land.

The peasant sector that still uses indigenous languages controls an area estimated at 28 million hectares, which correspond to 22 biocultural hot spot centers [6]. Peasant and indigenous territories contain the principal sources of water, biodiversity, and genetic resources in the country, constituting a unique biocultural wealth [7].

In Central America, Chapin [8] produced a detailed map, published by the National Geographic Society, which showed that areas that remain under tropical and temperate forest cover coincide substantially with indigenous territories. In addition, the principal Biosphere Reserves in Central America overlap or correspond to indigenous populations (Maya, Las Minas, Rio Platano, Bosawás, La Amistad, and Darien). The case of Kuna Yala, located in the Atlantic region of Panama, is especially noteworthy because several decades ago the indigenous communities of the Kunas took autonomous control of their territory, where today they still maintain traditional forms of subsistence and a conservation plan.

In South America, although indigenous communities represent less than 2 and 1 % of the total population of Colombia and Brazil, respectively, indigenous cultures play roles of enormous importance in the conservation of the countries' ecological and biological richness. In the first case, the almost 100 different cultures that inhabit the country hold between 30 and 50 % of Colombian territory through a system of legal defense called *resguardos* [9, 10]. In Brazil's case, 300,000 indigenous people speak 233 different languages and possess almost 100 million hectares of territory, principally in the Amazon region [11]. In addition to the above, Brazilian extractive reserves combine active conservation with the use of non-timber products. This combination helps to conserve enormous portions of the Amazon Basin in Colombia and Brazil that have high levels of biodiversity.

As a contribution to the pluralistic and multilevel approach to conservation, this chapter analyzes the main conservation features of social actors at the local community level. That analysis is made using an ethnoecological perspective, which in turn is based on the integration of three cultural dimensions: beliefs, knowledge, and practices of traditional individuals, households, and communities.

## An Ethnoecological View of Community Conservation

Although the label appeared for the first time in 1957, scientists and researchers are increasingly using the term ethnoecology. Over 400 publications (papers, books, and theses) explicitly use the term [12]. Unfortunately, the word ethnoecology has been utilized without appropriate conceptualization. Thus, with very few exceptions [13–15], scientists have engaged in little critical reflection on to what precisely the term ethnoecology refers.

Following the premise that culture cannot be separated from production, the author and his colleagues have developed a definition of this new field of knowledge. Ethnoecology can be defined as an interdisciplinary approach exploring how human groups perceive nature through a screen of beliefs and knowledge and how, in terms of their cultural inheritance, humans use and/or manage natural resources [16–18]. Thus, by focusing on the *kosmos* (the belief system or cosmovision), the *corpus* (the whole repertory of knowledge or cognitive systems), and the *praxis* (the set of practices), ethnoecology offers an integrative approach to the study of the process of human appropriation of nature. This approach allows recognition of the value of the belief–knowledge–practice complex of indigenous peoples in relation to the conservation of biodiversity [1].

## *The* Kosmos

For indigenous peoples, land and nature in general have a sacred quality that is almost absent from Western thinking. Land is revered and respected, and its inalienability is reflected virtually in every indigenous cosmovision. Indigenous people do not consider the land as merely an economic resource. Under indigenous cosmovisions, nature is the primary source of life that nourishes, supports, and teaches. Nature is, therefore, not only a productive source but also the center of the universe, the core of culture, and the origin of ethnic identity. At the heart of this deep bond is the perception that all living and nonliving things and natural and social worlds are intrinsically linked (the reciprocity principle). Of particular interest is the research done by several authors [6, 9, 19, 20] on the role played by the cosmology of several indigenous groups as a regulatory mechanism in the use and management of natural resources. In indigenous cosmovisions, each act of appropriation of nature must be negotiated with all existing things (living and nonliving) through different mechanisms, such as agrarian rituals and shamanic acts (symbolic exchange). Humans are thus seen as a particular form of life participating in a wider community of living beings regulated by a single and totalizing set of rules of conduct.

The principal consequence of this set of rules of conduct for conservation is the existence of a certain *ecological code of ethics*. This code stems from the indigenous vision of life, in which people view nature as a live being with the capacity to speak and dialogue with human beings. This sacred ecology, as coined by Berkes [21], uses as its base the idea of a balance or equilibrium of everything that exists and thus

describes a framework for human interaction with the Earth's natural resources. The tangible expression of this code of ethics is the existence of the sacred sites and territories that indigenous communities have established throughout the world.

Sacred natural sites are the spatial expression of spirituality and religion as well as the earliest form of protected areas [3]. Sacred natural sites consist of all types of natural features including mountains, hills, forests, groves, rivers, lakes, lagoons, caves, islands, springs, and trees. Sacred sites have been recorded in 33 countries, with over 13,000 sacred groves in India alone [22].

## *The* Corpus

Indigenous societies house a repertoire of ecological knowledge that is generally local, collective, diachronic, and holistic. In fact, since indigenous peoples possess a very long history of resource use practice, they have generated cognitive systems of their own circumscribed natural resources, which are transmitted from generation to generation. The transmission of this knowledge is conducted through oral language; hence, the corpus is generally an unwritten knowledge. Memory is, therefore, the most important intellectual resource among indigenous cultures.

This body of knowledge is the expression of a certain personal wisdom and, at the same time, of a collective creation, or in other words, a historical and cultural synthesis turned into reality in the mind of an individual. For this reason, the corpus contained in a single producer's mind expresses a repertoire that is a synthesis of information from at least four sources: (a) the experience accumulated over historical time and transmitted from generation to generation by a certain cultural group, (b) the experiences socially shared by the members of a shared time's generation or cohort, (c) the experience shared in the household or the domestic group to which the individual belongs, and (d) the personal experience, particular to each individual, achieved through the repetition of annual cycles (natural and productive), enriched by the perceived variations and unpredictable conditions associated with them [17].

Thus, indigenous ecological knowledge is normally restricted to immediate or proximate environments and is an intellectual construction resulting from a process of accumulation of experiences over both historical time and social space. These three main features of indigenous ecological knowledge (being local, diachronic, and collective) are complemented with a fourth characteristic, namely, holism. Indigenous knowledge is holistic due to its intricate linkages to the practical needs of use and management of local ecosystems. Although indigenous knowledge is based on observations on a rather restricted geographic scale, it must provide detailed information on the whole scene represented by concrete landscapes where natural resources are used and managed. As a consequence, indigenous minds not only possess detailed information about species of plants, animals, fungi, and some microorganisms; they also recognize types of minerals, soils, waters, snow, landforms, vegetation, and landscapes.

Similarly, indigenous knowledge is not restricted to the structural aspects of nature, which are related to the recognition and classification (ethnotaxonomies) of elements or components of nature. This knowledge also refers to dynamic (referring to patterns and processes), relational (linked to relationships between or among natural elements or events), and utilitarian dimensions of natural resources. As a result, a high degree of cognitive integration ensures the holistic character of indigenous knowledge and serves as a methodological framework for ethnoecological research [16].

## *The* Praxis

Indigenous societies generally subsist by appropriating a diversity of biological resources from their immediate vicinity. Thus, subsistence of indigenous peoples is based more on ecological exchanges (with nature) than on economic exchanges (with markets). They are therefore forced to adopt survival mechanisms that guarantee an uninterrupted flow of goods, materials, and energy from ecosystems. In this context, indigenous societies adopt a predominant use–value economic rationality, which in practical terms is represented by a multiuse strategy that maximizes the variety of goods produced in order to provide basic household requirements throughout the year [23]. This main feature accounts for the relatively high self-sufficiency of indigenous households and communities.

Indigenous households tend to engage in nonspecialized production based on the principle of diversification of resources and practices. This mode of subsistence results in the maximum utilization of all available landscapes in the surrounding environments; the recycling of materials, energy, and wastes; the diversification of the products obtained from ecosystems; and, especially, the integration of different practices: agriculture, gathering, forest extraction, agroforestry, fishing, hunting, small-scale cattle raising, and handicrafts. As a result, indigenous subsistence implies the generation of a myriad of products including food, domestic and work instruments, housing materials, medicines, fuelwood, fibers, and animal forage.

Under this multiuse strategy, indigenous producers manipulate the natural landscape in such a way that they maintain and favor two main characteristics: habitat patchiness and heterogeneity and biological as well as genetic variation. In the spatial dimension, indigenous territories become a complex landscape mosaic in which agricultural fields, fallow areas, primary and secondary vegetation, household gardens, cattle-raising areas, and water bodies all act as segments of the entire production system. This mosaic represents the field upon which indigenous producers, as multiuse strategists, play the game of subsistence through the manipulation of ecological components and processes (including forest succession, life cycles, and movement of materials). Researchers have demonstrated that some forms of natural disturbance can increase biodiversity if they increase habitat heterogeneity, reduce the influence of competitively dominant species, or create opportunities for new species to invade an area.

Conversely, the number of species is commonly and relatively small in highly disturbed biotic communities, because few populations are able to reestablish themselves before they are reduced by later disturbances. In contrast, a low rate of disturbance provides few opportunities for pioneer species and might allow competitively dominant species to usurp limiting resources. Therefore, biodiversity is often greater at intermediate levels of disturbance than at either lower or higher frequencies.

The creation of landscape mosaics under an indigenous multiuse strategy in areas originally covered by only one natural community represents a human-originated mechanism that theoretically tends to maintain (and even increase) biodiversity. Several authors have already stressed the importance of models of low-intensity mosaic usage of the landscape by indigenous peoples and other smallholder populations for biodiversity conservation. The same diversified arrangement found in indigenous landscapes tends to be reproduced at a microlevel, with multispecies, multistory cropping, or agroforests favored over monocultures.

As a consequence, animal and especially plant genetic resources tend to be maintained in indigenous agricultural fields, aquaculture systems, home gardens, and agroforests. Polycultural systems managed by indigenous agriculturalists and agroforesters are relatively well known, and the recent specialized literature contains plenty of case studies illustrating such designs. Especially notable are the home gardens and agroforestry systems of the tropical and humid regions of the world, which operate as human-made refuge areas for many species of plants and animals, notably in areas strongly affected by deforestation. At the farm level, it is broadly recognized that crop populations are more diverse in indigenous farming systems than in agricultural areas dominated by agro-industry. Therefore, indigenous peoples are recognized as key agents of on-farm preservation of plant genetic resources threatened by agricultural modernization (genetic erosion). The production of fossil-fuelled monocrops instead of indigenous-cropped polycultural parcels also promotes the loss of biodiversity in farming systems. Indigenous agricultural systems and landscapes are acknowledged as designs that preserve not only landraces of crop species but semidomesticated and wild crop relatives, and even non-domesticated species.

## Examples and Cases

As developed in the last section, conservation initiatives of indigenous communities are facilitated by intrinsic features, linked with their own beliefs, knowledge, and practical strategies. These three dimensions can act separately or in diverse combinations and intensities. Although there is not a systematized inventory at the national level of case studies certifying the validity of these ethnoecological assumptions, this final section makes a brief review of the relevant examples reported by the literature.

Examples of community conservation projects have proliferated in the south and southeast of the Mexican territory in the last decade, especially in Quintana Roo [24], Chiapas [25], and Oaxaca. In this last state, conservation initiatives were

reported in 90 communities with an area of 265,000 ha in 2007 [26], a figure that increased to 126 cases with 375,000 ha by 2011 [27]. Community conservation efforts in the southern regions of Mexico were especially promoted by COINBIO, a World Bank project devoted to conserving areas of high biodiversity by strengthening community conservation initiatives on communally owned lands in the states of Oaxaca, Michoacán, and Guerrero.

In addition to the above, outstanding examples of biodiversity and ecological conservation for spiritual reasons have been documented in indigenous groups of the northeast. The best-known example is that of the Wixárika (also known as Huichol) [28]. For more than 1,000 years, the Wixárika people have made pilgrimages from their ceremonial centers in the Sierra Madre Mountains, across the desert, to Leunar, the sacred mountain where the sun first rose. The Wixárika pilgrims traverse more than 800 km, stopping to give offerings and say prayers at dozens of sacred places along the way. The route encompasses the area known as Wirikuta, the final destination of the annual pilgrimage ritual. Wirikuta is a spatially definable sacred landscape of approximately 140,000 ha, which is dotted with sacred natural physiographical features (water bodies, mountains, rock formations, etc.), as well as sacred plant and animal species, conformed by the peyote, the revered cactus, and the deer. Even though Wixárika people's pilgrimage route and their destination are protected by state and federal law as well as international accords, a Canadian mining company, First Majestic Silver Corporation, is attempting to exploit the rich veins of silver that lie beneath the surface of the landscape.

A second example is that of the Seri Indians. The total Seri population currently numbers fewer than 900 individuals, who own a territory totaling 210,000 ha in the state of Sonora, encompassing Tiburón Island (120,000 ha), and 90,000 ha of mainland territory. This nomadic group considers Tiburón Island, or *Tahejöc*, to sit at the center of its cosmovision and universe. In the mid-1990s, Tiburón Island, together with other islands in the Gulf area, fell under federal protection as part of The Great Islands Biosphere Reserve. As a whole, the Seri indigenous region has one of the highest percentages (56–91 %) of primary vegetation cover in the nation, resulting from the sound traditional management system implemented by the Seri people. Seri subsistence was based on the use of both terrestrial (over 300 plant species, of which 75 are edible [29]) and marine sources (fishes, turtle, and eelgrass, *Zostera marina*). Fieldwork [28] has shown that the Seri territory, including the peninsular and island areas, is dotted with sacred entities varying in size, importance, and significance. The Seri territory in its entirety can be categorized as a sacred landscape marked by various sacred natural physiographical features (water sources, rock formations, coastal mangroves, etc.) that are revered by the community due to their spiritual significance. The Seri territory also contains communities of sacred floral and faunal species (e.g., cacti, shrubs, and marine turtles). Other similar cases have been documented by Otegui-Acha [28] in the Huastec sacred caves and Tarahumara and Yaqui/Mayo regions.

Unlike the above examples, in the tropical and humid regions, indigenous groups tend to maintain tracts of mature and secondary forests and their species for practical reasons. In fact, indigenous groups adopt a multiple-use strategy, which combines

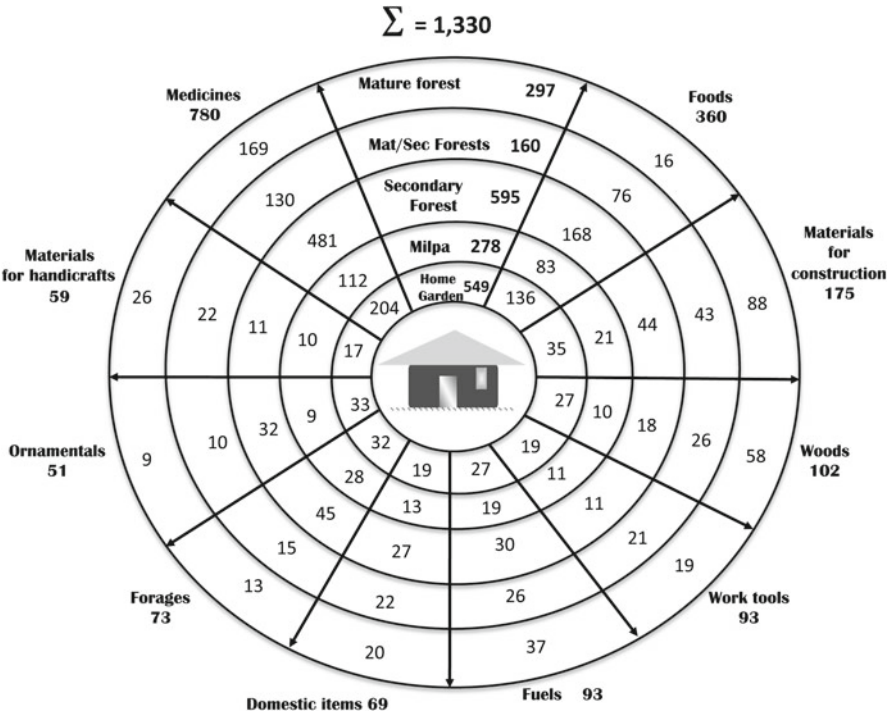


**Fig. 2.1** Number of plant species per landscape unit utilized by ten indigenous groups of the tropical lowlands of Mexico (Huastecs, Totonacs, Otomis, Chinantecs, Nahuas, Popolucs, Zoques, Mayas, Lacandons, and Chujs) as reported by ethnobotanical research. *Boldface numbers* indicate the total number of species per landscape unit [30]. Note that only one figure is given for *milpa* and home gardens

agricultural husbandry and forestry activities. The system includes the use and management of mature forests, secondary forests and their regrowth stages, as well as agroforests resulting from the manipulation and introduction of additional productive species into forests (coffee, cacao, vanilla, and other commercial species). It further encompasses *milpa* or cornfields, *potreros* or cattle-raising areas, cash crops or agricultural fields other than *milpa*, water bodies, and home gardens. Depending on its particular environmental, social, and economic conditions, each household utilizes several or all of the landscape units as part of its multiple-use management strategy. Different versions of this diversified system have been explicitly or implicitly recognized and reported by researchers in case studies of such ethnic groups as the Huastecs, Totonacs, Chinantecs, Mazatecs, Chontales of Tabasco, Zoques, Nahuas, and Lacandons (see ref. in Toledo et al. [30]). As a result, the number of useful species per household and/or village becomes impressive. A quantitative survey of the useful flora based on the ethnobotanical studies carried out among ten indigenous groups inhabiting the humid tropics of Mexico revealed a total of 1,330 useful plant species and 3,173 “products” (Fig. 2.1) [31]. From a conservation perspective,

the creation of landscape mosaics under indigenous management in areas that were originally covered by only one kind of ecosystem represents a human-originated mechanism that, theoretically, tends to maintain and even increase biodiversity. The idea that maintaining a productive landscape with a variety of uses and ecosystems is the best strategy to maintain biodiversity has gained consensus among scholars.

Over the past 3,000 years, Mayan peoples have inhabited some of the most biologically rich regions in the world. Today, one group of direct descendants of the ancient Mayans is the indigenous communities that inhabit the Yucatan Peninsula. This region presents adverse environmental conditions, such as the absence of surface water in the north and center of the peninsula, more than 6 months without rain, land that is not very apt for agricultural activities, recurrent forest fires, and a high frequency of hurricanes. Despite its long history of settlement, and a present-day population of around one million inhabitants, the region contains notable forested areas and a moderate diversity of flora, estimated at between 2,400 and 3,000 plant species (Fig. 2.1) [32].

From an ethnoecological point of view, an analysis of the present-day Yucatec Maya [33, 34] reveals three dimensions of their culture with clear conservation value. First, their strategy of applying multiple functions to their natural surroundings leads to their taking advantage of a variety of landscapes for subsistence and interchange of goods at a domestic level. Next, their sacred concept of health, in the sense of balance or precarious equilibrium, is applied at multiple levels, from care of the human body, the house, the home garden, the community, and the fields to the concept of the whole world or the universe. Finally, the people's knowledge of plants, animals, fungi, topography, soils, vegetation, among others, operates as a point of articulation between the two dimensions above [33].

The Yucatec Maya adopt a strategy of multiple use of local resources, which permits them to maintain a dual economy based on production for subsistence, with the extra outputs of this production destined for markets. By putting this strategy into practice, the communities maintain, use, and manage between 300 and 500 different species of plants and animals. The majority of these species come from the family home garden and from forest management. The multiple-use strategy adopted by Yucatec Maya is spatially expressed in landscape mosaics (see Fig. 2.2), a pattern found throughout the entire Yucatan Peninsula.

A key element needed to understand the Maya cosmovision is their concept of the Earth (*Lu´um*), as a polysemic, syncretic, and multidimensional domain. In effect, *Lu´um* is commonly utilized to refer to the soil, the land, the territory, the landscape, nature, and even the whole world [35, 36]. Each of these concepts is assigned to a function of discursive context or practice. As a domain, *Lu´um* has a utilitarian value as well, referring to food products, the house, health, and energy as something sacred (esthetic, symbolic, and intangible) [36, 37] although no separation exists between the material and the symbolic. *Lu´um* has a multidimensional connotation, as well, since this term refers (a) to the Earth as a bidimensional space, (b) to the soil and ground as a three-dimensional space, and (c) to the Earth as an intangible or holy domain. In effect, *Santo Lu´um* or the spirit of the Earth is one of the most important deities of contemporary Yucatec Maya culture and is amply

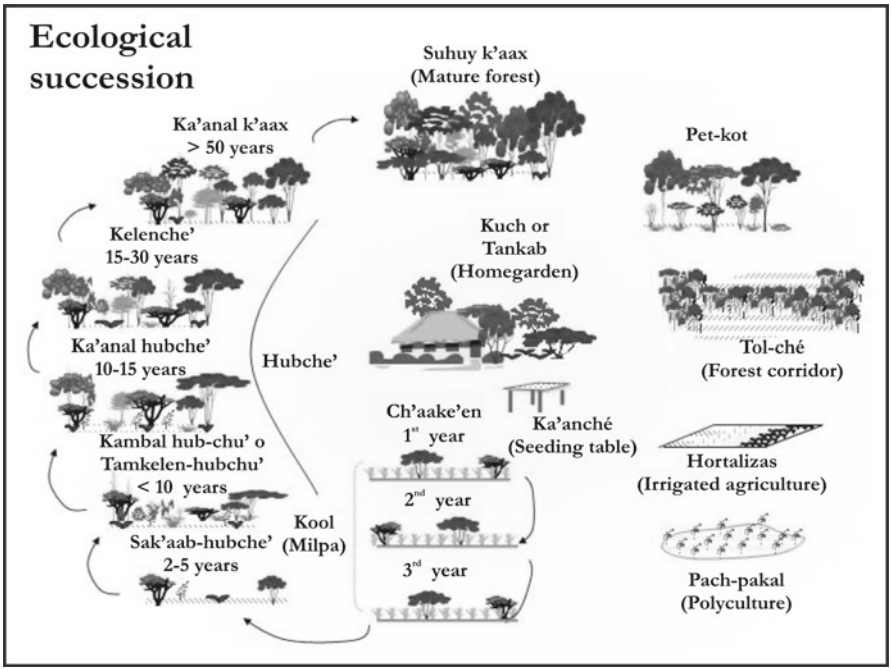


**Fig. 2.2** Scheme of the multiple-use strategy adopted by Yucatec Maya families [33]

venerated. Moreover, the semantic richness and epistemology of the *Lu´um* domain is an expression of syncretism, because Yucatec Maya experience a synthesis of pre-Hispanic, colonial, and modern times [33].

Finally, the Yucatec Maya consider the Earth to be a living being, whose health is related to the food chain and the well-being of plants, animals, the ground, and all interconnected living beings [36, 37]. Supernatural beings or *aluxes* (the owners or administrators of natural phenomena) take part in rituals or practices that commemorate conservationist actions, which have as their objectives a material and symbolic balance, when weighing abundance and scarcity and weakness and strength. The studies documenting Maya rituals illustrate the concept of health and equilibrium and the permanent relationship that exists among humans, the Earth, nature, and the gods.

These three ethnoecological case examples illustrate the complex interrelationship of indigenous *kosmos, corpus*, and *praxis* in creating and maintaining highly biodiverse conserved landscapes in Mexico. The presence of the sacred in the material and everyday, extending from the self to the landscape, inscribes conservation in lived practice, in place. To succeed, community conservation efforts and formal recognition schemes must take these cosmovisions as seriously as those of Western science.

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# Chapter 3
# Conservation and Forest Communities in Mexico: Experiences, Visions, and Rights

**Leticia Merino-Perez**

*Complex ecosystems need to be managed by complex governance systems*

Elinor Ostrom

## Introduction

As in other developing countries, in Mexico forest and conservation policies are fields of debate and struggle. Among the urban population—which makes up the vast majority of the country—it is generally thought that deforestation is intense, widespread all through the nation; collective property and use of natural resources by the rural poor are regarded as the main drivers. While deforestation and forest deterioration are frequent in many regions, they cannot be explained using simple equations. Simplified perceptions of socio-environmental contexts become foundational assumptions for the elaboration of public policies that often misread local realities and result in dysfunctional panaceas when imposed on local societies and landscapes [1, 2]. Based on the results of empirical research on 103 forest communities, I discuss some of the main demographic, social, and economic characteristics of the Mexican forest communities that safeguard much of Mexican biological diversity. I emphasize tenure features, uses of the forests, local protection and conservation practices, and local perceptions regarding different pressures on forest systems. I analyze the role that forest communities play in forest conservation in light of these research findings.

L. Merino-Perez (✉)
Instituto de Investigaciones Sociales, Universidad Nacional Autónoma de México, Mexico City, Mexico
e-mail: merinoleticia@gmail.com

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## Forests, Rights, and Ecological Values

Seventy-three percent of Mexico, i.e., nearly 142 million hectares, is under forest cover, which comprises a wide variety of forest ecosystems that include pine, pine-oak, and cloud forests, as well as humid and dry tropical forests, all of which contribute to Mexico's status as a mega-diverse country. Mexican agro-biodiversity is also rich by global standards.

The vast majority of forested land (75 %) is under collective tenure, and more than 50 % of all collective holdings are forest communities.[1] One hundred and five million forested hectares are collectively owned by 30,305 *ejidos* and *comunidades agrarias* [3]. Mexican forest regions are home to nearly 12 million people; many of them are indigenous [4] and most of them are poor and have weak political representation and political voice. Collective tenure is the result of an extensive agrarian reform implemented from the 1930s to the early 1980s [5–9]. There are two legal types of collective property: *ejidos*, which represent the majority of collective holdings and refer to land that was given by the state to groups of petitioners. *Ejidatarios* are individuals who have tenure rights in *ejidos*. *Comunidades agrarias* are areas of land that were restituted to indigenous communities after their historical rights were officially recognized. The most relevant contemporary difference between these two types is the capacity of *comunidades agrarias* to include new members and the legal impediment for *ejidos* to do so, as *ejidatarios* can only bestow their rights on one single successor.[2] Within the territories of *ejidos* and *comunidades agrarias,* agricultural plots and houses in the settlements are privately owned, while other areas such forests, bodies of water, and pastures are generally considered commons. Forests within communities are by law not only commonly owned but also communally managed, as the federal agrarian and forest laws prohibit the division of forest areas and consider community assemblies to be legally responsible for forest management. Nevertheless, in different regions, forest areas have been parceled out, driven by diverse agricultural policies and by the implementation of new land tenure legislation after the signature of the North American Free Trade Agreement (NAFTA) in the mid-1990s.

[1] I use the term "community" to refer to both *ejidos and comunidades agrarias.* When I refer specifically to the later I explicitly call them *comunidades agrarias.*

[2] From 1993 to 2007, the *"Programa de Certificación de Derechos Ejidales*" (PROCEDE) certified property rights after defining territorial limits. It also certified individual property rights over agricultural plots in those *ejidos* that agreed to do so. PROCEDE only worked with *comunidades agrarias* in a second phase and then only to define borders, as the agrarian reform law prohibits the direct privatization of these lands. In order for *comunidades agrarias* to parcelize land, assemblies need first to decide to become *ejidos* in order to grant individual property rights with the subsequent possibility of selling them into private lands. In 2007, when PROCEDE closed, 41 % of collective lands in the country remained uncertified. These were mostly forestlands of *comunidades agrarias*. These lands are not included in the Registro Agrario Nacional (RAN), which consequently reports lower values of the proportion of community property in the nation's forest cover.

Communal property has deep historical roots in Mexico. It was present in pre-Hispanic times and prevailed in many regions after the Spanish conquest. During the three centuries of colonial rule, communal tenure was the only type of property regime permitted for indigenous peoples [6]. After independence in the nineteenth century, the prevailing liberal policies regarded private property as an imperative for achieving desired economic modernization. By the mid-nineteenth century, communal lands and those of the Catholic Church[3] were declared public property. From the 1870s to the 1900s, most of these lands were sold or given in concessions to foreign railroad and mining companies, as well as to private owners with government privileges, creating an unprecedented concentration of lands in private hands. Large landholdings known as *haciendas*, dedicated to export crops (such as sugar, cotton, henequen, tobacco, and coffee), rapidly grew on the old communal lands. *Haciendas* benefited from the cheap, and sometimes even forced, labor of those dispossessed by the implementation of postcolonial tenure laws. Nevertheless, communal property and communal governance prevailed in many forested regions, which were protected by their remoteness and the poor agricultural value of most of the lands. The restoration of previously communal lands to local communities and the distribution of the lands of *haciendas* among their workers were the main claims of the massive social movement that took root in Mexico at the beginning of the twentieth century. After the 10-year revolution, agrarian reform policy became a pivotal political strategy for peacekeeping and political control of rural society.[4]

As a consequence of land reforms after the revolution, Mexico became one of the few countries in the world[5] where communities have legal ownership of a large share of forestlands. However, community forest property still has important limitations. Among these is the fact that federal government retains strong control over rights to forest resources within community lands, so even if commoners and *ejidatarios* have access and use rights to forest resources [10], these are under strong governmental regulation. Also, water and underground resources are legally defined as public property all over the country, which gives the federal government the right to use or grant concessions on water and mineral resources within community lands.[6] Under this legal scheme, the federal mining law defines mining as a national priority over any other activity. During the federal administration of 2006–2012, the lands under mining concessions[7] increased by 53 %, affecting 30 % of the mountainous lands of Mexico, which are often forested.

[3] The Catholic Church was the main landowner in Mexico by the end of the colonial period.

[4] All solicitors of land were registered as members of the official party, the *Partido Revolucionario Institucional (PRI)* that remained in power for more than 70 years. Often rural members of the PRI were not aware of this affiliation. As party members, their votes were automatically assigned to the PRI in all elections.

[5] Second only to Papua New Guinea

[6] Constitución General de los Estados Unidos Mexicanos, Art. 27

[7] The majority of the mining concessions in Mexico—granted by the federal government—are currently in hands of Canadian corporations.

Forests are sources of multiple ecosystem services[8] that benefit a variety of social actors at local, subnational, national, and global scales. Social and political asymmetries tend to divide stakeholders whose perceptions about forests values and views regarding the ways forests should be managed differ, and even conflict. Different actors also have and/or claim differing rights. During the last three decades, forest conservation and forest environmental services have gained national and global relevance. Forest conservation is particularly sensitive in Mexico since forests host much of the countries' biological diversity. There is also a growing perception of scarcity concerning the hydrological services provided by forests and the role they play in the mitigation of global climate change and its local impacts. Control over forests is an increasingly contested domain. National urban and international stakeholders perceive deforestation as a never-ending generalized process driven by the poverty of forest dwellers and their collective rights over forests. The last two federal administrations have been strongly responsive to these urban and international concerns [11].

## Conflicting Agendas: Forests, Conservation, and Agrarian Policies in Modern Mexico

Over the last two decades, policy analysts and lobbying groups in international arenas have underlined the importance of recognizing the property rights of local forest user groups as a key for both conservation and equity. Recognition of these rights is shown to create long-term incentives and commitments among local people toward forest conservation [2, 12–16]. How does this hypothesis apply to Mexico, where forest communities gained legal property rights much earlier than elsewhere (in modern times), yet where deforestation rates have been, for decades, some of the highest in the world?

Part of the answer to this apparent contradiction lies in the incomplete devolution of property rights and the limited role given to local rural communities by development policies.[9] Conservation goals were marginal to policy for many decades and

[8] The perspective of the *Millennium Ecosystem Assessment,* distinguishes provision, regulating, cultural, and support ecosystem services.

[9] I refer to lack of investment, bureaucratic control, and price controls on the products of small rural producers (i.e., corn, beans, and wheat), which resulted as early as the 1960s in increasing rates of bankruptcy among them. The chronic crisis of the countryside was deepened after the implementation of the North American Free Trade Agreement, which resulted in massive outmigration from rural and indigenous areas, where illegal cropping is frequently the only viable economic option (Warman A. El Campo Mexicano en el Siglo XX. Mexico: Siglo de Luces y Sombras, Fondo de Cultura Económica; 2000. Robles Berlanga, H M. Apuntes sobre el ejercicio del presupuesto 2007 para el sector rural. Mexico City: Centro de Estudios para el Desarrollo Rural Sustentable Times, *Feb* 18 (2009):4. Gordillo, Apendini, Bartra, Merino and Scott; 2011. Un nuevo trato para la sociedad rural. Escuela de Administración Pública de la Ciudad de México, México. 2011; Fox, Jonathan y Haight Libby (coord.) Subsidios para la Desigualdad. Las políticas públicas en México a partir del libre comercio, CIDE, México; 2011).

were only taken into consideration following policyholders' gradual recognition of the significant social and environmental impacts of unsustainable development and agrarian policies on landscapes and communities.

In the second half of the twentieth century, as industrial development was adopted as a central policy orientation, contradictions among different policies became evident. The Federal Agrarian Department granted property rights to rural communities all over Mexico, but communities were treated as unable to log their forests efficiently in order to provide the raw materials necessary for the then-expanding economy. From the 1950s to the 1970s, long-term logging concessions to private and/or state-owned industries were imposed in the richest forest regions, and communities were forbidden to make any use of the forests under concession that they supposedly owned. Conservation policies equally disregarded local rights. By the mid-1950s, logging bans affected 50 % of the country's forests, including those in the watersheds where major urban centers are located [7, 8, 17–19]. If communities were often the formal, de jure, owners of forests, their de facto rights were frequently denied by the same state that had granted them. In this ambiguous institutional context, many communities ended up perceiving forests as obstacles to real tenure. The incentives of private forest industries—which controlled and still control most timber extraction—tended to favor "mining forestry," or high-grading, oriented to maximize short-term profits, in the absence of long-term rights over forest resources and despite frequent opposition from local communities. Profits from state-owned forest enterprises, largely established during the 1970s, were mostly invested outside the forest sector. During the 1960s and 1970s, as social unrest grew in rural areas, new *ejidos* were created mostly in the tropical forests of the South, still under public tenure and with very low population density at the time. During this era, conservation concerns were absent, and forests were treated as actual obstacles to development. Agriculture and cattle raising were actively promoted in mountain and tropical forests, through subsidies and colonization policies. Not surprisingly, during the 1970s, deforestation reached rates as high as 3 % per year. In terms of tenure patterns, new *ejidos* were planned for agricultural production, favoring not only forest removal but also the division of lands over collective management of communal forests. Petitioners came from different regions and states, and from different productive and organizational backgrounds, they often shared a lack of experience with tropical environments.

By the 1980s, three main types of land use dynamics could be found:

- Forest cover was generally preserved in areas under forest concessions, even if composition and structure was modified and the commercial value of forest resources diminished as a result of poor management practices. People learned that forests could be harvested and managed in a sustained way and for commercial purposes.
- Logging bans had mostly perverse impacts, creating de facto open access to communal forests. Community forest uses were criminalized, in years when the market demand of forest raw materials increased and local needs for income and forest goods also grew.[10] Governmental capacity to monitor and sanction uses

[10]During the 1950s–1980s, the country experienced very high population growth rates. These were also years of rapid expansion of the market economy in rural communities.

defined as illegal was—and still is—weak. This pattern, common in central Mexico, which has the nation's highest population density, resulted in fragmented and deteriorated forest areas, where uses were poorly regulated in practice and where protective activities were rare.

- A third pattern was that of increasing colonization of the tropical areas of the South and Southeast, where extensive forest areas were cleared and converted, principally, into pastures with low productive value.

Policy failures had pervasive impacts that have proven hard to reverse: important fractures in forest production chains, lack of investment in the protection and management of forest resources and in forest roads and industrial infrastructure, disincentives for forest owners to protect and use forests with a long-term view, and incentives for different forest users to maximize short-term profits. On the other hand, official conservation policies (i.e. protected areas) are largely perceived by rural societies as an unfair governmental imposition, resulting in frequent processes of land use change and forest deterioration.

## Community Forest Management: Potential and Limitations

By the late 1970s, when logging concession leases were close to termination, many communities strongly opposed their renewal. Paradoxically, structural adjustment policies, implemented since the mid-seventies, created a policy environment unfavorable to state-owned enterprises, in which community forestry became possible. Communities' demands were echoed by a progressive group in the Department of Forest Development (DDF) that promoted a new policy experiment: support for commercial logging performed and controlled by communities, as a way to halt deforestation and create local incentives toward sustainability, while maintaining the flow of raw forest materials to the market. This initiative was based on the assumption that communities could become both efficient forest producers and viable environmental stewards. It was first implemented in areas where bans were lifted [9] and later in the richer forests previously under concession, where this initiative achieved greater success. The DDF programs were based on intensive training and technical consultation for communities and on support to community federations, which were created to gain access to technical forestry advisory, originally provided by the federal government [8, 20]. Some years later, some of the communities with the most valuable forest assets and better internal organization achieved remarkable gains: they made important profits from forest businesses, were able to build and maintain roads, bought extractive and industrial equipment, and organized their own technical and administrative teams. The majority of the successful communities reinvested most of their profits into forest assets: forest protection and management systems, logging equipment, and forest industries. Commercial credit and public funds played only a marginal role. Some communities soon adopted an environmental agenda. Forest certification under the Forest Stewardship Council scheme

was first applied in Mexico in 1993; 10 years later, around 800,000 forested hectares and 12 % of the timber produced in the country were certified [21].[11] A new forest law promulgated in 1986 prohibited concessions and granted forest communities the right to be consulted about the implementation of any policy that might affect their rights.

