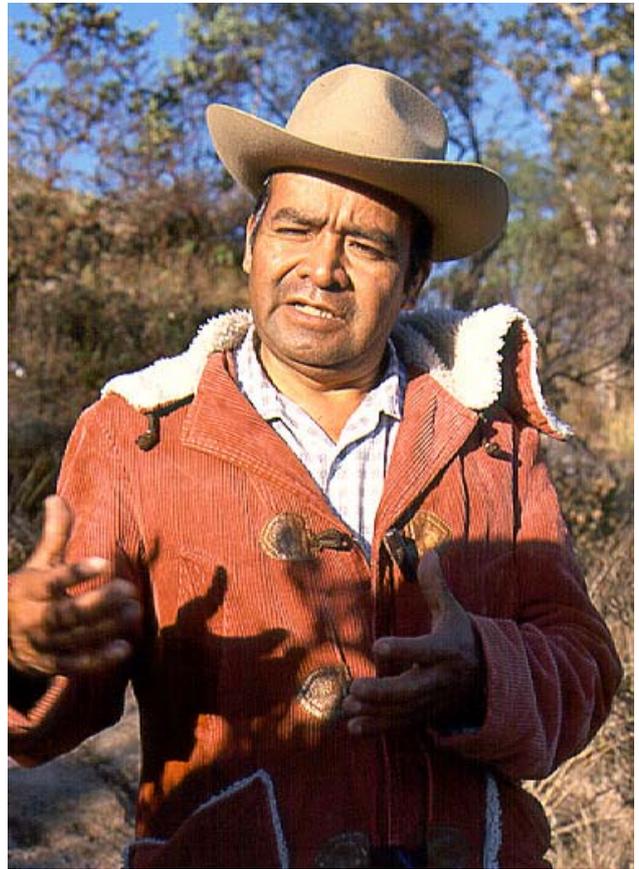




## **The Community Protected Natural Areas in the State of Oaxaca, Mexico**



**Editor: Gonzalo Oviedo, Ecogestion  
October 2002**

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Front cover picture: Don Angel (community leader and tourist guide, Ixtlan), Oaxaca State, Mexico

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WWF Forests for Life Programme, Gland, Switzerland  
WWF-Mexico Programme Office

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## Summary

Rural communities in Mexico enjoy legal rights over their territories and natural heritage, and have local statutory powers that back decisions taken by the highest community authority, the assembly of community members. These powers are embodied in community statutes, which are legally recognized under the political constitution of Mexico.

The legally endorsed power of communities to establish norms for governing the use and management of natural resources falling within their territories has been a fundamental factor in the adoption of community strategies for biodiversity conservation in the state of Oaxaca. Communities feel that an important element of their rights and duties is the management of their lands through their own institutions. Communities have resisted or distrusted the establishment of official protected areas on their lands, which they consider detrimental to community interests. In some cases this has been an additional reason for the adoption of local community strategies for biodiversity conservation.

Oaxaca is, according to biodiversity experts, the most important region of Mexico for biodiversity conservation, due to its great biological richness, high degree of species endemism, and increasing risks to its most valuable ecosystems. At the same time, Oaxaca is particularly interesting for its cultural diversity, as it is the home of 16 different indigenous peoples.

In the last few years, community experiences of biodiversity protection and conservation in Oaxaca have expanded in number, geographic coverage, and diversity of approaches. More than 60 cases have been registered so far, providing protection or special conservation measures to nearly 200,000 hectares of land. The importance of these developments cannot be underestimated, as communities in Oaxaca hold nearly 80 per cent of the state territory.

Four cases of community-based biodiversity protection are reviewed in this document, showing a diversity of approaches and situations. The first case reports an initiative for wildlife protection taken by the community of Santo Domingo Tonala. Here a local, community-based organization, the Municipal Council for Monitoring of Fauna and Flora (Consejo Municipal de Vigilancia de la Fauna y la Flora – COMUVIFAF), was set up to develop and enforce regulations for wildlife protection and sustainable use. This organization, truly grassroots and accountable to local communities, later received full backing from municipal and state governments, and achieved a high degree of success and effectiveness in biodiversity protection.

The community of Santa Maria Huatulco, with the help of the non-governmental organization (NGO) Autonomous Group for Environmental Research (Grupo Autonomo para la Investigacion Ambiental, A.C.), WWF, and the United Nations Development Programme, initiated discussions that led to the creation of a Communal Protected Areas System (CPAS). This process was initiated by the desire of the community to fully control their natural resources, which had been threatened by a government plan to include 6,500 hectares of communal land within the proposed Huatulco National Park. The strategy sought to manage and safeguard vital community resources in an autonomous way as community reserves. The CPAS is based on sustainable use of biological resources and provision of ecological services aimed at maintaining the health of the landscape for local communities and for tourism.

The community of Santa Catarina Ixtepeji owns 21,107 hectares of land in the Northern Range (Sierra Norte) of Oaxaca. It started a process of territorial management that led to the development of a very interesting example of biodiversity protection. Through the strengthening of forest management strategies, biodiversity resources were subject to economic and ecological valuation, via an environmental management unit aimed at protecting plants of ornamental value, watersheds, woodlands without logging potential, and the communally protected natural area.

For some time, large parts of the land belonging to the Union of Zapotec-Chinantec Communities (UZACHI) had been granted as forest concessions. Once the communities regained the lands, UZACHI started a process of community planning for territorial management, with the support of two NGOs – Rural Studies (Estudios Rurales, A.C.) and Farmers Advisory (Asesoría Campesina, A.C.). The development of their land use plan took two years. The plan reflects the high value placed by the communities on biodiversity conservation, as around 50 per cent of the land received protection status. The system is effectively supported by sustainable forest management practised by the communities and certified under the Forest Stewardship Council (FSC). The union's protected areas management programme includes an experimental mechanism for community-led biodiversity prospecting, the offer of educational and research services, and a proposal for carbon capture through forest conservation.

Conclusions from the review of community-based biodiversity protection strategies in Oaxaca suggest that they have several advantages over official protected area practices:

- They are long-term strategies.
- They possess simple and transparent mechanisms for administration and decision making.
- They maintain a healthy link with economic spaces and activities.
- They safeguard structural and functional features of ecosystems in a more integrated manner than in formal protected area systems.
- Costs are relatively low.

These comparative advantages of community-based biodiversity protection strategies should be further explored and better valued, so as to provide community strategies with stronger support and turn them into important approaches for safeguarding biodiversity in Oaxaca and the whole of Mexico. The experience of community-based conservation strategies in Oaxaca can also offer valuable lessons for other countries in Latin America and the rest of the world.

# Introduction

WWF – World Wide Fund For Nature – believes that it is necessary to create an ecologically representative network of effectively managed protected areas to protect a viable sample of all the forest types found on the planet. This has been recognized by the signatory governments to the Convention on Biological Diversity as the cornerstone of their national conservation strategies. The development of such a network involves: identification of the most suitable areas for protection; a process of negotiation and advocacy to establish the protected area; followed by planning and capacity building for effective management; and monitoring and evaluation to check that protected area values are being maintained.

It is recognized that the conventional model of state-owned and managed protected areas has various limitations and shortcomings, the principal one being the abrogation of the ‘natural rights’ of forest dependent or dwelling communities. This can no longer be ignored. It is the duty of governments and the society at large to enable these communities to participate fully in the conservation of biological resources.

