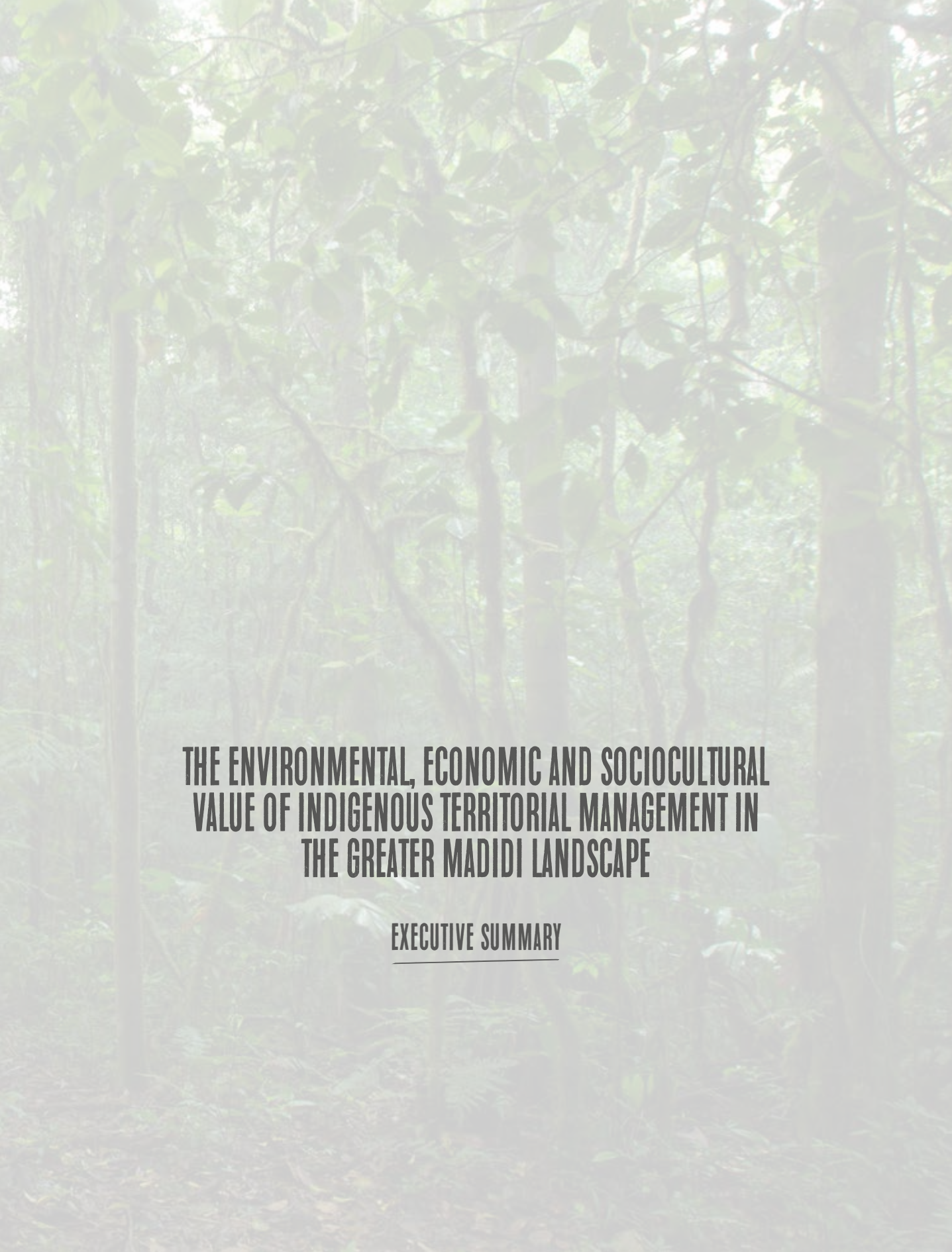
ITM INDIGENOUS TERRITORIAL MANAGEMENT

THE ENVIRONMENTAL, ECONOMIC AND SOCIOCULTURAL VALUE OF INDIGENOUS TERRITORIAL MANAGEMENT IN THE GREATER MADIDI LANDSCAPE

EXECUTIVE SUMMARY



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Executive summary. The Environmental, Economic and Sociocultural Value of Indigenous Territorial Management in the Greater Madidi Landscape.