During the late 1980s and early 1990s, governmental support for community forestry faded. In the context of structural adjustment and economic liberalization, the successful cases appeared hard to replicate, particularly in small forests and those with scarce timber resources of commercial value, as in the cases of tropical humid and dry forests. The obstacles faced were diverse in nature: chronic disinvestment in the forestry sector and massive imports of foreign forest products, frequently subsidized and mostly coming from forest plantations,[12] in the wake of NAFTA implementation. Others included strong overregulation of forest activities and high opportunity costs of forest conservation and sustainable management in comparison with (subsidized and unregulated) mountain agriculture and cattle raising.

The Ministry of Environment, Natural Resources and Fisheries (SEMARNAP) was created in 1994 and assumed responsibility for the administration of forests and forest activities, which had previously been held by the Ministry of Agriculture.[13] From that moment on, forest policy has tended to disregard productive goals, focusing on attempts to lower extractive pressure on natural forests and treating commercial plantation forestry as the principal production mode. The expansion of restrictive protected areas, which often entered into conflict with local livelihoods, was actively promoted by SEMARNAP. Such protected areas rapidly became the key governmental conservation approach, in spite of their high social costs and often unclear environmental gains [22, 23]. Large investments in reforestation and private commercial forest plantations were the favored forest policies, even though these mostly generated poorer results than were predicted.

Community coalitions and civic groups lobbied for alternative policies that would be more attentive to sustainable development. SEMARNAP launched, with the support of the World Bank, a second generation of pro-community forestry

[11]Forest Certification has not grown as initially presumed, as it poses high demands without clear benefits: certification costs, forest management requirements, and quality demanded by export markets, while certified communities have not accessed niche markets with better prices.

[12]Canada and the United States (Mexico's NAFTA partners) are the two largest forest producers in the world. They have strong forest industries and large forest road networks. Mexican community producers—with more limited experience in the forest business, with frequently deteriorated resources, incoherent policy support, and strong barriers to access credit—have found hard to compete with this two commercial partners and other forest product-exporting countries such as Chile, with whom Mexico has also signed trade agreements.

[13]During the 1980s and early 1990s, the administration of forest activities was under the responsibility of the Secretaría de Agricultura y Recursos Hidráulicos (SARH), which became Secretaría de Agricultura y Ganadería (SAGARPA) in 1994. Water policy, fisheries, and forest policy became the responsibility of SEMARNAP. In 2006, fisheries management was returned to SAGARPA, and SEMARNAP became SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales).

programs led by a joint initiative: PROCYMAF,[14] which proposed to craft fine-tuned strategies able to respond to the diverse conditions of Mexican forest communities. Initially, it was a pilot project implemented in the southern state of Oaxaca. Oaxaca is home to large indigenous populations, organized predominantly in *comunidades agrarias,* with a history of some successful community forestry experiences, and benefitting from robust governance traditions. PROCYMAF was strongly influenced by the international wave of progressive advocacy in favor of participatory, decentralized and pro-poor forest policies of the late 1990 and 2000. This orientation responded to the failure of projects that aimed to stop deforestation in developing forest countries of the global South via support for central governments. Years later, responding to the demands of Oaxacan communities, the National Forest Commission (CONAFOR)[15] and the World Bank launched a new initiative, this time oriented specifically to work on community conservation, called "Programa de Conservación Indígena de la Biodiversidad," or COINBIO.[16]

Within few years, PROCYMAF and COINBIO showed important achievements: the area under forest management and certification schemes was increased, and new community forest enterprises were created based on the diversification of forest uses. Many communities developed and adopted local environmental regulations, committed to sustainable forest use, and included diverse protection measures in their local management plants. Many communities established protection and conservation areas within their lands, which were based on community assembly decisions and were protected by local rules. In spite of their achievements, PROCYMAF and COINBIO remained marginal policies; their learning was never mainstreamed into national forest and conservation policies. During the last federal administration (2006–2012), as the presidency tried to gain international prestige as a global leader for implementing climate-change responsive policies, reforestation and payment for environmental services[17] programs became not only governmental panaceas but also presidential priorities. In recent years, climate policies, such as the Program of Reduced Emissions through avoided Deforestation and Degradation (REDD), risk causing new threats to local rights and livelihoods, as mitigation goals[18] are clearly given priority over local production, adaptation,[19] and resilience capacities. Although it is widely documented that resilience capacities also depend on the existence of locally owned biodiversity conservation measures, Mexico's forest and conservation policies repeatedly alienate environmental goals from local governance. "No use," nowadays, appears to be the ideal management strategy, and empty territories the preferred conservation landscape.

[14] PROCYMAF was initially called "Programa de Conservación y Manejo Forestal"; during a second phase, the name was changed to "Programa de Desarrollo Forestal Comunitario" but kept the original acronym.

[15] Comisión Nacional Forestal

[16] Created in 2001

[17] Implemented as rents paid for the nonuse of forest lands

[18] Mitigation of global emissions of greenhouse gases through the maintenance of forest carbon sinks

[19] Adaptation to respond to the local impacts of global climate change

## Forest Communities' Diverse Conditions

Successful community forestry experiences remain a minority, and forest production programs are mostly marginal in terms of budget and policy support. Even PROCYMAF's policy successors[20] promote practices based on social capital but do not support forest use. Nevertheless, the achievements of successful cases express the social and environmental viability of community-sustained forest production, community conservation, the importance of their synergies, and the role of public policies sensitive to their potential and needs.

Mexican forest communities are numerous and varied. Conservation and forest policies as well as civic initiatives need to acknowledge and respond to the diversity and complexity of regional contexts and changing conditions. With the purpose of documenting these diverse conditions, a team of the Institute of Social Sciences at Universidad Autonoma de Mexico (UNAM), with the support of the Comisión Nacional en Ciencia y Tecnología (CONACYT), PROCYMAF, and the Workshop on Political Theory and Policy Analysis from Indiana University, carried out a survey in 103 forest communities, the results of which I discuss in the following pages. Communities included in the random sample are managing a minimum of 300 ha of temperate forests[21] in the states of Durango, Jalisco, Michoacán, Guerrero, and Oaxaca. The sample was stratified considering the number of communities in each state. The results may thus be considered broadly representative of (or highly relevant to) half of the forests in Mexico—the proportion with lower population pressure.

In the regions the study took place, collective tenure and commons status currently have a strong presence, despite the many pressures these systems faced both before and after the 1992 changes in the land tenure law, when selling *ejido* lands became legally possible [5, 24, 25]. On the whole, collective property is stronger in forest communities than in agricultural lands. As forests are traditionally—and legally—defined as commons, forest communities are those with the largest share of common lands. Sales of *ejido*[22] land have occurred in 30 % of the sampled forest communities, though in more than 80 % of the sample, local authorities declared that nobody was interested in privatizing their territory. *Ejidos* are the predominant form [26] of communal tenure in Mexico, but *comuneros*[23] are the majority of collective property rights holders in forest regions. *Ejidos* face serious difficulties in generational replacement, as the lack of access to property rights for younger people can result in their expulsion from the *ejido*. Among our sample, more than 88 % of *ejidatarios* and 32 % of *comuneros* were over 40 years old (see Table 3.1). Data also show that 19 % of families living in the sampled forest communities were *avecindados*, who are individuals living nearby and, often, using *ejido* lands but lacking in tenure rights.

[20] The Direction of Community Silviculture within CONAFOR

[21] Pine, pine-oak, oak, fir, and cloud forests

[22] The direct sale of the lands of *comunidades agrarias* is still prohibited; in order to sell their lands, the assemblies need first to decide to become ejidos.

[23] Rights holders in *comunidades agrarias*

**Table 3.1** Age groups among property right holders in forest communities according to the survey of the Conditions of Forest Communities in Mexico (IIS-UNAM)

| Age groups | Ejidos (%) | Comunidades agrarias (%) |
|---|---|---|
| % of communities with a majority of right holders younger than 40 | 11.7 | 67.4 |
| % of communities with a majority of right holders with ages between 40 and 60 | 60 | 20.4 |
| % of communities with a majority of right holders older than 60 | 28.3 | 11.7 |

Often, these are the sons of *ejidatarios* and represent the poorest families in the community and therefore might have a reduced incentive to take part in forest conservation activities.

Tenure conflicts among and within communities generate significant pressure on collective property and forests. In our study, 34 % of our cases face problems over borders with their neighbors, while 21 % have internal tenure conflicts. Conflicts have negative impacts on forest management and forest condition. In nearly 50 % of the cases studied, local authorities declared that these conflicts have impacts on forest health, as they induce deforestation, illegal logging, and obstacles to protecting forests from pests and fires. In many cases, tenure conflicts impede the development of legal forest uses and forest management plans.

Poverty is widespread among forest communities. Traditional agriculture and cattle husbandry in mountain areas—very low income-generating activities—sustain local livelihoods. Subsistence agriculture is practiced by 75 % of the families in 98 % of these communities. In spite of low gains from agriculture, it allows families living in uncertain conditions to cover some of their basic food needs. Cattle husbandry is also frequent—present in 84 % of the communities of the sample—but practiced by smaller groups within the community: less than a quarter of the families in the majority of these communities. The profits from cattle husbandry are also low: in 35 % of the communities, this activity provides less than 25 % of the total income of the producers. Cattle husbandry is perceived as a form of savings: environmental and labor costs are not properly taken into account in households' cost-benefit analysis.

The contribution of forestry to local employment and income is small, in spite of the productive potential of many forests and the strong need for economic options. In nearly half of the communities (49 %), nobody is engaged in any commercial forest use; in 23 % of them, *ejidatarios/comuneros* involved in forestry make up less than a quarter of community members. Only in 6 % of the communities does more than half of the population engage in forestry activities. The share of forest activities in local income is equally low: in only 11 % of the communities with commercial forestry activities do those involved in forestry obtain over 50 % of their yearly income by these means.

Due to the pronounced altitudinal range within community lands, diverse forest ecosystems are present within the borders of many of them. Together with temperate forests (pine, pine-oak, fir, or cloud forest), some communities also have areas covered with different types of tropical humid or dry forests. Different types of

**Table 3.2** Uses of the different types of forest ecosystems present in community forests according to the survey on the Conditions of Communities with Temperate Forests in Mexico

| Type of forest/use | Firewood collection (%) | Grassing (%) | Agriculture (%) | Conservation (%) | Commercial logging (%) | PES[a] (%) |
|---|---|---|---|---|---|---|
| Pine forests | 65 | 60 | | 62 | 58 | 31 |
| Pine-oak forests | 81 | 60 | | 65 | 48 | 18 |
| Oak forests | 92 | | | | | |
| Cloud forests | 41 | | 30 | 80 | | 18 |
| Fir forests | 45 | | | 70 | | 31 |
| Tropical rain forests | | 75 | | | | |
| Dry tropical forests | 61 | 75 | 45 | | | |

[a]Payment for environmental services

forest vegetation are used for different purposes and are valued and managed in different ways.

Forest resources are fundamentally sources of domestic goods, but uses vary according to forest type (see Table 3.2). Firewood collection, grazing, and agriculture are common uses yet are very seldom regulated locally and/or officially and are rarely under any formal management practice.[24] Agriculture is the second most important use of cloud forests, where coffee is a frequent crop. The subsidies to "sun-grown coffee"[25] plantations during the 1970s were an important driver of the rapid disappearance of cloud forests in many regions.[26] Only 18 % of the communities with cloud forests received payments from the CONAFOR Program of Payment for Environmental Services at the time of fieldwork (2008). Cloud forests in Mexico have very high conservation value as ancient and complex ecosystems, rich in biodiversity and endemic species. Eighty percent of the sampled communities with cloud forests have established conservation areas devoted only to their protection. Oak forests—also rich in biodiversity—are mainly used as sources of firewood. The limited sustainable use options for most of the extended areas of oak, dry tropical, and tropical rainforests pose challenges for the conservation of these highly biodiverse forest systems.

Temperate forests in Mexico have high biological productivity, a potential advantage for Mexican forest producers. Nevertheless, only one-third of the estimated potential logging volume is legally harvested. Deforestation has decreased in many regions principally as a result of agricultural abandonment; deterioration is now the

[24]I understand "forest management" as the whole of planned interventions in forest systems, with diverse purposes: harvest, protection, biodiversity conservation, carbon sequestration, etc.

[25]The productivity of sun-grown coffee is on average three times higher than "shade-grown coffee," but it has much higher environmental impacts as it is based on forest removal. Shade coffee grows under the forest canopy, maintaining biodiversity and other environmental services.

[26]Since the 1990s, many communities in southern Mexico practice shade-coffee cultivation, maintaining the forest cover, and getting certification as organic and/or sustainable producers. This was not the case in the 1970s and 1980s when sun-coffee cultivation, based on forest removal, was promoted by government programs.

main problem in temperate forests [27]. Together with active forest protection, many forest areas need restoration and improved management systems.

## Main Patterns and Synergies of Forest Use and Conservation

Many of the results of the survey used were summarized in four indices[27]: the index of pressures on forest areas, the index of protection and conservation activities, the index of organization and social capital, and the index of community forestry economy[28].

A summary of the contribution of forests to community economy is presented in Fig. 3.1. Thirty-five percent of forest communities do not carry out any commercial use of the forest resources they own, and 34 % only harvest non-timber forest products with very low prices and profits. In 13.6 % of the cases, illegal timber

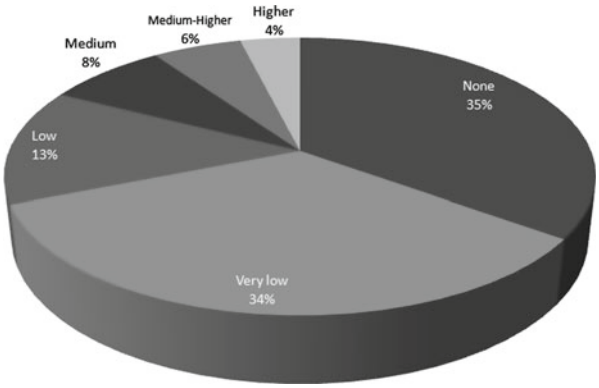


**Fig. 3.1** Percentage of the contribution of forests to community's economy according to the survey on the Conditions of Forest Communities in Mexico

[27] The variables used to build the indices were as follows: Index for Pressure on Forests—presence of illegal logging, forest fires, and pests; grazing in forest areas; and deforestation. For the Index of Local Protection and Conservation, the variables were monitoring to prevent forest fires, forest pests, and illegal cutting; practices for fighting forest fires, forest pests, and illegal cutting; and presence of community conservation areas. For the Index of Organization and Social Capital, the variables were frequency of community meetings; strength of local governance systems; participation in community meetings, in local governance and voluntary communal work; and communities' rules for forest harvest and protection, monitoring and sanctioning related to local governance, resource management, and forest protection/conservation. Finally for the Index of Community Forest Economy, the variables utilized were vertical integration of forest production chains, level of diversification of forest uses, productive forest assets owned by communities, and financial assets.

[28] A full description of the methodology followed for the construction of the indices and the full results of the survey are available at www.ccmss.org.mx and in Merino, Leticia, and Martínez, Ana

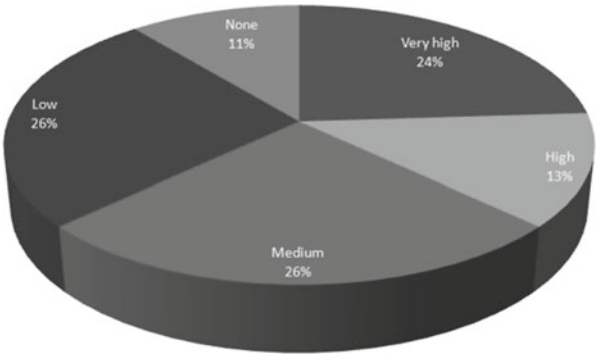


**Fig. 3.2** Pressure on forested areas within communities according to the survey on the Conditions of Forest Communities in Mexico

extraction was reported yet provides only a minor contribution to local economies. Most communities of this latter group sell or have sold timber as stumpage with extractions performed by outsiders and little or no community control. These operations often have high impacts on forests while providing few benefits to forest owners. In many cases, local and nonlocal environmental groups have launched campaigns to resist logging. Commercial community forestry—community-controlled harvest of forest products and forest management—takes place in 17.5 % of the cases (and in about 600 communities in Mexico). Of this latter group, 7.8 % only have basic technical capacity for the sale of timber as logs; they do not have the resources to finance timber processing, relying instead on timber buyers to do so. Nevertheless, they own extraction equipment, have built forest roads, and provide local employment. Just under 10 % of the communities in the sample have forest industries, sell boards, and, in some cases (3.9 %), have value-added products. About half of the communities within this last group have diversified their sources of income through diversified commercial forest uses, extracting and selling resin, bottling water from water sources in the forest, and providing ecotourism services, all of which create important local sources of employment and income. Logging remains the most important forest activity for financing the development of new forest activities [28, 29]. Communities that engage in certified forestry activities such as the certification of forests by the Forest Stewardship Council (FSC) and other entities are part of this last group.

There is significant pressure on forested areas on most of the community forests of our sample (63 %). In those communities, forests face illegal logging, overgrazing, uncontrolled forest fires, and pests. Pressures can be considered "high" and "very high" in 37 % of these cases.[29] On the other hand, another 37 % of the forests in the sampled communities face relatively low pressures (see Fig. 3.2).

Eugenia, 2013; "A vuelo de pájaro, las condiciones de las comunidades con bosques templados en México." Mexico D.F.: CONABIO.

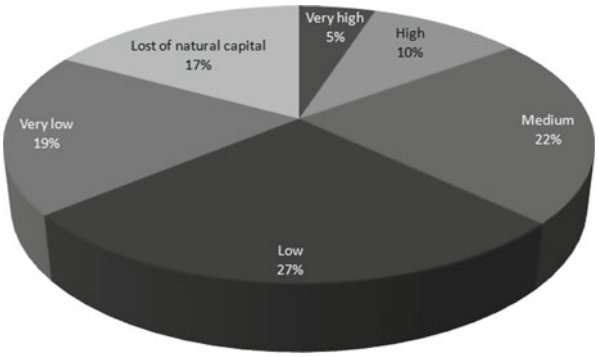


**Fig. 3.3** Protection and conservation activities according to the survey on the Conditions of Forest Communities in Mexico

Fieldwork results show that such low values are dependent on two conditions: protection activities and conservation measures being implemented by many forest communities and the gradual abandonment of agriculture.[30]

As many as 37 % of these communities are actively engaged in forest protection, monitoring forests conditions, and fighting fires, pests, and illegal logging to different degrees. Some communities have established local protected areas based on the decisions of community assemblies. Forty-six percent of communities carry out protection activities at minimal levels, which we classified as "low" and "very low" (occasionally monitoring and fighting forest fires). This relatively weak protection and conservation performance tends to occur in contexts where incentives created for forest uses are low and insufficient to carry out costly protection measures. An important share of the communities (17 %) reported recent forest losses. Protection practices in these last communities are very weak or absent (see Fig. 3.3).

Governance of communal forests has undeniably high transaction costs and demands strong coordination and cooperation (collective action). When collective governance is in place, it offers larger social benefits and broader local participation in forest protection than does privatized forest property. Even if many forest communities have an organizational base, they tend to have weak local institutions (rules) to govern forest resources—an important condition for the successful management of forest commons. Based on the value of our index, we found social organization to be "weak" in 79 % of the cases and "medium" and "high" in just 18 % of them (see Fig. 3.4). Nevertheless local governance based on community participation is still in place where assemblies of *comuneros/ejidatarios* meet regularly and frequently to discuss collective issues and make decisions and rules regarding forest resources. These issues include the use of the forest commons, forest

[29] For the construction of the indexes, a numerical value was given to each variable. The total value of each of the indexes was classified in five categories: very high, high, medium, low, and very low.

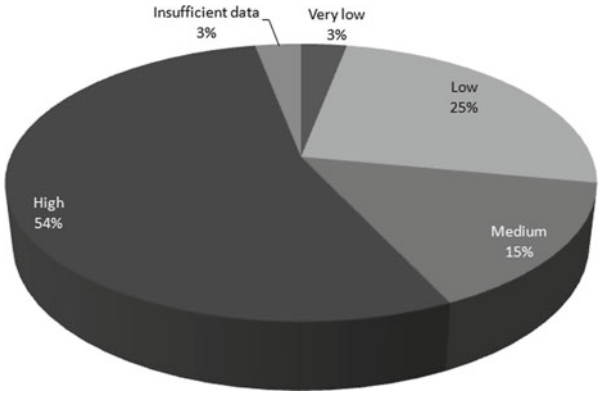


**Fig. 3.4** Organization and social capital according to the survey on the Conditions of Forest Communities in Mexico

production, collective investment, conservation practices and share of responsibilities, as well as about the community's relationships with governmental programs, and other local governance issues. In such cases, assemblies are well attended and show a high degree of participation by *ejidatarios/comuneros,* those community members with decision-making rights.

Voluntary work in favor of communities often takes place and serves as the basis for the development and maintenance of communities' infrastructure and public services, but it also often contributes to forest protection and restoration activities. However, ejidatarios and even comuneros (those with land rights) are often minorities within communities,[31] and most families excluded from property rights have little or no incentive to take part in collective voluntary work—including forest protection. This is particularly important as excluded families tend to be the youngest families and frequently the majority of the population.

Social organization in Mexican *ejidos* and *agrarian communities* is far from ideal; it faces diverse and strong challenges, such as the exclusion of young people in *ejidos* and the exclusion of women from property ownership and thus decision-making in both *ejidos* and *comunidades agrarias.* Internal conflicts related to the "elite capture" of the benefits of common resources are also frequent. In addition, outmigration puts social organization under strong additional stress as it affects generational replacement and makes communication, consensus building, and trust among community members increasingly costly and difficult. These pressures are particularly strong for 53 % of the communities in the sample, where the local governance structure is losing viability, and social investment in collective action has

[30]In some cases, the abandonment of agriculture has stopped forest clearing, which also corresponds to the lower numbers of forest fires, as frequently mountain agriculture was based on slash and burn practices.

sharply decreased. The small number of communities with "very high" social organization reflects the high transaction costs involved in upholding community and common forest resource governance, as well as the lack of incentives to meet these costs. Forests used for domestic consumption, which is the predominant form of forest use, provide certain incentives for conservation and organization. Nevertheless, as market relations are deeply rooted in everyday lives, economic incentives and community businesses have become strong drivers for collective action, local institutional development, and strong management and conservation practices. However, in contexts where community forestry remains underdeveloped, these incentives tend to be absent or weaker.

Following Ostrom's definition, we consider "institutions" as rules in use [13]. In this sense, "local institutions" are those rules known and agreed on by those affected by them, that is, the members of forest communities. Local rules for forest use were poorly developed in 68 % of the cases. Institutional strength was moderate in a quarter of them. In only 5 % of sampled communities did we find strong and very strong local institutional development around community and forest commons governance. The most common local institutions are the rules and norms related to community governance: the obligations to attend assemblies and to take part in local governance activities as well as in voluntary work for communities. In most cases only few rules were related to forest use and/or protection, which we can deduce from the low diversification of forest use, its low level of commercialization, and the lack of incentives to engage in more locally regulated uses, which are perceived as costly and unnecessary. Communities with the highest institutional strength are those with more developed and diversified forest economies. In such cases, institutional development refers not only to rules crafted around sustainable harvest of different resources but also favors enforcement of rules around land use planning and local governance.

## Conclusions

Communities with successful and sustainable forest businesses are a small but relevant minority in Mexican forested regions. Communities with the most developed productive forest assets, which demonstrate more capacity to add value to their production and to create local sources of employment and income, are also those with the strongest organization and institutions for local governance and forest sustainability. As well, they are those who invest more resources and effort in forest protection, management, restoration, and conservation activities. Nevertheless, it is worth mentioning that the values of the indices of social organization and even institutional development for most of the communities are higher than the values of forestry development. This shows that social organization, and even local institutions for forest management, are present—and in some cases, even strong—in communities with relatively low forest productive development and economic

incentives, showing that local governance and forests are "goods" that are locally valued. Pressures on forests and the degree of forest protection are also related to the development of community forestry, local institutions, and organization. The overall trend is that forest protection practices—at least those related to basic protection measures such as forest fire fighting and forest monitoring—are more frequent than experiences of forestry development. This pattern may reflect the fact that household reliance on forest products provides some incentives to engage in a basic level of forest protection. It does not, however, encourage communities to invest more efforts and resources in creation of more elaborate institutions, intensive monitoring systems, and/or more costly conservation measures, such as the segregation of community protected areas on communal lands. Remarkably, the proportion of communities with the three highest levels of protection/conservation practices in the sample is much greater than the proportion of communities with the three highest levels of forestry development. This suggests that in the presence of proper incentives—even if these are not very great—community investment in forest protection and conservation may develop users' capacities to carry out these activities. Within the communities studied, these practices include the following: setting aside conservation areas, management of seedling areas, carrying out research to inform management practices, biodiversity protection, and forest certification.

While many of the communities do not have commercial forestry development in their territories, almost all communities had local institutions. The values of the indices of forestry development and institutional strength are closely related, supporting the hypothesis that in the forested regions of Mexico, the development of community-based forestry provides incentives for local institutional development yet also relies on their strength to succeed.

The Mexican legal framework provides important advantages for community forestry, such as the recognition of communal forest tenure as established in the Mexican General Constitution since 1917. More recently, the 1986 forest law established the obligation of public consultation with communities regarding any policy that may affect their rights to, and use of, their forests and prohibits concessions to third parties. The most recent forest law (2003) formally recognized the public value of community forest management and the need for governmental support for it, the inclusion of Payment for Environmental Services programs, and the importance of forest certification.

The last two federal administrations have given unprecedented support to the forest sector: from 2000 to 2008, federal investment in the forest sector increased ninefold. Data from a recent study on the performance of forestry and forest policy during the 2000–2006 federal administration in Mexico [29] showed two clear tendencies: from 1994 to 2000, forest production grew by 49 %, and production volume grew from 6.3 million $m^3$ of round wood to 9.4 million $m^3$. Five years later (in 2005), timber production dropped by 33 %, returning to 1994 levels. This loss occurred in the context of two important "windows of opportunity," the aforementioned financial support of public policy, together with an important increase in the national consumption of forest products, which grew from 16.3 million $m^3$ in 2000

to 27.5 million $m^3$ in 2003 and 21.3 million $m^3$ in 2005. As a consequence of the increased national demand and reduced supply, the forest deficit increased in volume (by 167 %) and value (by 222 %), in spite of the relative monetary stability during this period.[32] Underlying the forest production trends are important losses in local technical, administrative, organizational, and commercial capacities, as well as weakening of incentives to actively engage in conservation and forest governance.

In December 2007, during the United Nations Conference on Climate Change, the Mexican government committed to plant 500,000 ha of trees per year and to contribute to the mitigation of global climate change through the reduction of the country's total emissions by 30 % by 2020.[33] Massive reforestation—already favored in the past despite evidence of constant failures—became a central goal of forest policy, and resources to support it multiplied significantly.

The research results presented here document some of the main challenges faced today to social sustainable forest management and conservation in Mexico—challenges largely disregarded by current conservation and forest policies. First, the rights holders in the majority of communities are aging, so generational replacement—required for forest protection and successful community entrepreneurship is under serious threat. Second, tenure conflicts are frequent and largely remained unattended, and have pervasive impacts on local peace and on forest areas. Thirdly, poverty is widespread, and economic options are limited and sometimes incompatible with the conservation of forests. This is particularly true for those dry and humid tropical forest ecosystems, which generally have the highest biodiversity. Fourth, for the majority of communities, there are few incentives to sustain and develop local institutions around forest use and protection or to engage in active conservation and protection practices, which are increasingly needed in the context of the challenges created by global environmental change. Finally, present nascent community forestry experiences, which provide a bundle of social and ecological benefits, need support in order to compete in open global markets.

In order to respond to the challenges posed by the rapid erosion of biodiversity and global climate change, forests conservation and protection policies must rely on polycentric and democratic governance schemes, truly participatory approaches, and adaptive knowledge and management. In a country with large and diverse forests like Mexico, they should be based on understandings of the history, challenges, and potential of forest communities and should be fundamentally attentive to their voices. For Mexico, the challenge is to broaden this experience and extend it to a larger group of communities. In global scenarios, the lessons learned of Mexican community forestry may be useful for policies geared toward devolving forest rights to local communities.

[31] As life expectancy has grown in Mexico, ejidatarios have considerably aged without passing their property rights to their children. In the cases that they have, they can only inherit rights to

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# Part II
# Case Studies of Community Conservation

# Chapter 4
# Community Conservation Experiences in Three Ejidos of the Lower Balsas River Basin, Michoacán

**Andrés Camou-Guerrero, Tamara Ortiz-Ávila, Daniel Ortiz-Avila, and Jorge Odenthal**

## Introduction

In Mexico, the establishment of protected areas represents the most consolidated environmental policy for biodiversity conservation. However, diverse experiences have shown that the creation of these areas can foster socio-ecological conflicts that jeopardize not only conservation objectives but also local and regional development [1]. In countries like Mexico, where between 75 and 80 % of forests belong to *ejidos* and *comunidades indígenas*[1] [2, 3], it is urgent to consider alternative biodiversity conservation models. For that reason, community conservation perspectives have become important reference points.

Aside from protected areas, other strategies, such as traditional land management practices, have also conserved ecosystems and existing genetic resources. *Ejido* lands, in addition to specific *parcelas* belonging to inhabitants, include a portion of

[1]The "*ejido*" and "*comunidad indígena*" are collective forms of land ownership in Mexico that were created to address social injustices stemming from poor land distribution. After the Revolution of 1910, agrarian reform made extensive use of these two land tenure categories and enabled the creation of thousands of *ejidos* and *comunidades indígenas*. This form of land tenure is known as social property, which implies that its management depends on decisions inhabitants make according to internal organizational mechanisms recognized by the State. Source: Linck (1999) Tierras de uso común, regímenes de tenencia y transición agraria en México. *Estudios Agrarios. Revista de la Procuraduria Agraria*. México 1999(12):119–151.

A. Camou-Guerrero, Ph.D. (✉)
Escuela Nacional de Estudios Superiores Unidad Morelia, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico
e-mail: andres.camou@enesmorelia.unam.mx

T. Ortiz-Ávila, M.Sc.
Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

D. Ortiz-Avila, B.Sc. • J. Odenthal, M.Sc.
Investigaciones Aplicadas en Ciencias Ambientales y Sociales A.C., Michoacán, Mexico

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land for the common use of all members of the *ejido* [4–6]. Diverse authors have shown that production and natural resource use strategies for these common lands do not have a significant negative impact on the ecosystem's functional properties and may increase diversity via increased heterogeneity [7–9]. This is mainly due to traditional natural resource management practices based on knowledge generated over time by the human communities inhabiting the land.

Multiple international and national approaches define community conservation [10–12]. In this work we understand it as a community process that involves social organization and collective decision making oriented to demarcate a portion of communal territory, in order to preserve natural resources as well as local practices and knowledge. This process does not necessarily require external recognition such as governmental certification [13]. The most important premise underlying this definition is that biodiversity conservation can, and should, be compatible with the social welfare of rural populations.

Within this context, this work integrates the authors' experiences in three case studies that occurred from 2004 to 2006 in different *ejidos*, related to the formation of community conservation areas (CCAs) in the Lower Balsas River basin, in Michoacán, Mexico. The cases stem from a project called Conservation of Biodiversity in Indigenous Communities carried out in the states of Oaxaca, Michoacán, and Guerrero (COINBIO, by its Spanish acronym), financed by the United Nations' Global Environmental Facility Programme. COINBIO focused its efforts on participatory community research, with the objective of analyzing historical, social, and economic factors in the participant communities, and to develop local strategies for land management and biodiversity conservation [14].

The objective of this work is to consider the factors that both supported and limited community conservation efforts prompted by COINBIO in Michoacán. To achieve this, the chapter is divided into four general sections: (1) Biodiversity Conservation Strategies in Michoacán, (2) The COINBIO Project, (3) Case Studies, and (4) Discussion and Conclusions.

## Biodiversity Conservation Strategies in Michoacán

The state of Michoacán is located in the Central Occidental region of Mexico. Its 59,864 km$^2$ represents 3 % of the nation's land surface, and its 4,351,037 inhabitants live in 113 municipalities, which are divided into ten economic and administrative subregions [15]. Five physiographic provinces comprise the state: (1) Coastal plains (the expanse of land bordering on the Pacific Ocean), (2) Southern Sierra Madre, (3) Lower Balsas River basin, (4) Transversal Volcanic System, and (5) the High Plateau [16]. Michoacán's physiography has given rise to unique characteristics, like extensive mountain and volcanic systems, abundant lakes distributed throughout its territory, vast expanses of plateau, and a significant stretch of coastline bordering the Pacific Ocean. Different ecosystems have developed within these regions, which are represented by eight types of vegetation: coniferous forests, oak forests, mountain mesophytic or cloud forests, tropical deciduous forests, subtropical scrubland, thorn

forests, tropical sub-deciduous forests, aquatic and subaquatic vegetation, and other systems, such as palm groves and coastal dunes [17]. Furthermore, 9,509 species of organisms living in these plant communities have been registered, including 405 species endemic to Mexico, 224 of which can only be found in Michoacán [18].

In addition to its biological diversity, Michoacán's cultural diversity is also important because of the four indigenous groups living within its territorial limits: the Mazahua, the Otomí, the Purhepecha, and the Nahua. Each group inhabits different ecological regions that are considered high priorities for hydrological reasons, or because of the ecosystems forming part of their territories [18, 19].

For all of the reasons noted above, in 2007 the National Commission for Knowledge and Use of Biodiversity (CONABIO, by its Spanish acronym) ranked Michoacán as holding fifth place in total biological diversity at the national level.

Federal and state governments have promoted biodiversity conservation mainly through the establishment of protected areas and via other biodiversity conservation strategies based primarily on economic incentives. These include, principally, payments for environmental services, wildlife conservation management areas, and forestry management programs [13, 20]. To date, the state government has designated 31 protected areas, which account for 0.24 % of Michoacán's land surface [21]. Together with these areas, the federal government has created 11 terrestrial protected areas in Michoacán, which cover an additional 5.6 % of the state's land surface [12, 18].

The role of traditional practices in maintaining biodiversity in the state of Michoacán has been less documented. However, 51 % of Michoacán's territory belongs to *ejidos* and *comunidades indígenas*, and 24 % of these territories are designated for communal use (the area under collective use and not the parceled areas under individual management) [22].

Therefore, it is possible to assume that a significant proportion of the state's ecosystems are located in territories that are managed under communal guidelines, which are in turn structured by rules created by inhabitants who have a deeply grounded understanding of their surroundings.

The identification of processes that promote biological and ecosystem conservation has been recognized as one possible and necessary path for preserving the state's biological wealth and cultural diversity [23]. This has fostered the implementation of governmental and non-governmental mechanisms designed to strengthen conservation initiatives and practices within *ejidos* and *comunidades indígenas* in different parts of Michoacán. The most relevant experience in this sense has been the implementation of the COINBIO Project.

## The COINBIO Project

The COINBIO Project started in Mexico in 2001 in the states of Oaxaca, Michoacán, and Guerrero. COINBIO's main objective was to contribute to the conservation of areas rich in biodiversity by strengthening and promoting conservation initiatives in the *ejidos* and *comunidades indígenas* located in those areas while taking cultural values and traditional management practices into account [24].

The project was financed through the UN Global Environment Facility (GEF) program. In Mexico it was coordinated by a technical national committee, three regional committees, and local coordinators (one for each state) and administered by Nacional Financiera[2] (a national banking institution). In each state COINBIO involved a set of non-governmental organizations (NGOs), as well as independent consultants, who implemented the project. The project was carried out using an innovative strategy in which the participating *ejidos* and *comunidades indígenas* administered the financial resources provided by COINBIO and chose which projects they wished to develop as well as what technicians or organizations would accompany them in the work process.

The first stage of the COINBIO Project (2002–2005) emphasized four fundamental components: strengthening local abilities, community conservation and sustainable natural resource use, monitoring and evaluation, and national coordination. Support generated by the COINBIO program was channeled into community planning, training, consulting, research, and investment. Between 2002 and 2005, 192 projects were carried out in the state of Michoacán, with the participation of 62 *ejidos* and *comunidades indígenas*, each of which executed an average of three projects during the period in question. Eighteen of the participating communities (29 %) developed projects specifically related to the demarcation of community conservation areas. Most of the participating communities and *ejidos* developed other kinds of projects related to community planning of land use, inventories of flora and fauna, and the creation of wildlife conservation management areas [14].

## Case Studies

### *Location and General Characteristics of the Case Studies' Region*

In the context of COINBIO, NGOs[3] were chosen by three *ejidos* to facilitate their community conservation projects. These *ejidos* were La Pitirera (LP), La Lajita y Palos Prietos (LL), and General Lázaro Cárdenas (GLC) or Ciriancitos, as it is locally called. LP and LL are located in the municipality of Arteaga and GLC is found in the municipality of La Huacana in the region called Infiernillo (see Fig. 4.1). The GLC and LP *ejidos* are situated within the physiographic region called the Lower Balsas River basin, and LL is located between this province and that of Sierra Madre del Sur.

[2]It is currently administered by the National Forestry Commission with support from state governments'.