In addition, the growing body of research on systems of land, territory, and resource management employed by indigenous and traditional communities points towards many useful approaches and tools that can strengthen present-day conservation practices. At the same time, the current trend of globalization and the economic crisis facing governments in the developing world has severely eroded public sector services, including protected area management. This is reflected in dwindling budgets and resources and declining political interest in biodiversity conservation. Current policies on protected areas and biodiversity conservation cannot ignore these realities.

In Mexico, community biodiversity conservation has expanded rapidly and is increasingly influencing policy-making processes due to growing recognition by state and federal-level conservation agencies, NGOs, and academic institutions. In Oaxaca, one of the richest states in terms of biological and cultural diversity, community conservation initiatives provide valuable lessons for the country, the region, and other areas of the developing world.

WWF began to support community initiatives for the establishment of protected areas in Oaxaca state, Mexico, some years ago. In close collaboration with the Autonomous Group for Environmental Research (Grupo Autonomo para la Investigacion Ambiental), WWF has systematically accompanied and supported several Oaxaca communities in their conservation initiatives, counting on the collaboration of many governmental and non-governmental institutions, including the Oaxaca State Institute of Ecology, the Secretariat for the Environment and Natural Resources, COMUNITAS A.C., Development Projects Sierra Norte, the Oaxaca Inter-disciplinary Centre for Research and Integrated Regional Development, and the National Herbarium of the Mexico Autonomous National University. Throughout this process, WWF has learned much about the achievements, the difficulties, the potential, and the challenges of community conservation.

This document briefly presents some of those experiences and lessons. Nothing in them is definitive or constitutes written-in-stone doctrine; they are all processes of ongoing learning and continuous innovation, but one piece of truth appears unquestionable: the future of

conservation lies in people, and is only guaranteed by the improvement of their quality of life and the respect for their rights.

Devendra Rana  
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# Overview

## **Biological and Cultural Diversity in the State of Oaxaca**

As a party to the Convention on Biological Diversity, Mexico recognizes its obligations for the conservation and sustainable use of biological diversity in its various dimensions – from *in situ* conservation through protected areas, to management of agro-biodiversity and *ex-situ* conservation. Up to now, however, the bulk of investment in biodiversity conservation, from either public, international cooperation, or multilateral financing, has been directed to two main fields of work: biological research and the establishment of protected areas.

In practice, the erosion of biodiversity and natural resources in Mexico has significantly surpassed the outcomes of the few, limited conservation initiatives that have been undertaken. This has led to the exploration of new opportunities and avenues for expanding conservation work, by integrating other social actors besides government agencies.

Oaxaca is the region with the greatest biological diversity in Mexico. It harbours almost half the plant species and vegetation types in the country, as well as 40 per cent of mammal species, 63 per cent of birds, 26 per cent of reptiles, and 23 per cent of river fish reported for Mexico.

Similarly, from the standpoint of cultural diversity, Oaxaca hosts 16 indigenous peoples, whose territories cover nearly 80 per cent of state land, under diverse forms of communal tenure. The indigenous population represents around 30 per cent of the state population and around 20 per cent of the national total. The majority of this population is organized in communities whose internal government system is independent and autonomous from state or federal systems.

The Pacific tropical dry forests of Mexico stretch from the Mexican-USA border in the north, down to the border with Guatemala in the south, and run parallel to the Pacific Ocean. The state of Oaxaca, in the south of the country, is a fine example of the most remarkable tropical dry forests in Mexico, with extensive biological and cultural diversity.

Valuable medicinal and industrial plants species, as well as highly appreciated edible plants, can be found in these forests. An astounding 70 per cent of plant species found here are endemic. Some of the native tree species of the area have achieved worldwide recognition due to their uses and ecological functions, such as the “mother of cacao” or quickstick (*Gliricidia sepium*), known locally as *cacahuanano* or *mata rata*, a multiple-use, fast-growing species used for pest control, forage, living fences, fuelwood, and medicinal purposes.

The dry forests are home to big mammals such as cougar, white-tailed deer, jaguar, and river otter, as well as the rare pygmy skunk and the Mexican anteater. Exceptional as well is the wide range of other vertebrates such reptiles, and endangered, rare, and threatened species of birds.

The ever-changing landscape of this forest is a beautiful expression of its adaptive nature. Temperature and rainfall play a key role in the health and appearance of the forest. The dry

season lasts from five to eight months of the year, giving the forests an arid, dead appearance, but when the first rains fall, they transform into a vital mosaic of green flowering hues.

Mexican pine-oak forests are located alongside the tropical dry forests, in the higher altitudes of the mountains. Mexico is the world's centre of pine species, since 50 per cent of all pine species known are found here. Additionally, a remarkable 135 different species of oak exist here – compared with 87 oak species found in the United States and Canada combined.

In spite of their importance, these Pacific tropical dry forests have been ranked as one of the ten most vulnerable forest ecoregions in the world. They suffer from the highest deforestation rates and less than three per cent of them are currently afforded any protection. In Oaxaca, there are only two national parks which include these ecosystems: the Lagunas de Chacahua National Park (14,187 hectares) and the Huatulco National Park (11,890 hectares of which only 6,000 hectares are terrestrial – the rest is marine).

Some of the threats facing these fragile forests are:

- Expansion of agriculture and cattle ranching in the area, inadequate development policies, and a lack of incentives to strengthen community-based forest control and protection have resulted in an erosion of the natural forest frontier.
- Unplanned and unsustainable forest management – the combination of a lack of technical skills and financial resources amongst forest owners has resulted in forest degradation and deforestation.
- Urban growth and tourism development – tourist attractions include great expanses of stunning beaches and observing migrating whales, dolphins, turtles, and other marine fauna. Unsustainable tourism has resulted (in the form of unplanned infrastructure development and increased pollution due poor waste management) which could degenerate into massive coastal developments impacting on the forests, which run parallel and close to the coast.

The Northern Range (Sierra Norte), one of WWF's Global 200 ecoregions, lies in the northern part of the state of Oaxaca. The extraordinary biological diversity of the Sierra Norte results from its complex topography, which has created a wide variety of ecosystems. The tropical rain and evergreen forests (at lower elevations) and temperate forests (at higher altitudes) form a complex interconnected ecological system that sustains key genetic flows of animal and plant species.

The ecosystems represented in the area hold a vast number of species of flora and fauna that have gained the attention of the international scientific community since a relatively small-sized territory holds a very high density of species diversity. Endemism is also high, and there are many rare, endangered animal and plant species, including several species of the Cycadaceae family. Spectacular as well is the diversity of orchids and palm trees. There are many species in the area believed to have a potentially high economic value. As an example, the active ingredients of pioneer birth control pills were developed from a plant species native to this area.

The Sierra Norte is also particularly rich in mammal fauna, hosting species such as tapir, jaguar, cougar, wild boar, and ocelot.

The Sierra Norte forests, covering an area of approximately 200,000 hectares, are part of the traditional territories of the Zapotec, Chinantec, and Mixtec indigenous peoples. The Zapotec number 30,000 people and have lived in this region for centuries. The Zapotec communities have developed a wide array of knowledge related to the use and management of the area's natural resources, which goes hand in hand with their sensitivity and commitment towards nature. The Zapotec culture is widely respected in Mexico for maintaining its traditions, despite strong external influences that have deeply changed their socio-economic and political environment.