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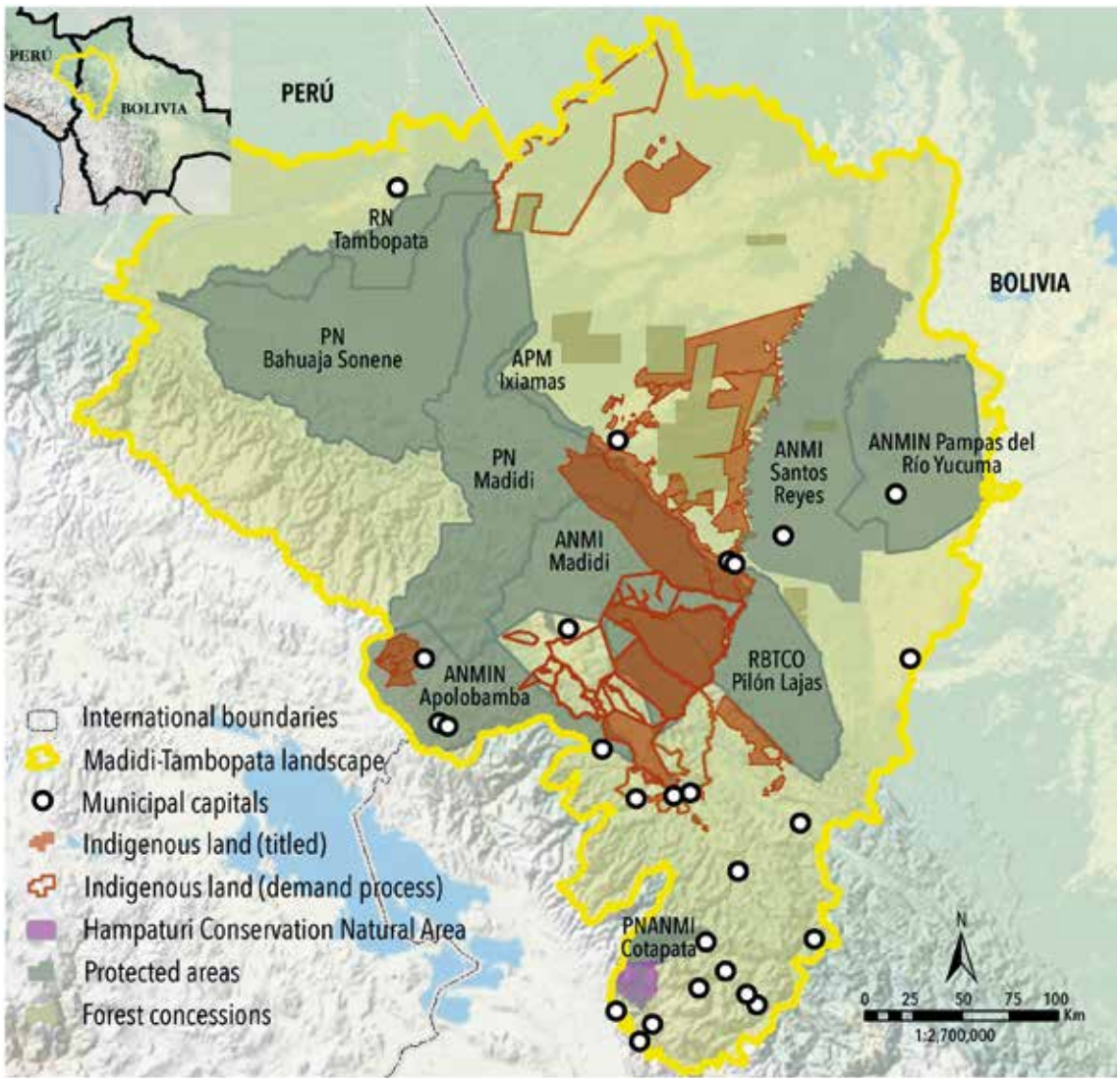
Greater Madidi-Tambopata Landscape
Bolivia-Perú



Introduction

Protected areas and indigenous territories together make up 45.5% of the Amazon Basin (RAISG, 2015) and represent 60% (FAO & OIMT, 2011) of the world´s tropical forest. In the case of Bolivia, protected areas and indigenous territories of the Amazon Basin make up 43.6% of the country´s surface area (WCS, 2016). Indigenous territories overlap or border protected areas and harbor most of Bolivia´s rich biodiversity. They contribute to landscape integrity through the zoning of areas for different purposes such as communal use, wildlife corridors, and watershed protection. This approach is fundamental for the preservation of cultural values, and the creation of opportunities for the sustainable management of natural resources.