[3]These NGOs were Grupo Interdisciplinario de Tecnología Rural Apropiada (GIRA A.C.) and Investigaciones Aplicadas en Ciencias Ambientales y Sociales (IACATAS A.C.). The authors belonged to these NGOs at the time that this work was carried out.

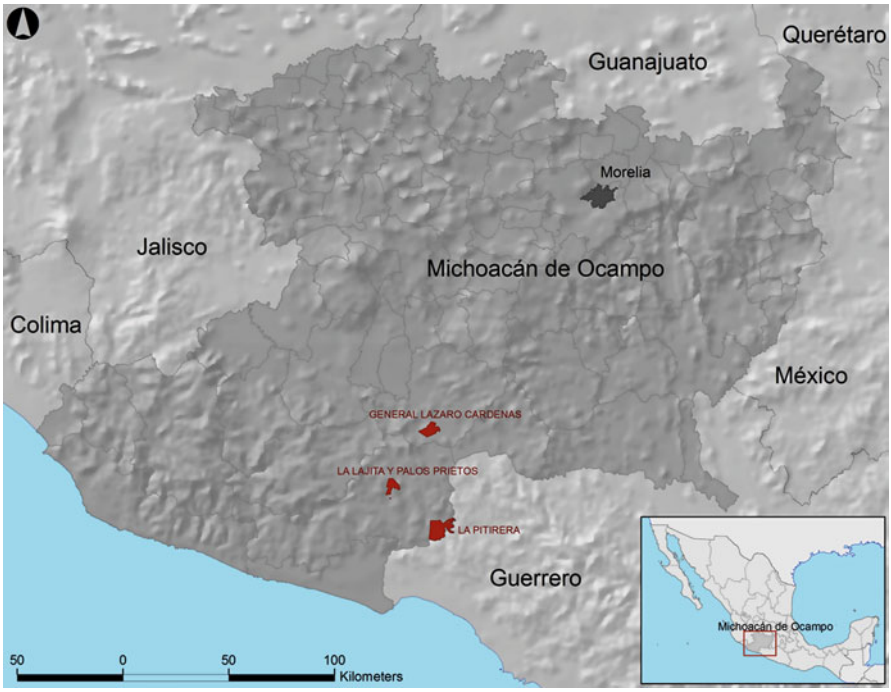


**Fig. 4.1** Map of the study area. The three ejidos within the context of the municipalities of Arteaga and La Huacana in the Michoacán State, Mexico

The municipality of Arteaga lies in the southern part of the state and has an average altitude of 820 m above sea level. Its 3,454.71 km$^2$ accounts for 5.9 % of Michoacán's total land surface, and it enjoys a yearly average precipitation of 546.5 mm and a temperature that ranges between 22.2 and 34.0 °C. Its population totals 21,790 inhabitants [15].

Arteaga municipality is highly diverse in terms of its vegetation. In the mountainous region one can find communities belonging to temperate forests and tropical deciduous forests, together with associated populations of *Quercus* spp. and *Bursera* spp. The canyons are known for the presence of tropical sub-deciduous forest, and in the lower plateau zone, one can find columnar cacti populations such as the *pitire* (*Stenocereus quevedonis*).

La Huacana municipality has an average altitude of 480 meters above sea level and a land surface of 1,952.60 km$^2$, which accounts for 3.3 % of the state's total land area. Annually it receives an average precipitation of 800 mm, boasts temperatures ranging from 10 to 54 °C, and has 32,757 inhabitants [15]. Most of La Huacana's land surface lies within the Lower Balsas River basin province. The characteristics of its vegetation are very similar to that of Arteaga municipality, with the exception that here one also encounters plant communities like palm groves (*Sabal pumos*).

## *Social and Environmental History of the Ejidos*

The *ejido* GLC was created recently, in 1973. The original *ejido* members were workers at a farm living on the banks of the Balsas River who were displaced after the construction of the Infiernillo hydroelectric dam[4]. The construction of this dam lasted for several years and was finally completed in the 1960s. During this time, extensive deforestation also took place to clear land for agriculture and livestock production, causing the local extinction of tree species. Small-scale fishing began in 1975, aided by the use of large rowboats and later, in 1978, the introduction of outboard motors and the founding of the *fileteras*, a cottage industry dedicated to cleaning and preparing fish fillets[5]. This work became more important, ultimately displacing agriculture as the community's most important economic activity. Starting in 1985, the community began to feel the effects of a prolonged drought produced by rainfall shortages, which had a dramatic impact on productivity. Because of this, crops like sorghum, sesame, and maize were replaced by plantations of new crops, such as the columnar cactus *pitire*, raised for its edible fruits. In 1990, local fishermen noticed that there were no more *mojarra*, or silver biddies (family *Gerreidae*) to catch, and in 2000 fish production plummeted. The COINBIO Project began in the *ejido* in 2003 with an inventory of flora and fauna [25], and in 2005 the CCA was established [26].

*The ejido LL* was formed as a result of a land struggle that farmers started in 1943 against the landowner (*hacendado*) of "Hacienda La Laja." In the early 1950s a dirt road was built, an event important for the creation of the *ejido* because road construction became an economic alternative to the hacienda's traditional agricultural work. Also, the road helped connect the area with the state's large cities and contributed to the arrival of governmental institutions such as the Institutional Revolutionary Party (PRI), which led to the founding of the party's first local committee. Growing economic and political autonomy fueled the desire for land redistribution, but it was not until 1962 that the *ejido* lands were granted, and 2,529 ha was allotted to 32 people. Shortly after that a crisis occurred when the landowner denied community members and title-bearing landowners access to water, causing the community's cattle to die.

Until 1998, the *ejido* lands operated under a common use agreement and were divided into three grazing areas where cattle were rotated through, depending on climatic conditions in the rainy and dry seasons. Currently, and by mutual agreement, the land has been divided into 32 grazing zones, one for each *ejido* member. In 1999, the federal government gave the community a document recognizing their rights as an *ejido*. In 2004, COINBIO began work by carrying out a community territorial planning [27], and in 2007 a project for demarcating the CCA was developed [28].

[4]The dam's original name is Adolfo López Mateos, but locally it is known as the Infiernillo Dam.

[5]These are semiformal spaces where the fish caught above the dam are cleaned and cut into fillets.

The land where the third *ejido*, LP, is currently located once belonged to the Hacienda La Pitirera. In 1957, construction work on the curtain of the Infiernillo hydroelectric dam began, an event that would drastically change the lifestyle of the region's inhabitants and its natural resource profile. The first major change occurred when hundreds of people from all over the region and from other states, especially Guerrero, began to arrive with their families. In 1958 work began on a railroad, which attracted even more workers to La Pitirera. The second big change driven by the dam construction was the alteration of the natural course of the region's rivers, especially of the Balsas River. Entire communities were displaced, exotic fish species (*Plecostomus* spp.) invaded the waters, and animals like the jaguar were declared locally extinct. The presidential resolution that granted the *ejido* to its inhabitants was published in 1958, recognizing a list of 88 *ejido* members. In 1962 they received compensation for the lands submerged by the hydroelectric dam. In 2005 COINBIO began its work with a flora and fauna inventory [29], and in 2007 the CCA was demarcated [29].

## Socioeconomic and Environmental Characteristics of the Community Conservation Areas

All three *ejidos* have fewer than 2,500 inhabitants, which places them into the category of rural localities. The LL *ejido* is the smallest, both in land surface and population, while LP is the largest of the three, in both population and land surface, followed by GLC. In all three cases, the entire population is *mestizo* and speaks only Spanish (see Table 4.1).

All three *ejidos*' main economic activities are livestock raising, hunting, and gathering of local resources. In the GLC and LP *ejidos*, fishing is also an important activity. In LL, mining is an economic activity for some people, and in LP some

**Table 4.1** Socioeconomic characteristics of General Lázaro Cárdenas, La Lajita, and La Pitirera *ejidos*

| Indicators | General Lázaro Cárdenas (GLC) | La Lajita (LL) | La Pitirera (LP) |
|---|---|---|---|
| Population, total number of *ejido* members, total *ejido* land surface | 563 people<br>54 members<br>3,412 ha | 178 people<br>31 members<br>2,622 ha | 2,492 people<br>88 members<br>7,050 ha |
| Economic activities in order of importance | Livestock<br>Fishing<br>Hunting<br>Gathering | Agriculture<br>Livestock<br>Mining<br>Hunting<br>Gathering | Services<br>Livestock<br>Agriculture<br>Fishing<br>Hunting<br>Gathering |
| Social cohesion | Low | High | Medium |
| Marginalization index [29] | High | High | Medium |

**Table 4.2** Environmental characteristics of the community conservation areas

| Indicators | General Lázaro Cárdenas (GLC) | La Lajita (LL) | La Pitirera (LP) |
|---|---|---|---|
| Year CCA was created | 2005 | 2007 | 2007 |
| Total CCA surface, % of *ejido* surface | 23 ha (0.6 %) | 229 ha (8.7 %) | 708 ha (10 %) |
| Vegetation types (extent of conservation) | Tropical deciduous forest (conserved) planted pasture agricultural area | Tropical deciduous forest and tropical sub-deciduous forest (well conserved) | Tropical deciduous forest and tropical sub-deciduous forest (well conserved) |
| CCA territorial management | Common use with natural resource extraction for subsistence and maize cultivation | Plots in dispute with hunting activities and natural resource extraction for subsistence | Common use with natural resource extraction for subsistence |

people benefit from supplying foodstuffs. The latter occurs because the offices of the hydroelectric plant are located nearby, which is responsible for an influx of people from other regions and states who demand goods and services.

In terms of the developmental level of the *ejidos*, GLC and LL have a high level of social marginalization[6], while that of LP is considered relatively low [31]. In terms of the extent of social cohesion, LL showed the greatest cohesion, LP a medium level, and GLC the lowest.

Table 4.2 shows environmental characteristics of the CCAs. GLC selected 23 ha for its CCA, which accounts for 0.6 % of its total land surface. The area had been assigned as common use land and was chosen because it was in a part of the territory that was not used for grazing and because it was well conserved. It is also the only part of the *ejido* where native maize has been planted, an activity carried out only by one farmer, a member of the *ejido.* The dominant vegetation type is tropical deciduous forest.

In LL, 229 ha was demarcated for the CCA, which represents 8.7 % of the *ejido's* total land surface. The area was selected because it joins two plots that were ownerless and thus the subject of a dispute. For this reason, they had never been used for agriculture or grazing, which favored the conservation of their vegetative cover. The surface is covered by tropical deciduous and tropical sub-deciduous forest.

The LP *ejido* selected a conservation area of 708 ha, which accounts for 10 % of the *ejido's* total land surface. It is a common use area that forms part of a canyon system that leads to the Balsas River. These topographic features make the land unfavorable for grazing and agriculture, though it has been used for plant and animal resource extraction. Therefore, the vegetation is well conserved and is mostly characterized by tropical deciduous and tropical sub-deciduous forest.

[6]The marginalization index is a summarized unit of measure that allows one to differentiate between localities appearing in the census according to the overall impact that specific deficiencies have on the population, like lack of access to education, living in substandard housing, and lack of material wealth [30]. The higher the index value, the greater the marginalization.

## Regulatory Mechanisms for the Three Community Conservation Areas

During the creation of the CCAs, the community assemblies defined the rules and regulations governing their use and management. The GLC's CCA was named "El Barril;" LL's was called "Los Capulines;" and LP came up with the name "Las Juntas de la Higuera." In LL and LP a regulatory definition was constructed for each CCA, whereas in GLC the assembly could not come up with an agreed-upon set of definitional rules, mostly because of the low level of social cohesion among the *ejido* members and because internal conflicts took center stage at meetings.

What follows are the definitions for each CCA and the regulations for use that each assembly decided upon. Table 4.3 shows how the LL and LP *ejidos* defined their own CCA and established the general criteria that indicates who is allowed to make decisions about the CCA. In the case of GLC, the assembly did not agree on a definition. The three *ejidos* established general rules for management activities in each CCA and made specific rules for hunting. Finally, LL and LP established actions that they wanted to carry out to communicate these regulations to other *ejidos* and visitors.

**Table 4.3** Community conservation areas definitions and rules for its use

| | El Barril (GLC) | Las Juntas de la Higuera (LP) | Los Capulines (LL) |
|---|---|---|---|
| *Definition* | None | "It's a heritage area so that future generations can see what ejido members cared for and cultivated in the past. It's something for us all to work on in order to preserve it for the future" | "It's an area we chose because the ejido members want to protect and conserve the flora and fauna, the rain cycle, our seeds, and to produce benefits for La Lajita's inhabitants and especially for the children who will benefit from it in the future. In this area the ejido members decide what can be done and what can't be done." "The Community Conservation Area is like the head of the ejido, it helps us to get organized and to keep us united. The CCA makes us happy because it keeps our landscape intact" |
| *General criteria* | None | *The CCA can be used for the following things and according to the following rules*:<br>1. Only people from the ejido are allowed to enter | *General criteria that frame the rules for using the CCA "Los Capulines"*:<br>1. The maximum authority for making any decision regarding any matter related to the CCA "Los Capulines" will be the Assembly of Ejido Members in La Lajita and Palos Prietos<br>2. The CCA will be used exclusively for conservation<br>3. The CCA is an area for the benefit of all |

(continued)

**Table 4.3** (continued)

| | El Barril (GLC) | Las Juntas de la Higuera (LP) | Los Capulines (LL) |
|---|---|---|---|
| *General rules* | 1. No felling of trees<br>2. No livestock can enter<br>3. No clearing of vegetation | 1. Fruit extraction allowed without damaging trees. The same holds for other plant species (medicinal, edible, etc.)<br>2. Visit the conservation area<br>3. Do not cut the tree to gather the fruit. No cutting lumber<br>4. Hunting and trapping animals in the protected area is prohibited<br>5. No burning or clearing of vegetation is allowed | 1. High environmental impact activities are prohibited within the CCA, like clearing vegetation for agriculture and livestock grazing<br>2. Hunting is prohibited in the CCA<br>3. Trapping of birds and other fauna is prohibited in the CCA<br>4. The Assembly must approve the extraction of any wood resources (like fence posts, house building materials, firewood, etc.)<br>5. Fruit can be harvested as long as the tree is not cut, which holds true for medicinal plants as well |
| *Hunting* | No hunting allowed | Conserve deer and wild boar | 1. Animals can only be hunted on each *ejido* member's plot. Only *ejido* members and their family can hunt, which prohibits outsiders from coming to hunt<br>2. You wish to hunt on someone's land, ask for permission first<br>3. If an animal is hunted according to regulation and it enters the CCA while wounded, the hunter can pursue it, but cannot hunt any other animal in the CCA. The Assembly must be notified of the event<br>4. Regarding hunting, closed season must be respected and does and newborns should not be hunted |
| *Specific actions* | None | 1. Inform bordering *ejidos*<br>2. Notify the municipal president's office<br>3. Form a protection committee<br>4. Put up signage for CCA | 1. Watch over and foster respect for the CCA among *ejido* members, bordering *ejidos,* and people not from La Lajita<br>2. Each *ejido* member is responsible for sharing the criterion with his family and assumes full responsibility for his guests<br>3. Avoid letting livestock into the CCA, watching over the nearby grazing areas, and fencing in the CCA |

## Discussion and Conclusions

In all three case studies, establishing the community conservation area promoted collective action, caused people to reflect on their perspectives concerning the mid- and long-term use of their territory and its natural resources, and strengthened the search for productive alternatives (see Fig. 4.2).

The process of creating the CCAs was centered on the reconstruction of the territory's socio-ecological history, which defines the ways that the inhabitants make use of its land, water, and other resources. The region where the three *ejidos* are located is marked by four major historical factors: (1) the maintenance of unsustainable economic activities, such as ranching, inherited from the haciendas that colonized the territory; (2) the maintenance of traditional, more sustainable productive activities, such as fishing, gathering, and agriculture for subsistence; (3) the hydroelectric dam that, as mentioned before, has had an impact on livelihoods in GLC and LP; and (4) the history of how the *ejidos* were formed, which accounts for the difference in land distribution strategies and access to resources.


**Fig. 4.2** Field work process: (**a**) General Lázaro Cárdenas; (**b**) La Lajita; (**c**) La Pitirera

In this way the conditions of the CCAs that were analyzed showed marked differences. The GLC and LP *ejidos* chose common use areas that had been used only for the sporadic extraction of plant and animal resources (in GLC's case, also for cultivating native maize). LL opted for an area that remained ownerless when the land was originally parceled out (some *ejido* members had used this area for hunting and sporadic plant resource extraction). Establishing the CCA there allowed the community to put a conflict to rest by having the assembly designate it for conservation.

In all three cases, the CCAs are far from the centers of population and are difficult to reach. Thus, their high level of conservation is due to the historical management and distribution of the land and the difficulty inhabitants had in gaining access to each site. Therefore, the criteria that the *ejido* members used for defining their CCAs are the following: (1) choose areas that will not generate internal conflicts when they are designated as conservation sites and (2) choose areas with a management history of low human impact. It is important to emphasize that the knowledge generated prior to the demarcation of the CCAs, through projects like community territorial planning and flora and fauna inventories, allowed for a deeper understanding of how the distinct environments were managed within each territory, which facilitated the identification of sites with good conservation potential. It thus becomes clear that community conservation is a process that is greatly enhanced by the experience of community territorial planning.

Another factor that is important to consider for promoting and strengthening community conservation strategies in Michoacán is the development of working methodologies that are based on the interests and needs of each community while remaining congruent with conservation objectives. It becomes necessary to take into account not only biodiversity conservation but also agrobiodiversity management practices. This implies the development of CCA management plans that incorporate activities that allow people to meet their subsistence needs while, at the same time, promoting alternative productive projects.

In the case of the three *ejidos*, development strategies were elaborated and implemented after creating the CCAs. For example, in GLC a columnar cacti reproduction project was developed; in LP, the *ejido* decided to continue with environmental service payment projects (even though the federal government did not accept their proposal, and they were left out of the program), and in LL the *ejido* continued with its nursery program for raising commercial tree species.

In all cases, the project for creating CCAs generated a secondary process related to enhancing the bond between the inhabitants and their territory. The fieldwork allowed *ejido* members and their children to reconnoiter, explore, and, in some cases, see *ejido* boundaries for the first time or even to discover areas they never knew existed. In LL's case, this allowed not just *ejido* members but the entire community, including young people, women, and children, to gain a sense of ownership of the conservation area. This became evident at the end of the project when the community organized a celebration at the CCA and almost everyone attended.

For the creation of a CCA to be successful, it is necessary to generate mechanisms for continuous dialogue and to build trust and respect between all people involved in the process. Both external and internal actors should consider that defining a

CCA is not a linear process because, generally speaking, methods, work plans, and even the goals themselves may be constantly revisited and rectified. This means that community conservation is a process that involves territories and natural resources, but it is built around a community's specific interests and needs.

Another significant need is to understand how the community conservation initiatives examined here are linked with regional process of biodiversity conservation promoted by governmental agencies. Related to this, conservation generally responds to international policies dictated by treaties and agreements, which in this case Mexico has signed. These agreements become policies and programs of different magnitudes and with different working perspectives.

One example of this is the creation of the Zicuirán-Infiernillo Biosphere Reserve in 2007 in the Lower Balsas River basin. This illustrates how conflict arises when projects are carried out in the same territory by different agencies and organizations with divergent philosophical frameworks and unequal legal and financial resources. The biosphere reserve is located in the same region referred to in this study and was being implemented from the top-down at the same time as the COINBIO projects, specifically the CCAs, were being gestated with community participation from the bottom-up. The area designated by the federal government for its protected area engulfed the GLC and LP *ejidos* and, along with them, their CCAs. These community-conserved territories have yet to be officially recognized by the reserve and are instead regarded as just another set of polygons [32] within the National Protected Area [12].

In order to know what impact the reserve will ultimately have on these *ejidos*, one would have to consult the master plan, known as the "Management Plan," which, by law, must clearly indicate just how the reserve's territory will be managed. The fact that work for implementing the biosphere reserve has moved ahead at a lightning pace without the possibility of public consultation of the "Management Plan," which at the time of writing has yet to be published (see CONANP), is something the authors of this work find highly problematic.

Since this appears to the general modus operandi of the huge governmental agencies and projects throughout Mexico, we are obliged to reflect upon the importance of differentiating between community conservation and the kind of conservation programs that derive from State-run programs. In the former case, conservation at the local level should stem from the perspectives, objectives, and interests of the landowners. The latter programs opt for a process that integrates short- and long-term strategies primarily designed to guarantee continuity and inter-institutional articulation between various governmental agencies representing multiple sectors. The actors involved in State-run programs usually reflect the composition of the regional, national, and international political and economic elites, who often care little for what happens at the local level because they perceive it as virtually irrelevant. However, previous studies show that conservation projects that fail to integrate the needs, knowledge, and vision of the local population are doomed to failure [1, 33].

In Mexico, local processes are not immune to regional and national contexts. It is also vital, therefore, to analyze how the new agrarian structures (stemming from

the reform of Article 27 in 1992), social instability, and the security crisis influence community conservation processes. It is also pertinent to analyze how local and community conservation processes are articulated with national and international developmental and biodiversity conservation tendencies and processes.

In conclusion, community conservation should be conceived as a flexible model that can adapt to a wide variety of historical features and socioeconomic traits based on five key aspects. The first is the definition (redefinition) of conservation priorities and objectives stemming from the communities; the second aspect is to value and consolidate local organization and decision-making forms as well as local strategies for territorial management. The third aspect is the development of education and training programs for the inhabitants of communities, while the fourth is the implementation of communication strategies with different sectors involved, and the last aspect is the implementation of evaluation and monitoring systems.

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# Chapter 5
# Challenges in ICCA Governance: The Case of *El Cordon del Retén* in San Miguel Chimalapa, Oaxaca

**Constanza Monterrubio-Solís and Helen S. Newing**

## Introduction

In October 2010, the Mexican National Protected Areas Commission (CONANP) presented the community of San Miguel Chimalapa (SMC), Oaxaca, with a certificate acknowledging their commitment to conserve an area of 15,328.54 ha (11.4 % of their land) for the next 30 years. This Voluntarily Conserved Area (VCA)[1] is called *El Cordon del Retén* (hereafter, El Retén) and is located on the eastern edge of the community. The Chimalapas region is of international significance for biodiversity conservation, and the dedication of this area to conservation demonstrates the potential of community conserved areas to complement state protected areas in ensuring adequate covering of priority habitats and ecosystems. It offers a useful case study illustrating many of the challenges that have been highlighted elsewhere in relation to governance of Indigenous Peoples' and Community Conserved Areas and Territories (ICCAs) [1–3]. Given that ICCAs are governed primarily, but not necessarily exclusively, by local and indigenous communities, they require new approaches to understand the complex interactions taking place within them. These interactions include the relationships between local people and external institutions working in the area (i.e., NGOs and different government agencies) as well as their links to broader social contexts, challenges, and outcomes [4]. Previous case studies have demonstrated that while formal state recognition of ICCAs may be essential for their effective protection, it can lead to a weakening of community control as external actors intervene in order to meet formal bureaucratic requirements [5].

[1] "Voluntarily Conserved Area" is the legal term through which the reforms to Article 46 and 74 of the General Environmental Protection Law (LGEEPA) provide formal recognition to natural lands conserved by private, communal, or ejidal owners [20].

C. Monterrubio-Solís, M.Sc. (✉) • H.S. Newing, Ph.D.
Durrell Institute of Conservation and Ecology, School of Anthropology and Conservation, University of Kent, Canterbury, Kent, UK
e-mail: cm411@kent.ac.uk

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Nevertheless, little attention has been paid to the complex interactions between both internal and external relationships that can lead to a diversity of outcomes for ICCA governance. This chapter presents a case study of El Retén, focusing on both internal aspects of community governance and institutional relationships with external agencies in order to explore the following: (1) the potential of formal state recognition to weaken community control on ICCA management; (2) the mismatch between expectations generated and actual perceived benefits among community members; and (3) the need for a broader landscape approach in order to find a way to engage with overriding local concerns such as ongoing land conflict. The case study is based on data drawn from semi-structured interviews with local people and various agency representatives, a household survey and direct observations made by the first author between July 2010 and May 2011.

## The Study Site

The Chimalapas region is located on the border of the states of Chiapas and Oaxaca on the Isthmus of Tehuantepec in southern Mexico (see Fig. 5.1). It is home to some 15,114 people [6], representing a multiplicity of ethnic groups,[2] who have migrated

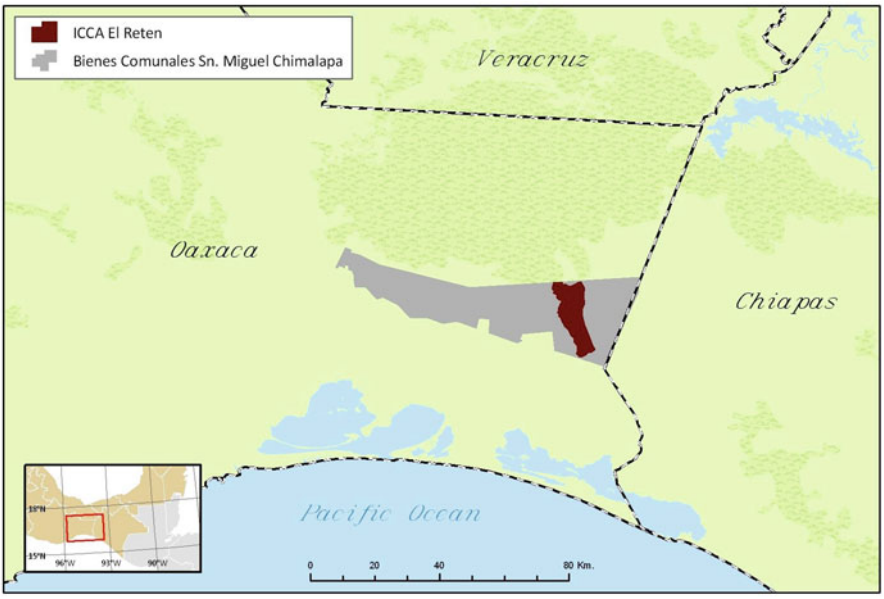


**Fig. 5.1** Location of San Miguel Chimalapa and El Retén. With permission from Rafael García González

[2]These include Zoque, Mixe, Huave, Mixtec, Zapotec, Chinantec, Tzeltal, Chamula, Chatino, and Mestizo people [7].

to the area at different times and under different circumstances. The region is divided into two titled indigenous communities – Santa Maria Chimalapa and San Miguel Chimalapa—which are also municipalities within Oaxaca.

San Miguel Chimalapa (SMC), the site of El Retén, has title to 134,000 ha of land (see Fig. 5.1). In 2010 it had 6,608 inhabitants [6] distributed between one main population center (the "*cabecera*") and 17 smaller settlements or *congregaciones*. El Retén is in the eastern region of the community lands, and the four closest settlements (San Antonio, Benito Juárez, Sol y Luna, and 5 de Noviembre) have had a particularly important role in its creation, especially with regard to the ongoing land tenure conflict that takes place in the area. The municipality is classified as a region of extreme poverty, making it eligible for multiple government aid programs and subsidies.[3] However, internally, living standards are very variable, decreasing with increasing distance from the *cabecera*. The eastern region of SMC has no paved roads, no electricity, and very basic health and education services.

The Chimalapas region is also known for its outstanding biodiversity. It is part of a natural corridor called Selva Zoque, which represents the northern limits of high tropical rainforest on the American continent and one of the largest remaining areas of this ecosystem in Mesoamerica. The floristic diversity in the region is still little-known. Initial fauna surveys have revealed a high level of species diversity, including 146 mammal species, 316 bird species, and some 900 butterfly species, representing 36 % of national biodiversity [7]. El Retén itself represents the largest area of pine-oak and temperate forest left in SMC. It also includes 1,965.60 ha of tropical cloud forest and 1,932.32 ha of tropical rainforest within gullies and slopes [8]. Despite the importance of these ecosystems, land tenure conflicts, inappropriate colonization and agricultural policies, and the constant search for sources of income by the inhabitants and migrants, together with economic pressure from cattle ranchers, loggers, and drug dealers, have resulted in serious impacts on the state of the environment in the region.

From a conservation perspective, therefore, the region represents a critical area. It is a priority eco-region for the World Wildlife Fund [9], part of Conservation International's Mesoamerican biodiversity hotspot [10], a national biocultural diversity hotspot [11], and one of 152 Priority Terrestrial Regions for conservation identified by CONABIO[4] [12]. Nevertheless, a state protected area would be politically and socially inappropriate because of land conflicts, local mistrust in external agencies, and local resistance to external impositions. The following translated quote by a resident, cited in Anaya and Alvarez [7] (p. 22) expresses the latter very clearly:

> … another plan for Chimalapas? No, thank you…based in all sorts of plans, in the name of planning, Chimalapas has been destroyed, its names have been dispersed, and it's forests swept away… Instead of keeping those futures, where nothing really happens, we would rather keep our concrete realities, our own dreams…We do not want to dream someone else's dreams, they turn into our nightmares.

[3] These include federal programs Procampo (providing subsidies for local corn production) and Oportunidades (aimed at women and including economic aid and capacity building).

[4] National Commission for the Knowledge and Use of Biodiversity

## Processes Leading to the Creation of El Retén: Struggles for Land, Livelihoods, and Biodiversity

The official declaration of El Retén as a VCA was the culmination of years of interaction between the local community, NGOs, and government institutions based on their different interests in territorial consolidation, agrarian conflict and land tenure, and biodiversity conservation (Table 5.1). At the same time, the declaration was simply another moment in the quotidian creation of history in SMC community life.

**Table 5.1** Timeline: events leading to the official recognition of El Retén (Adapted from Doane [13], Russell [17], Anaya and Alvarez [7])

| | |
|---|---|
| 1687 | Zoque people bought their own land to the Spanish crown for 20 gourds of gold. |
| 1850 | Illegal possession and natural resources exploitation by external cattle ranchers and loggers within the limits of Chiapas and Oaxaca started. |
| 1947 | Lands in the eastern Chimalapas' region were claimed as national lands by Chiapas. Establishment of logging companies and cattle ranches within community lands. |
| 1950 | Official recognition and definition of the colonial titles for the Chimalapas' region. |
| 1955 | Beginning of intensive palm harvesting and trade in the region. |
| 1967 | The two municipalities, San Miguel and Santa Maria Chimalapa, were acknowledged by the federal government, but the physical boundaries were unclear and overlapped with what Chiapas claimed as national lands. Starting point of the agrarian conflict. |
| 1970s | Period of land invasion and colonization in the eastern region of Chimalapas. Establishment of people from communities from Chiapas and Guerrero expelled due to religious conflict within communal lands. |
| 1977 | Sanchez Monroy, the main logger and rancher, was expelled from the eastern SMC. |
| 1987 | 1 Meeting of ecologists, technicians, academics, and federal authorities in Oaxaca to emphasize the conservation importance of Chimalapas, without informing or inviting the local people. |
| | 1.1 Proposal for the creation of a biosphere reserve due to the ongoing ecological deterioration in the area without prior informed consent from the communities. |
| 1990 | Maderas del Pueblo received funding to develop a social and ecological diagnostic in the Chimalapas region. |
| 1991 | Creation of the National Committee for the Defense of Chimalapas (NCDC) chaired by authorities from Santa Maria and San Miguel and supported by Pact of Ecological Groups and other technical advisors |
| 1994 | Recovering of La Gringa (40,954 ha), Santa Maria Chimalapa, and agreement to declare it as an Ecological Campesino Reserve. Maderas del Pueblo was in charge of the implementation. On the other hand, SEMARNAP kept promoting the biosphere reserve. |
| 1996 | 2 Forum organized in Chimalapas by NCDC to promote the Campesino Reserve and to reject the declaration of a biosphere reserve, a forestry project, a hydroelectric dam, and a highway that would affect the ecological integrity of the region. The projects were stopped. |
| | 3 LGEEPA was reformed allowing the participation of community and private landowners in formal conservation. |
| 1998 | Forest fires expand from May until July, affecting 30 % of the pristine tropical rainforest in Chimalapas (37,806 ha of them was in SMC). |

(continued)

**Table 5.1** (continued)

| | |
|---|---|
| 2000 | CONANP became a deconcentrated commission of SEMARNAT.<br>Maderas del Pueblo international funding was denied, increasing tension between the NGO and the communities led to its withdrawal from Chimalapas, and the NCDC lost strength. |
| 2001 | People from the communities created their own civil organization called United Chimalapas in Defence of Ethnicity and Biodiversity (CHUDEB), but it soon diluted |
| 2003 | CONANP started providing certificates to voluntarily conserved areas. |
| 2004 | Santa Maria Chimalapa certified the VCA " Area Comunal Cerro Azul." |
| 2008 | LGEEPA's Art. 46 was reformed to recognize VCAs as another form of PA and subject to its regulations.<br>SMC received the first PES for El Retén (2,899 ha). Part of these resources pay for the development of the management plan of El Retén. |
| 2009 | Grupo Mesofilo stopped working in SMC and was substituted by GADES. |
| 2010 | *El Cordon del Retén* was formally declared a VCA, covering an area of 15,328.54 ha. |

A copious amount of material has been written, giving detailed accounts of this history from different perspectives [7, 13–15]. Most relevant for this chapter is the institutional process, which Doane [13] has described in detail, so it will only be briefly summarized here. Rather than evaluating this process in terms of the authenticity, or lack thereof, of the conservation marketing discourse by local people (as Doane does), however, we find it more useful to recognize that the process has involved multiple actors with distinct but overlapping priorities, all of which have contributed to reaching the point where the formal recognition of a community conserved area was possible.

The Chimalapas region is widely known for the ferocity of its land and resource conflicts, which are related both to its complex history of settlement and to its location on the ill-defined boundary between the states of Oaxaca and Chiapas. Because land conflicts are the overriding concern of the inhabitants of the region and have a deep influence on every aspect of their life, they are described in some detail here.

Although there has been archeological evidence of human presence in the eastern region of SMC since pre-Hispanic times, population densities were very low until 1947, when a group of logging companies was established in the area after it was claimed by Chiapas state as federal forest lands [13] (p. 455). During the 1950s, the federal government, through the National Commission of Colonization, titled new settlements or "*colonias*" in SMC communal lands under the jurisdiction of the state of Chiapas. However, in 1967, the region was officially divided into two titled indigenous communities within the state of Oaxaca—San Miguel Chimalapa (SMC), the site of El Retén, and Santa Maria Chimalapa. At the same time as SMC received its title as an indigenous community, logging companies present in the eastern region mobilized their workers to claim the lands for themselves, and 3 months later, the federal government gave formal titles to two ejidos within SMC's communal lands, again under the jurisdiction of Chiapas. Between 1970 and 1980 the Agrarian Reform Secretary (SRA) gave further titles to areas within the communal lands to other private owners and ejidos as part of the state of Chiapas.

Thus, although SMC is officially within the state of Oaxaca, five ejidos within its borders have titles granted by the state of Chiapas. Through the years, people from the eastern region of SMC have sought permits for timber extraction from Oaxaca's office of the National Secretariat for Natural Resources (SEMARNAT), but the permits have always been denied on the basis that they cannot be granted in an area where land tenure is disputed. However, in 2005 the federal office of SEMARNAT provided a 12-year authorization for timber extraction in this same area to one of the Chiapas ejidos. The lack of clarity over which government office has jurisdiction enhances the conflict between members of communities, who identify with the state of Oaxaca, and the ejidos. Some *comuneros* prefer to use their forests illegally rather than leaving them to the ejidos to exploit, so it is not surprising that there has been a low yet constant level of illegal logging.

Land conflict and the multiple negotiation processes surrounding it have defined, and continue to do so today, the way local people organize themselves, their settlement patterns, the way they prioritize their needs and perceive and use their environment, and above all the way they negotiate with government institutions. Many of the current settlements were created through the movement of households from the center of SMC to peripheral areas in order to defend the land from specific threats. This is the case for the four communities closest to El Retén, which were formed from 1972 onwards by landless people from the central settlements who settled there and successfully mobilized to displace logging companies and cattle ranchers. The uncertainties of tenure and the related conflicts have taken their toll on community cohesion and on the environment, although in the case of the settlements located in the eastern region, land conflicts have also promoted community cohesion and organization through shared resistance. Communal work or *tequio*[5] has disappeared in central parts of SMC, and there have been many incidences of rule breaking in relation to local agreements made to counter illegal logging, land invasion, leasing of land for cattle ranching, excessive hunting, and illegal traffic in fauna (often by outsiders). As a result, extensive forest areas within SMC have been destroyed, and only a few large remnants of primary vegetation remain.

From the mid-1980s onwards, the remaining forest areas and the threats they faced attracted the attention of national and international conservationists, and several proposals were made for the establishment of protected areas in Chimalapas. In 1987, under the auspices of the federal agency for urban development and ecology (SEDUE)[6] [16], the first land-use planning exercise was published. Also in 1987, a meeting between academics, technicians, NGOs, and government agencies was organized by *Pacto de Grupos Ecologistas* (PGE) in Oaxaca in order to emphasize the importance of the conservation of the Chimalapas region. The meeting was

[5]Tequio is voluntary community work that requires community members to contribute with their labor or material goods in the name of community benefit. It is a key component of the uses and customs (*usos y costumbres*) system.