Although the biological and cultural richness of the Sierra Norte is beyond doubt, specific conservation measures, such as protected areas, have not been implemented by federal or state governments. Among other reasons, this is due to a lack of confidence by the indigenous population in official conservation strategies, which they believe do not respect community rights, communal land tenure system, Zapotec culture, and traditional ways of using and managing the area's natural resources.

This then is a region especially rich in biological diversity, in particular in its coastal and mountain forests, and where diverse and vital native cultures with traditional systems ensuring sustainable resource management have thrived in spite of adverse historical conditions. Out of this ecological and cultural context, many community-based conservation initiatives have emerged, which combine traditional systems with modern practices, and ensure respect for natural processes and cultural priorities. The community-based initiatives reviewed in this paper are good examples of this process.

### **Community Strategies for Biodiversity Protection**

The Community Strategies for Biodiversity Protection (CSBP) in Oaxaca state have a wide range of forms and approaches, including land-use planning at the level of community plots, cellular reserves, sustainable forest management, and consolidation of systems that integrate important parts of the territory with the explicit purpose of maintenance and sustainable use of biodiversity (e.g. Units for Wildlife Management, the Communal Protected Areas System of Santa Maria Huatulco, and the scheme of biodiversity protection of the Union of Zapotec-Chinantec Communities (UZACHI) in the Sierra Norte).

Despite a diversity of approaches, the main strategies share common features in their principles and basic functioning, namely:

- They originate in communities whose territoriality is well defined and is supported by a high sense of ownership.
- The development of CSBP is based upon the use of biological diversity as a tangible resource, usually collective.
- The CSBP are not considered as isolated approaches, but as part of coherent territorial management through which communities ensure the provision of the goods and services needed for their development.

It becomes apparent that, unlike official protected areas whose main objective is to conserve, in a pristine, untouched state, representative samples of the key ecosystems present in the country, the CSBP consider biological diversity as an intrinsic part of their resources

necessary for the cultural, social, and economic development of a community. Biodiversity is valued as an important part of the territory, and thus the security of ownership and the rights of management justify the investment of significant efforts to maintain and safeguard it.

There are several advantages of community systems compared with official protected areas. Some of these advantages are:

- They are long-term strategies. The construction of CSBP is closely linked to the purposes and aspirations of the community, since CSBP are part of their ethics and cultural strategies and of their long-established approaches to provision and production of basic goods. Very often community lands coincide with areas of high biodiversity (as in the Sierra Norte and the Pacific Coast). This encourages the development of a long-term vision for the land and its resources.
- They possess simple strategies for administration and decision making. Normally such initiatives are handled and sanctioned within community assemblies, democratic spaces open to all members of the community where people discuss the benefits and losses or trade-offs of different initiatives and make decisions that are immediately integrated into community statutes and bylaws. This provides effective governance that does not depend, in principle, on external factors or structures.
- They maintain a healthy link with economic spaces and activities. The concept of CSBP defines these spaces and activities as structural parts of plans and strategies for broader land management, and so protection measures are closely and usefully linked with spaces and activities dedicated to material and cultural production. The case studies show that communities have achieved a very high standard of environmental management. This is ensured by the sense they share of the tangible benefit deriving from sound management of their resources. Their biodiversity protection strategies maintain high degrees of consistency in land management and safeguard complex ecological processes (migrations, genetic flows, etc.) that go beyond the borders of protected areas. Through cultural and territorial integration, community strategies offer wider and more effective safeguards than those offered by formal protected areas, since the establishment of sustainable practices goes beyond the core protected zones (as it can be witnessed in the cases of the articulation of protected areas and certified forest management of UZACHI and Ixtepeji).
- Community strategies safeguard structural and functional features of ecosystems. The segregation of areas for protection is not based mainly on valuation of biodiversity uniqueness (endemism, rare species), but rather on values related to safeguarding the structural and functional processes of ecosystems, which allow for the provision of goods and services to the community (e.g. wide strips of forests, zones of recharge, migration areas). Thus, the CSBP ensure long-term evolutionary processes, as they maintain the machinery of natural laboratories in a more functional and genuine way.
- They maintain costs at relatively low levels. The cases of UZACHI, Ixtepeji, and Huatulco show that costs of maintenance of CSBP normally are covered to a great extent by the community's economic activities and by its various systems and structures (e.g. community councils, committees for fire control). This keeps protection costs low, compared with those of formal protected areas systems.

For the state of Oaxaca, whose territory is largely *campesino* (smallholdings) and indigenous, the potential offered by CSBP is really high. A preliminary survey carried out by the Oaxaca

state office of the National Secretariat for the Environment and Natural Resources (SEMARNAT), indicates, unsurprisingly, that there are many of these initiatives in Oaxaca. This is confirmed by the multiplication of community forest enterprises, set up after communities gained land from forest concessions.

### **The Regional Importance of the Oaxaca CSBP Experience**

Community-based conservation initiatives in Oaxaca have acquired the magnitude of a real social movement. They are deeply rooted in the particular conditions of the state, particularly the high biological diversity, vital and diverse cultures that have traditionally depended on that biodiversity, and a legal and policy base that ensures communal land tenure and offers opportunities to exercise communal management and government. In addition to these contextual factors, there is a relatively weak institutional presence of the central and state governments on matters relating to biodiversity conservation and protection measures.

To what extent is the CSBP process Oaxaca-specific? Are there conditions in other areas of Mesoamerica and Latin America that favour the emergence of similar processes of community-based biodiversity protection, and if so, can the CSBP of Oaxaca offer useful lessons for the region?

In the rest of Mexico, and in Latin America as a whole, the convergence of factors of high biological and cultural diversity is widespread, as is the continuing vital presence of traditional systems of land and resource management. However, both the biological and cultural richness of the region face risks and threats, deriving from the unstoppable, rapid advance of market economics, and from government policies and practices orientated not so much towards conservation and sustainable local development, but to responding to wider regional and global pressures.

A second important consideration is the appearance and strength of indigenous and rural peoples' social movements, which build on long-standing claims to land, territorial and cultural rights, and increasingly adopt conservation and sustainable resource management agendas. This process finds encouragement and opportunities in new regional trends of legislation and policy making, inaugurated by the Convention Biological Diversity, where the knowledge and practices of indigenous and traditional communities for conservation is recognized and measures to strengthen them advocated. Indeed, virtually all legal and policy framework instruments developed in the last few years in Latin America for biodiversity conservation invariably include provisions aimed at the recuperation, maintenance, respect, recognition, and strengthening of traditional knowledge and practices, and ratify the principle of active involvement of indigenous and local communities in conservation.

In parallel, there is in Latin America, a broad and growing movement for the defence of indigenous peoples' rights; evidenced by the fact that almost all countries of the region with significant indigenous populations have ratified the International Labour Organization Convention on Indigenous and Tribal Peoples in Independent Countries. This convention, which has encouraged the revision of national laws and policies on indigenous populations, contains several provisions relevant to the environment. The indigenous rights movement in the region highlights the inextricable links between the survival of traditional management systems, land tenure security, and biodiversity conservation, and holds up the thesis that the best way of ensuring long-term, sustainable management of indigenous lands and territories is

in securing land tenure and respecting traditional institutions. Although much remains to be done in terms of demarcation, legal recognition of the ownership, and effective protection of traditional lands and territories, the conservation argument in favour of tenure security grows in influence and is increasingly accepted as an important reason for recognizing and protecting indigenous lands and territories.