The Tacana and Leco Indigenous Peoples developed land management experiences since the early 2000´s, which resulted in outcomes in participatory planning (technical and spatial), institutional strengthening, the development of economic enterprises and biodiversity conservation. Their traditional territories are located in the northern Amazon, within the La Paz Department, which contains one of the most biologically diverse landscapes in the world. The regions varied topography, climate and elevations (altitudes between 190 and 6040 m above sea level) resulted in the development of a high diversity of habitats and wildlife species, with the highest concentration of plants and animals in Bolivia: 60% of the flora and 66% of the vertebrates, with a very high number of bird species (77%), and 10% of the world's birds.

The regions conservation value led to the creation of national protected areas of Madidi, Pilón Lajas and Apolobamba in Bolivia, administered by the National Protected Areas Service (SERNAP). These protected areas are vital for the protection of watersheds, forest preservation and the maintenance of wildlife species. These protected areas complement the activities of nine indigenous territories that strengthen integral planning at the landscape level. As a transboundary area, with southeastern Peru, its importance for conservation is even greater, contributing to ecosystem connectivity and the coordination of protection actions.

Case studies on the environmental, economic and socio-cultural value of indigenous territorial management in Bolivia were produced to systematize, analyze and share the experiences gained by the Tacana and Leco peoples. These studies focus on different thematic areas and look in depth at methodological aspects, and the implementation processes for strategic actions. They contribute to discussion and the exchange of ideas on issues of vital importance to Bolivia, particularly given the central role of indigenous peoples in conservation and development strategies.

More than a quarter-century after the Indigenous March for "Territory and Dignity" of 1990, there have been significant changes in the recognition of indigenous peoples' rights and their political role. Before they were considered as nomadic "wild tribes", marginalized from national life. The country´s lack of knowledge regarding the indigenous reality of the lowlands and their peoples led to the expropriation of their

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ancestral territories and the exploitation of their labor force. Their growing capacity for mobilization, and the articulation of their demands, helped strengthen their role as a political actor and encouraged the Bolivian state to recognize indigenous peoples' right to self-government, to manage their territory and to decide on their development strategies.

However, indigenous territories remain marginalized within the collective imagination of Bolivian society where there still exists the idea that, as with protected areas, indigenous territories can be an obstacle for development. People lack the proper information and understanding regarding the value of indigenous territories as an alternative for the rural development of the country. They do not recognize the economic contribution obtained from the sustainable management of natural resources, nor do they value the role in the maintenance of forests and environmental services, vital to the long-term development of the country.

The results of the various studies will open up new spaces for discussion on one of the most effective development and conservation proposals carried out in the country. It will also enable a better understanding of the contributions made to biodiversity conservation, economic development and the strengthening of indigenous peoples' culture. It will also help indigenous organizations to strengthen their governance capacities, participate in decision making processes for development projects, and guide climate change mitigation and adaptation strategies.

The Wildlife Conservation Society (WCS) has worked with indigenous organizations in the development of their territorial management processes and the systematization of their experiences. There is agreement on the necessity to create the conditions that facilitate integral territorial management, and that respond to the objectives of strengthening cultural identity, nature conservation, and the improvement of livelihoods. The support of WCS was made within the framework of the The Greater Madidi-Tambopata Landscape Conservation Program, implemented since 1999. The Greater Madidi-Tambopata Landscape is situated on the eastern slope of the Andes, between northwestern Bolivia and southeastern Peru, covering an area of approximately 142.000 km^2. The case studies on indigenous territorial management were carried out in the Bolivian area.

Cultural and historical characteristics of amazonian northern La Paz

Historically the northern Amazon of La Paz was inhabited by diverse cultural groups, among them the Tacana, Araona, Esse Ejja, Leco, T'simane and Mosetene indigenous peoples. These indigenous groups had their own social organization and were governed by caciques. Hunting was considered a primary activity in the material and spiritual development of their culture. The people cultivated cassava, peanuts, beans and maize. They fished and collected honey and a great variety of fruits. They used the rivers and roads for transportation and commercial exchange, establishing economic and cultural relations with the peoples of the High Andes and other parts of the Amazon.