[6]The institutional precursor of SEMARNAT

conducted without informing the local communities. Community members from San Miguel and Santa Maria were informed about the event through other means and mobilized to arrive at the meeting by surprise. Once there, the community members demanded information about the issues being discussed and that they be consulted about these issues as well. Later that year, PGE representatives visited Santa Maria and launched a dialogue, although a proposal for the establishment of a biosphere reserve had already been developed. Given this history, local people came to perceive that a biosphere reserve would take considerable control out of their hands and therefore mounted significant opposition. Along with the biosphere reserve proposal, there were other projects that were perceived as posing a threat to the Chimalapas region during the 1980s including a forestry project promoted by the Inter-American Development Bank, a hydroelectric dam, and a highway from Chiapas to Veracruz that would have passed through Chimalapas.

In 1990, Maderas del Pueblo (MDP), a local NGO, started working within the Chimalapas region, with funding from WWF[7] in coordination with the Economic Research Institute of UNAM,[8] PGE, and other NGOs. MDP was in charge of developing a socio-environmental diagnostic of the Chimalapas rainforest, but its role soon came to be much more important for local people. This was due not only to its involvement with the communities but also to its approach, which, in contrast with other environmental NGOs, also granted importance and efforts to the resolution of the land tenure conflict. The role of MDP has been already described and analyzed by Russell [17] and Doane [13], and for the purposes of this chapter, it is sufficient to say that, at the time, MDP was the main external institution working in the area in complete absence of formal government involvement. After a series of workshops and community planning processes, a proposal for an Ecological Campesino Reserve was developed as an alternative to a biosphere reserve, one that would allow local inhabitants to maintain greater control over their lands. In 1994, local people recovered an area, called La Gringa (40,954 ha) that had been invaded in Santa Maria Chimalapa, and set an agreement to establish the Ecological Campesino Reserve on this land. In the same year the community plan for the Ecological Campesino Reserve was delivered to SEMARNAT, but it was rejected on the basis that it was not in line with existing legal frameworks and government policy. At that time, the LGEEPA considered legitimate only those protected areas managed by the government under a determined set of management classifications, which did not include community or private conservation. After all the effort and resources invested, carefully described by Anaya and Alvarez [7], the creation and implementation of the Ecological Campesino Reserve did not proceed due to a lack, in the legal system, of a mechanism for community participation in conservation.

In 1991, the National Committee for the Defense of Chimalapas (NCDC) was established to protect Chimalapas both at the level of national policy [17] and also

[7] Later funded by the UK Department for International Development

[8] National Autonomous University of Mexico

by supporting local people in opposing the imposition of an increasing array of major development and conservation projects on their lands. As mentioned before, these included a forestry project promoted by the Inter-American Development Bank, a hydroelectric dam, a highway from Chiapas to Veracruz, and—also perceived as a threat because of its implications for the loss of local control—the biosphere reserve. The movement gained political weight and brought the Chimalapas region and its problems to national attention. The NCDC drew enough social and political attention to succeed in stopping all the projects, while MDP kept developing local people's capacities for sustainable production and providing legal advice to the communities.

Forest conservation became an increasingly pressing issue for people in the Chimalapas region in 1998, when a combination of extreme drought, increasing slash-and-burn farming, burning of pastures to renew grasslands for livestock, and illegal fires started by hunters led to the biggest wildfires in recent regional history. Local people, with the assistance of some 1,000 members of the Mexican army and Mexican and US fire brigades, fought the fires for a month, yet some 37,806 ha of forest in SMC was damaged, and one third of the entire Chimalapas region was affected. The fires were a milestone in local perceptions of the importance of forests: fighting the fires, people realized that logging and land clearance for cattle ranching had made the area around their settlements more vulnerable both to fires and to soil erosion, with worrisome implications for water supplies and climate change. The area that suffered the highest impact was the eastern region of SMC—the area that now includes El Retén [15]. As described above, the four settlements in this zone were first established as a conscious action to reclaim lands from logging companies and cattle ranchers; the settlements were therefore already collaborating on issues related to land claims and natural resource management. Each of the settlements had an internal system to control fires through *tequio,* and they had also collaborated in negotiations with nearby ejidos over ongoing land conflicts, in the participatory planning processes for the Ecological Campesino Reserve and the opposition to the proposed biosphere reserve (see below), and in working to secure land tenure and new sources of income. These collaborative and cooperative efforts all shaped the local context that eventually led to the official recognition of El Retén.

In 2000, international funding of MDP was discontinued, and this eventually led to the withdrawal of the NGO from the region and the fading away of the NCDC. Different reasons are given for the cessation of funding by the NGO members, the official agencies, and the local people. The following statement by a *comunero* explains the role of MDP as perceived by some of the local people:

> Maderas del Pueblo informed us, they got really involved in the agrarian conflict, and the government did not like that. The government does not like people getting advised, nor people getting organized. That is why not even our own authorities liked them [MDP], and that is why they [local authorities] treat us [residents of Benito Juárez] as rebels… but not everybody understood the role of MDP, and those who didn't have information were used by the government (Benito Juárez, 25/11/2011).

Once MDP withdrew, some local leaders organized their own NGO called CHUDEB (United Chimalapas in Defense of Ethnicity and Biodiversity) in order to apply for funding for production projects. But questionable and personal interests were soon perceived among the leaders, and the organization slowly faded away.

In the same year as MDP's international funding was discontinued, the National Secretariat for Natural Resources (SEMARNAT) underwent structural changes and the Natural Protected Areas Commission (CONANP) became an independent institution. The Oaxacan regional office of CONANP, together with directors of other environmental government agencies at the regional level, acknowledged widespread local community resistance to the imposition of biosphere reserves, which led them to search for "softer" legal mechanisms for conservation that did not involve a loss of local autonomy and sovereignty over lands and resources. This development in Oaxaca was important in shaping changes in national environmental law and policy in favor of civil and community initiatives. The general Law for Ecology and Environmental Protection (LGEEPA) was reformed repeatedly between 1996 and 2008, and through these reforms a mechanism was created for formal "certification" of voluntarily conserved areas (VCAs) on private and community conserved lands. Upon receiving certification for a VCA from CONANP, communities or ejidos could be considered for environmental services payments from the National Forestry Commission (CONAFOR) and other programs managed by CONANP, and thus certification is perceived to have significant potential economic benefits.

From the perspective of external state and non-government institutions, the process leading up to the official recognition of El Retén started with the establishment of communication and collaborative links between World Wildlife Fund, which has been working and developing a relationship with the authorities from both communities in the area since 1990, representatives of the Oaxacan government offices for environment, protected areas and forestry (SEMARNAT, CONANP, and CONAFOR, respectively), and other NGOs working in the region. Between 2005 and 2007, these agencies started working together with the aim of establishing a common ground in order to offer a single and clear strategy to the communities, instead of making dispersed and often contradictory efforts. WWF promoted and helped to fund a series of activities to build capacity, information sharing, and strategy among the different agencies and NGOs; once a working group, a common goal, and a single discourse had been established, negotiations with the two Chimalapas communities were embarked upon.

The proposal for VCAs came at a time when there had been significant changes in government policy and institutional structures for conservation. Thus, the first VCA to be established in the Chimalapas region was "Cerro Azul" in Santa Maria Chimalapa in 2004, following which negotiations started with SMC in order to persuade local people to support the creation of a second VCA that would act as part of a natural corridor across the Selva Zoque. The area for the proposed VCA was selected through a process of land-use planning developed by WWF and a local NGO called Grupo Mesófilo in 2006. El Retén is located in the mountains, in areas

used only for hunting and collection of palm products.[9] During the process of negotiation to achieve the formal recognition of El Retén, many workshops and meetings were held by representatives of CONANP, CONAFOR, and the NGOs WWF and Grupo Mesófilo in the settlements of San Antonio and Benito Juárez. The VCA's management was to be based on an integrated approach to conservation and sustainable use, prioritizing the conservation of ecosystems, biodiversity, watersheds, landscape, and environmental services while at the same time opening the possibility of commercial use for the benefit of local inhabitants in the eastern region of SMC. External institutions put a strong emphasis on financial incentives in the form of future jobs and economic alternatives in order to gain local support. The fact that a certified VCA would make SMC eligible for payments for environmental services (PES) was a powerful incentive for local people to give their support, especially in a context where government services and funding were very limited. In addition, four key sustainable economic activities were proposed to the settlements: resin and palm harvest, ecotourism, avocado plantations, and *chayote*[10] cultivation. The proposed activities also included the establishment of a bottled water plant but the details about the projects such as a timeline, funding, and operation were not specified.

In order to get a certificate of VCA, SMC needed a management plan for El Retén and economic resources to develop it. Thus, external institutions lobbied for SMC to become eligible for PES by CONAFOR in order to generate economic incentives and resources for the development of the management plan and, consequently, to get the VCA certificate. In 2008, the community of SMC received its first PES for El Retén for the conservation of 2,899 ha of forested lands. Part of the money was used for technical studies to develop a management plan for El Retén. The management plan, which was finalized in December 2008, is a very comprehensive document that defines the general objective of the VCA as:

> To maintain natural ecosystem elements of *El Cordon del Retén*, in particular species of flora and fauna, through activities that allow the conservation of the current communities of flora in the area and that generate the sustainable development of the eastern region's inhabitants.

The management plan also divides El Retén into several different management zones (see Table 5.2 and Fig. 5.2) [18]. It states that management should be adaptive and should provide opportunities for participation, training, and benefit sharing of the local communities, although it is not specified how this should be done. El Retén was finally formally declared a VCA and SMC received a certificate in 2010, covering an area of 15,328.54 ha (11.4 % of the communal land).

[9]Currently, the palm harvest is not an economically viable alternative since there is a mismatch between the minimum volume that buyers demand and the quotas established by the environmental regulations.

[10]Edible plant cultivated for its fruit but also for its young shoots and roots.

**Table 5.2** Area within El Retén dedicated to different types of land use [8]

| Management classification | Hectares |
|---|---|
| Conservation/non-wood forestry products (palm) | 3,897.92 |
| Use and restoration | 1,143.35 |
| Conservation | 5,210.47 |
| Forest management/restoration | 849.12 |
| Forest management | 4,200.04 |
| Urban area | 27.64 |
| Total | 15,328.54 |

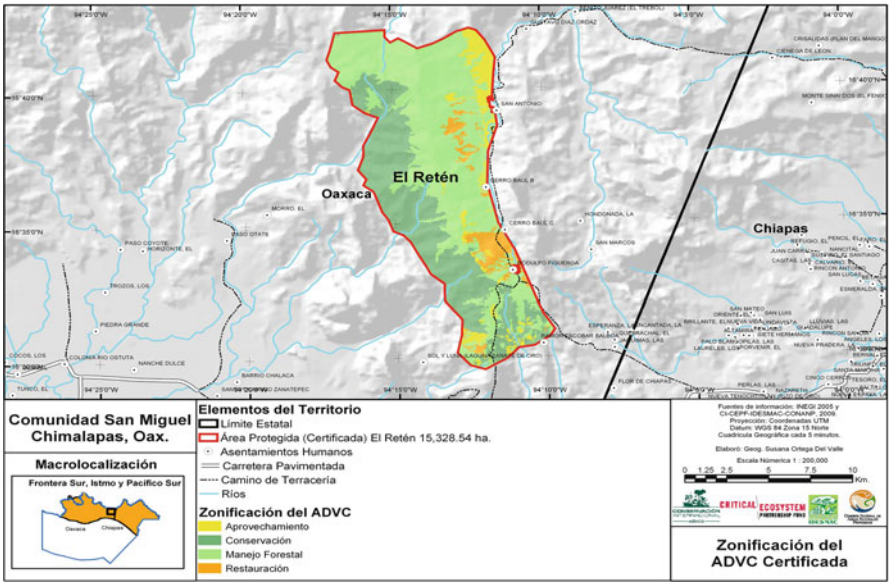


**Fig. 5.2** Management areas of *El Cordon del Retén* [18]. With permission from Marco Huerta

## After Official Recognition: Challenges Encountered in the Management of El Retén

One year after the formal recognition of El Retén and 3 years from the first delivery of PES, changes in natural resource management systems, weaknesses in the internal governance structures of the community, and tensions between the community and external agencies have raised several issues that illustrate some of the challenges that are being identified in ICCAs across the world. This section outlines some of the challenges that have arisen in relation to each of these points.

## *Institutional Arrangements for Governance and Implications for Local Control*

The principal institutional mechanism for the management of El Retén takes the form of an inter-institutional planning and operational committee constituted of government and NGO institutions,[11] which meets on a regular basis to develop proposals and discuss progress with the projects in place. The inter-institutional group represents an innovative approach to the protected area management that avoids a multiplicity of competing external actors and prevents duplication of efforts or competition between different institutions with similar goals. However, it includes no community representatives, but rather, presents proposals and reports to the community through the formal governance institutions of the latter. Therefore in order to understand the institutional arrangements of El Retén, it is necessary first to understand the preexisting governance structures of SMC.

SMC is both a municipality and an indigenous community and thus there are two formal institutional systems. The municipal president forms the political link between local people and federal and state governments, whereas the communal or agrarian authority is responsible for all land and internal issues. These issues include the division of land and resource rights between individual settlements, and since there has been no municipal authority since 2009, the communal authority is currently the channel through which all matters concerning El Retén are addressed. The communal authority takes the form of a committee – the *Comisaría de bienes comunales,* or common property commission – which is chaired by a *comisariado,* and has a secretary and a treasurer. These authorities are elected and regulated by locally defined norms and customs. There is also a three-person monitoring committee that oversees the performance of the communal authorities. The most important community decision-making body is the general assembly, which is responsible for all issues regarding who belongs to the community, the community's norms and organization, internal land allocations, and regulation of natural resource use. The *Comisaría* is responsible for calling general assembly meetings and facilitating and enforcing their decisions.

In addition to the central governance structures for SMC as a whole, within each settlement there are representatives of both the municipal and community authorities – a municipal agent and a community auxiliary secretary – who are elected every 1 or 2 years, according to local arrangements. A local assembly takes place within each settlement once a month or as needed. In theory, everyone who fulfills the requirements to be a comunero[12] also has the right to participate in the general

[11]The group is constituted by CONANP, WWF, GADES (Grupo de ayuda para el Desarrollo Sustentable A.C.), Pronatura Sur A.C., and FONDO (national and local environmental NGOs). WWF and GADES are the institutions most directly involved with the community concerning El Retén.

[12]These requirements are to be a Mexican citizen: older than 18 years or the head of household, in which case there is no restriction by age, to be registered on the agrarian census or the general assembly census, to live and to work in the community, and to respect the community's customs. By no means do all the inhabitants of SMC fulfill these requirements, and in particular, very few women are *comuneras*.

assemblies of SMC as a whole (more than 500 people in total). However, general assembly meetings have often generated a lot of conflict as different groups, usually divided by political parties, push for their own interests, and in recent years the general assembly has been substituted by "auxiliary secretaries' assemblies," which involve only the auxiliary secretaries from each of the 17 settlements together with the *comisariado*. This change appears to have been made by the previous *comisariado* without consultation with the *comuneros*.

The planning and operational committee for El Retén coordinates with SMC by presenting proposals, first to the community's *comisariado* and then, after receiving his comments, to the auxiliary secretaries' assembly. Auxiliary secretaries then report back to their own settlements. GADES, a local NGO, acts as an additional bridge between the inter-institutional group and SMC and is responsible for extension and technical assistance, for overseeing implementation, and for managing the accounts. However the first challenge that has arisen is that the replacement of a general assembly attended by all *comuneros* with a representative assembly attended only by auxiliary secretaries has harmed perceptions of accountability. Moreover, without the general assembly many local people do not feel that they are active members of the decision-making process. In relation to El Retén, there is also some tension over the relative roles and responsibilities of the central community institutions and the four settlements in the eastern region that are most directly affected by its creation. Thus the land-use planning exercise of SMC that led to El Retén's creation was validated at the assemblies held locally in the settlements of San Antonio and Benito Juárez but not in the general assembly, diminishing its legitimacy from the perspective of many *comuneros*. Conversely, in the process to produce El Retén's management plan, workshops were carried out in San Antonio and Benito Juárez (the two closest settlements), and the issue was discussed in the assemblies within the settlements; however the final decision was taken in the auxiliary secretaries' assembly, thus excluding the majority of the people. During this study, 73 % of people in San Antonio and Benito Juárez said that they had not (or did not remember having) participated in the decision to adopt the management plan, and many did not know what the management plan contained.

Local calls for more involvement are particularly acute in relation to the distribution of funding and economic benefits. Members of the four settlements nearest to El Retén have looked after the area over many years, dealing with land conflicts and fighting fires, and they feel their efforts have led to the conservation of the forested lands that constitute and surround El Retén. Therefore they feel that they should receive the bulk of the benefits from the establishment of the VCA. However, due to the operational rules of the PES program, payments arrive at the community level, and their distribution is decided upon centrally. A proportion of the money is used by external agencies for technical studies and accounting services, and a further amount is used to support implementation, including funding for productive activities (mainly but not wholly in the eastern region) and wages to *comuneros* from San Antonio and Benito Juárez for fire fighting and monitoring teams. The rest is distributed among the 17 settlements regardless of their proximity to and relationship with the conserved area. There have been proposals from comuneros from the eastern

region to change this distribution, but people from the central and other non-eastern regions have refused. This creates a dilemma for the community authorities and resentment among the inhabitants of the eastern region. The imbalance between work and benefit sharing and the different concerns regarding the distribution of economic resources was expressed during one of the auxiliary secretaries' assemblies by a *comunera*:

> We, in the eastern region, have been protecting El Retén with no payments, we have that concern, we are not fighting for resources, we want the work to be done, if the central region does not want to, we want to conserve. If that money gets distributed [among the 17 settlements], who is going to protect El Retén? We do not seek the money for personal benefit but to protect what we have always been protecting (San Miguel Chimalapa, 4/3/2011)

There are also inequities between the four communities in the eastern zone: three settlements do most of the work to control fires, and only two are included in current NGO projects for alternative sources of income or the temporary employment program (fighting fire and patrolling of the VCA). Clearly, the current benefit-sharing arrangements need to be reviewed, but the different interests of different parts of the overall community make this problematic.

## *Mismatch Between Expectations and Actual Benefits*

An additional issue is the mismatch between expectations and the overall cash benefits that have been generated by projects connected to El Retén. Proposals presented by external agencies for alternative economic activities are often interpreted by local people as indicating new sources of income in the near future, whereas in practice, as with any development process, only some of the proposals will come to fruition and many of those that do so will take some years to generate significant amounts of cash. Three years after the communities first agreed to establish El Retén, the only new income-generating activity that was perceived to be working well was resin harvest. As with any community project, a long process of organization, training, and hard work from communities and NGO staff was necessary in order to produce and commercialize the product. In November 2010, the "*resineros*" (resin workers) sold their first 42 tons to a distiller from Michoacán, Mexico. This event has caused enthusiasm, because it is the first activity to actually provide a new source of cash. However, the other income-generating projects (ecotourism, avocado plantations, and squash cultivation) are still pending, since the funders are waiting to see the performance of the resin enterprise before making more investments in the area.

The process by which new activities are developed and the uncertainty involved are not made sufficiently clear to *comuneros*, and therefore the lack of progress can damage trust between them and the external agencies, as the following statement by one *comunero* shows:

> They made false promises, such as that the communities close by [to El Retén] would get benefits from the payments for environmental services and that new production projects would land here. That is how people got convinced, they made big promises… if San

> Antonio did not sign, nothing could be done, they promised things and benefits that have not been realized… they do not convince me, it has been already three years of resin and palm, which [the latter] was already being harvested. (San Antonio, 16/11/2010)

The need to report to funders and generate proposals for further funding puts pressure on the NGOs and local community members who work closely with them, since they need to deliver results and projects quickly. Conversely, community processes and decision making can be time- and energy-consuming, repetitive, and instable, especially in a volatile social and political context like the one found in El Retén. The danger is that, in the rush to obtain agreements as quickly as possible, many details are not fully explained and sufficient time is not allowed for people to make considered choices. This limits local involvement and understanding and can lead to unrealistic expectations and to disappointments when the agreements are put into practice.

## *Need for Institutional Structures for Participation and Accountability*

Recently, the four settlements of the eastern region have worked together to push for more participation in decision making and benefit sharing. In early 2011 a contingent of some 15 people from the eastern region went to an auxiliary secretaries' assembly with their local auxiliary secretary in order to voice their concerns about decision making regarding land conflict and benefit sharing from PES. However, they found that there was little opportunity for substantive discussion and participation. During the assembly, the representative from GADES explained the details of a new funding program to support the conservation process in SMC and give continuity to the PES program for El Retén. Thus the assembly was presented with a detailed plan with little room for modification. As one auxiliary secretary explained during the assembly:

> It is not true that we come to a meeting in which all of us are going to decide how the resources will be managed. We come to the meeting, and everything is already there… that is why there are always problems…—we can either take it or leave it—… if we decided among us it would be something different. We as auxiliary secretaries have seen that this is not about an agreement, but [instead] we are told what has to be done. (San Miguel Chimalapa, 4/3/2011)

Thus, even if there is a coherent program that has been developed by the external institutions according to the conservation and development needs of the site, the lack of spaces for participation of local people and flexibility on the programs diminish the legitimacy of the process. The fact that issues do not get to be discussed in a general assembly makes decision making more fluid, but at the same time it enhances dissatisfaction and even resistance from local *comuneros*. Recently the question of how much money is being received from international and national funders by NGOs and government agencies has captured local people's attention. This started after an event where the collection centers for resin were inaugurated in

San Antonio and Benito Juárez. The event was attended by a representative of an international donor (the Spanish Agency of International Cooperation for Development, AECID), which had been funding the implementation of the resin project. During the event, members of the intermediary agencies emphasized the enthusiasm of AECID's representative about the project and about community involvement, but according to local people, no one introduced the AECID representative to the communal authorities or to any community member. As local people realized that this project (and probably many other activities) was being funded through international aid, they started questioning the NGOs about the funding, but they did not receive a clear response, creating suspicion. As one *comunero* stated:

> NGOs and embassies are supporting with funds, those funds never fully reach their destination and we do not know how much stays where… They never tell us [about the investments], they [the NGOs] always go around and tell us that they are not the right person to ask about those issues. (Benito Juárez, 19/02/2011)

In summary, management of El Retén is led by external institutions, while community participation in planning and decision making appears to be very limited. The fact that the principal institution for the reserve's management includes no local community representatives contrasts with the idea of an area that is defined and promoted as community-governed. In practice, external institutions appear to lead all aspects of management of El Retén, while the role of the local community is to legitimate the alternatives provided by external institutions. This is a contentious issue, especially if we consider the former great resistance from local people towards the biosphere reserve on the basis of that very concern. External institutions argue that the VCA allows for a much greater degree of local control than a biosphere reserve, which had been proposed some years earlier, and as long as there is sufficient information and transparency, it is appropriate for NGOs and state institutions to take the lead until local people's capacity to meet the various bureaucratic and managerial requirements has improved. Nevertheless, apart from the training for the production activities, the current management is not explicitly building local capacity for the VCA's management. For some local people the picture seems quite clear; they understand the VCA simply as another name for the biosphere reserve and believe that local people agreed to its creation because of the potential of economic benefits, as the following statement from one of the *comuneros* shows:

> People from SEMARNAT used to come looking for the comisariado… they said that if we agreed with the conservation we would have resin, a bottled water plant, trails for tourism, but it was something imposed and people did not even go to the meetings… Then, they [SEMARNAT] started changing the name… until they said it would be a campesino reserve… they hired people for the fire control brigades, provided a car, groceries… they change the name and there were offers… as if it were an auction… until in an assembly [only with auxiliary secretaries instead of a general assembly] the agreement was accomplished. (Benito Juárez, 19/02/2011)

Furthermore, for some community members, the VCA is seen as a government takeover of the proposal for creation of an Ecological Campesino Reserve, which they had supported strongly and which they believe would have given them a much greater degree of control. Thus perceptions of the current arrangements are colored

heavily by the long history of previous proposals for protected areas in SMC, even though none of these were successful. How the Biosphere Reserve and Ecological Campesino Reserve would have worked out in practice and whether they would have faced similar problems in terms of power sharing and accountability remain matters for conjecture.

## ICCAs: Power Gives and Takes

Despite its recent establishment, El Retén provides a clear illustration of the reality of community conservation in many latitudes. From the community perspective, just as in other parts of Oaxaca, local resistance in the Chimalapas region has helped local communities keep a certain degree of autonomy over their lands and resources, but at the cost of continuous economic and social marginalization [19]. Thus, the principal value of El Retén for local people is in its potential to create new sources of income, although they also hope that it will further support their struggles to resolve land conflicts, and they share conservationists' concerns about deforestation and its effects on ecosystem stability. However, by acceding to the formal recognition of a VCA, local people accept a certain degree of takeover by external institutions in order to meet the requirements that such formalization implies. The current situation cannot be accurately presented in a polarized manner, as either totally positive or negative. On the one hand, the process required for the formal recognition of El Retén has been enhanced by better inter-institutional communication and coordination for conservation and for sustainable income alternatives. On the other hand, the local perceptions presented in this chapter are intended to give voice to local concerns regarding the loss of community control and sense of ownership, which, ultimately, are antagonistic to the definition and success of an ICCA and a VCA. Thus, the challenges El Retén faces reflect common challenges elsewhere in community conservation processes in terms of land tenure, power sharing, cost and benefit sharing, local representation and accountability, and engagement with different organizational levels of government and non-government agencies.

One initial problem emphasized by this case study is the relevance of the establishment of clear rights over land and resources in order to provide a basis for conservation efforts. Even though one local strategy is to gain political support through conservation for the resolution of conflicting land claims under the jurisdictions of the states of Chiapas and Oaxaca, the solution remains elusive, and thus all the efforts and processes are predicated on uncertain foundations. This problem relates to another issue of wider relevance to ICCAs, which is that of defining the ecological and social scale of conservation initiatives. The voluntary recognition of more than 15,000 ha for conservation represents a major success in the region and certainly opens up the opportunity to increase that area in the future. Nevertheless, the area is relatively small and the responsibility for its conservation relies on a large and geographically dispersed community. In theory the land-use planning and management plan are meant to work at a landscape level. In practice, a mechanism

that works through the delineation of a small area for protection without consideration of larger-scale patterns of tenure and use detracts from a landscape approach and raises difficulties in terms of the roles and responsibilities of social actors at different levels—particularly in terms of equitable sharing of cost and benefits among the different settlements—according to their location or within the community as a whole. The need for development of a broader landscape approach is further reflected in calls from the community for conservationists to find a way to engage with overriding local concerns such as ongoing land conflict. Ultimately, resolving these problems is fundamental for the long-term sustainability of the conservation area, as ongoing insecurity of tenure provides incentives for furtive and uncontrolled logging to continue within the area of influence of El Retén. Thus one of the key challenges, in order to support ICCAs, is one that protected areas face in general, namely, transcending the isolated protected areas framework by integrating them into a landscape approach at the practical level [20, 21].

A last relevant issue is the danger of relying heavily on economic incentives such as PES to promote formal commitments from the communities. First, since the recognition of El Retén brought PES and alternative production projects to communities adjacent to the reserve, the community authorities believe that the recognition of more land as VCAs will bring further PES and production and restoration projects, improving the well-being and income of the different settlements. However, funding for PES is not secure in the long term; further coordination among internal and external institutions as well as among the different levels of government is required in order for PES funding of Oaxacan ICCAs to be sustainable beyond the 5 years that the current PES program lasts.

Through this case study, it has been possible to observe both local and external processes leading to the certification of El Retén, emphasizing the need for further development of legal frameworks in order to truly support community conservation initiatives. The development of legal frameworks that allow communities participation in formal conservation, and current NGO-government coordination are positive achievements. Nevertheless, this case study shows the potential of formal state recognition to weaken community control over ICCA decision making and management. In El Retén, the role of community members remains, overall, to give legitimacy to external management proposals for the VCA. Moreover, external institutions' schedules generate pressure for achieving rapid agreements locally, resulting in an even greater mismatch between the expectations generated and the actual benefits perceived among community members. Regarding incentives for conservation, the case study emphasizes the importance of developing participatory, long-term, sustainable processes that focus not only on the market profitability of projects but also on transparency and cultural sovereignty.

Ultimately, this chapter calls for the development of a broader landscape approach that is supported by calls from the community for conservationists to find a way to engage with overriding local concerns such as ongoing land conflicts. Clear allocation of rights and benefits as well as responsibilities over land and resources are an essential basis for successful long-term conservation in El Retén and elsewhere.

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# Chapter 6
# Local Perceptions of Conservation Initiatives in the Calakmul Region

**Luciana Porter-Bolland, Eduardo García-Frapolli, and María Consuelo Sánchez-González**

## Introduction

The debate on biological conservation has evolved largely framed by scientific questions about the appropriate focus of study (i.e., genes, species, populations, ecosystem functions, biological processes) [1, 2]; the scales that are most attainable (i.e., local, regional, national, or international) [3, 4]; the conservation strategy best suited (i.e., networks of protected areas or key biodiversity corridors) [5]; or even if people-oriented approaches vs. fortress exclusionary models are most desirable [6, 7]. The answers to these questions have usually been sought through expert-driven research, aiming for optimal solutions. This fits the societal turn toward science and its experts for information to solve conservation problems [8, 9]. Western scientific discourse, normatively conceived of as objective, value-free and deliverer of knowledge and truth, has played an important role in the debate on biodiversity conservation and has a demonstrated capacity to guide the conservation policy-making arena [10].

However, as has been widely discussed [11–13], biological conservation inevitably turns as much on human action as it does on the environment and its biological processes. In fact, The Nature Conservancy (TNC) [14], the world's largest conservation organization, has reoriented its scientific approach towards conservation and begun stating that conservation is as much about understanding and working with people as it is about understanding and working with nature. Therefore, conservation, as

L. Porter-Bolland, Ph.D. (✉)
Red de Ecología Funcional, Instituto de Ecología A. C., Xalapa, Veracruz, Mexico
e-mail: luciana.porter@inecol.edu.mx

E. García-Frapolli, Ph.D.
Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico

M.C. Sánchez-González, Ph.D.
Centro de Investigaciones Históricas y Sociales, Universidad Autónoma de Campeche, Campeche, Mexico

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Frazier [11] notes, is a social–political pursuit that deals with human customs, relations, motivations, and with the political institutions and structures that drive the interactions between people and the environment; and must be perceived, planned, executed and evaluated as such.

According to some authors [9, 15, 16], conservation has gone beyond the exclusivity of the natural sciences scenario and has entered the domain of political and social debates. In this context, a number of actors interact in what Escobar [17] describes as a complex network. In this network, international organizations, nongovernmental organizations (NGOs), scientists and research institutions, pharmaceutical companies, prospectors, local communities, and social movements, among many others, have their own perspectives on conservation, and with it, their own political stakes, rendering biodiversity a matter of ethics and resulting values [15, 17]. For instance, Fraga [18] argues that the concept and practice of conventional conservation is predominantly a political activity and social movement born from the urban, academic elite, and is thus often extra-local, diminishing local people's capacities to decide their own environmental and socioeconomic futures.

The designation of state-managed protected areas (PA) has become the main instrument for conserving biodiversity worldwide [7]. PA conceptualization and implementation have been subject to different approaches, from strict biodiversity protectionism [10, 19–23], to the involvement of local people, their knowledge, and their understanding of nature in conservation management [24–28].

People-oriented initiatives, however, have varied widely in the extent to which local people have been included. These initiatives range from those that simply enforce participation or invite local people as passive partners, sometimes with material tradeoffs [29–31] to initiatives that build on local knowledge systems and institutions by recognizing local people's rights to land and their role in decision-making processes [32–36]. However, forced displacement, prohibitions on access to commonly used natural resources, establishment of PAs without prior consultation, and exclusion from the design and implementation of PA management policies have been common, and are some of the reasons that local communities have often opposed external conservation initiatives [23, 37].

Such opposition has been present in the case of the Calakmul Biosphere Reserve (CBR) [38], the largest protected area of tropical forest in Mexico [39]. The CBR was established in 1989 in the southern state of Campeche, in the Yucatan Peninsula, and was included in the Man and the Biosphere Reserve network in 1993. It has an area of 723,185 ha, and adjoins two other protected areas in the Maya Forest: the Mayan Biosphere Reserve in Guatemala and the Society Hall Nature Reserve in Belize. The history of the CBR, including its foundation, has been characterized by confusion over conservation and development objectives [40, 41]. While officially promoting conservation, regional development policies implemented in the area have led to the conversion of tropical forests into agricultural lands in some portions of the CBR, its buffer zones and influence areas [42–44].

It has been widely documented [38, 45, 46] that the area was conceptualized as a biosphere reserve, partly in response to growing international pressures to create forest conservation areas. The CBR design also responds to new ways of institutionalizing conservation by building on the region's ecology to encourage ecotourism,

and perhaps also to the growing environmental awareness of local governments in the region. The way in which this PA was conceptualized and designed, together with the acknowledged contradiction between different objectives of public policies implemented in the area (i.e., agriculture vs. conservation), has generated a series of conflicts among stakeholders [47].

In this chapter, we document a study in which we explored the views of local inhabitants regarding conservation initiatives in the Calakmul region. Through semistructured and open-ended interviews, we obtained information from representative Calakmul residents regarding their perceptions and views of the CBR. We also asked about their participation in conservation initiatives both as individuals and as members of grassroots organizations working in the area. Our main objectives were (1) to document how local people consider taking part in, benefiting from, or being affected by state-controlled conservation efforts, and (2) how effective they consider their participation in local initiatives. This information is important for understanding ways of increasing local participation to strengthen the effectiveness of conservation in the region.

## Research Context

The Calakmul region supports part of the population living within or near the buffer area of the CBR. Information for this study was derived through interaction with members of local organizations that correspond to different communities in the region. The organizations in question are the Consejo Regional Indígena y Popular de Xpujil (CRIPX) and the Sociedad Cooperativa de Producción Agropecuaria S^Cajel Ti Matye'el (henceforth, Cooperativa), who at the time this research was conducted (2005), shared most of their activities as a single organization. Both were formed during the mid-1990s as grassroots organizations with the main objective of exerting pressure on the government to demand basic services and increase economic opportunities in the region [48]. Also, as the region gained the attention of the international conservation community, after the establishment of the CBR, the area became a recipient of funds for conservation projects [38, 47]. CRIPX and the Cooperativa began to incorporate conservation projects into their activities and actually became influential in some of the funds assigned to development and conservation projects in the area, although most of external funding was initially administered by a third local organization [48].

In order to derive information from representatives of CRIPX and the Cooperativa, we conducted formal conversations with 29 of their members. The sample of informants that were chosen was based in their availability, assuring they were active members of their organizations and therefore could be considered as key informants. Most of the informants (83 %) were men, and their ages ranged from 30 to 70 years. The interview was divided into three sections. Section one referred to general information about the informants regarding their origins and economic activities. Section two focused on questions addressing their perceptions and views regarding the CBR, and the third section was about their involvement in conservation activities

**Table 6.1** Economic activities conducted by different informants (in percentage) including average plot size under cultivation or number of cattle or bee colonies at the time the research was carried out

| Activity | Average plot size (ha)/other (min and max) | Number of informants involved ($n=29$) |
|---|---|---|
| Slash and burn (milpa) | 2.4 ha (1, 5) | 25 (86 %) |
| Commercial agriculture[a] | 1.0 ha (0.5, 2) | 13 (45 %) |
| Cattle | 28 heads (4, 50) | 9 (31 %) |
| Pasture for cattle | 30 ha (8, 60) | 9 (31 %) |
| Apiculture | 24 bee colonies (2, 67) | 12 (41 %) |
| Agroforestry | 1.2 ha (0.5, 3) | 13 (45 %) |
| Forestry | 1.2 ha (1, 2) | 5 (17 %) |

[a]Mostly chili pepper production

promoted by their organizations. These interviews were complemented by informal open-ended talks with men and women who were members of the organizations and also through several workshops conducted during the research period. The information derived from interviews and informal conversations was organized in a database and descriptive statistics were used to indicate trends in views and perceptions regarding the different issues identified.

## *Livelihoods in the Calakmul Region*

Interviewees belonged to 12 different localities[1] within the Calakmul region. The sample reflected the demographics of the region. That is, informants had arrived to the Calakmul area from different regions of the country. In the case of our sample, respondents came from six different states, although almost 60 % were from Chiapas (from different ethnic backgrounds—speaking either *Chol* or *Tzeltal*), and the rest from Tabasco (24 %), Veracruz (7 %), and other Mexican States (≈10 %). Most informants completed or partially completed only primary schooling. As stated, all informants were members of CRIPX and almost half also belonged to the Cooperativa. They had been living in the region for an average of 21 years (ranging from 4 to 22 years since first arrival). Most held agrarian rights as *ejidatarios* (62 %), and the rest either owned private property or were not, themselves, landowners (this was especially true of female respondents). All claimed to have access to land to work on (in the case of women through their husbands and one man through a father-in-law). The plots held by informants averaged 53 ha in size, with a minimum of 28 and maximum of 129 ha. A summary of economic activities is provided in Table 6.1. The small area of plots under cultivation both for rotational (traditional slash and burn agriculture

[1] Álvaro Obregón "Zoh laguna" (two), El Sacrificio (two), La Victoria (one), La Virgencita de la Candelaria (one), Los Angeles (six), Manuel Castilla Brito (one), Nuevo Campanario (one), Nuevo San José (two), Once de Mayo (one), Ranchería Las Delicias (one), Ricardo Payró (three), and Unión 20 de Junio antes "La Mancolona" (eight).

locally called *milpa*) or semipermanent (agroforestry, pastures, or commercial agriculture) production relative to the larger areas held by informants is due to the marginal quality of local soils and the limited investment capacity of producers. Most land is covered by successional forests of different ages.