On the other hand, in Latin America there is widespread erosion of the effectiveness of government institutions in charge of protected areas and conservation measures. Economic crises systematically reduce government budgets and resources for conservation and change priorities. Additionally, there is growing disquiet, especially from local populations, about conventional protected areas models, on the grounds that these affect people's rights and interests, aggravate poverty in resource-dependent populations living in or near protected areas, and often are not even effective in terms of protection. This pushes more and more to search for alternative biodiversity protection models, where the main actors are no longer government agencies but local communities, civil society organizations, local governments, landowners, and primary resource users.

All these processes and factors in Latin American explain the spread of projects similar to those of Oaxaca CSBP throughout the continent. One of the most interesting illustrations of this trend is that indigenous communities are increasingly demanding the creation of protected areas on their lands and territories, as areas officially declared and recognized by governments and integrated into national protected area systems, but legally owned and directly managed by the communities themselves. This has happened for example in the cases of the Tawakha Biosphere Reserve in Honduras, created at the request of the Tawakha people following years of struggle with insensitive state powers; the Alto Fragua – Indiwasi National Park on the Andean slopes of the Colombian Amazon, established at the initiative of the Ingano people; the San Miguel – Bermejo Ecological Reserve in Ecuador, declared on Cofan indigenous land at their request; the Nargana Protected Area of the Kuna people of Panama; the Amaraeri Communal Reserve of the Harakmbut people of Peru, finally established after more than 15 years of struggle; and so on. In other cases, indigenous and rural communities establish, directly and without any involvement from government, their own protected or conservation areas, where they enforce special regulations through their traditional or newly established institutions.

The experience developed so far by indigenous and rural communities in Latin America indicates the importance of key conditions necessary for the success identified in Oaxaca:

- Clearly defined territoriality, supported by measures offering security of tenure and confirming historical and cultural attachments to community lands.
- A minimum base of strength and integrity of local culture, that allows community institutions to perform their duties with credibility, confidence, and support from the population.
- An explicit concept recognizing that biological diversity is a resource for the people and that it should provide tangible benefits to them, in an equitable and collective way.
- The recognition of the importance of collective rights and responsibilities for biodiversity conservation and use; as the benefits arising from it are also collective.
- A planning approach that recognizes community conservation areas not as isolated structures but as organic parts of a broader territory, where interconnectedness with

agriculture, forestry, and other spaces and activities, is as important as protection of particular spots. In this approach, protection mechanisms are part of broader strategies of territorial management having the central purpose of securing the sustainable provision of goods and services needed for socio-economic and cultural development of the communities.

Many other lessons could be drawn, but it is not the intention of this document to carry out an exhaustive analysis of a social movement that is wide, diverse, complex, and continuously changing. The purpose is rather to show the most relevant elements of the process, and to illustrate and suggest avenues for reflection and further action. A clear conclusion emerges from these examples: community-based conservation initiatives in Oaxaca and elsewhere in Latin America have great potential, and supporting and fostering them should be a top priority of any conservation organization active in the region.

## Case Studies

### **Community Strategy for the Protection of Wildlife in Santo Domingo Tonala**

#### *The Area and the Community*

Santo Domingo Tonala is a municipality located in the Low Mixteca region, Oaxaca, Mexico. Its average altitude is 1,390 metres. It belongs to the district of Huajuapán de León, and comprises the municipal jurisdictions of San Juan de los Reyes, San Sebastián del Monte, and Yetla de Juárez. There is evidence of human settlement since prehistoric times and vestiges of prehispanic settlements dating to AD 700. At the beginning of the Spanish conquest, Tonala was the main regional centre. The destruction caused by an earthquake in 1882 prompted massive emigration, after which control of the region moved to Huajuapán, the district capital. Nevertheless, the reconstruction of settlements and the importance of natural resources of the area, among them water, allowed Tonala to continue as a regional centre; developing an important agricultural economy based on irrigation. In the late 1930s, the Yosocuta dam was built with a storage capacity of 50 million cubic metres – capable of irrigating several thousand hectares.

According to the 2000 census, the municipality of Santo Domingo Tonala has a population of 7,308 inhabitants, 30 per cent of whom are aged 15–35 years. For this age group, the main sources of employment are outside the region, notably in Oaxaca City and Mexico City, the north of the country, and the USA. There is little population pressure on natural resources or for new agricultural or urban areas, since young people have few expectations of remaining in the area.

In Tonala there are three rural communities and one *ejido* (communally-controlled land designated by land-reform legislation) covering 11,352 hectares, or 71.2 per cent of the municipality's area. Private agricultural lands are in the hands of 211 landowners, with a total of 854 hectares (5.4 per cent of the municipal area). A total of 7,529 hectares of *ejidal* and communal lands are used for agriculture, of which 1,000 hectares are irrigated. Most of these irrigated lands are concentrated in the Tonala *Ejido*, which accounts for 70 per cent of production. This output caters both for the local market and, for some products, further afield.

Geographically, Santo Domingo Tonala is part of the Mixtec-Oaxaca Province and comprises several valleys – Cuicatlan, Huajuapán, Tehuacan, Tepalme, and Zapotitlan, belonging to the upper basins of the Papaloapan and Balsas rivers. Its climate is semi-arid – being in the rain shadow of the Sierra Madre Oriental.

Following the WWF ecoregional classification, the municipality of Santo Domingo Tonala belongs to the dry forests of Balsas, an area of the highest conservation priority at the regional scale.

In the centre of the area, the predominant vegetation is tropical deciduous forest, with trees of 6 to 14 metres and limited low vegetation. According to the National Commission for the Understanding and Use of Biodiversity (CONABIO), the region of the Tonala municipality is called Tehuacan-Cuicatlan, and is characterized by a great richness of wild species with high

concentrations of endemic flora. The predominant vegetation is deciduous forest in the valley, and oak forest in the highlands. To the north, there is a great diversity of vegetation, predominantly xeric shrublands surrounded by plots of irrigation agriculture and some spots of *crasicaule* shrublands.

The region is considered by CONABIO to have high ecological values, due to the high diversity of xeric shrublands and transition zones (ecotones) with forests dominated by coniferous and oaks. The presence of deciduous forest is an element that enhances the diversity of the area.

The region registers high endemism, especially of seed plants, some of which are endangered. An additional reason for judging the region as one of high conservation value is its function as a centre of origin and diversification of species.

An important natural value of the area is its hydrological resource, whose connections with forest conservation are recognized and appreciated in the region. The Salado River flows through a valley that also receives water from underground springs originating in the nearby mountains.

The scenic beauty of Tonalá has turned the area into a tourist attraction, since apart from the biological richness there are impressive panoramic sights, excellent mountain trails, cave paintings, archaeological zones, historic monuments, and many other interesting attractions.