The establishment of missionary towns by the Franciscans in the seventeenth and eighteenth centuries gave rise to the towns of the region, Apolo, Atén, Tumupasa, San José de Uchupiamonas and Ixiamas. The missions produced changes in the spatial, social and productive organization of the indigenous peoples, while at the same time keeping their cultural identity. The peoples' traditional agricultural crops were displaced by the introduction of new crops: wheat, rye, banana, rice, coffee, sugarcane, citric fruit, and the rearing of cattle, horses, sheep and chickens. Evangelization influenced religious beliefs and led to the mixing of indigenous and Christian traditions.
From the mid-nineteenth century and the beginning of the twentieth century, the rise in demand for quina (quinine)

and rubber, led to a boom which spurred the process of colonization in the region, and the exploitation of the indigenous labor force and the depopulation of communities. This had an influence on their social composition, productive systems and economic dynamics. The intensification and commercialization of agricultural and livestock production saw the establishment of agricultural estates. It was a moment of "quechuization" of some towns and the formation of new communities.

Towards the end of the 1970s, a new development policy was fostered in northern La Paz, known as "The March Towards the North". This movement promoted the migration of colonizers from the altiplano highlands to the Amazonian lowlands. In the process communication lines were opened and logging concessions granted. This had the effect of modifying traditional productive systems and led to the unsustainable and unplanned extraction of forest resources including timber species and wildlife. It was at this time that the greatest loss of indigenous lands took place. Towards the end of the twentieth century, between August and September 1990, indigenous peoples mobilized "The March for Territory and Dignity". The march articulated their demands for the legal recognition of their lands and also the promulgation of legal norms to protect the territorial, social and cultural rights of the lowland indigenous peoples, giving rise to the creation of their parent grassroots organizations and the demands of the Tacana and Leco peoples over their ancestral territories. This process coincided with the creation of the Madidi, Pilón Lajas and Apolobamba National Protected Areas, generating significant changes in the political, social and economic scenario of the region.

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The Tacana Indigenous People

In 1992, the Tacana Indigenous People´s Council (CIPTA) was formed as the parent organization of the Tacana People. In 1997, CIPTA submitted a request to INRA (National Agrarian Reform Institute) to secure legal land tenure over part of their ancestral territory (769,000 ha). Up until now 389,303 ha have been titled, of which 39,430 ha overlap with the Madidi Protected Area. This land is of great importance due to its Amazon forest ecosystems and savannah plains, which are home to populations of endangered species including the jaguar (*Panthera onca*), giant otter (*Pteronura brasiliensis*), marsh deer (*Blastocerus dichotomus*) and black caiman (*Melanosuchus niger*).

The Tacana Indigenous Territory is located in the Iturralde province, in the municipalities of San Buenaventura and Ixiamas. The territory encompasses 20 communities with a total population of 3,773 in 2012. In conjunction with the land titling process, in 2000, CIPTA began territorial planning by carrying out participatory self-diagnostics and communal development plans. Another key activity was the zoning of the territory, through the compatibility analysis of the territory's different land and resource uses. This process concluded with the elaboration of the "TCO Tacana I Sustainable Development Strategy Based on the Sustainable Management of Natural Resources 2001-2005". The implementation of the development strategy resulted in strengthened governance, the consolidation of territory, the construction of internal norms of access and use of natural resources and the development of productive enterprises.

In 2011, through a participatory process, a second territorial management plan was elaborated and later approved in 2014. The 2015-2025 plan tackles priority development issues for the Tacana people including: risk management, organizational strengthening, health, education, sanitation and infrastructure, food security, territorial consolidation and control, natural resource management and cultural revitalization.

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The Leco Indigenous People of Apolo

The Leco of Apolo Indigenous Territory includes 21 communities and 4,000 inhabitants who are represented by the Leco of Apolo Indigenous People's Council (CIPLA), which was created in 1996. Their territory is found among the humid and dry Andean montane forests and Andean savanna, which host a diverse flora and fauna. This area is also important for the conservation of threatened landscape species such as the Andean bear (*Tremarctos ornatus*), Geoffroy's woolly monkey (*Lagothrix lagotricha* cf. *tschudii*), and the military macaw (*Ara militaris*). It also constitutes the habitat of the Bolivian the swallow-tailed cotinga (*Phibalura boliviana*), an endemic species of the Apolo pampas.