Homegardens, particularly animal-rearing (poultry and pigs), was mentioned as important by all informants. Also, 28 % (eight interviewees) mentioned complementing their household agricultural economy through day labor (*trabajo de jornal*); another 28 % (eight) mentioned work in one of the organization's community establishments (including a mill, a *tortillería*, a bread store [*panadería*], and a convenience store). Three informants mentioned involvement in other economic activities, such as making handicrafts, working in a nursery, in charcoal production, or in a sawmill. Two of the informants had administrative positions within the municipality.

## Perceptions and Views Regarding the Calakmul Biosphere Reserve

Considering that up to 83 % of informants had their agricultural plots within the CBR buffer area and the rest in nearby areas, we asked questions regarding their knowledge of and participation in the CBR. We also asked who they thought the CBR belonged to, what benefits, if any, they received from the Reserve, and their views regarding its importance, both for themselves and for the general public. Finally, we inquired about what changes they saw as necessary in the natural resource management of the CBR.

Regarding the *Reserve's establishment*, 12 of the 29 informants (41 %) mentioned having learned about it the same year the decree took effect, which was in 1989 (see Fig. 6.1). About 35 % of them learned of its existence during the following decade, and 24 % became aware of it after the year 2000. About half of the

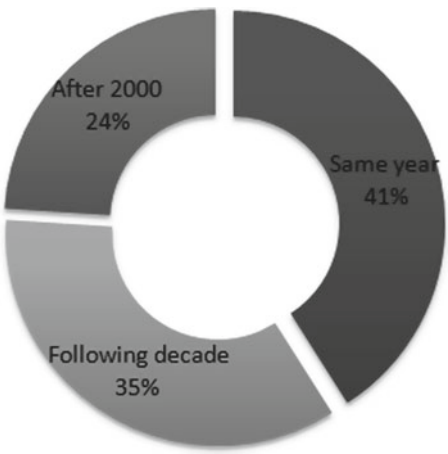


**Fig. 6.1** Year when informants from Calakmul learned about the declaration of the Calakmul Biosphere Reserve (officially established in 1989)

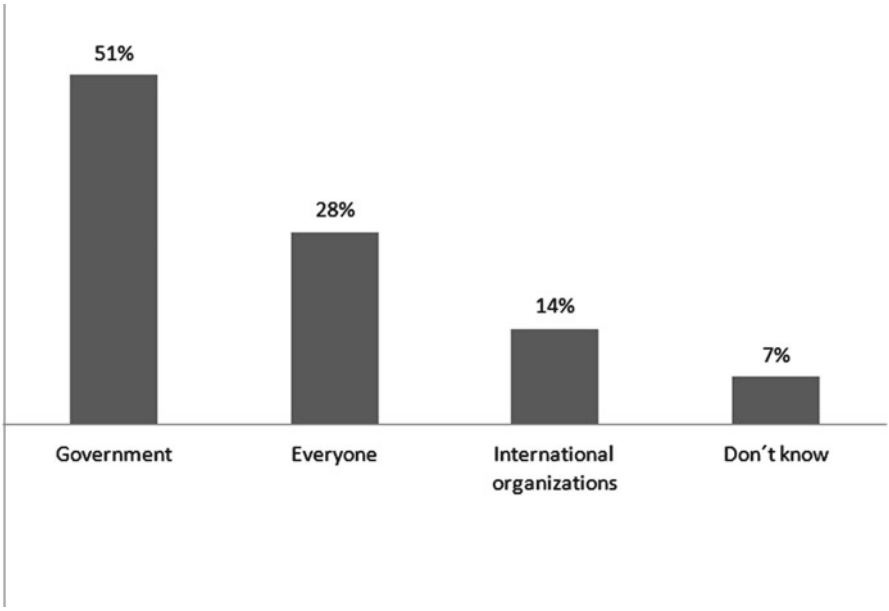


**Fig. 6.2** Respondents' opinions regarding the ownership of the Calakmul Biosphere Reserve

informants heard about the establishment of the CBR directly through government officials, and the other half either through members of their organizations, local authorities, or through family and friends.

When asked about their *participation in activities related or promoted by the CBR* on resource management, 23 of a total of 29 informants (79 %) said they had not participated in any such activity. The rest (6; 21 %) mentioned having participated in either of the following activities: workshops, informative meetings, or exchange visits, mostly related to activities organized by the Mesoamerican Biological Corridor. One man had been a representative of his organization during the formulation of the CBR management plan. Most informants said they had never visited the Reserve, while only four had (only two informants visit it regularly and the other two have visited it "occasionally", as for example a field trip to the archeological site).

When asked, *to whom does the Reserve belong*, 8 informants (28 %) believed that the CBR "belongs to everyone," while 15 (52 %) that it was owned by the government (see Fig. 6.2). Negative comments were common, such as "who benefits is the municipality, the Reserve's managers and government institutions," or even "although they say it belongs to the people, the truth is that it belongs to international organizations and the government." Four interviewees (14 %) said that the CBR belonged to other nations or international agencies; for example, "(*it belongs to*) industrialized countries, since they do not have forests anymore, they want ours… this is not a local initiative." Only two respondents said that they did not know to whom the Reserve belongs.

Most informants (76 %) also believed that the CBR was established for the sake of protecting nature or other important features, such as to safeguard plants and animals or for the sake of environmental services. One informant indicated that the biosphere reserve was established to protect the archeological site, while three people (10 %) believed it was established for external needs (particularly international demands). Four interviewees (14 %) said that they did not know why it was established: "we were never told, nor were our opinions asked."

Regarding *benefits obtained through the CBR*, respondents' answers were also divided. To the question of whether they believed they receive any direct benefit, most (69 % or 20 informants) indicated that they did not receive any direct economic incentives for the Reserve's conservation. One informant said "we never receive concrete aid and it surprises us because being within the Reserve we were told that we would have economic benefits." Another noted, "…no government aid, (*the government*) does not realize that the benefit of caring is not only for us, it is for everyone because we take care of the world's lungs." However, to the question of whether informants considered the Reserve "important", only two said that it was not, because "it has only resulted in people being kicked off their land". The other 93 % (27) of the informants stated that the CBR is a very important place, particularly because it helps to care for the forest and its fauna and flora.

Environmental services were also mentioned as benefits obtained through the CBR. For instance, respondents said, "because the climate is changing," and, "without the forests the rain recedes." Other comments were related to the availability of natural resources, e.g., "for obtaining wood for home building, for making beekeeping equipment", and "there are many animals that we can hunt and eat when the harvest is scarce." Informants also commented on quality of life—"near the forests you can live more peacefully." Additional comments related to respondents' futures and their children. Some of the informants also believed that the Reserve benefited them because of economic gains they received through their participation in projects such as Payments for Environmental Services (PES), projects for fire control (e.g., through the Temporary Employment Program, which is a federal government program), or reforestation initiatives. Other perceived benefits arrived through training programs run by NGOs working in the area. However, many stated that most economic benefits presently exist only in potential (e.g., their participation in ecotourism or in PES, for which several informants were engaged in submitting applications).

To the question of whether they thought *the CBR was important to local people in general*, half of the interviewees commented that most people in the region do not consider the CBR to be important: "almost nobody cares," e.g., and "there is a lack of awareness and vision for the future." Some argued that this was mostly because of a lack of knowledge: "they do not know what felling the forests causes." Others argued that the problem is "that people want a payment for everything they do," or even "because people realize that who benefits is the federal government." Finally, one respondent noted, "most people are not interested because they feel it [the Reserve] is what causes them to not be allowed to work in the forest".

The other half of informants thought just the opposite. They reported that people in general were aware of the importance of protecting the forests, mostly in relation

to quality of life, and the goods and services it provides both to them and to humanity in general: "because people from other places can breathe pure air and learn about nature" and, "if forests are destroyed, the results, such as lack of rain, affects everyone." Some commented that it made them proud to live within an important Reserve or that "there is now more environmental awareness." Others argued that this awareness stemmed from the realization that forests can be destroyed or that "they see that people felled their forests and now they have to buy wood."

Regarding *limitations or problems of living within the CBR*, only eight informants (28 %) did not identify any complaints, while the rest did. One person commented, "there is no problem, but it is better if we protect the forests through our own activities." Limitations were perceived mostly in people's ability to work their land, fell trees, and hunt: "we are limited regarding the way we are accustomed to work the land… we cannot fell or burn to eat." Other restrictions perceived are limitations on granting additional land: "there is no land for new *ejidos* or to work in." This problem is intensified given the area's poor soil quality. "They say we cannot fell secondary vegetation (*acahuales*) of 8 or 10 years old. The problem here is that soils are too poor," one respondent noted. They also need to work hard to maintain effective fire prevention. This generates "limitations since we cannot freely do many things."

Other comments relate to the fact that residents are not taken into account, e.g., "there are many restrictions, such as burning dates established without consultation" and, "most of the people working in the Reserve are outsiders while local people who know the local situation are not hired." Corruption problems were also mentioned: "[there is no problem]… while I adhere to the law and the government respects my rights… [*however*] the problem is that the law does not let us fell trees but they let those with money use illegal permits." Others mentioned that they consider it wrong that the government did not comply with promises it made. For example in the case of relocated communities[2] "the Reserve does not help" and "there are many issues regarding land tenure."

Another group of questions were related to respondents' knowledge regarding *research conducted in the area*, as research is one of the purposes of biosphere reserves [49]. Almost half of the informants had not heard of any study and the other half stated that they have heard about some research being conducted. However, they expressed their negative feelings regarding how results were being communicated: "they never leave their work results and sometimes they do not tell us what they are doing", one informant noted. "[I knew about] …a study about insects, but we never heard more about it," said another, and "yes, I was knowledgeable about studies but I never had the chance to read one, for example the one about the jaguar that was conducted to learn about their populations."

[2]Unión 20 de Junio antes la Mancolona, of which several informants belonged to is a community that was relocated in 1993 since they formerly where located in an area that fell in what was designated as "core area" of the CBR.

We also asked if they thought the studies were important in general. About half of the informants mentioned either that they did not know or did not answer the question. The other half thought that they were important. Some comments were that they were important "to learn how to care for the forests," "to learn what plants and animals we can see… understand which ones are threatened or learn about their populations," "there are many plants and animals for which we do not know their names or how can we use them." However, they also stated that these studies "are important only if we know about their results" and that "what we want is to know why these studies are important and how can they be useful to us." Most informants thought that research was not important to them because they did not know about it. Some argued that research should be related to their needs "if not, researchers come, do their work, and never come back," said one respondent, while another noted, "I think it is important only if they bring back the information and that it serves to improve the work in the land."

The last question regarding the CBR was *what informants thought should be done to improve it*. To this question 23 informants (79 %) had a response. These fell into in three categories. (1) Funding: 16 (55 %) of those responded that people needed access to funding for projects with greater impact within communities. Some comments were "[*we need*] projects for relocated communities and for those living nearer [the Reserve] and in bad conditions," or projects "to benefit people and help the forest." Comments related to how this funding should be applied included, "funding should arrive directly to communities;" that "resources that arrive to the Reserve arrive directly to campesinos," and finally, "to depoliticize the aid received from the Reserve." Some argued that it needed a technical council with delegates from each community, "since only a small group of people benefit yearly from projects from the Reserve," to "make projects successful since many times there are no follow-ups to guarantee compliance regarding commitments." (2) Six informants' (21 %) comments were related to specific needs. They ranged from "advise people how to plant and care for trees, because they only bring the plants and leave," to "we need areas of intensive agriculture (mechanized agriculture) to stop felling each year." Other respondents identified the need for "the opportunity to work freely, that is, if we cannot burn we need other options," and "to be able to work." They also talked about the need to integrate local people into conservation efforts. Regarding changes in the way things work in the CBR, they called for "attention to *campesinos*, because we are blamed for the destruction," and changes in "the methods of how decisions are taken." One respondent identified the necessity of "directly integrating the people who live within the Reserve: communities, working groups, and NGOs, so they can provide their opinion to generate a management plan that includes research, so that people can feel the Reserve is theirs and together work for its protection." Another simply stated the need to "consider that people live off the land." (3) The third group of comments (from four informants) centered on the need to provide more information to the people: "we need workshops to explain to people why hunting with dogs is prohibited, workshops about fire, and explanations of what are the good periods for hunting, among other subjects." Alternately, one informant suggested that "first there need to be people explaining why the Reserve is important."

## Perceptions and Views Regarding Participation in Conservation Activities Promoted by Local Organizations

All informants agreed that part of the objectives of their organizations were to conduct activities that promoted conservation. Some comments were "it is important to stop deforestation…" or, "forests are being destroyed and winds and hurricanes are becoming stronger," and, "children need to get to know the forest." Almost all informants (93 %) made comments about which activities they thought could help care for forests, animals, and the soil. Of these, 13 (45 %) said that through productive projects such as those "to improve pastures, planting trees in the already established ones for forage and shade," to "provide follow-ups to projects already being conducted," developing "projects for women," and "funding projects with technicians and money." Eleven (37 %) thought that the focus should be on training or raising public awareness, through "workshops in the CEFOINCAC[3] school," via "raising members' awareness and not through government impositions," and by "considering children." Some people gave examples of activities that could be conducted. These included "learn how to use forests… they are pretty but for me to eat I have to use them; ecotourism could be a way of using them," and "everything that benefits the environment such as agroforestry, forage tree planting, agrosilvopastoral systems, protein banks within pastures, etc." Other members talked about the importance of strengthening the organization and participation in resource management, "through meetings to reach agreements," or "making alliances with specialists."

Only one informant mentioned not having participated in environmental activities promoted by their organizations. The rest had participated in one or several activities, as listed in Table 6.2.

**Table 6.2** Activities promoted by conservation-related organizations and proportion of informants participating

| Activity | Number of informants |
|---|---|
| Agroforestry | 20 (70 %) |
| Participation in an activity held at the CEFOINCAC School | 19 (64 %) |
| Beekeeping | 11 (38 %) |
| *Parcela* Xpujil[a] | 8 (26 %) |
| Fire prevention | 7 (25 %) |
| Tree nurseries | 6 (21 %) |
| Ecotourism at La Mancolona | 6 (21 %) |
| Other (i.e., goat rearing, horticulture) | 5 (18 %) |

[a] *Parcela Xpujil* refers to a 50 ha plot that the Cooperativa has been managing for at least 25 years. Within the plot they have 40 ha for conservation and the rest are managed as an agrosilvopastoral system, including a confined area where they legally keep and reproduce peccaries and deer. The CEFOINCAC School is also within the 10 ha portion of the *Parcela Xpujil*

[3] CEFOINCAC is the Centro de Formación Indígena y Campesino de Calakmul (Calakmul Center for Indigenous and Peasant Training), an initiative developed by the local organizations with external funding and with the objective of having a program for local training regarding different issues related to natural resource management and community involvement.

We asked respondents if they thought that the activities related to conservation promoted by their organizations, such as those mentioned in Table 6.2, were important, what their limitations were, and how they could be improved. General comments were that all projects were important but that they needed follow-up, increased training, financial support, and to secure greater participation and improve internal organization: "a big limitation is that projects have not been adopted by local people, and the responsibility for this lies both in the organization and in the communities" (Table 6.3). A suggestion made for a general solution was for members to "contribute whenever they receive a project, if not, they don't take serious responsibility." Respondents commented that, while it was important for CRIPX and the Cooperativa to obtain economic resources from institutions interested in conservation, these resources should be administered for the benefit of many and not for just a few individuals.

In general, informants expressed interest in participating in more activities and in learning more about the forest and its conservation. When identifying other activities their organizations could promote, people mentioned they would like to be involved in training activities regarding forest management and conservation, environmental awareness, alternatives to agrochemical use in agriculture, and other related subjects as proposed by local residents. They also mentioned that it would be important to conduct an evaluation of past activities and to understand land use change processes and production alternatives. They said it was important to seek funding for productive projects, particularly to improve cattle rearing within agrosilvopastoral systems; to increase agroforestry systems, tree planting, and tree nurseries; to promote other alternative systems such as orchid gardens or ornamental plant nurseries; to improve agriculture with more intensive alternatives; and to improve beekeeping and its markets.

## Discussion

Examining the political ecology of Calakmul, Haenn [38] indicates that from the beginning, the establishment of CBR was framed by conflict and opposition embedded in tensions regarding competing class interests in resource control and the appropriate role of the government in land stewardship. These tensions, as she explains, reflect power relations but also are framed by the way different stakeholders (i.e., environmentalists, researchers, local and federal government agents, as well as local inhabitants) understand the Calakmul environment and therefore view the role of conservation in the area. For instance, while for environmentalists the forest is devoid of human presence, for local inhabitants the forested environment, echoing Richard White [50], is a "place of work", the base for their subsistence. Therefore, strict conservation undermines their livelihoods [38]. The views provided by respondents in this study, several years after Haenn's work, reflect this vision strongly. Local people consider that their involvement and participation in the CBR has been limited and that the Reserve threatens their livelihoods and well-being through limitations imposed on resource use and access. While most of the respondents live within the limits of the Reserve, the dominance of the

**Table 6.3** Opinions regarding the importance, limitations, and suggestions for conservation-related activities promoted by CBR-area organizations

| Project | Importance | Limitations | Suggestions |
|---|---|---|---|
| Agroforestry and tree planting | Provides fruits to eat and wood to use in the future<br>Areas of experimentation | Drafts, poor soils, fire incidence<br>Organizational problems<br>Lack of interest of many<br>The incentive of some people is only the money they get for planting<br>Time needed to see results | External institutions need to provide technical assistance and economic resources<br>Improve internal organization<br>Consult producers which plants they want to plant<br>Plan what to plant according to soil type<br>That member's appropriate the projects<br>To have individual plots and not only group plots<br>Apply best practices such as to improve soils, water management, etc. |
| Nurseries | It is important for producing plants (many problems in reforestation practices or agroforestry are related to the poor quality of planting material that is brought from faraway places)<br>Nurseries provide economic benefits (direct payments) | Lack of organization<br>Lack of appropriation<br>Discouragement from the part of participants<br>Lack of technical assistance<br>When economic payments end people stop participating<br>Lack of communication among directives of organizations and its members<br>Lack of markets | Search for markets<br>Provide follow ups<br>Technical training<br>Awareness training |
| Parcela Xpujil[a] | Important as a conservation and restoration area<br>Area of experimentation to try different planting schemes<br>Demonstrative agroforestry and conservation area<br>Conduct research regarding plant disease/planting techniques<br>Source of jobs to some | Little participation among members of the organizations<br>High maintenance costs<br>Only few members of the organization know about it and make decisions<br>Lack of resources for its maintenance<br>Few members want to collaborate with their time and work | Increase participation among members of the organization<br>Search for financial aid for its continuation and maintenance |

| | | | |
|---|---|---|---|
| CEFOINCAC[b] School | A place to hold meetings, workshops, courses, etc.<br>A place to learn and receive technical training for people of all ages, men and women<br>A place for interacting with outsiders who come to provide workshops<br>A place where the youth can learn<br>A place to learn about conservation and fire prevention<br>A space to improve organization among members and communities | Lack of financial aid to consolidate the project<br>Lack of infrastructure and resources to organize workshops<br>Important to rethink its functioning | More communication among members about plans and how it works<br>Greater participation among members of decisions taken related to the school<br>Have more people come to give workshops to members and non-members of the organizations<br>More spaces for women<br>Have a permanent program<br>Seek for funding<br>Obtain equipment (boards, better bathrooms, etc.) |
| Fire prevention | Important for the conservation of forests<br>Training for fire prevention and fire management<br>Environmental awareness<br>Understand fire behavior<br>Improve agricultural activities | Lack of equipment<br>Need to improve fire brigades<br>Few supports from formal institutions<br>Lack of interest of some people | More workshops for more members of communities |
| Ecotourism project in Mancolona | Potential economic activity given that because of poor soils agricultural activities are not sufficient<br>Source of income for dearth periods<br>Alternative for forest conservation<br>Potential in the region because it is internationally known<br>Value natural and cultural diversity<br>As a way of exchange with outsiders to share benefits<br>Learn from outsiders | There is no funding for its continuation and consolidation<br>Many expenditures for management<br>Internal conflicts<br>Lack of organization and communication<br>Tensions among funding agencies<br>Lack of community understanding of what is tourism (no tourism culture in the community)<br>Discouragement because it is not working<br>Lack of visitors | More funding needed |

(continued)

**Table 6.3** (continued)

| Project | Importance | Limitations | Suggestions |
|---|---|---|---|
| Beekeeping | Provides economic resources<br>No need to fell the forest | Efforts toward organization not good enough<br>No money to by honey from individual producers<br>Lack of organization at the regional and municipal levels<br>Lack of information regarding the installations for gathering honey<br>The installations are not working | A greater commitment from the part of associates<br>Improve organization<br>Investment<br>Information |

[a]*Parcela Xpujil* is a 50 ha plot in which part it is for conservation, part is for the CEFOINCAC school and part for the establishment of an agroforestry system

[b]*Centro de Formación Indígena y Campesino de Calakmul*

environmentalists' perspective—that of a forest devoid of people—is evident when only four respondents report ever having visited the core area of the CBR. This underlines the perception of the CBR as inaccessible space.

For local inhabitants, outside government and nongovernment institutions have interests which conflict with their own. Although local people recognize the importance of protecting nature for their own livelihoods, they also see the importance assigned to Calakmul by other stakeholders (usually those with greater power), and therefore recognize the need for negotiation. Such negotiations have been part of the CBR from its early stages in the form of conservation and development projects [47]. During the 1990s, after initial local opposition [38], large influxes of funding were directed to the area, mostly through the Consejo Regional Agrosilvopecuario y de Servicios de Xpujil S. C. (CRAX). CRAX was founded in 1990, and in contrast with other grassroots organizations in the area, it was established with government assistance and given the specific charge of administering national and international funding for conservation and development. Later on, the organization became dysfunctional because of problems of politicization and corruption [40]. CRIPX and the Cooperativa, in contrast, were formed by local actors mostly with the objectives of demanding services and access to land in the area [48]. As part of their political struggle, they gained a degree of influence over part of this funding and began to get involved in several of the aforementioned initiatives.

The initiatives referred to by the interviewees have been part of a learning and collective process of searching for alternative productive activities consonant with conservation. Some of these activities have been promoted by outside governmental and nongovernmental institutions, while others have been born from residents' own initiatives to seek improved livelihoods. Although these initiatives have suffered from multiple constraints and thus enjoyed only limited results, according to informants, respondents still designated them as part of the set of solutions for conservation in the area.

A more recent study by Haenn [47] indicates that conservation funding in the area is currently very limited in reach (particularly compared to funding for other purposes) and that most funds often find destinations other than those proposed. Organizations in the area are currently weakened (i.e., CRIPX and the Cooperativa are no longer working together), and conditions in Calakmul have become more complex as changing political, economic and institutional conditions emerge [51].

Changing conditions open up additional challenges for collective action for local communities and in particular for their engagement in conservation-oriented activities. As newer alternatives for community involvement in conservation are officially envisioned, such as ecotourism and PES, suggestions by local inhabitants should be considered. Broadly speaking, the input received through this study identifies the need for greater autonomy and participation in decision-making, in the strengthening of local institutions, and in relation to livelihood strategies. The latter implies that investment in conservation has to be more than merely economic subsidies for specific projects (i.e., PES or investments in ecotourism infrastructure with no connection to the tourist sector). Funding should instead be aligned with a regional policy in which local people (as well as the environment) are favored by agricultural development, private investment, and markets.

Local informants also suggest that investment in training and access to knowledge are very much needed. For the gap between how locals and outsiders view the environment to be diminished implies a fundamental shift in the paradigm of how research is conducted and information is returned to communities. For this, the meaningful engagement of local people in research must be taken into consideration. For Calakmul's heterogeneous population, local understandings and knowledge systems are part of the negotiations directing the relations of people and the environment [52]. However, learning and adaptive capacities should not be undermined.

## Conclusions

We have summarized and excerpted the views and opinions that representatives of local organizations in Calakmul made with respect to the CBR. In general, they perceive that they have not taken part in decision-making regarding the establishment and management of the Reserve and that it responds mostly to external interests. They see the CBR as imposing restrictions to their decisions about land use and management, which undermines their subsistence. At the same time, local people have benefited from external funding and have undertaken efforts towards conservation. Suggestions for more effective engagement focus on the need to confer greater autonomy and heighten local inhabitants' participation in decision-making regarding natural resource management.

Livelihood strategies should be at the center of all productive sectors (e.g., agriculture, forestry, and tourism) in coordinating the regional conservation agenda, as a strategy for environmental stewardship in face of the local realities. Building on local institutions offers a way forward through investments in training and communication. The information provided in this study offers important insights into opportunities to increase local participation and engagement, crucial elements in strengthening the effectiveness of conservation in the CBR area and others like it.

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# Chapter 7
# Community Conservation in Punta Laguna: A Case of Adaptive Ecotourism Management

**Eduardo García-Frapolli, Martha Bonilla-Moheno, and Gabriel Ramos-Fernández**

## Introduction

Mexico is the tenth largest tourist destination in the world [1]. In the last decade, the country received an average of 20 million visitors per year, making tourism a priority sector for the Mexican government. Since the 1970s, the Yucatan Peninsula—particularly Cancun and the Riviera Maya corridor in the state of Quintana Roo—has become the flagship of Mexican tourist development [2]. Each year, these destinations attract a large number of international and national visitors, as well as hundreds of local inhabitants (many of them Mayan) in search of jobs [3]. In fact, between 2007 and 2011, the state of Quintana Roo alone received more that 7 million tourists each year (except in 2009 when it received *ca*. 6 million), and represented over 30 % of the total national revenues from tourism per year [4].

As a consequence of the constant growth of worldwide tourism and the need to diversify tourism attractions, there has been an increase in the options to explore "remote," "natural," or "exotic" areas [5, 6]. The Yucatan Peninsula has easily fulfilled this demand; it has vast "wilderness areas," and a significant number of indigenous people inhabiting the region. While the economic income generated by tourism in the region to date has been mainly concentrated in large corporations (i.e., hotels, restaurants, or tour operators), it has recently started to provide an economic option for communities offering landscape attractions, such as sinkholes, lagoons, or charismatic wildlife. As a result, government agencies such as the

E. García-Frapolli, Ph.D. (✉)
Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, Mexico
e-mail: garcia.frapolli@gmail.com

M. Bonilla-Moheno, Ph.D.
Instituto de Ecologia, A.C., Xalapa, Veracruz, Mexico

G. Ramos-Fernández, Ph.D.
Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional (CIIDIR)- Unidad Oaxaca, Insituto Politécnico Nacional, Oaxaca, Mexico

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National Commission for Protected Areas (CONANP), are actively promoting tourism inside protected areas, especially for those communities living within or around those areas who depend on extractive activities.

Ecotourism considers the environmental, social, economic, and cultural impacts of tourism, and attempts to ensure the participation of local people [7]. Wallace and Pierce [8] suggest that ecotourism should (1) minimize impacts, (2) increase awareness, (3) contribute to conservation, (4) allow for local people to make their own decisions, (5) direct economic benefits to local people, and (6) provide an opportunity for enjoying natural areas. However, its global impacts (i.e., greenhouse gases from air travel, for instance) are often overlooked. According to Mowforth and Munt [7], ecotourism involves the participation of many and diverse stakeholders (i.e., tour operators, tourists, host communities, development agencies, local and national governments, conservationists), which can lead to conflict regarding control over activities and financial benefits. In these cases, business becomes the main driving force tending to alienate local people rather than empowering them, a consequence similar to that of traditional tourism [5].

There is a general consensus that ecotourism promotes local development and can be an important tool for conserving biodiversity [9–12]. In fact, the interesting thing about ecotourism, as noted by Kiss [13] (p. 232) "is the prospect of linking conservation and local livelihoods, preserving biodiversity whilst simultaneously reducing rural poverty, and of achieving both objectives on a sustainable (self-financing) basis." The basic concept of ecotourism coincides with the basic idea of community-based conservation, i.e., that conservation and local benefits should coincide [14]. However, the challenge concerns how to integrate the perspectives held by local people with the views of other actors involved in the conservation process. Usually, as Berkes [15] notes, the approach has been either to maintain conservation as the ultimate objective of the intervention, or to protect the productivity of a resource as a means to enhance local livelihoods and development options. But as Agrawal and Gibson [16] explain, besides perceiving different realities, stakeholders have different hierarchies of power and access to the decision-making process regarding what, where, and how to conserve. Therefore, decisions will always be determined in terms of these hierarchies of power, and local communities tend to be at disadvantage.

From the perspective of CONANP, ecotourism is an important tool for reconciling the conflict between conservation and development and the institution has established different strategies for its promotion within protected areas (PAs). The approach has been to develop a preventive strategy in those areas where tourism is incipient and a corrective strategy in those areas where the extent of tourism is already problematic [17]. In conjunction with other governmental institutions, such as the National Commission of the Development of Indigenous Peoples (CDI), the Secretary of Social Development (SEDESOL), the National Fund of Social Enterprises (FONAES), the Secretary of Environment and Natural Resources (SEMARNAT), and the National Forestry Commission (CONAFOR), CONANP has promoted tourism initiatives through three different programmatic actions [18]: (a) the development and application of management tools, such as ecological zoning; (b) supporting communities with infrastructure and equipment, such as buildings and equipment

for monitoring and maintenance of flora and fauna; and (c) capacity building, such as training local communities for management and environmental education for local people and visitors.

The increasing demand for exotic, natural, and remote environments combined with governmental programs, have exposed local people to new forms of economic and productive activities. This has forced locals to acquire new skills in terms of the production of leisure services instead of end products (i.e., agriculture, apiculture, gathering, etc.). In most cases, locals have achieved this transformation without being properly trained or guided by the industry or government agencies. In many cases, locals have learned to manage ecotourism ventures on their own, modifying their behaviors and strategies in light of previous management experiences. Understanding tourism management through an adaptive approach implies recognizing the need for flexibility in order to prioritize competing interests, depending on the specific circumstances. Adaptive management provides an arena of uncertainty, complexity and potential for conflict [19].

In this chapter we describe the experiences of ecotourism management in Punta Laguna and analyze them from an adaptive management perspective. As McAreavey and McDonagh [20] note, the adaptive approach pays attention to the fact that management learning occurs, that adjustments can be made, and that future initiatives can be based on new understanding. We describe how the community has modified exclusionary behaviors, increased levels of local decision-making, and implemented entrepreneurial attitudes towards managing their community conservation initiative.

## Punta Laguna

Punta Laguna (PL) is located in the northeastern region of the Yucatan Peninsula, on the border between the states of Yucatan and Quintana Roo in Mexico. It is part of the "*Otoch Ma'ax Yetel Kooh*" reserve (OMYK; "the house of the monkey and the puma," in Yucatec Mayan), designated by the federal government as a protected area in 2002, in response to a community-based initiative [21]. The dominant vegetation in the area is semievergreen seasonal forest [22] in different successional stages. Like most of the Yucatan Peninsula, this land has historically been under *milpa* agriculture, a rotational cultivation system where maize is the main crop.

Modern settlers arrived to PL in 1964, when a group of *chiclero* families (gum tappers) emigrated from their original town in Yucatan, Chemax (about 30 km west of PL), in search of forests containing the tree *Manilkara zapota*, from which gum is extracted. Its current inhabitants, approximately 125 people, are Yucatec Mayans who conserve some of their cultural traditions, including language, agricultural practices and religious ceremonies [23]. Each household in PL implements multiple economic activities, such as *milpa* agriculture, homegardening, beekeeping, ecotourism, and handicraft production [24].

The region, characterized by large forested areas with low population densities, has been experiencing a rapid demographic and economic change due to the

accelerated development of tourism along the nearby Riviera Maya on the Caribbean coast. This tourism-generated regional economic development has provided an economic alternative for PL.

## Four Stages of Ecotourism Management in Punta Laguna

### *A Family Management Business (1980–2002)*

Despite being relatively close to large tourist destinations such as Cancun, PL remained in relative isolation until 1982, when a road was built linking Nuevo Xcan (25 km to the north of PL) to Coba (20 km to the south). The first visitors were archaeologists who worked in Coba, a large site that was the subject of intense archaeological investigation during the 1970s and 1980s [25, 26]. These visitors were interested in PL's own archaeological site, which is smaller and less important than Coba (described in Benavides and Zapata 1991 [27]). The National Institute of Anthropology and History (INAH) recognized the community leader as the unofficial caretaker of this site and encouraged him to prevent deforestation around it. Probably as a result of this unofficial position, and perhaps due to the fact that he and his family lived close to the site, he became the first tourist guide with the job of taking visitors around the archaeological site and leading figure in the protection of the surrounding forest.

The forest around the lagoon contains a very high density of *ramon* (*Brosimum alicastrum*) trees, one of the main species in the diet of spider monkeys (*Ateles geoffroyi*) [28]. The ease with which monkeys could be observed around the site, particularly during the morning and late afternoon, turned them into an additional attraction for visitors [29]. As more visitors arrived, the community leader invited his brothers and oldest sons to join him as tourist guides. Although there is no data on the number of tourists arriving at this stage (1980s), visitors arrived on their own and in small groups.

As tourism agencies visiting Coba heard about PL and the spider monkeys, they began taking detours bringing larger groups (10–20 people) to PL with more regularity, at least during the high tourism season. It is at this point, in the early 1990s, that the former director of the conservationist nongovernmental organization (NGO) Pronatura Peninsula de Yucatán (PPY) visited the area and formally recognized the community leader as the liaison with the PL community and raised funds to pay him a monthly fee for his efforts in conserving the forest; he continued to receive this fee for more than 10 years (PPY, personal communication). By this time, the area was (unofficially) labeled by the PL community as the "Reserve of the spider monkeys."

Around mid-1990s, primatologists arrived in PL with the intention of working in an undisturbed forest. They began conducting research on spider monkeys' behavior, quickly becoming allies of those families who were promoting the conservation of

the habitat of spider monkeys. Soon, the community and primatologists realized that they could support each other for mutual benefit—for example, both needed trails through the forest to follow the spider monkeys.

The continuous presence of PPY and primatologists in PL was instrumental in turning the "Reserve of the spider monkeys" into the protected area of OMYK. As visitors and people from nearby areas were turning their attention to PL, the community leader began negotiating for government support for his conservation efforts. In 1998, PPY aided in this negotiation, providing technical information on the area's biodiversity and promoting the designation of the area surrounding PL's lagoon as a PA at the state level. However, because PL belongs to the Valladolid *ejido*,[1] which lies at the border of Quintana Roo and Yucatan states, the designation of the area as protected at the state level was challenging since both states were wary of designating a PA that the neighboring state could also claim credit for. It was not until the proposal for the creation of a PA was raised to the federal level that the state border issue was resolved, and in 2002 an area of 5,367 ha was designated within the federal protected category of "flora and fauna protection area," one of the six categories of protected areas in Mexico [30]. This is one of the few examples of a federal protected area created in response to a community initiative [21].

By the time the protected area was designated, the number of visitors had greatly increased, yet the community leader's family was the only one reaping the benefits. As a result of the designation, the authorities from the Secretariat for the Environment and Natural Resources (SEMARNAT) became more actively involved in the area. One of their first interventions was to ask a community member who was not participating in the business to monitor, during a whole year, the number of buses and the approximate number of people visiting the area every week (Fig. 7.1). At the time, PL was receiving an average of 900 people per month, each paying $1 USD as an entrance fee and an average of $15 USD to whoever took them as a guide. When the compiled information on the community leader's family earnings became known by the rest of the community and even by neighboring communities belonging to the same *ejido*, they became the focus of increasing vehement critiques, as people blamed them for monopolizing a tourist business that was based on the spider monkeys and the forest, two collective resources. Conflicts increased in intensity within the community and the *ejido* in general, to a point at which an external intervention by PPY and the federal government was required.

[1]The *ejido* is a form of land tenure based on common-pool resources resulting from the land redistribution process of the Mexican land reform. *Ejido* land is divided for three main uses: (1) human settlements; (2) a portion of common-use lands (including forests, water sources and other resources), where the rules regarding access and use are collective; and (3) parcelled land for individual exploitation. The social organization includes a decision-making committee (*asamblea*), a representative committee that carries out the resolutions of the decision-making committee (*comisariado*), and vigilance committee (*consejo de vigilancia*). The *asamblea* also regulates the use, management, access, and conservation of common-use lands (Tellez L. Nueva legislacion de tierras, bisques y aguas. Mexico: Fondo de Cultura Económica; 1993).