### ***Wildlife Protection Project***

A grassroots organization called the Municipal Council for Monitoring of Fauna and Flora (Consejo Municipal de Vigilancia de la Fauna y la Flora – COMUVIFAF), was set up in 1987 for developing and enforcing regulations for wildlife protection and sustainable use. In particular, the council undertook to protect deer (*Odocoileus virginianus mexicanus*) and the forests, particularly in the central area of the municipality and surrounding zones. This organization carries out activities such as:

- Regular patrolling to prevent illegal hunting and felling.
- Promotion of community participation in fire fighting.
- Promotion of sound uses of the forest, and particularly discouragement of its rental for goat grazing.
- Promotion of a programme to protect wildlife to the population of all communities of Santo Domingo Tonalá.
- Promotion and coordination of activities for the protection of wildlife with neighbouring municipalities that also own forest lands.

The group, originally founded by poachers who realised that they were taking the game to extinction because of uncontrolled hunting, decided to turn themselves into wildlife defenders, and to care for its recovery. The group started with the aim of making sustainable use of the deer population once the species had recovered and the quality of the habitat improved. At the beginning, they were unaware of the legal framework they could use, which regulations, which statutory powers, and the technical means that were at their disposal. They approached SEMARNAT in 1997, looking for orientation. The SEMARNAT office for the

state of Oaxaca hired a technical team of vets specializing in wildlife management, Ecozootecnia, to undertake field evaluations and organize workshops with community groups. Following this work, COMUVIFAF and municipal authorities requested the establishment of a Wildlife Management, Conservation, and Sustainable Utilization Unit (UMA), to focus on sustainable hunting of deer in an area of 3,000 hectares.

Shortly after the establishment of the UMA, studies carried out in the area confirmed that vegetation and deer population had significantly recovered. Findings suggested that sustainable, regulated hunting of deer was now possible, since a population of about 600 deer was found in the area, but indicated also the need for complementary measures for the enhancement of local biodiversity.

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Another important recommendation was the reintroduction of the collared peccary. The report found that the vegetation had suffered serious change since the disappearance of the peccary, and that it could no longer sustain certain animal populations. Reintroduction of the peccary was necessary to regain the equilibrium. Through a donation from the Zoological Park of Centenario in Merida, Yucatan, reintroduction of the species was successfully achieved in July 1999.

### ***Community Values and Organizational Skills***

The effectiveness of the local strategy for biodiversity protection is due to a large extent to the respect that the population has for the work of COMUVIFAF – respect founded on 14 years of dedicated labour. Even though the council did not count on backing from a communal assembly or similar structure and used a completely voluntary regulatory system, the local population would ask them for permission whenever they needed to cut trees, and would willingly accept sanctions from the council.

In 1990, the municipality formally recognized the council's work and turned its regulations into local law. The current legal instrument establishes the framework for the council's activities, its forms of organization and operation, the regulations for hunting and fishing, the norms for grazing, and for the use of forest products.

The UMA for regulating the hunting of deer covers an area of 3,000 hectares, two-thirds of which are private lands and one-third on municipal lands. Some private lands have been rented by the council from their owners for the establishment of the UMA.

### ***Regulating Access to Wildlife Resources***

Since 1987 when the council was founded, regulation of hunting was initially through temporary and later permanent bans. These measures have been supported by local and state authorities, and currently the UMA is dependent on the General Wildlife Law and on a regulatory measure that established a quota of 18 deer per year. The council's regulations, backed by the municipality, set out rules on subjects such as the time each hunter is allowed

to stay in the area, the species and types of animals they can hunt, the number of shots, the services that the council offers, and the fees for hunting.

### ***Political and Social Support and Relationships with Local Authorities***

The attitude of the population of Santo Domingo Tonala and the surrounding municipalities towards conservation of their environment may be a little passive but is generally positive. This appears to be confirmed by the fact that the severe deforestation trends of the past have been completely reversed. Witnesses of the experience state that COMUVIFAF would have not survived 14 years had it not counted on some degree of support from local people. Although the meetings and operations of the council are not widely attended, local people believe that it is useful and necessary and its work should be supported.

It is also interesting to note that throughout this 14-year period, municipal authorities have progressively transferred responsibilities to the council, including for example fire control, supervision of licences, and reforestation.

A very important source of institutional support for COMUVIFAF has been SEMARNAT, which since 1997 has provided resources for technical assistance.

### ***Issues of Technical Capacity***

Supporting the development of the UMA, SEMARNAT has provided staff training, environmental education, and improved infrastructure, such as automatic feeders for deer and water provision facilities. The project however goes much beyond the UMA and implies conservation of the natural resources as a whole within the area of the municipality. Council members know their territory well, and the authorities come to them whenever solutions to certain problems are sought or simply for regular patrolling of the area. They are experienced in dealing with hunters. They know how to handle the animals in an emergency, and are experts in fire fighting. In sum, their technical capacity is now remarkable and continuously improving.

### ***Achievements, Impacts, and Difficulties***

#### ***Impacts on Biodiversity Conservation***

Some species on the verge of extinction now have bigger, growing populations. Protection of the deer has automatically given protection to other plant and animal species. The council wants to expand its activities so that protection of natural resources is wider and more effective, and proposes the establishment of a biological corridor to link valuable areas in other municipalities. However, there remain some communication and coordination problems between the council and some authorities and even some rural communities. These problems need to be addressed to ensure geographic and social expansion of the project.

#### ***Impacts on the Community and Social Institutions***

One of the most important achievements of the council is the recognition and support it has gained from the people of Tonala. The fact that a group of volunteers is accepted by the

population to patrol community lands show a high degree of confidence. The community has increased its sense of ownership and pride of their forests and wildlife. Meetings are open to everyone and the work of the council is transparent. Following educational activities in schools, many young people have joined the council.

Among the authorities, the impact of the project is also visible and significant regulations established by the council have been made municipal laws. Also, they have allocated municipal funding for renting plots of land to be integrated into the UMA. The project has encouraged communities from other areas to seek advice from the council for their own conservation efforts.

The degree of control that COMUVIFAF now has over its project is advanced, from institutional and managerial perspectives. However, there is still a strong dependence on external technical expertise.

### *Economic Impacts*

The UMA has not yet yielded economic benefits. The need to diversify resource use and promote more widely the services of the area has been noted.

However, the lack of economic benefits has not discouraged the council or the communities, as they all see the real benefits as essentially ecological, rather than economic. Fortunately, council members and communities do not depend solely on direct exploitation of the resources of the area for their survival.

There are safeguards to ensure that any economic gains first and foremost assure its sustainability. An agreement signed by COMUVIFAF, SEMARNAT, and the municipality, establishes that for the next five years, 85 per cent of any economic benefits will be reinvested in the project, with the remaining 15 per cent used for environmental and educational services in schools. The agreement will be reviewed in due course.

### *Conflicts and Solutions*

A conflict has recently arisen between agrarian communities and the council concerning its patrolling activities in agricultural lands. Some people want to keep goats and cattle. The council realizes this may pose a serious threat to the whole of the project, as the continuation of extensive use of the land for cattle ranching or animal husbandry may produce severe degradation in the area. A possible solution is to buy some of the land used by cattle ranchers.

Another potential conflict relates to the exploitation of a gypsum quarry within the UMA. The municipality gave authorization for this activity without consultation with the council or the community, and there are serious doubts about its benefit to the community and the environmental impacts.