In 1997, CIPLA presented a land claim of 654,000 ha to the National Agrarian Reform Institute (INRA), in 2008 the Leco of Apolo people obtained land title for 238,162 ha, (Polygon 1), however land titling is still pending for 292,264 ha (Polygons 2 and 3). Of the 238,162 ha titled, 231,000 ha overlap with the Madidi National Park. For the Leco People of Apolo, the collective legal tenure of their territory means a great deal. It signifies the recognition and revalorization of their indigenous origins and identity, as well as the opportunity to define new development strategies. Since 2009 the Leco People of Apolo implemented their Life Plan *Wesra Leco Chajlasin*, which is based on the Leco people's vision of their culture and development. Strategies focus on harmonizing conservation and development objectives, through the revalorization of the Leco culture, the strengthening of management capacities, sustainable natural resource management and the generation of economic opportunities that contribute to improving the Leco quality of life.

With the aim of strengthening the joint management of the overlapping area between the Leco of Apolo indigenous territory and the Madidi National Park an agreement was signed between CIPLA and the National Protected Area Service (SERNAP). As part of the agreement CIPLA has supported the park´s control and surveillance activities through joint patrols with park rangers and community members. Also, they helped to establish a camp on the Hondo River and provided equipment for the park rangers.

In addition, a monitoring and evaluation system was set up for the Life Plan. To ensure equity in access to and use of natural resource, CIPLA has developed a general ruling that regulates the distribution of benefits.

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The relevance of territorial management for biodiversity conservation and sustainable development

Territorial management experiences are oriented towards sustainable development and biodiversity conservation, generating participatory planning approaches and methodologies, as well as organizational strengthening and the sustainable management of natural resources. The processes developed over the last 15 years were the result of consensus building among communities, political and technical decision making in the design and implementation of management tools and continuous learning in their application. These processes were built on the basis of traditional cultural values, a common development vision, internal cohesion, social equity and autonomy and the self-management of the territory.

The territorial management of the Tacana and Lecos Apolo Indigenous Territories provides valuable information and concrete results that show experience in the field and the effectiveness of land management tools including planning, zoning, regulation, demarcation, territorial control, monitoring, and the development of technical, administrative, and organizational capacities. This experience has led to the strengthening of governance systems at different levels.

Territorial management plans or Life Plans enable indigenous people to protect their lands, and to use them within a territorial order that promotes natural resource management activities based on the principles and criteria of environmental, social and economic sustainability. These plans are also contributing to the preservation of indigenous cultural identity and the revalorization of ancestral knowledge.

The alliances established with protected areas allowed for the implementation of joint protection actions in the overlapping areas, integrating conservation and development. Likewise, connectivity corridors that link protected areas and indigenous territories, favored the conservation of intact forest and healthy wildlife populations such as the jaguar, Andean bear, lowland tapir and white-lipped peccary.

Management capacity building processes resulted in increased awareness among indigenous organizations and communities of the environmental, economic and socio-cultural value of the management of their territory. The ordering and titling of the indigenous territories is one of the most valued aspects, as well as security in the access and use of natural resources and the development of productive enterprises. Of particular importance is the value of territorial management instruments that act as technical guidelines and direct the implementation of planned activities, as well as facilitating the process of cultural re-appropriation.

The lives of Amazonian indigenous peoples are essentially dependent on maintaining a harmonious relationship with nature and the forest for their spiritual, social, cultural and economic development. Indigenous territorial management is a pervasive relevant experience for the construction of a development model from the perspective and cultural identity of indigenous peoples that also strengthens their commitment with biodiversity conservation.

CASE STUDIES ON THE ENVIRONMENTAL, ECONOMIC AND SOCIOCULTURAL VALUE OF INDIGENOUS TERRITORIAL MANAGEMENT

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ENVIRONMENTAL
VALUE

ENVIRONMENTAL VALUE

Mileniusz Spanowicz/WCS

The importance of indigenous territories for wildlife conservation

A wildlife species occupancy study, carried out over an area of 865 km^2 established important baseline data along the San Buenaventura-Ixiamas road, where the Madidi National Park meets with Tacana indigenous territory. The presence, distribution and occupancy of mammals, will now be used to monitor the effects of road infrastructure improvements and identify, verify and position wildlife habitat corridors. The species with the greatest occupancy values were the agouti (*Dasyprocta* spp.), paca (*Cuniculus paca*), red brocket deer (*Mazama americana*), collared peccary (*Pecari tajacu*), tapir (*Tapirus terrestris*), crab-eating racoon (*Procyon cancrivorous*) and small felines (*Leopardus* spp.). White-lipped peccary (*Tayassu pecari*) and jaguar (*Panthera onca*) had lower occupancy values.