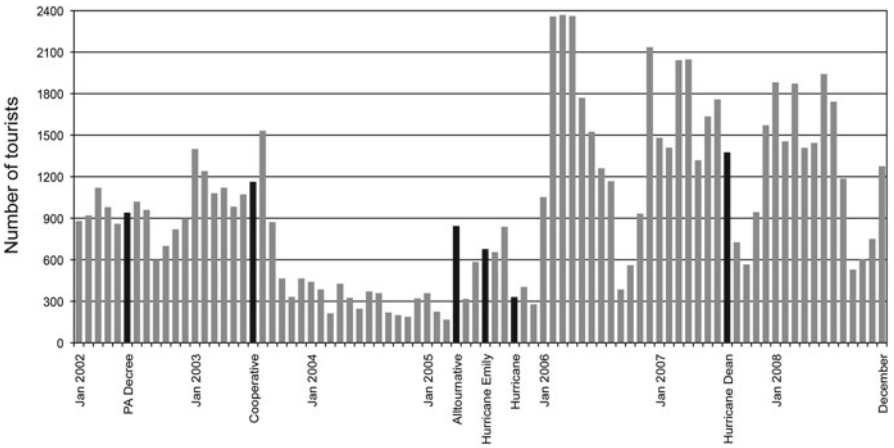


**Fig. 7.1** Monthly tourist entrances to Punta Laguna (2002–2008)

## *Cooperative Organization (2003–2005)*

The exclusive participation of the community leader's family in the management of the tourism business created two conflicts: an internal one, with the rest of the families in PL who were not benefiting from the ecotourism business; and an external one, with the authorities of Valladolid, who claimed that the *ejido* as a whole should have the same access to benefits from productive activities carried out on communally owned land. By then, PPY had been collaborating with the PL community for more than 10 years, developing a relationship of trust not only with the community leader and his family, but also with the community as a whole. In addition, by being included in the Technical Advisory Council for the protected area, PPY was officially involved in the decision-making process for the management of the area, and was able to negotiate with *ejido* authorities.

In 2003, PPY presented a proposal for the regulation of the public use of the protected area, focusing on the tourism activities in PL. It included the creation of a cooperative for managing the tourism business in PL, called *Najil Tucha* (house of monkeys, in Yucatec Mayan). Responsibilities in the cooperative were to rotate, and benefits were to be shared equally among all of its members. The cooperative was also to share a fixed proportion of the benefits with the *ejido*.

The general terms of the proposal by PPY were approved in the Technical Advisory Council after several months of negotiation. The particular terms were: (1) 60 adult members of the community (men and women) would be part of the cooperative; (2) there would be two paid jobs for people reporting to the rest of the cooperative including the number of visitors and the income gained; (3) 12 men would rotate working as guides; (4) groups of women would rotate to sell handicrafts to visitors; and, (5) all decisions would be taken collectively by the general assembly of the cooperative, presided by a committee that would come up for

election every 3 years. As for the benefits to be shared with the *ejido*, it was agreed that each month, 25 % of the money earned from the entrance fees would be provided to the *ejido*.

While these agreements certainly helped to reduce the conflicts within the community, and between PL and the *ejido*, when the cooperative decided to increase the entrance fee by 50 % (from $1 to $1.5 USD per person), the main tourist agency visiting the area decided to quit, arguing that the terms and conditions of the business could only be changed by them and not by the community. Because of the heavy dependence on this single tourist agency, this decision represented a large decrease in the total number of visitors arriving to PL, which did not increase again until almost 2 years later, when the cooperative decided (with strong opposition from the community leader and his family) to sign a contract with a different tourism agency that granted them the benefits to manage tourism activities (see Fig. 7.1).

## *Entrepreneurial Tourism Management by an Outside Agency (2005–2010)*

During the first months of 2005, and after several years of trying to convince locals to become "business partners," one of the biggest ecotourism agencies from the Riviera Maya (*Alltournative*) came to an agreement with *Najil Tucha*. In fact, for some years, this agency had already been managing two different destinations in nearby communities, Pac Chen and Tres Reyes, both located less than 10 km away from PL. According to Otto von Bertrab, Director of Expeditions from Alltournative, for a long time they were eager to include PL in their destinations because of its wonderful lagoon and scenery (*Alltournative* personal communication, August 26, 2004).

After several meetings, Alltournative and *Najil Tucha* came to an agreement and signed a 10-year contract in which the tourism agency agreed to pay a fixed monthly rent for using, on a full exclusivity basis, a significant portion of PL and OMYK's touristic area. This fixed rent was agreed independently of the number of tourists arriving to the site. As part of the agreement, the agency made several commitments:

1. To employ members of the cooperative for delivery of the majority of the services (i.e., receiving tourists at the entrance, guiding and preparing tourists for forest activities, photographing tourists, cooking). All employees had to wear an Alltournative t-shirt instead of their cooperative t-shirt, while women working in the kitchen had to be dressed with the typical Mayan dress or *huipil*.
2. To employ two elders to perform as *H'men* (ceremonial priests) and perform fake "Mayan ceremonies." The fact that they were not real *H'men* was irrelevant, as the only requirement for them was to dress in white clothing and perform a "welcome ceremony" to tourists in Yucatec Mayan.
3. To manage the community's garbage and deposit it outside PL.
4. People employed by Alltournative were hired on a daily basis and were paid $11 USD per day of work, which was the average daily income in the area.

During this period (2005–2010), the great majority of tourists visiting PL arrived through this agency (see Fig. 7.1). However, given that the area remained a federal protected area managed by CONANP, independent tourists were also allowed to visit the area, albeit with a restriction on using the infrastructure built or owned by Alltournative (some *palapas*, the zip-line gear and the canoes). For about $100 US dollars per tourist, Alltournative offered adventure ecotourism with a touch of contemporary Mayan culture and the advantage of watching spider monkeys in the wild.

Although the agreement was signed between *Najil Tucha* and the tourism agency, and all negotiations were conducted between both actors, Alltournative's strategy for gaining control over decisions regarding the management of the area was to empower young people who, at that time, did not have political power in the community or in the cooperative. Not only did these young people become representatives of the agency in the assemblies of the community and the cooperative, they also suddenly accessed more power and control over local decision-making than those running the cooperative. This move by Alltournative immediately affected the fragile unity and cohesion between members of the cooperative, renewing social disruption within the community. However, this time the conflict arose between those criticizing the outcome of the agreement and those arguing that Alltournative was bringing job opportunities and social wellbeing to PL. The main criticism came from the community leader and his family. They argued that the new entrepreneurial management of PL by an outside tourism agency had made them simple wage earners instead of the owners of, and decision-makers in, their ecotourism initiative.

Although this friction never wholly disappeared, it clearly diminished when tourists and their money began flowing into the community. Between 2006 and 2008, the agency brought around 15,000 tourists to the area (on average, more than 400 tourists per month), which paid more than 4,000 daily salaries to community members. However, this bonanza did not occur immediately. During the first year of the collaboration between *Najil Tucha* and Alltournative (2005), the region was hit by two major hurricanes, Emily in July and Wilma in October, which decreased tourism significantly. As a result of the great expectations that people from PL had concerning the agency's management of the area, that year tensions emerged between the agency and the community; these were not relieved until tourists began, once more, to appear.

Moreover, in 2005, Alltournative built their infrastructure in PL without any environmental impact assessment. This resulted in a conflict that prompted CONANP to assign one field representative to the area. Although the cooperative and community members were collaborating closely with the tourist agency, CONANP's field representative, as well as researchers in PL, acted once again as external advisers, as for them it seemed that the agency was constantly trying to gain greater control of the area.

As OMYK is a federal PA, locals were obliged to allow any person who paid their ticket fee ($1.20 USD) entrance to the site, a fact that Alltournative leaders disputed but were unable to influence. Oddly, the tourism agency showed little interest in taking tourists to see spider monkeys, which remained the main tourist attraction in the area. Locals began working with other tourism agencies exploiting this

particular attraction while simultaneously expanding into other ones, such as diving in the sinkhole. These activities were fully compatible with the agreement that *Najil Tucha* had signed with Alltournative, since they were not using infrastructure built by the latter. After a couple of years of working exclusively with Alltournative, *Najil Tucha* once again assumed some control over the decision-making process of the ecotourism initiative, and decided to work simultaneously with several tourism agencies—a move that was supported by CONANP. From this moment on, negotiations were once again limited to Alltournative and *Najil Tucha,* and could no longer involve the young people that the tourism agency had empowered.

Another difficult period for Alltournative came with the 2008's global financial crisis, and a year later (2009) with the H1N1 Swine Flu crisis. Both crises significantly decreased the international tourism flow to Mexico and the Yucatan Peninsula, greatly reducing the economic activity in the area. After some extremely unfavorable periods, during which no tourists took the tours to PL, Alltournative faced financial difficulties and was obliged to limit the number of tours. In 2010, the agency decided to cancel all expeditions to PL.

## *Cooperative Organization with Entrepreneurial Know-How (2010 to Date)*

In 2010, after Alltournative ended their visits to PL, the cooperative *Najil Tucha* regained control over the tourism business. Despite the lack of official data on visitors to PL during the year 2009, according to local people and CONANP staff, it was as bad, or worse, than the period between 2004 and 2005. However, the decrease in tourism during 2009 was gradual, giving locals the opportunity to adapt, generate alternatives and revise their ecotourism strategy.

Having been trained by, and having worked for, Alltournative for over 4 years, people in PL were now fully able to manage their ecotourism business. In fact, during 2009, foreseeing what might (and eventually did) transpire with Alltournative, locals applied for federal funds to receive professional training in ecotourism, including safety training, particularly for activities that might put tourists at risk. Besides training, *Najil Tucha* also sought financial support to purchase replacements for the equipment that Alltournative had taken with them, including cameras, computers, and printers. The act of replacing the equipment strengthened the cooperative and empowered locals to recognize their capability, both in terms of financial and human resources, to run the ecotourism business in PL.

Nowadays, *Najil Tucha* is in charge and has absolute control over the business. Once again, they have incorporated all families and members from PL in the cooperative. In fact, unlike the previous period when the cooperative was in charge (2004), *Najil Tucha* has formed a new governance structure in which the manager is closely accompanied by other members of the cooperative in most of the decision-making processes concerning the business. As before, they still maintain the assembly as the main deliberative organ of the cooperative.

As a destination, PL still offers the same amenities as before, but at a reduced scale in comparison with Alltournative. Although there is no available data on tourist entrances during this period, according to CONANP's field representative (personal communication, 2011), between 5 and 7 tourists arrive daily, either by taxi, rented cars, or with tourism agencies. These tourists now experience the same activities Alltournative offered as part of their expeditions, for example the zip-line, canoeing, and the "welcoming ceremonies," in addition to other activities the community had been offering through other tourism agencies, such as rappel descent and diving into the sinkhole, spider monkey viewing, camping, and so on. Tourists have to pay their entrance fee to the protected area and then decide which additional activities they want to pay for. Because of the way the cooperative has organized the routes and activities, tourists can engage in all of the activities on offer in a single day.

The cooperative formalized four guiding groups in which local people can participate. Each guiding group has its own activities, and depending on their skills, local people participate in more than one group. For instance, requirements for those belonging to the spider monkey guide are to speak both Spanish and English, and knowledge of many aspects of the behavior of this species and of the best monkey-spotting locations. At present, only 14 people can act as guides in this group; this number has remained more or less constant over the years, as these guides require certification by CONANP. Those who know how to manage the photographic and electronic equipment belong to a second guiding group; the elders who perform as *H'men* for the welcoming ceremony belong to a third group; and finally, the fourth group includes people in charge of setting up the equipment for the zip-lining, canoeing, rappel descent and diving.

People from PL value the fact that they are able to manage the ecotourism business as they see fit. Although the number of tourists has decreased significantly, they feel confident with this new strategy. One important reason for this is that they once again see themselves as owners of their conservation initiative, now with the entrepreneurial know-how to run the business profitably. The main threat they now face is that they lack an autonomous organization for procuring their own flow of tourists: they continue to rely on external agencies to secure them, or on tourists arriving independently.

## Conclusions

For more than 30 years, Punta Laguna has experienced a process of adaptive learning in community-based conservation. As with most self-started experiences of ecotourism, PL's initiative has gone through several management phases, some more successful than others. In general, the community over the years has learned to value having control over conservation and management programs and clear regulatory frameworks, as well as evidence that their forest is being soundly conserved while generating local benefits. As it has been documented elsewhere [31], regulatory frameworks, and strong and shared cultural values are important for the long-term

stability of natural resource management. These also help shape economic expectations of local people regarding future scenarios about community conservation and the generation of benefits that can influence their own decision-making. This is important given the enduring idea that pro-people conservation projects do not protect biodiversity [32], and that PAs ought to apply strict protection and focus less on community development [33].

Unlike other cases of community-based conservation [34], in PL there is clear evidence that biodiversity in the area is being conserved. For instance, studies on the demography and population of spider monkeys in PL have demonstrated that, at present, the spider monkey population has a high probability of long-term persistence [35]. This species needs large areas of forest and high tree diversity, which implies that a viable population ensures the persistence of other species with lesser habitat requirements [28].

Although the PL case shows evidence of the importance of creating benefits for local people through community conservation, this case suggests that it is equally important to avoid large income disparities among community members. As described in previous sections, the social and economic exclusion of many families in PL threatened the whole conservation initiative, to the point that external intervention was needed. The income inequalities were in part the reason why most of the members of the cooperative *Najil Tucha* decided to sign the contract with Alltournative instead of maintaining the ecotourism business at the local level. It was as a consequence of the significant income disparity between the community leader's family and the rest of the community that, in 2005, the cooperative opted to give up local control and power in decision-making for the possibility of more equitably shared monetary benefits. Therefore, as Scheyvens [5] notes, issues of economic distribution within a community are as important as the total amount of economic benefits a community may receive.

The management experience with an external tourism agency turned out to be a critical learning event, as it allowed local people to accumulate expertise relevant to managing the tourism activity. This particular example shows the importance of transferring information and knowledge across stakeholders. In fact, the process of appropriating the entrepreneurial "know-how" was crucial for the empowerment of local people: they realized that they were perfectly capable of controlling their own future within the conservation initiative.

Nowadays, local people own and control most of the tourism-chain of PL. For example, they decide on the type of tourism that takes place; they control how the business is organized, both in terms of human resources and amenities offered; they decide how to direct economic benefits to members of the cooperative and reinvest them; and they decide the number of tourism agencies they want to work with. Being closely linked with primatologists, they have also had the opportunity to define and enforce tourism carrying capacity for wildlife observation. The only part of the tourism-chain they do not have control over is how to bring tourists staying in the Riviera Maya or nearby destinations into PL; they still depend heavily on tourism agencies for that purpose. This is probably the greatest weakness of the business. In effect, as they experienced over the years, agencies are the ones who have access

to tourists and can influence their decision to visit the area. The greater access community members will have to the relevant expertise and infrastructure to address this issue, the greater their control over their initiative.

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# Part III
# Methodological Aspects for Understanding and Strengthening Community Conservation

# Chapter 8
# Local Participation in Community Conservation: Methodological Contributions

**Isabel Ruiz-Mallén, Antonio De la Peña, Maria Elena Méndez-Lopez, and Luciana Porter-Bolland**

## Introduction

Worldwide, the importance of local or community participation in decision-making regarding natural resource management for sustainable rural development and biodiversity conservation is increasingly recognized among both academics and policymakers [1–3]. Over the last two decades, a growing volume of research has focused on understanding the role of local communities in conservation, and particularly on understanding the importance of traditional ecological knowledge for managing natural resources [4, 5]. Two main sets of evidence support the argument for including local participation in decision-making.

First, evidence shows that official conservation policies that severely limit human use of natural resources for the sake of biodiversity conservation, such as strict protected areas, too often have harmful effects on livelihoods and the well-being of human populations living in or around these areas [6]. For example, conventional approaches to biodiversity conservation generate social tensions that can at times lead to violence, particularly when local people are displaced or restrictions are

I. Ruiz-Mallén, Ph.D. (✉) • M.E. Méndez-Lopez, M.Sc.
Institute of Environmental Science and Technology (ICTA), Universidad Autònoma de Barcelona, Bellaterra, Barcelona, Spain
e-mail: isabel.ruiz@uab.cat

A. De la Peña, Ph.D.
Department of Anthropology, Universidade Federal da Integração Latino-Americana, Foz do Iguaçu, Paraná, Brazil

L. Porter-Bolland, Ph.D.
Red de Ecología Funcional, Instituto de Ecología A. C., Xalapa, Veracruz, Mexico

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imposed on their access to natural resources within their territories, leading to a loss of livelihood opportunities [7, 8].

Second, in recent years, experts have reported multiple cases in which participation of rural communities in natural resource management has promoted sustainable rural development and improved biodiversity conservation [9, 10]. Throughout Latin America, for instance, many rural and indigenous communities have developed strategies to regulate land use change and manage their natural resources and ecosystems, thereby promoting biodiversity conservation and enhancing sustainable livelihoods for community members [11]. Also in other tropical regions, forest management practices that are developed locally have been shown to boost conservation initiatives [12, 13]. Experts argue that such community conservation initiatives can protect threatened wildlife [14] and maintain forest cover and ecosystem functions [15, 16], while empowering communities [17]. Moreover, current approaches acknowledge that participatory resource management for biodiversity conservation must involve the devolution of power to rural and indigenous communities, which means recognizing local rules and institutions, reinforcing self-organization and networks, promoting social learning, and increasing capacity-building [17].

Despite the growing acceptance of these arguments, the concept of *participation* and its meaning is a contested topic among researchers, policymakers, planners, and stakeholders [18, 19]. Two main approaches stand out.

On the one hand, *participation* has become associated with empowerment and the capacity of local actors to achieve collective action; this perspective is commonly associated to the social capital framework [20]. The concept of *social capital* refers to social networks, trust, and norms that facilitate cooperation by enhancing governance effectiveness and economic performance [21]; it is also related to social relationships based on mutual reciprocity and shared values [22]. According to this view, which we call *normative*, local participation in any conservation activity will be higher if participants agree on the way they will coordinate their efforts. Trust is a fundamental element in this approach, for individuals who trust each other will commit themselves to the assigned tasks with greater conviction. Furthermore, local peoples' participation in community and supra-communal organizations might increase their access to resources and livelihood possibilities as a result of the interactions between local populations, state, and market [23].

On the other hand, critics see the normative model as analytically devoid of the structural, economic, and political determinants that condition development and conservation [24, 25]. This *political* approach states that participation is a process intimately connected to the position that individuals occupy in the hierarchy of social relations within the society. Participation, in this sense, is a valuable resource itself, which in some contexts is denied to, or limited for, some individuals or groups, often as a result of their belonging to particular social categories (e.g., women, ethnic minorities, and lower status groups) [26, 27]. Authors who take this perspective stress the need to understand historical practices of exclusion from institutional decision-making [28], which might be intra-communal or intimately linked to the state and its institutions [29]. Others concentrate on exploring the structure of social relations in order to understand how power and inequality are practiced in the construction of collective action [30]. From this perspective, participation is a

differentially distributed choice, meaning that in some contexts, the opportunity to participate is determined not only by personal preferences and values but also by a political and socioeconomic context, where some groups or individuals might enjoy greater choices and possibilities to be active in decision-making.

The different understandings of *participation* affect the way in which it is studied and applied. Both theoretical frameworks (normative and political) use a variety of methods to assess myriad levels and types of local participation in natural resource management. In this chapter, we discuss the methodological implications of both approaches by reviewing evidence from research on participation in protected areas management and conservation. We focus on previous literature based on research that uses both qualitative and quantitative methodologies for assessing rural and indigenous community participation on environmental decision-making in developing countries. Although an interesting body of literature on social participation research methods exists in urban areas in both developing and developed countries [31, 32], it is not considered here because socioeconomic, cultural, and political contexts differ between rural and urban areas, limiting such studies' applicability in peasant and indigenous communities.

We then propose a multi-methodological approach for examining participation that describes and analyzes political interactions and power relationships among actors at different decision-making levels by using a combination of formal social network analysis, ethnographic interviews, and graphical representations of social links. This mixed methods technique, which was tested in Mexico, provides complex interpretations that are both contextual and comparable across populations, and that take into account the theoretical backgrounds of both the normative and political approaches.

## The Conceptual Debate Around Participation

The growing call for inclusion of local actors in the design and implementation of conservation initiatives makes the *participation* concept one of central importance. But, what is it understood by *local or community participation* in natural resource management and biodiversity conservation? The normative approach, which has dominated the debate, understands participation as a civic tradition dependent on cultural context. This approach, analogous to the idea of social capital in development, understands communities as possessing different forms and levels of social and cultural attributes such as trust, reciprocity, solidarity, and exchange relationships, as well as common rules and norms within the community and among community members and outsiders. This implies that there is little differentiation in the values and practices of the members of a community. While it is highly desirable to have models of participation that pay attention to culture-specific features of a society, the risk implied in this model is that communities appear as homogeneous units whose members all think and behave in the same way, as dictated by cultural values. Class and conflict are often ignored in this approach that unites all groups and experiences in human societies using the broad brush of culture. The issues of access to,

use of, and exclusion from natural, economic, and political resources are bypassed in favor of explanations that stress local values and ideological preferences; the approach ultimately runs the risk of overlooking structural and material conditions that determine behavior [33–35].

The political approach does not reject the role of culture in influencing ideas about participation in local contexts, but it assumes that culture is practiced, reproduced, and at times challenged in social interaction. It calls for an analysis of practices before assuming that the local community upholds cultural traditions—shown to be sometimes unknown even to its own members—that hold the key to conservation. In addition, it assumes that the social structure of communities is hierarchical and differentiated in terms of power and wealth, and that this social stratification heavily influences members' participation in decision-making activities. Participation, in this sense, is a resource contingent on contextual and political variables at several levels of analysis, which include the household, the community, and national and global processes.

Social capital is a recurring theme in participation and conservation. Normative social capitalists such as Robert Putnam [21] and Francis Fukuyama [36] see the concept as closely related to participation in voluntary associations. Collective action is enacted through associations, which can only happen if individuals have the inclination to take part in actions that involve others. For Putnam, the presence of voluntary associations in a community shows that individuals have built an environment of trust in which people can engage each other freely. According to him, these are the foundations of democracy and development. Because Putnam's approach originates from the idea that social organization and cultural values have a constructive and transformational quality in communities, little emphasis has been placed on understanding the contextual events that might have brought people to join or resist local associations, how their members differ in their definition of community welfare, and who is left out of local associations, and why. As Arneil [27] puts it, the focus in Putnam's approach is the amount of social connectedness not the nature of the connections among people. However, one way to identify and analyze the nature of relations, including their possible inequalities, is by bringing back the individual as the unit of analysis. Social network analysis has made the political approach operational by disaggregating *the community* and looking for different experiences, perceptions, and actions in conservation. In other words, what matters in understanding the relationship between participation and conservation are the actual forms and circumstances of local people's participation, not only that people participate or that they are connected.

## Methods for Assessing Local Participation in Natural Resource Management

Since the 1990s, researchers have attempted to typify local participation in development and natural resource management [37–39]. In practice, local or community participation in environmental management varies significantly in degree: it can

take place on a scale that goes from passive partners to active practitioners. In 1995, Pretty [37] suggested classifying how agricultural development organizations, both governmental and nongovernmental, apply the term community participation into the following seven types: (1) Manipulative participation, which means inviting local representatives to sit on official boards without conveying any power; (2) Passive participation, when official boards communicate their decisions to local people regarding natural resource management without operational feedback mechanisms; (3) Participation by consultation, when communities are consulted by decision-makers or asked to respond their questions; (4) Participation for material incentives, which means people participate incentivized by work, food, cash, or other material means; (5) Functional participation, which refers to interactive involvement of local people in predetermined activities, such as collecting data, which may also imply integrating their decisions to a minor extent; (6) Interactive participation, when participation integrates local people's involvement in the analysis, discussion, and development of management initiatives predetermined by external institutions; and (7) Self-mobilization, when communities take their own actions and decisions concerning natural resource management, independently of external institutions.

During that decade, a variety of action-research methodologies, such as Participatory Rural Appraisal (PRA) and Stakeholder Analysis (SA), were developed to enhance communities' participation in decision-making over natural resource management. PRA, which emerged from the Rapid Rural Appraisal (RRA) model, includes participatory methods (i.e., mapping, transect walks, well-being and wealth ranking, and seasonal calendars) to enable local people to share their knowledge for planning and action in natural resource management projects [40]. SA is a tool developed in management studies, useful for generating knowledge on stakeholders' interests and assessing their interactions in terms of power and influence. In development and conservation studies, the technique generates information about who the key actors are, their knowledge, interests, positions, alliances, and influence related to the conservation policy under consideration. A certain level of knowledge, for instance, would indicate stakeholders' familiarity with the protected area. Policy makers and managers could use information resulting from SA to interact more effectively with key stakeholders and increase support for protecting the area [41]. For example, SA was used to identify and analyze stakeholders' participation in India's Corbett National Park [42]. Researchers identified nine groups of stakeholders among villagers; some of them were supportive of the National Park, while others, who were also participating, objected to the protected area. To consider the participation of non-supportive alliances in management was very important for managers and policy makers as these groups constrained the effectiveness of the conservation initiative. Additionally, ethnography and other mixed methods have been used to understand why and how, or why not, people participate in conservation initiatives [39–43].

Significant progress has been made in labeling participation types and developing more sophisticated methods to promote local participation. Similarly, a variety of methodologies have been developed to describe scenarios of participation in conservation issues. However, some argue that more efforts should be made to deeply

examine actors and institutions inside communities and how these influence management and conservation decision-making processes [44]. Nevertheless, as we have discussed earlier, the concept of *participation* is not always defined in the same way. Consequently, the level of local people's involvement in biodiversity conservation can be measured by using a variety of methods depending on how *local or community participation* is understood and used by researchers.

Methodologies based on the social capital framework are common in the literature on local participation in natural resource management decision-making. Qualitative methods, such as field observation, semistructured interviews, focus groups, key-informant interviews on livelihoods, governance, and institutions, have been used to explore the creation and impact of social capital at community, regional, and national levels [22, 23, 45, 46]. In the Bolivian and Ecuadorian Andes, Bebbington [47] ethnographically described the role of six indigenous community organizations in transforming their environment and socioeconomic conditions. Community participation was assessed as the capacity of indigenous organizations to negotiate and influence dominant institutions (i.e., church, state, and land owners); it was found to be conditioned by the financial, technical, and political support that the organizations received from nongovernment organizations (NGOs), trade unions, priests, and other external actors or institutions. In a study in Ghana, Lyon [45] conducted semistructured interviews and a focus group to analyze local farmers' social capital in terms of mechanisms of trust among traders and themselves, including aspects of preexisting and new networks, traders' friendship, and the role of intermediaries.

A considerable number of studies have used quantitative methods to measure social capital in communities [48–50]. Some research has used evidence on organizational membership. For instance, Putnam [21] measured social capital primarily by the number of local organizations in the community. Grootaert and Narayan [48] focused on six aspects of local associations: (1) number of memberships of each household in existing associations; (2) degree of group heterogeneity in terms of their members' economic status and kin groups; (3) number of times someone from the household attended association meetings; (4) level of participation of each member in decision-making, assessing if the participation was "very active," "somewhat active," or "not very active"; (5) members' amount of contributions in cash and in kind in each association; and (6) type of association, for example if it was community-initiated or externally imposed.

Another empirical approach to social capital has measured it at the individual level. In a study conducted in Indonesia, Bebbington and colleagues [49] asked people if they borrowed money from someone other than their own siblings or family in times of emergency. In a different study, in a highly autarkic society of farmers and foragers in the Bolivian Amazon, Tsimane' social capital was assessed by asking each adult about two common measures of traditional forms of social capital: the number of gifts given to people of other households, and the number of times that she or he helped people of other households or participated in communal work [50–52].

In summary, local participation in decision-making over natural resource management has been measured as social capital at two levels, community and

individual social capital, both of them understood as homogeneous units, meaning that there is an overarching system of values that heavily influences participatory practices, regardless of the unit of analysis. Critics state that such methodologies reinforce the transformational quality on which social capital is built upon, while ignoring issues of differentiation, class, and heterogeneity of communities [53]. Ethnographic research in Tanzania conducted by Cleaver [24] looked at factors constraining local people's ability to exercise agency even when social capital was increased by strengthening social relationships and public participation of the poor. Three factors were identified: (1) lack of physical and mental capacity for gainful employment (being able-bodied); (2) lack of opportunity for participating in social relationships; and (3) lack of ability to represent their interests to outside actors and institutions at low transaction costs. Cleaver is a strong proponent of understanding the limits that social structures impose on individual choices. Participation is a social activity that occurs within the confines of social relations, which are structured to give order to life.

Social network analysts have amply developed the idea of structured choice. Lin [54, 55] and Lin and Dumin [56], for example, have shown that valuable resources (jobs, emotional support, information, etc.) are embedded in social structures, meaning that resources are inseparable from the way communities structure their relations; and secondly, that these structures are characterized by differences in distribution and rank, i.e., the higher the rank of a person, the greater the concentration of valued resources in the network of relations of a group. In the jargon of formal network analysts, the better the position of origin in a network, the more likely an actor will access and enjoy resources, including social capital [57].

The social network analysis literature is vast and its techniques varied [58–60]. For the purposes of participation and conservation, what interests us most is the capacity of network analysis to uncover how social differences (in, for example, gender, ethnicity, and status) influence the ability of individuals to access and obtain benefits in a social group [61, 62]. In addition, network analysis is a useful tool because it offers a quantitative measure of how people are connected to (or disconnected from) one another in a social group. Communities and their social structures are, in this sense, networks where actors are connected by specific degrees and places, and where, as a result of the position each of them occupies, it is possible to infer their behavior.

In social network analysis, the "popularity" of social actors in a network is called centrality, which is composed of three basic measures. The first is *degree centrality*, which reveals how many direct ties an individual has to others in a network, potentially resulting in direct access to sources of support. Some see it as a measure of autonomy, as many direct ties makes an individual less dependent on any particular actor, and hence more powerful. Second, *closeness centrality*, which shows how close an individual is to other actors in a network, is measured by the number of ties an actor has to go through in order to reach another. How many people does X have to go through in order to hear the latest news about a local conservation project? The fewer the ties, the faster a person can spread or receive information, therefore having an advantage over others [63]. Third, *betweenness centrality* refers to the extent

to which an actor can be a broker or a bridge in a network; a strategic position which might indicate a potential for control over others [59] or control over the flow of information.

Centrality measures place emphasis on the individual as the source of analysis in participation and conservation. They reassert difference, and the possibility to further investigate histories of exclusion, power, and access that vulnerable groups have experienced. Network analysis, nonetheless, has its own limitations, as it is very difficult to investigate issues of exclusion, and politics in general, solely from the numerical data that it provides. In other words, it is possible to know with accuracy which actors control the flow of resources, how powerful cliques are structured, and which actors are isolated, yet it is difficult to know why this is so. In order to have more complex and contextually meaningful answers, network analysis can be enhanced by ethnographic data. Together, both approaches are capable of grounding participation and conservation in broader fields of social, economic, and political interaction.

## A Methodological Proposal to Assess Local Participation in Conservation

We have described and discussed the two theoretical and methodological approaches to assess participation (normative and political). It has been not our aim to either promote or reject either of the two approaches, but to expose the strengths and weaknesses of each one to study local participation in conservation. In an effort to combine both approaches to understand and measure community participation in biodiversity conservation, in this section we present a methodological proposal that has been tested in six case studies in Mexico. Because the focus of the chapter is on methodological issues, results from the study will be presented elsewhere [64].

The methodological proposal we present here is framed in an interdisciplinary Mexican-European research project (2009–2011) focused on the role of local participation in biodiversity conservation entitled *Conservcom*. The project's aim was to compare local participation in official Protected Areas (PAs), Payments for Ecosystem Services (PES), and Indigenous Peoples' and Community Conserved Areas and Territories (ICCAs) in six rural and indigenous communities located in four southeastern Mexican states: Felipe Carrillo Puerto and Chunyaxché in Quintana Roo, Xmaben and Unión 20 de Junio antes Mancolona in Campeche, Santa Cruz Tepetotutla in Oaxaca, and Tonalaco in Veracruz. In trying to understand local participation in decision-making regarding conservation initiatives from normative and political perspectives, a multi-methodological approach was designed by the *Conservcom* research team, in which anthropologists, environmental and ecology scientists, and geographers collaborated. The methodological approach included three chronological research tools: (1) *sociograms* [65] developed in participatory workshops; (2) individual surveys; and (3) social network analysis.

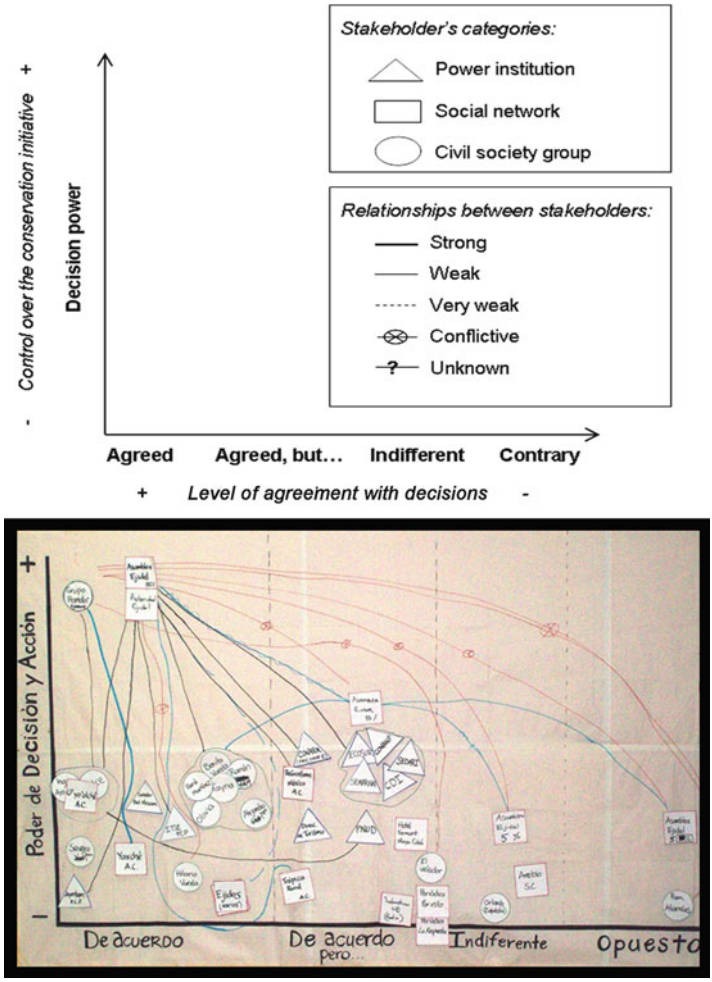


**Fig. 8.1** Sociogram graphical representation of social interactions among stakeholders involved in local conservation initiatives (*above*). Example of the sociogram generated in Felipe Carrillo Puerto (*below*)

The sociogram, a graphical representation of social links, was developed in a focus group involving local people who had knowledge about the conservation initiative under study. It aimed to (1) identify all types of actors implicated in the management of the conservation initiative, (2) understand their roles and power (or control) regarding decision-making processes for the conservation area, and (3) identify power relationships among stakeholders by means of a graphical representation (see Fig. 8.1). Moreover, the sociogram allowed the identification of key actors and action groups closely related to the management of the conservation

initiative in question, in order to define the samples to which apply other tools (i.e., interviews and surveys).

Previous to the elaboration of the sociogram, we identified one or two key informants in each community, and asked them to elaborate a list of government institutions, individuals, NGOs, and other stakeholders who had participated or were still participating in designing or managing the studied conservation initiative in the community. We also asked key informants for existing conflicts among the stakeholders in the list and, if there were, we organized one or two sociogram focus groups in order to separate people and avoid possible conflicts. During the sociogram focus group, we first asked participants to complete the list of stakeholders and organize them in one of the following categories, which were represented by different geometric symbols: (a) powerful institutions as triangles (i.e., Church, government); (b) social network as squares (i.e., farmer organizations, NGOs); and (c) civil society groups as circles (i.e., women, young people, men). We then asked participants to place each identified stakeholder in a diagram whose "*x*" axis indicated their level of agreement with decision-making concerning the local conservation initiative (where zero indicated that a stakeholder agreed fully with decisions about the conservation initiative, and an increased grade of rejection moved the value to the right). The "*y*" axis indicated stakeholders' control over the conservation area decision-making. Finally, types of relationships between stakeholders (i.e., strong, weak, very weak, conflictive, and unknown) were represented by different kind of lines in the diagram. The sociogram representation was a useful tool to understand who was involved in each conservation initiative and how stakeholders' involvement was perceived. In several cases, the composition and dynamics of the community and its social organization related to conservation initiatives' designation and management were extremely complex. For instance, in Felipe Carrillo Puerto, where the community established two ICCAs, focus group participants identified 36 local people, 15 civil organizations, and 11 power institutions as stakeholders. Sixty-six percent of the stakeholders were seen as supporters of the ICCAs' management, another 25 % of them as thinking that community conservation required improvement, and 5 % as indifferent. Only 4 % were identified as contrary to the community conservation initiatives [66].

The individual surveys included information on local people's participation in decision-making of each conservation initiative at three levels: (1) creation of the area; (2) design of the management plan; and (3) management activities. Questions to assess the individuals' reasons for participating or not were also included [67]. We interviewed one adult person in each household, and made sure that those holding land rights were included in the sample. Responses were coded in relation to respondents' level of involvement (i.e., never, sometimes, often, always), which were given predetermined values to create an index of participation level (Table 8.1).