Sport hunters from Oaxaca City are also a source of conflict, as they have threatened to sabotage the UMA arguing that it is the only place in Oaxaca where entrance to them is denied. Fortunately, hunters from other areas have come to the support of the council and the UMA.

Rubbish, which gets into rivers, harms animals and despoils the landscape, is another problem. The need for information, awareness raising projects, and signs has been highlighted.

### ***Challenges Ahead***

The most important challenge is to reach an intercommunity agreement for the protection of the resources of the larger zone. To this end, the council needs to open up dialogue with the agrarian and municipal authorities, while at the same time continue to raise awareness within the community. It is hoped that institutions such as SEMARNAT and Ecozootecnia will accompany the council in this process. Given the importance of stopping cattle ranching, the council needs to secure funding to buy the land currently used by private landowners for this purpose. This is not a large amount, but the funding is unavailable locally.

Another challenge is to create better conditions and to improve the infrastructure for patrolling. A planned sightseeing facility for visitors at the Cerro Pachon, the highest elevation in the county, will also be used for watching and monitoring the area.

A programme of information and awareness raising for visitors is urgently required. The council and municipal authority are interested in developing an ecotourism programme, and it is expected that SEMARNAT and other government and non-governmental agencies will come in to support the idea. This would also include strategies for promoting good waste management practices.

Finally, achieving some degree of economic benefits for the communities is seen as a fundamental challenge. The tourism project could be a useful approach to addressing this problem.

### ***External Relationships***

Although relationships with municipal authorities have been generally positive, there is concern that elections could bring changes at any time, and thus a better mechanism for closer collaboration is desirable. Municipal authorities should play a central role in facilitating agreements and coordination with rural development agencies and with communities in the broader area.

A closer working relationship with the state government is also advocated, with a view to obtaining greater state support and better marketing of the project.

At the federal level, it is expected that SEMARNAT will continue to support the project via different programmes under its remit.

## **Communal Protected Areas System of Santa Maria Huatulco**

### ***Introduction***

The Huatulco area has one of the most important sections of Pacific dry forests in the Oaxaca and is considered one of the most threatened tropical ecosystems, as it is estimated to have lost about 98 per cent of its original cover. Pacific dry forests harbour a great number of species of socio-economic importance, and are comparable to tropical rain forests. There is a wealth of documentation affirming that the Pacific dry forests, especially in the Oaxaca coast, have high concentrations of genus and species of endemic vertebrates. In the Oaxaca coastal region, 55 species of endemic vertebrates have been registered. In comparison with other important areas of dry forests in Central America, the Oaxaca coast has the highest conservation priority. The dry forests of Huatulco have the status of bioregion due to their global importance. The area has also been included in the Endemic Bird Areas.

In summary, the Pacific dry forests of Huatulco:

- host a significant proportion of intact Mesoamerican dry forests.
- have a high proportion of species of conservation priority, and therefore investing in conservation in the area is likely to be highly cost-effective.
- benefit from communities which promote participatory and sustainable initiatives.

### ***Protected Areas***

The Communal Protected Areas System (CPAS) is a regulatory instrument that seeks to preserve the natural heritage of the Huatulco community, protect an important section of dry forest and its biodiversity, and promote social and economic development within the area.

The protected areas system was formally constituted in the communal assembly in July 2001. The community is seeking to have the system recognized by the municipal authorities and for the work to be coordinated with the Huatulco National Park, while taking care to maintain the desired degree of autonomy.

The CPAS is made up of 16 communal protected areas, covering 8,825 hectares, constituting 30 per cent of the total communal lands.

The objectives of the CPAS include:

- Protection of wilderness areas and their biodiversity within the communal areas of Santa Maria Huatulco.
- Promote mechanisms that facilitate the sustainable use of biodiversity and payment for environmental services, as a strategy to ensure the conservation and balanced development of the Huatulco community.
- Promote participatory scientific research to increase ecosystem knowledge and to create the foundations for the establishment of a monitoring system.
- Promote public and private investment to ensure CPAS performance.

- Promote collaboration with government, and social and private sectors.
- Advance the development of a local-level biosafety mechanism.
- Contribute to land-use planning for Santa Maria Huatulco as an important initiative for the long-term protection and maintenance of the natural heritage.

### ***Community Involvement***

The rural community of Santa Maria Huatulco comprises 71 settlements.

The process of declaring the Huatulco National Park (initiated by SEMARNAT in Mexico City) was a key catalyst for this community initiative. The community became concerned about control of their lands and resources. This opened a dialogue with the Environment Secretariat and the National Ecology Institute; the communities became involved in the analysis and planning of their lands and decided not to give up lands to the national park project, but rather begin their own conservation project, with support from WWF, UNDP, and SEMARNAT. This eventually resulted in the CPAS and Communal Land Use Plan. The process also gave birth to a Sustainable Development Trust Fund, which is meant to invest in the project part of the money obtained from sustainably exploiting resources.

### ***Legal and Political Context***

The community created their own vision for biodiversity protection. Although at the beginning the process was triggered by strong opposition to the national park, little by little it helped develop a new concept of community-based protected area, which later gained credibility with SEMARNAT, the National Ecology Institute, and the National Protected Areas Commission (CONANP). Further, the process fostered an alliance with the national park service, and allowed the community to participate on the park's technical committee and work with a common agenda.

This CPAS process also has served as a model for setting up the Global Environment Facility (GEF) funded Indigenous Communities and Biodiversity Conservation (COINBIO) programme, in Oaxaca, Guerrero, and Michoacan. The Huatulco community and the NGO, GAIA, are part of its technical committee for Oaxaca.

### ***Conflict Management***

Management of initial conflicts in the planning process and with the establishment of the national park helped strengthen internal decision making within the community. There were strong disagreements between the community and external actors such as government agencies and private investors interested in the tourism project. Good information was available and consensus was forged. Conflicts helped strengthen the sense of territorial unity and social well being, improved community infrastructure, and helped lead to the creation of a consultative council to deal with biodiversity and natural resources issues. Currently this

council is composed of representatives from agrarian and municipal authorities, five regional community delegates, GAIA, and the Huatulco National Park.

### ***Current Situation and Challenges***

Tourism development projects still threaten the ecosystems of the area, as they involve the use of complex and costly technology and benefit few people, at a cost to many. This has highlighted a number of conflicts that the community has not yet been able to resolve.

The key challenge is to clarify and solidify the possible benefits these 16 communal protected areas can offer. If expectations created so far are not met in the short to medium term, the integrity of communal life as well as the wildlife spaces will be threatened.

It is important to examine the role that supporting community and local initiatives plays in biodiversity protection. Activities that strengthen cultural and territorial identity provide a sound basis for the community to put in place new processes for conservation.

The federal and communal initiatives complement each other and demonstrate the need for maintaining a healthy relationship between the two. In the case of Huatulco, there is clear and strong synergy between the national park and the communal protected area system, and both are fundamental components of a regional approach to conservation of biodiversity and natural resources.

## **The Santa Catarina Ixtepeji Communally Protected Area**

### ***Introduction***

The Sierra Norte is an area ranging from 1,600 to 3,210 metres in altitude, with wide climatic variation. This contributes to its special biodiversity characteristics. It is considered among Conservation International's 17 Biodiversity Hot Spots, and forms part of ecoregion 101 of WWF's Global 200; outstanding at the global level for its diverse and complex hardwood and conifer forests, and for its critical conservation state. There is high species endemism and uniqueness. There is still limited knowledge about plants, butterflies, reptiles, and amphibians present in the area. The area is part of the complex of Important Areas for Bird Conservation.