Close to rivers and streams the occupancy values increased for the jaguar, tapir, paca, racoon and small felines, reflecting the affinity of these species to humid habitats. The red brocket and agouti were more common in secondary forests where tender leaf forage is more readily available.

Occupancy values of most species fell markedly closer to urban populations. This is attributed to higher hunting rates, forest fragmentation, and habitat destruction caused by human population growth over the last thirty years. This is particularly true for the jaguar, white-lipped peccary, collared peccary and lowland tapir.

The wildlife occupancy study carried out along the San Buenaventura-Ixiamas road enabled the identification of wildlife corridors that connect Madidi National Park with the Tacana Indigenous Territory and supports observations made by the Tacana communities in questionnaires applied in 2001, 2005 and 2013. Of the 28 corridors identified 5 were prioritized, these are close to San Buenaventura, Tumupasa and Ixiamas and characterized by creeks which straddle the road. These corridors assure the dispersal of wildlife, especially that of charismatic and threatened species, and are vital to mitigate the environmental impact of road development.

The Tacana Indigenous Territory is crucial for the preservation of threatened wildlife including the giant otter, jaguar and black caiman. Studies have revealed important occupancy values of traditionally hunted species, such as the lowland tapir, collared peccary and agouti, indicating the sustainability of subsistence hunting, which is important for the food security and cultural values of the Tacana people.

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Indigenous territorial management and the conservation of water sources

The Tacana territory overlaps with 20 different watersheds, 15 of which originate in the Tigre, Cuñaca, Hurehuapo, Mamuque and El Bala hills, whose headwaters mark the limits of Madidi National Park. Stemming from these headwaters, rivers such as the Emero, Tequeje, Enapurera and Tarene flow into the Beni River.

At least 83 streams and rivers flow into the Beni River, 75% of which originate in hills within the Tacana Indigenous Territory. The Tacana territory protects extensive intact forests that collect and hold water draining from the hills, supplying water downstream. The Emero, Tequeje and Undumo watersheds originate directly on the lowland alluvial plain. They are not connected to mountain streams and instead are fed by underground water sources.

The study area has two main urban centers: Ixiamas and San Buenaventura, a semi-urban center: Tumupasa, and 85 rural communities: 1,100 intercultural and indigenous households outside the Tacana Indigenous Territory, as well as 475 households within the indigenous territory consume water originating from the Tacana Indigenous Territory and Madidi National Park.

The Tacana territory protects the sources of a large number of water bodies each contributing, on average, 0.83 m^3 of water per second to the Beni River. This river, in turn, discharges up to 2,050 m^3 of water per second, at the height of the Bala strait, to the Beni basin. It is important to mention that this Basin deposits the highest amount of water and sediments in the Madeira River, the largest basin of the Amazon.

The Tacana Indigenous People´s Council (CIPTA) and its 20 communities have identified actions to protect their water bodies through zoning of their territory and establishing ecological easements to maintain water bodies, wetlands and healthy wildlife populations. In the application of territorial management, control and monitoring activities have contributed to safeguarding water bodies, with successful results. In 2004, CIPTA filed a complaint for water contamination in the Tequeje river, resulting in the eviction of mining companies that extracted gold at that time.

Different natural pressures and human activities threaten these watersheds. Climate change vulnerability analysis within watersheds shows the level of exposure, sensitivity and adaptability of different ecosystems. The results show a medium vulnerability in 63% of the area of all the basins, particularly in Emero, Undumo and Enapurera, located within the Tacana

Indigenous Territory and in the border of Madidi National Park. The basins with high vulnerability (18%) and with extreme vulnerability (19%), such as the Turiapo river, that occupy smaller areas, are crossed by the San Buenaventura-Ixiamas road and are near the town of San Buenaventura.

Added to this factor is the effect of timber extraction and deforestation, which is greater in areas closer to communities along the San Buenaventura-Ixiamas road, especially closer to the hills. The study carried out on deforestation along the San Buenaventura-Ixiamas road corroborates that the Tacana territorial management has been effective in reducing deforestation, and deforestation was higher in the stretches of the road which do not carry out territorial management.