To obtain the participation index [64], we first multiplied the values of answers by each action related to the conservation initiative—i.e., (1) deciding on the creation of the area; (2) designing the management plan; and (3) management activities. As a result, we obtained participation values for (1) the creation (0–3); (2) the management plan (0–9); and (3) management activities (0–9). We then added these

**Table 8.1** Questions, answers, and values of individual surveys [67]

| | Did you participate… (*A*) | How did you participate… (*B*) | Range of values ($A \times B$) |
|---|---|---|---|
| Survey questions | Answers and values | | |
| … in the meeting where the creation of the conservation initiative was decided? | No = 0<br>Yes = 1 | Just listening = 1<br>Making questions = 2<br>Giving opinions = 3 | From 0 to 3 |
| …in designing the management plan? | No = 0<br>Sometimes = 1<br>Often = 2<br>Always = 3 | Just listening = 1<br>Making comments and proposals = 2<br>Collaborating with the management committee = 3 | From 0 to 9 |
| … in management activities? | No = 0<br>Sometimes = 1<br>Often = 2<br>Always = 3 | Activities are mandatory = 1<br>Being paid = 2<br>As a volunteer = 3 | From 0 to 9 |

three ranges of values and created the participation index (0–21), which included the following four categories of local participation in conservation: (a) nonparticipation (if index value was equal to 0); (b) low participation (if index values were 1–5); (c) medium participation (if index values were 6–11); and (d) high participation (if index values were 12–21). These results provided quantitative data at individual and household levels on local people's participation in each conservation initiative. Our results showed that the majority of local people did not participate in official PAs decision-making and management. For instance, 87 % of people in Chunyaxché and 90 % of interviewees in Felipe Carrillo Puerto did not participate or were not participating in management and decision-making for the Biosphere Reserve of Sian Ka'an. In general, although less than half of the interviewers participated in ICCAs and PES, local participation levels in both initiatives were higher than in PAs. The participation index also showed that, in general, most of those who participated fell within the "low level" of participation, when taking into consideration the frequency of, and motivation for, their participation. As an example, in the case of PAs, only 11 % of respondents participated, 7 % of them were at the "low level" and the other 5 % at the "medium level" of participation, according to the index. The ICCA of the Chinantec community of Santa Cruz Tepetotutla, in Oaxaca, scored the highest level of local participation [64].

The aim of the social network analysis was twofold. First, it sought to identify in what way, and for what reasons, local people participate in natural resource management/conservation, including participatory strength, and forms of participation. Secondly, it aimed to correlate this data with the socio-demographic characteristics of individuals and their histories of institutional and organizational participation. Data were collected using the following questions included in individual surveys: (1) Did you, or someone from your household, work with other people from your community to the benefit of the community? (2) What kind of work did you do?

(3) How many times did you participate? and (4) Did you participate compulsorily or voluntarily?

We used a *two-mode network analysis*, which consists of finding patterns of relations between two orders of categories: (1) types of people and (2) participatory activities in natural resource management. The objective was to find out whether certain types of people tend to group together around certain types of management activities.

The dominant approach in network analysis consists of comparing actors against actors in a matrix of relations (a simple binary option of ones and zeros is used to indicate the presence of a relationship) in order to assess who knows whom, and how those ties (or their absence) form structural patterns of relations. However, in a two mode network, the matrix does not look for the presence or absence of ties among all actors; instead, it compares activities and people as a way to find out how actors and events fit together. For example, do certain types of actors tend to dominate certain conservation/management activities? Are there patterns in the social, economic, and political profiles of people according to the program, initiative or task carried out? What do those who participate have in common? And conversely, what types of individuals do not participate? There might be patterns in which certain programs, initiatives, and activities tend to cluster different sectors of a community, perhaps based on their gender, wealth, or ethnic background.

In using a two-mode network analysis, we could find out whether certain types of conservation activities—for example, local initiatives or externally induced ones—tend to match up with certain types of individuals. Could it be that remunerated management activities are dominated by a subgroup of the community? Is there a relationship between gender and the type of management/conservation participation? By looking at the relationship between actors and activities (and eventually among actors themselves), we were able to uncover patterns of relationships in a community that correspond to kinship relations, political affiliations, and spatial locations that influence participation. When associated with ethnographic and demographic characteristics, including reported and observable features of management-related participation, social network analysis offers a sociopolitical dimension to the assessment of the relationship between conservation and participation.

Preliminary findings from our research suggested that participation in conservation initiatives, be they ICCAs or PES, were peripherally located in the networks and connected to a lower number of people in relation to other economic activities, except in Santa Cruz Tepetotutla, where management activities related to agroforestry and ICCAs were placed in a focal position in the network (see Fig. 8.2). However, in the six studied communities, *milpa* agriculture was placed in a central position in networks, meaning the majority of people practiced it. In general, these results showed that one or a few small groups of local people in each community were involved in conservation initiative decision-making. Such a finding supports the documented result found using the index mentioned above, of a large concentration of people in low levels of participation in all communities.

Another way of seeing these results is that natural resource management activities are not variables that provide sound explanations for the way community members

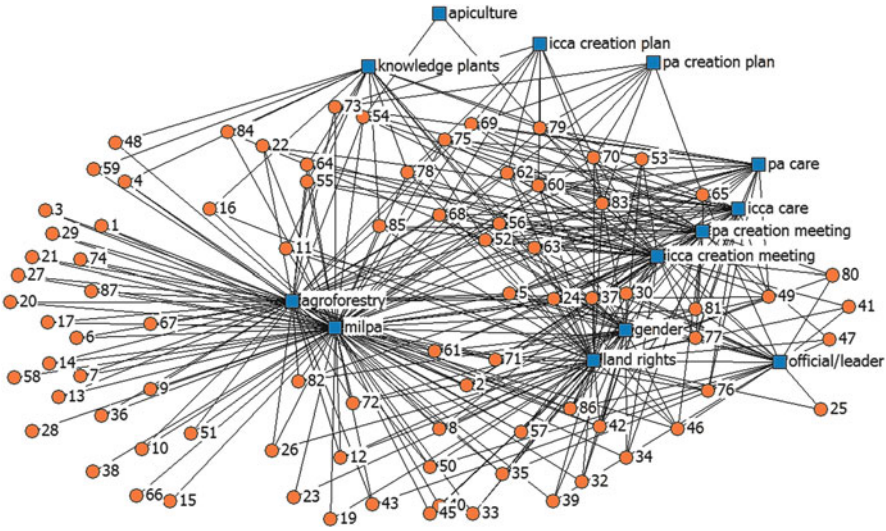


**Fig. 8.2** Network showing the relationship between a sample of conservation, demographic, and economic activities and households in Santa Cruz Tepetotutla

choose to organize, exploit, or conserve natural resources. Other activities such as apiculture, and eco-tourism to a lesser degree, in addition to *milpa* agriculture, were more central to people's choices. Conservation, in this sense, was a complementary economic activity for local livelihoods (except in Santa Cruz, where it was central), and to be involved in conservation initiatives was a strategic choice made by particular actors. It remains to be seen how central or peripheral the members of each community are, and how these locations relate to wealth, status, political influence, and activities related to participation in conservation (among other variables). By completing this analysis, we hope to show that participation in natural resource management is a complex social and political choice that goes beyond the volition of individuals or community values.

## Conclusions

The methodological approach we developed, described above, characterized and analyzed political interactions and power relationships among individuals by using formal quantitative data collected in a survey, as well as social network analysis and qualitative data. For the purposes of a methodological approach interested in the contextual and political aspects of conservation and participation, the data collected through network analysis is rich, but needs to be complemented with ethnographic material that describes the experiences and histories of individuals in the community. Sociogram focus groups and individual surveys gave us the needed information to understand the general scenario of local participation in conservation initiatives in

each community. The methodological framework we offer aims to integrate structural and individual aspects of conservation in its participatory dimension. This mixed methods technique provides complex explanations that are both contextual and comparable across conservation initiatives.

Adapted outcomes of this research will contribute to the theoretical debate regarding local participation in conservation. The latter has implications for public policymaking on biodiversity conservation and landscape management decisions that respect tenure rights, ethics, and culture of rural communities, recognizing its heterogenic nature.

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# Chapter 9
# Community-Based Biodiversity Monitoring in Mexico: Current Status, Challenges, and Future Strategies for Collaboration with Scientists

**Diana J. Pritchard**

## Introduction

There is a growing use of data on biodiversity and ecosystem functions that support human well-being [1]. The obligation to provide this is met by monitoring, which involves the systematic gathering of data at different points in time to identify trends. Prevalent approaches focus on the collection of key biological indicators at distinct levels of biological organization, from landscape patterns to ecosystem, species, and genetic levels [2, 3]. An array of actors including scientists, states, political decision-makers, resource managers, and local communities require monitoring for conservation objectives. Monitoring is used for basic research, serving to test hypotheses about ecosystem structure, function, and composition. It enhances understanding of the behavior and dynamics of ecological processes and changes [2]. International agreements require monitoring to measure progress towards targets of global policy, including those relating to environmental sustainability and biodiversity loss. Prominent among these are the Millennium Development Goals (MDG) and the Convention on Biological Diversity (CBD) particularly Article 7, and the Aichi Targets. As an integral part of biodiversity management, monitoring has numerous applied functions. It is used to identify resource security and use, define priorities for conservation [4], and assess the impact of conservation policies [5]. Biodiversity monitoring is increasingly used to enhance public accountability and to support advocacy [1], with evidence that it helps to enable local communities to defend their environments and livelihoods [6–8].

International conservation agencies, such as the Global Environmental Facility (GEF) and the United Nations Environment Programme—World Conservation Monitoring Centre (UNEP-WCMC) have a primary concern to measure progress towards targets of global policy. They focus resources to fund and coordinate the

D.J. Pritchard, Ph.D. (✉)
School of Global Studies, University of Sussex, Brighton, UK
e-mail: dp230@sussex.ac.uk

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monitoring of global trends in the current scenario, where knowledge is fragmented and data sets are incompatible. Since monitoring in developing countries is mainly funded by such international organizations and donors [9, 10], the schemes established are designed to meet their information objectives. In this situation, local-level monitoring initiatives—despite their potential to contribute to monitoring and conservation management objectives—are overlooked and receive negligible funding and research attention. There are a few exceptions, notably the Nordic Agency for Development and Ecology, in Denmark.

While the widespread adoption of remote sensing and Geographic Information System (GIS), species diversity and abundance indexes has established these as conventional monitoring approaches, in countries with developing economies they are impractical, unrealistically complicated, too extensive, and impossible to support with locally available funds [11–13]. Being "externally driven," they rely on high technology and experts from beyond the location under study, who design the initiatives, define what will be monitored, collect the data and analyze the results [9, 14]. They typically collapse when external funding stops [15] and, because they require counterpart commitments, siphon limited local or national resources away from other monitoring or management priorities [11]. As significantly, they fail to engage sufficiently with, or even exclude, local resource use decision-making processes [1, 11, 16], defying the reality that day-to-day management of biological resources rests largely in the hands of poor rural communities [17]. It remains unclear as to what are the most suitable, accurate or even relevant methods of biodiversity monitoring in developing countries [18, 19]. Nonetheless, it is sensible to suggest that monitoring schemes should be designed and implemented with regard to the socioeconomic realities and institutional and technical capacities of these countries, using simple methods [17]. Involving local people not only provides a cost-effective method, but their incorporation is also all the more crucial because they affect and manage patterns of local resource use.

This context generates growing interest in the concept, theory and practice of community-based monitoring (CBM). It has features common to participatory monitoring and locally based monitoring because they all involve participants who are not specialists, and take place at a local scale. Yet, it differs from these approaches because it incorporates people who reside in the villages and localities of the areas being monitored. As such, CBM is conducted at a local scale by individuals who may have no science education, and who are directly involved in all or some of the stages of the monitoring process: from the design through data collection, analysis, and interpretation of the results [9, 20]. Although biodiversity monitoring emerged from the institutionalized scientific camp with an emphasis on empirical and technical rigor (in relation to the issues of methods, choice of biological indicators, accuracy of sampling, recording, and collection), mounting research points to the valuable contributions of nonspecialists in economically developed and less developed countries [16, 20, 21].

This chapter, which views CBM as an activity entailing collaboration with scientists, examines the potential for its development in Mexico. First, it draws on cases from across the world to outline the relative merits of local involvement in

monitoring above conventional monitoring, which still prevails in countries with developing economies. Second, it establishes a conceptual framework to distinguish the qualitative differences between different monitoring schemes that involve both scientists and communities. Third, it characterizes existing monitoring activities underway in Mexico within the public and private sectors and amongst rural communities, in relation to the extent of local participation. Fourth, it emphasizes the imperative that productive collaborations between scientists and communities be nurtured in Mexico. Lastly, it sets out some strategies to promote engagement with community participation in monitoring activities, and to overcome prevailing barriers.

## Multiple Merits of Community-Based Monitoring

### *Documented Experiences of CBM Highlight Numerous Merits*

1. *It translates into resource management decision-making and action.* Worldwide, local communities exert significant degrees of ownership or control through the formalization of *de facto* influence and legal authority [22]. Locally sanctioned individuals or organizations conduct monitoring at the village level. Results are acted upon by authorities, who are effective at modulating the resource use patterns of villagers via culturally validated norms, restrictions and prescriptions [23]. The implementation of decision-making is also prompt: calculated at under a year, compared to between 3 and 9 years for scientifically executed monitoring [16].
2. *It enhances the knowledge and capacities of scientists and local communities*. Being highly resource-dependent, most rural communities have detailed knowledge and observations of resources and their status [24]. They make observations concerning habitat diversity, species distributions, ecological interactions among organisms, economically important species, and practices that are sustainable. These have been used for the following: as a substitute for baseline environmental data to measure changes over time in remote regions; for formal academic knowledge about local ecology, natural history, and human–environment interaction; and for institutionalized natural resource management decision-making [6]. Communities may gain from collaborating with scientists through training in monitoring techniques, such as the use of binoculars, systematic reporting procedures, or GIS techniques [6, 7]. Such collaborations may also complement local knowledge, since scientists may identify the origin of rapid threats from external sources and casual relationships deriving from wider spatial contexts [23, 25], or from policy domains. Peasant and indigenous populations remain largely marginalized in political, socioeconomic, and cultural terms, however, compared with the relative privilege and influence that scientists enjoy. Thus, communities will only gain where they can be assured that their collaborations with scientists generate benefits to themselves, rather than result in the misappropriation of their knowledge [26, 27].

3. *Collaboration can deliver social benefits and empowerment.* Scholarly field research on aspects of folk knowledge systems has been shown to validate the knowledge of local people and increase their sense of control and of agency [9, 28]. More concretely, collaborative monitoring can enhance the claims to management rights of rural and indigenous communities over their territories, ancestral lands, protected areas and resources [6, 7, 15, 29]. It has also strengthened claims for mitigation or liability, as in disputes concerning toxic contamination, where locally generated monitoring data has widened recognition of the detrimental environmental and health impacts caused by extractive industries [6, 7]. Through active involvement in monitoring, local people can enhance their technical capacities, and gain familiarity with Western scientific language that can strengthen their contestations of dominant social and economic discourses and policies [19].
4. *It is simple, cheap and requires fewer resources.* Participatory monitoring requires fewer professional and financial resources [9, 19]. Comparative experiences in protected areas show that collaborative participatory monitoring produces higher levels of conservation management interventions than conventional scientific methods, while being cost-effective [15]. It involves simple methods, some of which build upon activities that communities traditionally use to communicate and exchange information, such as village meetings. It may also involve training locals to replicate what scientists call a "transect," by systematizing observations they make during the routine daily walk to collect firewood or to fields, or to establish new transects either on foot, in canoes along rivers, or while swimming over coral reefs. Other methods include writing records of oral data, or logging of information. New methods may need to be adopted such as visiting sensitive areas (including water holes or salt licks), walking through local markets or restaurants to monitor wildlife trade, setting camera traps, etc. [9]. For external organizations, locals provide cheaper alternative technical personnel, and an opportunity to cover larger geographical areas, for longer periods of time [6].
5. *It ensures sustainability*. Monitoring in developing countries can only track changes over time if it involves local people, because the monitoring of attributes defined by outsiders necessarily has to rely on continued access to externally sourced resources. Only collaborative schemes that collect information of local value will provide long-term solutions [11]. When locals are involved in defining the components to be monitored, the choice of the methodology, and interpretation of results, monitoring activities can continue once initial funding has stopped. [15, 21]
6. *It contributes to multiple level conservation efforts*. In line with the accepted wisdom that environmental conservation must be addressed through efforts at multiple levels [30], CBM provides local level data that delivers a more complete account for analysis [30], and a mechanism by which local actors can complement global science. Although it may not yet deliver the data that is required by international organizations (although its relevance beyond the immediate site remains to be explored) without such local initiatives the international targets set by CBD and MDGs are unlikely to be relevant or attainable [31]. Also, because CBM incorporates livelihood issues, it integrates international policy targets into conservation management [30].

## Community-Based Monitoring as Planned Intervention but Also Traditional Practice

The concept and practice of CBM embodies a range of interpretations and activities. As a formalized conservation practice and research topic, it is a rapidly expanding field, viewed as a planned intervention that enhances conservation goals [29]. The conservation literature typically interprets the involvement of local residents in rather instrumental terms: as a means by which scientifically defined monitoring objectives can be rendered more efficient, cost-effective, and feasible. From this perspective, CBM is considered an opportunity that is created or endorsed by external agents [9] and the role of the scientist is privileged. Local people are treated as passive actors, not active resource managers who could use the information or benefit from the support that complementary science could provide.

By contrast, beyond the confines of western scientific theory and practice and biodiversity conservation management approaches, informal monitoring of environmental components takes place in communities. It relies entirely on local expertise and, with no involvement of external agents, represents a form of autonomous "self-monitoring." Although conservation scientists claim that such monitoring generates inadequate data [9], studies from the fields of ethnobiology and ethnoecology document the wider significance of local ecological knowledge systems. Case material illustrates how communities in many countries use their local knowledge to manage productive landscapes and tropical ecosystem processes and functions [29, 32–34]. Yet, historically, Western society and its formal institutions have largely dismissed such local, traditional or indigenous forms of knowledge as being inferior, risk-adverse, and irrational or primitive. They are devalued by dominant culture [35], and people trained in Western scientific methods and knowledge normally question the value of such knowledge [36].

An overview of what is termed "traditional ecological knowledge," which is evident in places remote from where Western science is a dominant knowledge system, highlights the value of CBM approaches. Traditional ecological knowledge refers to indigenous or other forms of traditional or local knowledge, practices and beliefs concerning the local environment, its biotic and abiotic components, as well as the processes that sustain them, including human interactions [32]. It accumulates and is handed down over generations, evolving largely through empirical observations, experimentation, and by cultural transmission through contact with other knowledge systems [33]. Through it, local populations maintain their subsistence and livelihoods in their specific landscapes and develop and adopt techniques to manage ecological process in relation to energy transfer, limiting factors and carrying capacity [28]. As a customary system, it guides local practices, including management, rotations, harvesting, and extraction activities [33], and regulates use to prevent the "tragedy of the commons." [37].

Scholarly attention to indigenous management strategies in Mexico has shown how they constitute coherent internalized plans [38, 39]. Indeed, terms such as "resource management strategy" and "agroforestry system" [38] were first adopted in

research on traditional systems in Mexico to highlight how these diverse knowledge systems constitute "intellectual constructions" [39] akin to rational scientific (Western) terms. Further evidence from ethnoecology in Mexico indicates that traditional ecological knowledge generates and is informed by feedbacks that render community resource management resilient and flexible, which is suggestive of adaptive management [34], and that professionals external to these villages could learn from traditional ecological knowledge-based resource management practices.

To date, CBM initiatives span a range of scenarios involving collaborations between expert biologists and local communities. These can be characterized—most appropriately for the purposes of this chapter—along a continuum of relative degree of involvement of local people and professional scientists [9]. At one extreme, locals are involved only in collecting data, for pay, while scientists design methods, analyze and interpret the monitored results to provide for information needs that are defined by and for institutions far from the site. At the other extreme, locals play an active role in all stages of monitoring. Scientists provide support through technical advice or training. They engage with the existing local knowledge systems and practices of local people with a view to enhance both community resource management capacities and their own formal biological knowledge about local socio-ecological realities [9]. Implicitly, the latter schemes acknowledge the rights and decision-making authority of local communities, which collaborate because they gain information that is relevant to their livelihood strategies.

## The Current Status of Community-Based Monitoring in Mexico

This section characterizes a selection of initiatives underway in Mexico (within the state sector, by NGOs and amongst communities), in reference to the nature and extent of involvement of local stakeholders and professional scientists. These are presented in Table 9.1.

### *Low Levels of Community Involvement in State Monitoring Programs*

As a CBD member state, Mexico has integrated biodiversity conservation and monitoring into its national environmental strategies and action plans (the Programme for Environment and Natural Resources (2007–2012), the National Programme for Protected Natural Areas (2007–2012) and its sustainable development agenda (the 2007–2012 National Development Plan). The country is only one of two nations with an official biodiversity information institute: the National Commission for the Knowledge and Use of Biodiversity (CONABIO), which represents a key resource for the coordination, analysis and communication of biodiversity information [40].

**Table 9.1** Comparing biodiversity monitoring initiatives underway in Mexico

| Character of monitoring | Conventional monitoring (as per MIE) | Monitoring with minimal community involvement confined to data collection (as per M-MBC, NCAI, Angéles Biosphere Reserve, CI, TNC, WWF, Pronatura) | Collaborative community-based monitoring (as per WWF in Gulf of Mexico; forestry management in Chiapas [Junzajab and Muquenal] and Michoacán [Pátzcuaro Basin]) | Indigenous "self-monitoring" (in communities throughout Mexico) |
|---|---|---|---|---|
| Actors involved | Professionals who conduct the design, data collection, and analysis | Professionals who conduct the design and analysis. Local communities are trained to collect data | Local communities, in collaboration with scientists, design, collect, and analyze data | Local communities conduct all stages autonomously |
| Aspects monitored | Biological taxa and indicator species defined by external agents | Biological taxa and indicator species defined by external agents | Environmental and livelihoods indicators. May include additional components proposed by scientists | Environmental and livelihood indicators |
| Objectives | To identify: progress towards international targets; conservation priority areas; scientific information; or management impacts | To identify: progress towards international targets; conservation priority areas; scientific information; or management impacts. And to address efficiency goals | To provide information for local decision-making and management; demonstrate impacts of policies and contamination. Has potential to contribute to monitoring at wider scales | To provide information for local decision-making and environmental management |
| Methods used | Those meeting scientific criteria as objective and replicable (line-transects, camera traps); high-tech methods (GIS, aerial photography, etc.) | Those meeting scientific criteria as objective and replicable (line-transects, camera traps); high-tech methods (GIS, aerial photography, etc.). And methods that locals can be trained to use | Those building on traditional methods which can be supplemented with use of focus groups, field diaries for routine observations, free ethnobiological listings, etc. | Traditional methods (informal observations, routine walks, local arrests) |
| Costs involved | High | Lower since funds required training for data collection | Lower still since some costs may be assimilated by the community | Low, costs assimilated by the community |
| Sustainability | Cannot be sustained once project ends | Cannot be sustained once project ends | Could be sustained by locals; may need funds from external sources | Sustained by locals |

Since 2001 a methodological and financial strategy has been implemented through the Programme for Biological Monitoring in Protected Natural Areas (PROMOBI) of the National Commission for Protected Natural Areas (CONANP) and, after 2003, systematic monitoring of conservation has been conducted in federal protected areas through the Information, Monitoring, and Assessment System for Conservation (SIMEC) [41]. This centralized national monitoring capacity has been consolidated with United Nations Global Environmental Facility (GEF) funding. This led to infrastructural investments and training in GIS technology to collected data on habitat conversion, biological, geographical, and socioeconomic data, and detailed data on indicator species and species distribution, together with methodology for tracking. Monitoring schemes are designed by experts who collect and analyze data [42].

While federal authorities are not mandated to involve other actors in biological monitoring, official institutions, such as CONABIO and CONANP have involved communities in protected areas. Communities have been trained in biodiversity concepts, sampling techniques and methods and use of equipment in protected areas, as part of the implementation of the Mesoamerican Biological Corridor-Mexico (an international initiative supported with global funds) [43, 44]. The trinational Initiative for the Conservation of Birds of North America (NABCI), where information is gathered on resident and migratory bird species to create a database of their distribution in all three countries also drew on community members to gather data [45]. At the Ángeles Biosphere Reserve, in Baja California, locals monitor local human activities including fishing and tourism. Given their alleged impact on key species, these efforts effectively provide information to police communities, while scientists conduct science-based monitoring of the populations of indicator species.

In all these cases, local involvement is confined to data collection and is rewarded with pay; [46] professional researchers conduct the design, analysis, and interpretation of the results. The data is destined for external authorities with a view to inform land-use and conservation policy instruments [43], state decisions on conservation priorities, and the management of protected areas. This approach secures a cheap source of data collection, but it does not constitute a long-term strategy, nor is it sustainable. As elsewhere, it does little to incorporate local people into area management practices or address their livelihood needs [19].

Most typically, state monitoring in Mexico is conducted with no local involvement, even in locations outside designated protected areas, such as where populations are organized in *ejidal* properties and indigenous communities. A notable case is the Integrated Management of Ecosystems (MIE) project. This was implemented, with GEF funds, in La Chinantla (Oaxaca), La Montaña (Guerrero), and Los Tuxtlas (Veracruz) when data on local biological resources of interest to the authorities was obtained without community participation [47]. During this period (2002–2012), local populations expressed suspicion of the federal environmental authorities in response to recent state efforts to legislate Biosphere Reserves in indigenous territories, which would undermine their authority and control of the land and its resources. The scheme also involved national and international experts

who used remotely sensed methods to collect information using GIS (and proposed subsequent work to be Web-based) [47]. This meant that local communities have little or no access to the information collected and subsequently stored. State biological monitoring initiatives can be sensitive, and are not viewed by some rural communities and indigenous people as benign.

Elsewhere, such as in the federal and state Protected Areas, Mexican authorities work with higher education institutes and organizations of civil society [41]. Although in other countries such alliances are seen as representing a positive element for the development of collaborative national monitoring schemes [40], in Mexico the government defines all aspects of the schemes [41] with a view to its own decision-making requirements.

### *Research Institutions Focus on Scientific Monitoring*

The Center for Ecosystems Research of the Universidad Autónoma de Mexico (CIEco-UNAM), Instituto de Ecología, A.C. (INECOL), El Colegio de la Frontera Sur (ECOSUR), and the Center for Tropical Research of the Universidad Veracruzana (CITRO-UV) are amongst institutions that respond to the increasing demand for, and interest in, monitoring biological resources. Their ecology training programs include courses and research in the theory and techniques of biological monitoring but contain few components in community monitoring. More generally, these institutions do not provide formal training to prepare biologists to develop fieldwork in collaboration with local people [48]. Yet an emergent trend within the scientific community urges ecological science—if it is to remain relevant in contributing to effective environmental decisions—to interact with rural communities, including for the design and implementation of monitoring schemes [48, 49]. Similarly, there is limited active research underway in these institutions to explore and understand the value and contributions of monitoring at different scales. Since an important element of the financial strategies of research institutions is to secure external consultancies funded by international sources [50] they tend to provide technical expertise to satisfy the demand for scientist-executed monitoring that informs decisions at national and supranational level [1, 6]. Nonetheless, institutions have acquired preliminary institutional experience with communities. One initiative, broadly relevant to biological monitoring because it relates to efforts to improve watershed management, has been underway in Veracruz since 2005. The scheme, Global Water Watch-Veracruz, involves training community volunteers to monitor the biological, chemical and physical quality of local rivers. Equipment is adapted to enable community members to undertake activities independently from experts [51], thereby securing continuous community involvement in obtaining information that is directly relevant to local livelihood interests [21]. Collaborative research has also begun to assess quantitatively the capacities of locally based methods to detect changes in populations, habitats and the provision of goods and services [23, 52].

### *NGOs Reproduce Conventional Expert Based Approaches and Train Communities to Collect Data*

International NGOs, including Birdlife International, Conservation International (CI), The Nature Conservancy (TNC) and World Wildlife Fund for Nature (WWF) have long-established country programs in Mexico including monitoring schemes in terrestrial and marine environments. Despite their differences, all these are designed to establish baseline information "to set global priorities for conservation," [53] to inform the regional and country conservation priorities of these NGOs [18] and "help prioritize" [53] by identifying key sites for further work [54] and to identify the impact of their own programs or projects. In particular, CI is executing a GEF project relating to watershed management in the Sierra Madre de Chiapas that aims to develop methods, tools and protocols to monitor and evaluate biodiversity and ecosystems services. TNC, focusing on the Gulf of Mexico [55], monitors and assesses the progress of restoration projects and the overall health of the Gulf. WWF's monitoring activities include the generation of information on the abundance and population trends of single priority or endangered species relevant to its involvement in key reserves, including the monarch butterfly (*Danaus plexippus*) at the Monarch Butterfly Biosphere Reserve (on the border of the states of Estado de Mexico and Michoacán) [56], and the marine vaquita (*Phocoena sinus*) in the Gulf of California [58]. These conventional monitoring schemes all emphasize the value of "strong scientific data" and the adoption of scientific methods to collect "reliable data across extensive geographic areas as a critical component of understanding anthropogenic effects on wildlife and habitats" [57] (p. 18, 20). They rely on high technology [59] and on experts, specifying that, "scientists should select indicators." Local people collect data [57], are trained in corresponding methods and paid. These monitoring schemes would not be sustained once international funding had ceased and do not reflect locally priorities, although in the case of an inventory of fish coordinated by WWF-Mexico in the Gulf of Mexico, information on species of importance to local fishermen as well as to reserve management authorities, were included [59].

The direct involvement of CI and TNC in the expanding REDD+ initiatives in Mexico suggests that these organizations will continue the trend of dependence on high technologies for monitoring purposes, at least regarding forest and forest cover changes. The World Bank has proposed the use of remote satellite-based and airborne platforms from which monitoring for this "carbon accounting" should be conducted. The recommended range of sensor technologies, including optical, radar, lidar, thermal, infrared, and microwave [60] only further compounds the trend toward high technology. Nonetheless, WWF is amongst those that may promote more participatory and inclusive monitoring practices. They are responding to the concerns expressed by global and regional civil society groups that the REDD+ initiatives may threaten forest biodiversity and the socioeconomic well-being of forest dependent communities [61].

With regard to national-level Mexican environmental NGOs, in recent years some have ventured into the field of monitoring, such as those incorporated into the Amigos de Sian Ka'an. This group was initially granted funds from TNC, and

continues to receive support for their activities from big international NGOs. Yet the data generated from these activities remain largely within internal reports, inaccessible to local communities, to scientists engaged in comparative study via review of the literature, and to the public in general. These NGOs provide technical and practical training to communities to conduct monitoring activities in and around protected areas, or in relation to specific species, always in accordance with externally defined priorities. For example in 2011, Pronatura, together with the Intercultural Centre for the Study of Deserts and Oceans (CEDO), ran a workshop in Puerto Peñasco, Sonora to "form a biological monitoring team that belongs to the community" [62]. While local people receive training, their involvement is restricted to data collection and they are not treated as formal decision-making subjects. To this extent, the NGO sector in Mexico appears largely to perpetuate approaches that involve local people with the objective to obtain conventional monitoring data at low cost.

Since 1999, an umbrella conservation organization called Grupo Tortuguero has been amongst those operating in the Bahia Magdalena region of Baja California Sur. It is composed of Mexican NGOs and community groups which conduct protection work on sea turtle species on which the communities depend for food and trade products and for ecotourism. Communities collaborate with federal environmental agencies by providing monitoring data on the trends and distribution of the charismatic species, and indeed SEMARNAT relies on community inputs "to help us do our jobs," [63] (p. 149) because the agency has insufficient funds. By providing coastal communities with technical training, funding and access to wider international conservation networks, the program enhances local capacities [63]. This scenario showcases the potential for state-community collaboration in contexts where resources of mutual interest are at stake.

## *Rural Communities Practice Monitoring in Traditional Ways*

Case studies in Mexico detail the role of local knowledge systems in regulating the management of areas under cultivation, and also where nonagricultural activities are conducted, including agroforestry, hunting, gathering, fishing, cattle ranching, forestry extraction, plantations, and cash crops [38, 39, 64]. There are indications, however, that these are being eroded or undermined by changing circumstances and that under certain conditions they may not capture significant habitat changes [23, 65]. By example, a study of two rural communities (Juznajab and Muquenal) in Chiapas, compared locally held and scientifically gathered sources of data on recent changes in forest cover and abundance of utilized species and concluded that local knowledge revealed less accurate depictions of declines [65]. Similarly, another study in highland Michoacán documented how local knowledge alone on rates of forest resource degradation provided an insufficient base from which to inform woodcutting practices in communities whose forests were under pressure from mounting demands for timber [23].

Some communities recognize the need to supplement their monitoring traditions. They are motivated to seek new knowledge in the face of the processes of outmigration, which have exacerbated the loss of local knowledge, and given pressure arising

from national social and economic policies, climate change, and intensification of demands for local resources from residents or encroaching communities [23, 65]. A local demand for quantitative monitoring data is also a response to the accounting and formalized requirements that are imposed by official mechanisms that support conservation activities, and to the need to provide future evidence of the ecological and social impacts of these [8].

## The Imperative for Greater Local Involvement in Monitoring in Mexico

Beyond the generic advantages of participatory monitoring, specific circumstances in Mexico suggest that the monitoring initiatives of federal, state and research institutions and NGOs should engage with local communities and their knowledge and practice systems.

### *Cultural and Biological Diversity*

Mexico has a diversity of ecosystems: its land surface consists of arid and semiarid zones, and includes temperate and tropical forests [66], qualifying it as a megadiverse country. Similarly, it contains communities of indigenous people and their territories are notably biodiverse. Indeed the states of Oaxaca, Chiapas, Veracruz, Guerrero, and Michoacán contain the highest concentration of biodiversity at the national level, as well as the greatest presence of indigenous peoples [47]. Any restriction on the use of resources in these areas directly affects these local populations and needs to involve them.

### *Within and Beyond Protected Areas There Is Extensive Community Ownership and Control of Resources*

The *ejidal* and indigenous or agrarian communities systems are amongst the legislative frameworks in Mexico that establish formalized rights and collective governance of common territory or property. Many are located completely or partially in federal, state or municipal protected areas [67, 68], and within the country's temperate forests [69]. In addition, since 1996, evolving state-endorsed financial and ecosystem service and voluntary conservation certification mechanisms establish arrangements for local communities to be formally involved in conservation activities [70]. Moreover, an expanding body of research in Mexico documents the positive contributions of local and indigenous communities to defining conservation strategies [48], protecting forests within the country [71, 72], increasing tropical forest cover [73], maintaining other environmental services [74], and perpetuating additional sinks of biological diversity, such as in productive agricultural landscapes [64].

### *Indigenous Communities Assert Their Rights*

Local populations in Mexico, particularly indigenous peoples, have been systematically excluded from environmental decision-making [75], and struggle for greater recognition and respect. According to the UN Human Rights chief, they "suffer discrimination in all spheres of public life, amongst the main problems … are land and territories, natural resources, administration of justice." They also remain food insecure, and in some zones have been involved for decades in conflicts around their assertion of rights [76]. With rural populations that have high natural resource dependence, indigenous communities increasingly assert their rights to be involved in biological research, including monitoring to identify the conservation and livelihood impacts of globalized conservation instruments [8]. Scientists must respect these rights. The intensification of conflicts over access to and control over natural resources—particularly those pertaining to livelihoods, culture, and economy [77] makes their collaboration vital.

## Challenges and Strategies for Greater Scientific-Community Monitoring Collaborations in Mexico

Although community monitoring remains a fledgling theoretical and practical activity in Mexico, as elsewhere, there is great value in integrating local knowledge with scientific approaches and scope for mutual cross-learning between scientists and local communities around monitoring approaches [78]. A series of obstacles needs to be addressed in order to open up spaces that are conducive to the creation and establishment of collaborative CBM approaches. Some of these obstacles have deeply rooted conceptual or structural origins and manifest as social, policy, and discipline-related barriers. They operate across all levels (from international to local) and either prevail generally or are specific to international organizations, federal and state agencies, research institutions, NGOs, or local communities. Table 9.2 provides an overview of these key challenges, and identifies strategies that could serve to address these on the part of different actors.