### ***Protected Areas***

The community of Santa Catarina Ixtepeji has a territory of 21,107 hectares, where community forest management is the most important activity. Under the current management programme, different areas have special status in order to maintain biodiversity.

Currently, 20 per cent of the total community area (4,225 hectares) is under special and restricted management, which includes:

- Conservation and restricted management areas – aquifer and springs protection zones, gullies, riverbeds, streams, and non-commercial wooded areas (422 hectares).
- Areas for non-timber forest species, controlled harvesting of white mushroom and ornamental species (2,325 hectares).
- Core zone – communally protected natural area (887 hectares).

These areas include temperate forests, with many species of pine and gallery forests containing high numbers of orchids.

Mammals include the white-tailed deer, wild boar, squirrel and rabbit; birds of prey like the royal eagle, falcon and buzzard; and other bird species, a few endemic.

<b>Significant Flora Species</b>	
<b>Species</b>	<b>Status</b>
<i>Abies guatemalensis</i>	Endangered
<i>Pseodutsuga menziesii var. Oaxacana</i>	Rare in the area
<i>Litsea glaucescens</i>	Endangered
<i>Boletus edulis</i>	Special Protection
<i>Amanita cesarea</i>	Special Protection
<i>Morcella elata</i>	Special Protection

<b>Significant Fauna Species</b>	
<b>Species</b>	<b>Status</b>
<i>Dendrortyx macroura</i>	Endemic, subject to special protection
<i>Harpagus bidentatus fasciatus</i>	Rare
<i>Colinus virginianus</i>	Endemic, endangered
<i>Glaucidium barsianum</i>	Threatened
<i>Otus guatemalae</i>	Rare
<i>Heliomaster longirostris</i>	Rare
<i>Lophornis helenae</i>	Rare
<i>Dendrocolaptes certhia</i>	Rare
<i>Cyanolyca nana</i>	Endemic, endangered
<i>Turdus plebejus</i>	Rare

### ***Community Involvement***

The Zapotec agricultural community of Santa Catarina Ixtepeji is directly involved in the conservation project. This indigenous community had its origins in 1565 when the Spanish set up the municipality which brought together five distinct Zapotec settlements. The name comes from the nahuatl *itztepexi* meaning obsidian peak. According to the 1995 census, the community population is 2,532 distributed among 15 localities. Administration of the Santa Catarina Ixtepeji territory is under presidential decree (in 1964) and there have been no major agrarian conflicts since this came into being

Two important elements of community involvement, which have ensured continued development of the community conservation strategy, are:

- Maintenance of the communal and collective way of life, based on the premise that forest biodiversity resources belong to the whole community, offer benefits for all, and should provide for a better quality of life for the whole population.
- The historical struggle of the Santa Catarina Ixtepeji community to maintain control and ownership of its lands and resources. This has fostered cohesive social structures that allow them to care for their land and make sure benefits are plural and collective in character.

These elements, along with similar situations in neighbouring communities, led the people of the region to seek to eliminate external forest concessions with the aim of commercially exploiting the resources themselves. The communities were successful in getting rid of the concession system in their territories.

There has been strong investment in social services (e.g. schools, streets, lighting), expansion of employment opportunities, and the development of a forest management plan certified under the Forest Stewardship Council (FSC). Certification ensures that the forest management:

- has a formal, explicit role in ensuring good long-term forest management.

- minimizes collateral damage caused to the forest during logging.
- protects local biodiversity and springs.
- prevents over-exploitation of common timber species.
- develops positive social relationships among local communities and workers.
- reforests degraded lands using local species and restores the ecosystem.

All this work culminated in the declaration of the protected area, in October 2000, and in the adoption of a management and conservation of biodiversity plan covering 4,115 hectares of communal land.

### ***Legal and Political Context***

All agricultural communities in Mexico maintain rights over their lands and natural heritage. They also have constitutionally recognized internal regulating powers called communal statutes.

The areas under special management and biodiversity protection are included in the communal statutes and within the forest management programme, which is a forest regulation tool registered with the Secretariat for the Environment.

There is a communal assembly agreement that incorporates an ecotourism committee as an administrative and patrolling body. There is also a technical land-use planning document, with its associated regulations, a survey and administration body.

In sum, the elements providing the legal and political basis for the protected areas system are:

- Legal land ownership: communal, established by presidential decree.
- Protection instrument: agreement from the community assembly of October 2000, where the communal protected area is delimited and the ecotourism committee is created, as the administrative body in charge of patrolling and administration.
- Technical plan with zoning, associated regulations and provisions for the establishment of a vigilant administrative body.

### ***Conflict Management***

The most important instrument for dealing with conflicts is the communal assembly, which uses customs and tradition as a base. Local people have confidence in the decision making of the assembly. The assembly has also been able to improve community services and distribute benefits, as well as maintain effective control over the community's resources and be proactive in community development.

External groups such as WWF, the Forest Resources Conservation and Sustainable Management Project (PROCYMAF), and the Mexican Fund for Nature Conservation have supported the assembly.

### ***Current Situation and Challenges***

The biodiversity protection strategy of Santa Catarina has allowed the convergence and consolidation of diverse initiatives and sites bringing a total of 4,225 hectares under protection and restricted use policies.

These areas represent diverse environments and fulfil different functions and environmental services, which include:

- Ensuring capture and recharge of aquifers, vital for agricultural production, provision of clean water and maintenance of flora and fauna.
- Protection of threatened plant and animal species, as well as habitat protection for regionally important species.
- Providing scenic and biodiversity benefits as possible goods to generate income and jobs for the community.

One current challenge is the establishment of a definitive body of rules or norms that will serve as the basis for management.

### ***Main Lessons and Conclusions***

One of the most important lessons from this experience has been that the strengthening of local autonomy and self-determination of Santa Catarina Ixtepeji has translated into not only the establishment of a protected area, but the planning of a diversified strategy to foster the fair development of rural and indigenous communities, and provide biodiversity protection services for one of the most globally important regions.

A few points should be noted in this respect:

- The area has been self-decreed by the traditional landowners, rather than being a decision imposed from external agents as has frequently happened in conventional conservation.
- The technical and financial support from environmental organizations (WWF, Mexican Fund for Nature Conservation, and PROCYMAF), has allowed decision making and administration to remain within the community, through the assembly. External organizations have, however, been important in providing technical advice.
- There are many activities that support the process. Firstly, the community forest management enterprise which generates income and social development. Diversification has included using non-timber forest products, such as ornamentals, edible mushrooms, resins, and Christmas tree plantations. The second area of economic support has come from arts, crafts, and ecotourism activities.

## **Forest Management and Protected Areas by the Union of Zapotec-Chinantec Communities of Oaxaca**

### ***Region and Areas Under Protection***

The area comprising the Union of Zapotec-Chinantec Communities of Oaxaca (UZACHI) in the Sierra Norte of Oaxaca is part of a region of global ecological interest. According to the land-use planning developed by UZACHI, almost 50 per cent of the 26,112 hectares belonging to the communities are under protection – 65 per cent in forest reserves, 23 per cent in wildlife protection areas, 10 per cent in watershed protection areas, and 2 per cent in recreation areas.