## Conclusions

Conventional monitoring is prevalent in Mexico (except for traditional monitoring), as it is elsewhere [83]. This restricted approach is increasingly redundant if monitoring is to serve more than just scientific inquiry. Besides, empirical studies regarding the contributions of scientific data to conservation planning challenge the assumption that having more biodiversity data is a good investment [11, 87]. Research institutions are failing in their teaching and research mission to devise

**Table 9.2** General and actor-specific challenges to collaborative community based biodiversity monitoring in Mexico and proposed steps forward

| Actor | Institution-specific challenges | Proposed steps forward |
|---|---|---|
| *General barrier 1: International funding and research biased towards monitoring for information regarding the global scale* | | |
| Donor agencies | Support is oriented to obtain international comparative data and to provide for immediate information needs; emphasis on high-tech methodologies to detect scale | Provide support to enhance national and local capacities, design longer term monitoring systems and innovative approaches which have high management impact |
| Federal, state and regional authorities | Required to meet international information needs which inhibit development of sustainable monitoring systems; reluctance to devolve monitoring functions to local management | Re-assess the feasibility of existing externally supported monitoring schemes, demand or access global funding to build sustainable monitoring capacities; and as CBD signatory, evoking the 2010 Strategic Plan (Paragraph 19) which establishes resources for in-country capacity building to make the case that GEF be more responsive to local monitoring initiatives |
| Research institutions | Scope of work is restricted to priorities established by international funders and state agents. | Pressure to develop and fund community based initiatives |
| NGOs | Scope of work is restricted to priorities established by international funders and state agents | Pressure to develop and fund community based initiatives, and respond by incorporating local priorities into monitoring systems |
| *General Barrier 2: Insufficient recognition of contributions of local indigenous knowledge systems and their monitoring functions* | | |
| Donor agencies | Formally recognised (in CBD 8[j]) and acknowledged as comparable to scientific knowledge [79] but into provisions for biodiversity conservation | Provide more support for approaches which explore the integration of international targets for biodiversity conservation, indigenous knowledge and benefits and access to implement CBD 8[j] [80] and which can demonstrate the meeting of MDGs |
| Federal, state and regional authorities | Official narratives and policy depict local communities as destroyers of natural resources [81] | If protection of natural areas is a goal then decentralize management functions and promote participation, including in monitoring activities, for pragmatic reasons |

| | | |
|---|---|---|
| Research institutions | Perpetuate the hierarchy between scientific and traditional knowledge systems | Eliminate this 'false dichtomoy' [82], employ indigenous knowledge holders to reflect CBD recognition of its importance [79, 80]; review literature on parallels between scientific and traditional knowledge; conduct empirical and qualitative research on traditional monitoring systems; identify methods and potential for co-inquiry |
| Communities and organisations of civil society | Have internalised the prevalent interpretations that their local knowledge and practices have no value. Changing circumstances and outmigration weaken the capacity of local knowledge to address information needs | Identify strategies and alliances with range of actors to validate and strengthen existing monitoring approaches with inputs from biologists |
| *General Barrier 3: Over-emphasis on basic science and biological indicators* | | |
| Donor agencies | Provisions for biodiversity conservation fail to integrate indigenous knowledge and benefits and access | Support the integration of international targets for biodiversity conservation, indigenous knowledge, benefits and access and MDGs |
| Federal, state and regional authorities | Resources directed at generating biological indicators to provide information for global institutions | Direct resources to promote more practical work on monitoring for management responses |
| Research institutions | Over-reliance on biological indicators; insufficient emphasis on applied research; false dichotomy between reliable and unreliable data [21]; emphasis on areas defined for conservation status rather than productive landscapes; national evaluation system (Sistema Nacional de Investigadores, SNI) rewards scientists for publishing in science journals, inhibiting interdisciplinary research and applied work | Incorporate more comprehensive set of indicators to capture multiple values of biodiversity and social and political factors that defines its use and conservation; acknowledge tension between efforts to gain standardised data and information needs at local level which have high impact on natural resource management; look to monitor in agroproductive landscapes to stimulate debate about their contributions to biodiversity; identify new empirical research agendas that incorporate more engaged research, fulfil criteria of scientific inquiry (and satisfy SNI criteria) and advance theory and practice of CBM |
| Communities and organisations of civil society | Cultural norms are perpetuated and internalised by rural people who undervalue their own local knowledge systems vis external agents | Identify and understand complementarities, similarities and differences between scientific and traditional knowledge and limitations of local knowledge in view of changed circumstances and information needs |

(continued)

**Table 9.2** (continued)

| Actor | Institution-specific challenges | Proposed steps forward |
|---|---|---|
| *General Barrier 4: Absence of protocols that combine scientific approaches and community based approaches* | | |
| Donor agencies | International instruments have developed provisions and indicators for biodiversity conservation which are not integrated with indigenous knowledge and access and benefit sharing | Direct funds to support innovative monitoring approaches which seek to incorporate both scientific and community knowledge |
| Federal, state and regional authorities | National institutions not mandated to address local knowledge systems | Expand mandates to support local initiatives and create depository for experience of local initiatives |
| Research institutions | Limited methodologies available internationally and few national case studies, failure to develop collaborative protocols which put information needs of the community at the center | Review experiences of existing in-country cases and those in other parts of the world; develop and join national and international networks to exchange experiences; identify good practice and promote local monitoring |
| NGOs | Failure to develop collaborative protocols which put information needs of the communities at the center | Develop and document collaborative experiences, as if planned for 2012–14 involving Global Diversity Foundation-Mesoamerica, Anima-Mundi and biologists from INECOL. Facilitate exchanges of experiences between communities; develop national network to exchange experiences of local level monitoring; link with overseas networks such as Monitoring Matters which aims to create a virtual community of local monitors and raise the profile of CBM [29] |
| Communities and organisations of civil society | Insufficient experience and case studies established or information disseminated to highlights the potential benefits of equitable collaborations. | Identify mechanisms and processes and demand processes that assure biologists enhance local capacities and create benefits to communities |
| *General Barrier 5: Benefits and access to monitored information is unsecured* | | |
| Federal, state and regional authorities | Centralise biological information, digital information stored remotely and is inaccessible to local people | Develop mechanisms and institutional arrangements, including through CONABIO, by which locals can access information; facilitate the exchange experiences of CBM |

| | | |
|---|---|---|
| Research institutions | Fail to acknowledge power inequalities between biologists and community members or to have protocols defining return of information collected from communities | Ensure transparency to communities and ensure that they have access to biological information collected |
| NGOs | Activities limited to that of funders | Provide training on the rights of communities and inherent power inequalities between urban based biologists and communities; ensure that communities have access to any biological information in most appropriate media |
| Communities and organisations of civil society | Data is inaccessible to rural communities | Demand access to information and its dissemination in accessible and culturally appropriate medium to villagers |
| *General Barrier 6: Inadequate engagement with local communities* | | |
| Donor agencies | Absence of funding criteria requiriong community engagement in monitoring schemes | Include community engagement in funding criteria |
| Federal, state and regional authorities | Participation of rural indigenous populations in protected area management is minimal or absent [83] | Create more participatory opportunties for rural and indigenous communities |
| Research institutions | No training to prepare biologists to engage with local communities; absence of professional research guidelines and ethics on social responsibility | Acknowledge ecology as a social activity which requires engaging with local people [49]; offer multidisciplinary courses for collaborative work with communities; learn how to participate in village meetings to tailor presentations and share knowledge in accordance with local cultures, such as through oral presentations, videos and plays [25]; develop and adopt professional guidelines which have been developed elsewhere [84] for conducting for work with human subjects which define responsibilities of biologists to society [85]; conduct debates about the ethical responsibilities of scientists and their social contract with society [86] |
| Communities and organisations of civil society | Prevalent cultural norms which are internalised by marginalised people and perpetuate the notion that local knowledge and practices is not valuable | Organise and facilitate activities and exchanges which demonstrate importance of local knowledge and practices; and engage with NGOs and research institutions demanding equitable and collaborative monitoring systems |

innovative approaches that engage with local communities and have immediate resource management impacts. Given the expanding needs for information at all analytical levels—for international, official and research purposes, and also for local communities—there is ample scope to promote community participation initiatives that reflect a wider gambit of components. These must go beyond the need for measurements that reflect biodiversity status and trends to encompass the sustainable use of biological diversity; the threats to it; the integrity, goods and functions of ecosystems; traditional knowledge and practices; and access and benefit sharing. These initiatives must also engage the socioeconomic, institutional, and regulatory factors, and assure communities the right to meaningful involvement [83]. This would contribute to resource management decisions in protected areas, productive agricultural landscape and forests, to livelihoods, and to the establishment of a stable and sustainable system that strengthens community capacities to monitor these additional components. It could also shed light on how local activities relate to the maintenance of biological and cultural diversity, and to broader processes of environmental change, poverty reduction, and food security. It may even provide information on advances toward commitments to global targets in these domains.

For CBM to emerge as a supplementary tool that contributes to optimal, just land and resource use in Mexico, significant paradigm shifts are required: to widen disciplinary boundaries and the modus of conducting research, and to address new responsibilities for ecological professionals and their institutions. A precondition must ultimately be a recognition across the board that communities have rights as key users and decision makers for extensive rural and forest resources. Their involvement at all stages is central to ensure that the data obtained through monitoring meets their information needs. The contribution that CBM may provide to wider national and international information requirements has yet to be identified, but is, to a large extent, contingent on the willingness of indigenous communities to collaborate with scientists who have done little to date to inspire confidence. There are now not only political but also practical imperatives for both communities and scientists to secure ways to move forward.

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# Chapter 10
# Drawing Analysis: Tools for Understanding Children's Perceptions of Community Conservation

**Roser Maneja-Zaragoza, Diego Varga Linde, and Martí Boada Juncà**

## Introduction

There is a growing consensus among scholars that children have an awareness of, and are capable of participating in, social, political, and economic issues in their town or community [1, 2]. From experiences in both urban and rural contexts, the benefits derived from the incorporation of children in decision-making processes on natural resource management in their communities are multiple. They include, among others, promoting their personal development and sense of belonging to the community, helping create a new model of leadership for participation and democracy, and valuing contributions young citizens can make in community administration and local government. Finally, and as stated in the Tbilisi Environmental Education Declaration in 1977, including young people in decision-making promotes their civic commitment through a democratic and participatory process including discussions, identification and definition of problems and priorities. Encouraging children's participation in the development of their own community fosters learning of formal techniques for participation in a democratic society, and the acquisition of lasting habits and interests of an environmental character. In addition, because children are able to graphically represent areas where adults very rarely go, they can contribute to the improvement of those places through their experience as users of and adventurers in these environments [3].

While the reasons for it are evident, the question of *how* to include children's preferences in local decision-making processes on environmental issues remains. The inclusion of children in decision-making processes represents a new frontier in

R. Maneja-Zaragoza, Ph.D. (✉) • D. Varga Linde, Ph.D. • M. Boada Juncà, Ph.D.
Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain
e-mail: roser.maneja@gmail.com

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development policies. The movement for the recognition of the rights of children to participate in decision-making processes is often compared to that of the recognition of women's rights because of the widely acknowledged importance of involving these parties in community development [3]. Although policies beneficial for women are often also beneficial for children, children need special attention, given that they have different needs and the longest future of any group in society.

Information on children's interests, priorities, needs and problems can be obtained through a wide variety of techniques [4, 5]. Drawings are a good tool for understanding perceptions of the environment, mostly in primary-level educational settings, thus allowing children's perspectives to be included in educational and public policy programs at local and regional levels.

A series of socio-environmental research programs [4, 6–9] have recently been carried out to assist in the development of new techniques for exploring the concerns of groups of children by analyzing their perceptions of their immediate environment.

One of the main purposes of the research on which this chapter is based is to formulate strategies for the conservation of natural resources and biodiversity using environmental education proposals and public policies at a local and supra-local level. We elaborated these strategies based on a study of the perceptions of children living in nine rural villages from La Huacana Municipality (Michoacan State, Mexico), all of which are connected to the Natural Protected Area of Jorullo Volcano. We present an effective and powerful methodological procedure, based on the interpretation of children's drawings, which allows researchers to obtain and analyze children's perceptions of their communities.

It is important to highlight that this methodology can be used by municipal governments, both to complement actions proposed by the local adult population, and to ascertain and consider young people's proposals. In order to communicate the problems detected by politically weaker social sectors to the decision-making political agents, a mediation process is necessary. Mediation aims to bring different worldviews and interests together in an attempt to establish common points, which can facilitate the collective elaboration of alternative actions. The methodology proposed by the Integral Environmental Evaluation (IEE), which aims to achieve relevant results by mainstreaming actors' perspectives with the perceptions of actors who have specific interests at stake [10], proceeds in a similar manner.

## Children's Perceptions Through Their Drawings

The use of drawings to obtain information is widespread for a number of reasons [11]: it is a relatively simple way of gathering social information about children; it is a powerful tool considering that most boys and girls enjoy drawing and do so willingly, finding it an engaging activity; and it is a quick, easy and fun activity for most children, an age-group that normally does not readily answer direct questions.

It also represents a fast and efficient way of collecting a large amount of detailed information with no previous knowledge, and it overcomes linguistic barriers and allows comparisons between different groups. Finally, it shows an image of the child´s mind, which, through the analysis of its content, gives an understanding of the child´s feelings and thoughts; and it enables children to easily choose the themes they wish to include or exclude without being influenced by adults or the research context [11, 12],

The modern study of children's drawings dates back to the end of the nineteenth century, when they were first used principally for aesthetic, educational, and clinical reasons [11]. More recently, phenomenological geographer Jim Blaut has introduced the theory and concepts of how children perceive space and distance [13–16], how they symbolize them, and how they attribute values to these locations. Research by other prominent authors in this field [17–26] is based on the classical theoretical framework of Jean Piaget [27–29], the father of the dominant theory of children's cognitive development. According to this constructivist theory, children follow different steps in their development: they begin with a "magical thought," they next start to master specific operations which involve spatial dimensions, and are finally able to develop cognitive constructions of space. Incremental theories, on the other hand, suggest that children possess an innate ability to understand spatial relations that develops through experience [30].

Children's understanding of their place of residence can be gained through maps, education and the media and, above all, through everyday experiences. At the same time, perceptions of a home place determine how one interacts with the environment. They can thus have a bearing on one's mode of participation and reflect changes affecting the actual community [31]. Most children get to know their immediate environments by moving around them. The way to school, to the park or to a friend's house all form part of their everyday experiences. They also learn, through direct interaction with their environment, how to identify barriers or dangerous points within their own community, such as crossroads or restricted areas. It is through these direct explorations that children, like adults, build their preferences [4].

Mental representations built from the surrounding world are known as mental or cognitive maps [32]. Mental maps, made popular in the 1970s, offer a way of exploring how children or other social groups perceive their community on a local scale, because they represent compositions created from the continuous flow of information received and built through experiences. They express the mapmakers' knowledge, experience, attitude and understanding of a given place. Some authors advocate that young people's perceptions of what they consider necessary in their everyday environments should be included in management planning projects [31].

Caution must be exercised, however, when analyzing the graphic representations of mental maps: representing the real world on a piece of paper is a complex act and some aspects of people's responses to the environment are difficult to express, or sometimes even indescribable [31], especially if there are implicit cultural aspects. There are also limitations related to each child's abilities to represent their understandings through drawing [12]. Moreover, as drawing is commonly used by

children, it must also be noted that stereotyped images may be used in relation to what they have learnt to draw [12].

## Drawing Analysis: An Effective Strategy for Conservation in Rural Communities

Research that analyzes problems from an integrated perspective—one that considers both the interaction of social and natural systems, and involves a wide spectrum of actors in decision-making processes—has become ever more important. Socio-environmental research and environmental education play fundamental roles in the search for solutions to the so-called environmental crisis. One of the principal functions of environmental education is to facilitate the use of socio-environmental research for problem-solving. It also seeks to establish a connection between scientists and other actors involved in the management of ecosystems, their resources and the services they provide [33].

Environmental education is a multidisciplinary field that is open to developing practices of everyday learning as a way of understanding the perceptions of the social groups involved. Environmental education can help to build more sustainable societies since its main functions are to act as a liaison between social sectors, to promote dialogue, and to identify similarities among those involved and those who must come to agreement [33]. Using this approach to bring distinct views and interests into dialogue, bridges can be established to facilitate the collective building of alternative actions.

### *How Can We Obtain Children's Perceptions?*

Figure 10.1 shows a proposed methodological procedure to obtain and analyze children's perceptions of their own locality with the goal of creating and designing community conservation strategies in the domains of education and public policy, which complement the official strategies promoted by adults.

The methodology used for this type of perceptual analysis is based on the interpretation of perceptions as recorded in children's drawings. Primary school students are given two blank sheets of paper to graphically represent the positive (*Draw what you like about where you live*) and negative (*Draw what you don't like about where you live*) aspects of their perceptions of the locality they live in. The positive aspects of the community obtained from such drawings are called preferences, while those referring to the negative aspects are known as deficiencies (see Figs. 10.2 and 10.3).

It is important to emphasize that children must be unaware of the educational background and interests of the researcher, in order to decrease the possibility for biased responses or conditioning [34], and to allow them to be as spontaneous as possible.

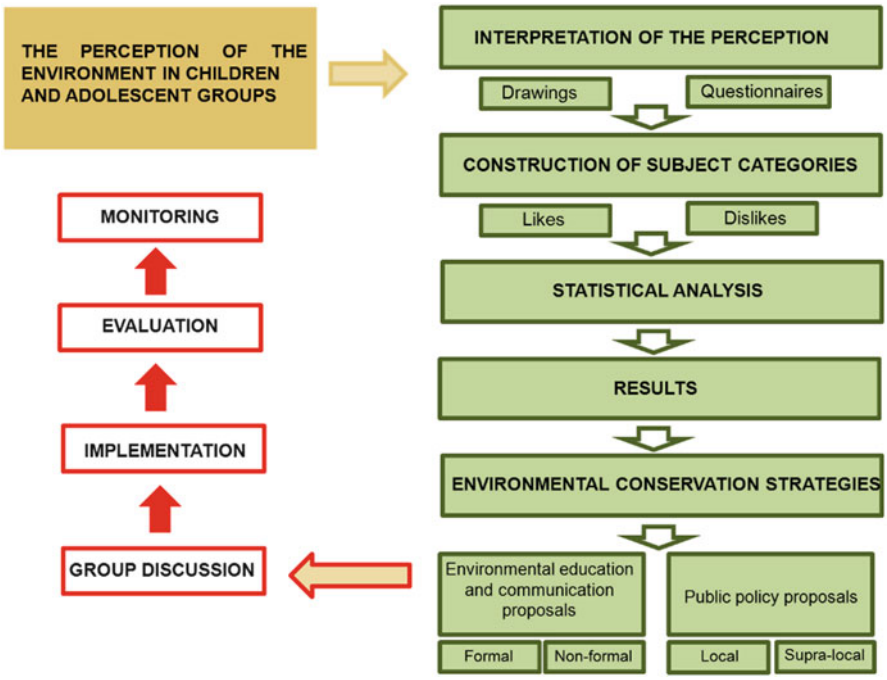


**Fig. 10.1** Methodological framework for analysis of children's perceptions of the environment [7]

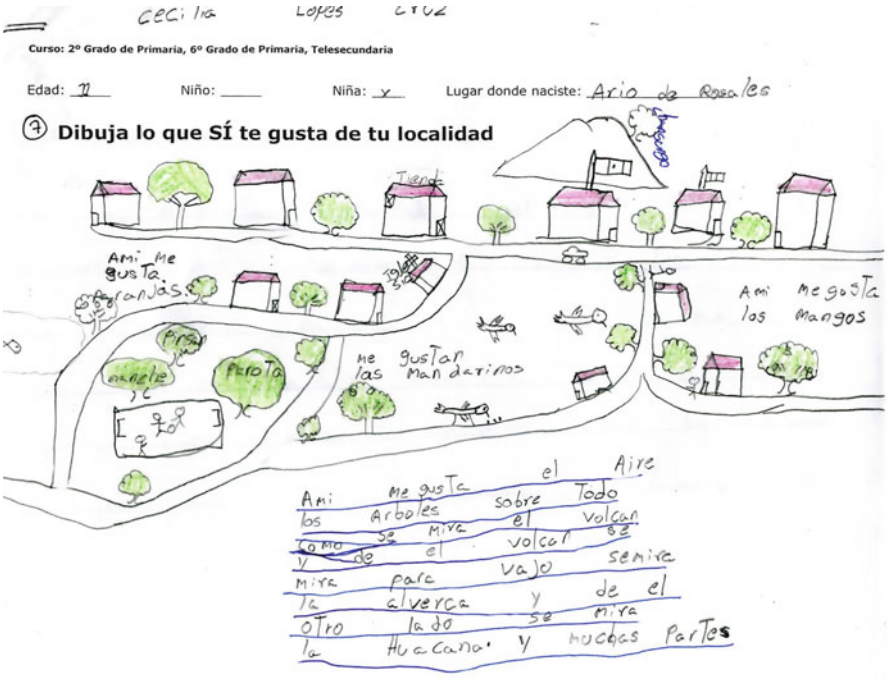


**Fig. 10.2** Preferences of a pupil in the municipality of Huacana (Michoacán, Mexico) [9]

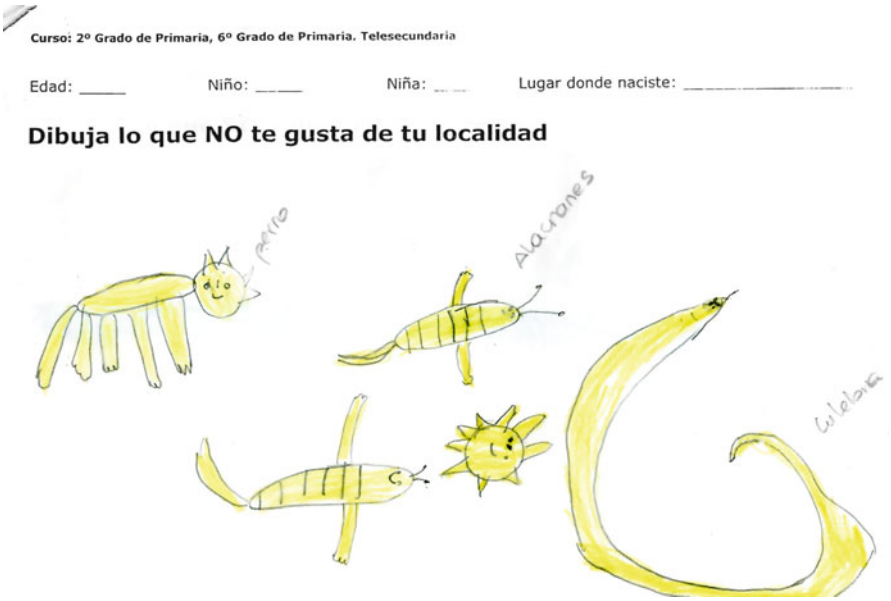


**Fig. 10.3** Dislikes of a pupil in the municipality of Huacana (Michoacán, Mexico) [9]

## *How Can We Interpret Children's Perceptions?*

Firstly, in order to reduce the effect of the researcher's subjectivity and establish a methodology for the interpretation of drawing content, it should be the children themselves who, once they have finished the activity, interpret their drawings and describe them to the researcher whose task it is to annotate them. The following example shows how annotations can be taken (see Figs. 10.4 and 10.5) [8].

Once the annotations of the drawings have been gathered, the process of analyzing the content begins. Children's perceptions are classified into different thematic categories of a socio-environmental type, using a bottom-up construction process. The inclusion of the children's perceptions into a specific category depends on the keywords that appear in each drawing.

Depending on the research and the type of content analysis used (conceptual or relational analysis) the number of subject categories can be extremely diverse. In the study carried out in La Huacana, 17 subject categories were obtained [8]. A bottom-up process is used to obtain the categories, meaning that the number of categories is not established a priori but depends on the keywords defined by the children as they explain their drawings.

The definition of common thematic categories is useful for making comparisons between different study cases because it provides a systematic way to classify perceptions. For example, the keywords "tree" or "bird" should be included into a *Nature* category because both are related to biodiversity.

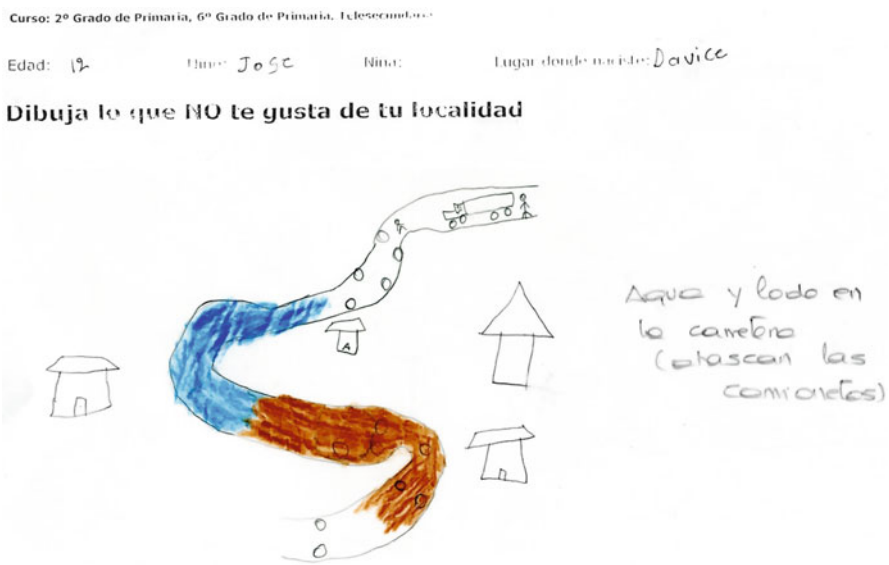


**Fig. 10.4** Example of annotations made to José's drawing, a 12-year-old boy, community of David C. Manjarrez (La Huacana, México). Annotations are written within the drawing showing different elements indicated by the children [9]


**Fig. 10.5** Example of annotations made to the drawing of Gabriela, a 10-year-old girl from the community of Las Carámicuas (La Huacana, Mexico). Annotations are written within the drawing showing different elements indicated by the children [9]

For statistical analyses, categories of children's perceptions obtained from the interpretation of the drawings are taken as dependent variables. Examples of these categories from La Huacana are Nature, Volcano (referring to El Jorullo Volcano),

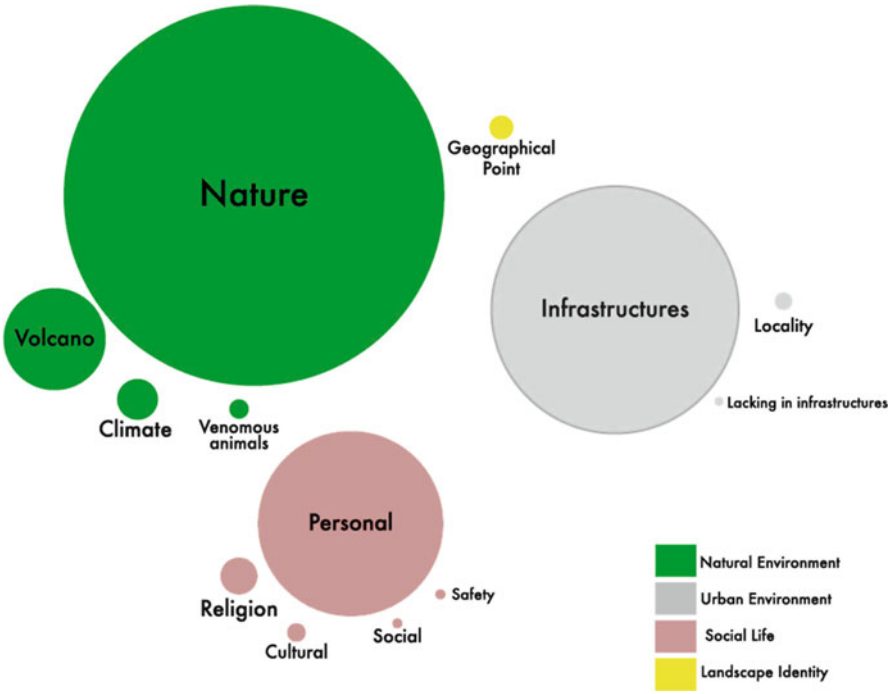


**Fig. 10.6** Preferences and deficiencies perceived by children in a sample of 284 children in La Huacana, Mexico [9]

Climate, Venomous animals, Geographical point, Infrastructure, Locality, Lack of infrastructure, Personal (referring to children's personal and familiar sphere), Religious, Cultural, Social, Safety, Politics, Environmental quality, Conflicts between communities, and Accidents. Independent variables correspond to the structural and demographic factors that define the characteristic of the sample: age, sex, educational level, place of residence, family members dedicated to primary production activities, and geographical context. However, independent variables can be different depending on the purpose of research.

Through statistical analyses of children´s perceptions with regard to the structural factors of the sample, we can ascertain the frequency with which a category occurs depending on these factors, using contingency tables. Then, using a *Chi-square* ($\chi^2$) test for independent samples, we can identify those structural variables that significantly influence differences in perception.

The results obtained through statistical analysis can indicate trends in how preferences and deficiencies perceived by children are distributed throughout the sample. For example, Fig. 10.6 shows the graphical percentage distribution of the preferences of a sample of 284 schoolchildren from La Huacana. In it, circle size is proportional to the appearance of the category in the drawings. Here, it is clear that

preferences and deficiencies tend to be grouped into a small number of recurring categories, while the remaining categories occur proportionally less often in the drawings [8, 9].

Generally, in representations of nature, elements related to the presence of water, such as rivers, streams, dams and springs, frequently appear. This might be because of the strong interaction between human beings and water throughout time [35], thus making it a constant stimulant of the human imagination.

The category *Infrastructure*, which includes all those elements related to facilities in the locality (i.e., schools, public squares, basketball courts and soccer fields), tends to appear as one of the most frequent categories, as these spaces offer the chance to engage in physical activity outdoors, are used for meetings and exchanges, and can contribute to a sense of shared community identity for local residents.

## *Effective Conservation Strategies in Rural Communities*

The processing and discussion of the results obtained from drawing analyses are used as a basis from which to draw up a set of strategies that contemplate the creation of spaces and tools to channel and transmit young people's concerns. This helps fuel endogenous development in rural areas, such as La Huacana, where high levels of emigration in search of employment and better living conditions make it unlikely that young people will continue their studies once they complete secondary education.

Drawings can also been used to help design proposals tailored to the needs and characteristics of each community by asking children what aspects they would like to change in their community. The answers obtained can be classified, for example, into four main categories according to whether they refer to aspects which are *political* (proposals related to municipal government administration), *environmental* (proposals to reduce environmental impacts and to foster a change of attitude and an increase in environmental awareness), *social* (proposals aimed at changing behaviors and lifestyles in order to improve community wellbeing) or *economic* (proposals aimed at improving the quality of life of the local inhabitants through actions requiring financial investment). Following the same methodology as that used in the interpretation of drawings, all four preceding categories are obtained using an inductive analysis based on the keywords.

For example, during research carried out in the municipality of La Huacana [8], we found that some actions proposed by the young people interviewed were not set out in the local plan for community development. In the Mexican case, some authors [33] contend that relatively little information arising from social research is used in public decision-making. Taking into consideration the collective contributions of children could help to ensure that more public policy decisions take into account real needs, improve efficiency and consider social and environmental justice. Such a process, however, would involve greater investments of time and money [36].

On a supra-local level, there are two principal reasons for promoting the incorporation of children's perceptions and knowledge in community conservation

strategies. First, some of the children's proposals should be evaluated for inclusion in rural management programs; and second, the young people of the locality should be considered as key players in the design of projects at a supra-local level, as current and future resource users, residents and workers in the region.

Identifying pupils' perceptions of the environment contributes to these goals by developing collective school projects that can address social and environmental issues affecting and shaping local lives [37]. As schools ought not to be kept separate from community realities, from the perspective of informal education (school-community linkages), the aim is to strengthen schools as centers of reflection and action on socio-environmental matters at local and global levels [36].

The following are proposals that may strengthen linkages between schools and communities. First, sharing the results obtained in action research cases between different groups (e.g., local government, teachers, children, adolescents and local inhabitants) facilitates the inclusion of these results in educational programs, especially if specific materials are produced to illustrate the results [38]. Next, transformation of the social system, through the development of new research processes, can help to overcome increasing social and community disengagement. Finally, educational and social processes can be linked to projects specifically tailored to the local context. The school can, therefore, become involved in the design of plans and programs affecting the development of the locality.

As for formal education (the incorporation of the socio-environmental dimension into the school curriculum), links can be established between school and everyday knowledge through strategies designed to connect schoolwork with community reality. By enhancing experience and knowledge acquired in extracurricular activities and integrating them into academic content we can improve our analyses of the problems of, and requirements for improving, the everyday lives of young people in the classroom.

The aforementioned are proposals to redirect educational practices to ensure the incorporation of a socio-environmental dimension into the school curriculum. They include adapting school planning proposals to the students' realities; and presenting and comparing the research results obtained with teaching staff of the primary and secondary schools involved, with the aim of generating theoretical insights. Finally, it is important to develop environmental education programs focused on addressing the key social and environmental problems identified by students.

## Conclusions

The use of innovative methodologies to detect children's perceptions is useful in order to incorporate them into educational and public decision-making at local and regional levels. This group has traditionally been excluded from participatory processes; when they are given a voice they can contribute to the democratization and improvement of public policies on environmental issues. The methodology used represents an effective tool for children to *discover the symptoms and real causes of*

*environmental problems*, the principle embodied in the Tbilisi Declaration. The formation of categories with a bottom-up approach ensures that children express their real needs regarding their localities and helps increase awareness regarding problems in the relationship between humans and nature, and thereby the potential for positive social and environmental change.

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# Chapter 11
# Conclusions

**Isabel Ruiz-Mallén, Susannah R. McCandless, Luciana Porter-Bolland, and Claudia Camacho-Benavides**

Through a variety of cases and lenses, this book has attempted to contribute to the better understanding of the socio-ecological dynamics and outcomes of community conservation initiatives in Mexico, specifically those located in the Southeastern regions of the country. Its aim is to continue enriching the academic and political debate about the effectiveness of government-managed protected areas versus what Janis Alcorn, in her Foreward to this volume, calls self-generated conservation by communities.

We have identified challenges faced by rural and indigenous communities seeking to sustain traditional natural resource management and biodiversity conservation. These comprise both socioeconomic aspects (e.g., tenure conflicts, poverty, lack of incentives and lack of generational replacement) and governance factors (e.g., top-down decision-making, power inequalities, passive participation of local people) constraining local people's agency in conservation.

Through several case studies of rural and indigenous peoples' participation in natural resource management decision-making from a historical point of view, we have also explored and discussed individual and collective factors enhancing successful community conservation initiatives in terms of biodiversity protection, local empowerment, and socioeconomic development. As all the authors in this volume

I. Ruiz-Mallén, Ph.D. (✉)
Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain
e-mail: isabel.ruiz@uab.cat

S.R. McCandless, Ph.D.
International Program, Global Diversity Foundation, Bristol, VT, USA

L. Porter-Bolland, Ph.D.
Red de Ecología Funcional, Instituto de Ecología A. C., Xalapa, Veracruz, Mexico

C. Camacho-Benavides, M.Sc.
Mesoamerican Regional Program, Global Diversity Foundation, Xalapa, Veracruz, Mexico

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document, opportunities for community conservation are related to a diverse and complex set of factors. These include questions of governance, as emphasized by Leticia Merino-Perez (Chap. 3), Constanza Monterrubio-Solis and Helen S. Newing (Chap. 5), Luciana Porter-Bolland and coauthors (Chap. 6), and Eduardo García-Frapolli and colleagues (Chap. 7), such as the reinforcement of customary institutional rules on natural resource management, the establishment of recognition and collaborative management processes with official institutions while maintaining local autonomy, and the reduction of power inequalities within the community as well as those caused by external actors. Authors also highlight the importance of understanding and addressing conservation at a landscape level, transcending the framework of isolated protected areas. Socioeconomic and cultural factors are also at play, as Víctor M. Toledo (Chap. 2), Isabel Ruiz-Mallén and coauthors (Chap. 8), and Roser Maneja and coauthors (Chap. 10) remind us. They refer to the diversification of local livelihood strategies, the promotion of social networks for cooperation, the importance of and respect for cultural values related to the use of natural resources, and the need to understand local young people's environmental perceptions and attitudes to engage them in conservation.

Will these community conservation initiatives be resilient to socio-ecological change? More research will be necessary to identify and deal with the current and future challenges faced by community conservation initiatives and formal efforts to recognize such initiatives in the context of global environmental change in Mexico. This book offers methodological proposals to address the study of social and ecological challenges, such as power inequalities and biological and ecological processes and dynamics. One way forward, as Diana J. Pritchard (Chap. 9) suggests, is through community-led biological monitoring, by developing a participatory process. Andres Camou-Guerrero and colleagues (Chap. 4) offer the insight that similarly, participatory processes of community territorial planning help familiarize a broad variety of actors with the resources and character of communal lands, building commitment and ownership of subsequent community-designed conservation efforts. We take to heart their exhortation to remember that, while establishing and maintaining a community conserved area may be a process grounded in mapped territories and natural resources, it is necessarily iterative, context-specific, and socially driven. Victor M. Toledo's (Chap. 2) elegant theoretical mapping of indigenous cosmovisions, tying the wellbeing of the individual to that of the community, its biocultural territory, and the world, gives us another critical set of tools to engage rigorously and respectfully in building a scalable, contextual science of community conservation.

This volume, as noted above, focuses primarily on experiences of community conservation in Mexico's southeast. To draw lessons more evenly from Mexico's bioculturally diverse landscape, we must also foster and support alliances between communities and researchers in the country's northern regions, as well as cross-regional exchanges and national networks of practitioners and expert allies.

Perhaps such a synthetic scientific practice represents a fertile point of departure for future work. Most of the studies reported here focus on socioeconomic, political, and cultural factors in community conservation. Yet international and national

conservation policymakers are hungry for outcome studies documenting community conservation's effects on biodiversity. In Mexico and globally, to stitch together empirical documentation of the threads of community wellbeing with those of biological health will require a shared emphasis by biological and social scientists on interdisciplinary, participatory study and theory-building. Only then can conservation from the ground up take its rightful place at the global table. Our hope is that the contributions herein move us one step closer to that goal.

# Index



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