The ecosystems covered by the UZACHI protected areas system include broadleaf tropical forest; coniferous fir forest, and broadleaf temperate forests. Seven types of vegetation have been identified, including temperate pine-oak forest, oak-pine forest, oak forest, mesophyte montane forest (the three types of Rzedowski), and high evergreen forest. Of particular interest is the *Oreomunnea mexicana* forest, considered by botanists as a Cenozoic vestige and locally named *caudillo* forest. It is found in the Comaltepec community.

Fauna include tapir, jaguar, cougar, wild boar, otter, and three species of endemic mice. The area is renowned for being a place of diversification of geckos, and for its reptile and amphibian diversity, including 11 endemic reptiles and 4 endemic amphibians. Among butterflies, the Papilionidae family is widely represented, with at least one endemic species.

### ***Community Involvement***

Three Zapotec communities (La Trinidad, Santiago Xiacui, and Capulalpam de Mendez) and one Chinantec community (Santiago Comaltepec) make up the UZACHI union.

The forest resources, distributed in 80 per cent of the land, were under the control of the paper industry for 25 years. Local communities, concerned about the continued loss of resources, mobilized to ensure timber concessions were not renewed. Following success in this struggle, a communal forest management system was set up and UZACHI was established in 1989. Since then, UZACHI has been working to sustainably manage the forest, with the help of a local NGO, Rural Studies and Farmer Advice (ERA A.C.).

Taking the forest issue as the spearhead, the communities sought to progressively widen their utilization strategies as a natural response to the need to safeguard the biological richness of their land. The strategy started with the drawing of a land management plan, via a participatory process that recognized communal economic needs and strict land use planning needs.

A key element providing support to UZACHI action is the legal recognition of community land and resources under Mexican legislation. The land-use planning developed by the communities is incorporated into communal statutes. Further, existing legal instruments in Mexico allow for local decision making embodied via the communal assembly.

### ***Conflict Management***

The land use planning process that UZACHI carried out helped solidify communal structures and decision making. Conflicts are addressed at the community level.

Externally, UZACHI had to address several political and economic interests of local elites who benefited from natural resource exploitation. Major benchmarks in the process were as follows:

- Between 1991 and 1993, the union had to confront private forestry consulting enterprises, which opposed communities contracting local forest engineers.
- From 1990 to 1994, they fought to get an agreement with the Sandoz-Pharma Company not to send external collectors to their wildlife areas, and instead they offered to provide local collection services to the company.
- Between 1994 and 1997, the union struggled to get the national Treasury Secretary to recognize its legal and social status and related fiscal obligations as different from commercial enterprises.
- Between 2000 and 2001, the union was accused of biopiracy during elections, but was defended by the board of the regional natural resources committee of the Environment Secretariat, who argued that *"the objectives and conditions of the agreement between UZACHI and Sandoz never promoted nor endorsed biodiversity extraction or appropriation of traditional knowledge, but instead allowed the technical strengthening of the union and its communities."*

Throughout this process, and in spite of many difficulties, UZACHI has become recognized for its seriousness and transparency, but will probably continue to be attacked as long as individual or particular interests using the forest resources are present.

### ***Current Situation and Challenges***

The main benefit from UZACHI's development activities over the last 12 years is the maintenance of the community's natural capital. The local system for evaluating sustainability calculated the natural capital to be worth US\$16,454,166 in 1993 and US\$16,791,666 in 1997, showing a positive economic trend in forest management.

In the search for financial alternatives that complement forestry revenues and help implement and maintain unchanged the land-use plan, UZACHI has developed several initiatives focusing on carbon capture and sustainable use of biological resources. These initiatives aim to produce additional social benefits (increasing natural capital and maintaining social equity) at regional, communal, and family levels, and seek to reduce social tensions and slow out-migration patterns by generating dignified work for the younger generations. The projects of sustainable use of biological resources and carbon capture can be succinctly described as follows:

### Isolation and Propagation of Mushrooms

Technical assistance and training contracts have been established to produce the *Pleurotus* mushroom. Other local mushrooms (*Lentinus* and *Pleurocibella*) will be cultivated, in a second phase, and technology transfers for mushroom cultivation will also be sought.

### Production of the Japanese Truffle (*Tricholoma matzutake*)

Japanese truffle production is another interesting medium-term alternative. With a market price of US\$60 per kilo (in 2000) it may be worthwhile to invest in technical development to increase production of the truffle. With more than 26,000 hectares, there are great opportunities for experimental activities and even for technology transfer to other Oaxacan communities.

### Ornamental Plants

Ornamental plants can also offer important income for the communities. Epiphytes (including ferns and bromeliads) collected from timber areas have begun to be sold. Part of the income goes to cultivators and the other to the community.

### Orchid Propagation

Due to the high value and variety of species of orchids in the region, this is an economic activity with interesting potential. There are qualified staff and appropriate equipment in UZACHI.

### Education and Research Services

The union is seeking to establish collaboration agreements with educational institutions, based on its experience in land-use planning, forest ecology, road building, forest management, and ornamental plants propagation. It can also offer technical training for field research. The union is also considering offering services to non-academic visitors, such as tourists, summer school groups, or clubs.

### Carbon Capture

Several aspects of community planning come under carbon capture activities. Because of lack of funds, however, UZACHI's agro-forestry programme has not been able to achieve significant results. The funds required to harmonize resource management would have to come from forest capital, so it is first necessary to invest in the forest, stop soil erosion, intersperse useful trees, and guarantee water storage, before beginning sustainable agriculture. Carbon capture funds would help guarantee a fund to support agricultural activities as well as cover other areas of interest, such as women's projects and development of rural industries capable of enhancing employment opportunities.

## ***Main Lessons and Conclusions***

The most important aspect of this experience has been the pioneering role UZACHI has played for other indigenous and farming communities in southern Mexico and Central America. Its work has inspired other communities to strengthen their sustainable use activities, based on caring for and valuing their territory and culture. The UZACHI model highlights traditional production processes and social participation, and strengthening territorial autonomy.

The scope of UZACHI's work has created constant challenges. For example, its direct work at the international level with bioprospecting has shown that it is possible to establish agreements with industry that benefit the community and create incentives for maintenance of wildlife areas, while at the same time helping to generate scientific advances.

The UZACHI experience shows some new approaches, which could provide foundations for modern systems of biosafety and administration of biological resources, through supporting community conservation and sustainable use systems.

The main challenge now is to see how the UZACHI experience can influence public policy making, as policy changes are fundamental for the experience to be successfully replicated.

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**The Protected Areas Initiative is working towards the following Forests for Life target:**

**The establishment and maintenance of viable, representative networks of protected areas in the world's threatened and most biologically significant forest regions by 2010.**

**By:**

- **identifying forest types currently excluded or under-represented in the PA system,**
- **promoting and supporting the creation of new protected areas in under-represented forest types using the 'Gifts to the Earth' tool, and**
- **promoting improved management of PA networks.**

**Forests for Life**  
**Protecting, Managing and Restoring the world's forests**

**WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:**

- **Conserving the world's biological diversity**
- **Ensuring that the use of renewable resources is sustainable**
- **Promoting the reduction of pollution and wasteful consumption**

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