Actions to mitigate environmental impacts and conserve water sources and ecosystems in this region will be of great importance, particularly in the face of gold extraction on the Tequeje River, near the Macahua and Carmen Pecha communities, road improvements between San Buenaventura and Ixiamas crossing the Beni, Buenbani, Caijene, Enapurera, Jiruma, Mayge, Tarene, Tuacuare and Turiapo watershed headwaters, and the San Buenaventura sugarcane mill on the Mayge, Jiruma, Turiapo rivers and part of the Beni river. In the future, the exploitation of hydrocarbons and potential dam constructions are threats to these hydrological, biological and geochemical processes.

The Tacana Indigenous Territory, due to its location and territorial management process, is an important opportunity for the protection of watersheds and to ensure the provision of water, not only for Tacana communities, but also for the rest of the region.

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Breeding zones of ecologically and economically important fish species

The Tacana Indigenous Territory has important breeding grounds for the piraíba (*Brachyplatystoma filamentosum*), one of the largest freshwater fish in the world, reaching up to 360 cm in length and 200 kg in weight. The drastic reduction in catch volume over the last 30 years in the Amazon basin, is as a result of serious overfishing and unsustainable management of the species.

Data from participative monitoring carried out between 2001-2007 by fishermen in the Cachichira, San Antonio del Tequeje, San Miguel, Carmen del Emero, Copacabana and Altamarani communities, documents the importance of fishing for Tacana households. Seasonal variations in fishing and the dynamics of fish populations in the region were analyzed using data on the number and size of fish caught. The study of the monthly fluctuations in the size and weight of Piraíba fished by communities showed that these increase with the seasonal decrease in the water level of the Beni River. The largest fish were captured during the dry season, while fish caught during the wet season tended to be smaller.

In another study carried out in 2015, the Wildlife Conservation Society reported a unique phenomenon on the Beni river, the massive migration of *Trichomycterus barbouri* juveniles, a small pencil catfish, called in the Tacana language "chipi chipi" which means "the smallest". These fish travel 370 km counter current up the Beni river through the Tacana Territory the nursery grounds of the floodplains of the Beni river, traveling further upstream to the Andean foothills, above the confluence of the rivers Khakha and Alto Beni.

The moment of migration is important for the fishing communities living on the banks of the Beni river, especially in Rurrenabaque. The fish are easy to capture as they move in easily detectable groups (schools). These fish are sold in the regional market contributing to the local economy and food security.

The presence of migratory catfish, from the smallest such as the "chipi chipi" to giant catfish such as the piraíba and the dorado (*Brachyplatystoma rousseauxii*), in the fishing areas of the Tacana territory is an indication that these flooded areas on the Beni river act as breeding areas, and as such contribute to the conservation of these species and ichthyofauna in general.

The documentation of migration processes in the Beni river basin, demonstrates the importance of the Tacana Indigenous Territory and the Madidi National Park for maintaining the connectivity needed by species that migrate locally and regionally.

Indigenous territorial management contributes to the protection of Amazonian forests

Indigenous communities are committed to looking after their forests and developing sustainable livelihoods that also contribute to mitigating the effects of climate change. Together with protected areas, managed indigenous territories contribute to the protection of wildlife and the reduction of forest loss in the Amazon.

The study of territorial management and avoided deforestation between 2005 and 2014 in the Bolivian portion of the Greater Madidi-Tambopata Landscape, under 3,000 m a.s.l., focused on four indigenous territories (Tacana I, Tacana II, Araona, and Lecos of Apolo), three national protected areas (Madidi National Park and Natural Area of Integrated Management, Apolobamba National Natural Area of Integrated Management, and Pilón Lajas Biosphere Reserve and Indigenous Territory) and three main roads (Yucumo-Rurrenabaque, San Buenaventura-Ixiamas, and Rurrenabaque-Reyes). Results reveal that deforestation in the landscape was five times lower in units that have territorial management (protected areas and indigenous territories) than in areas of the landscape without territorial management (0.06% vs. 0.3%).

A more detailed analysis shows that the level of annual deforestation between 2005 and 2014 in indigenous territories -titled and performing territorial management- has been relatively uniform and very low: 0.09%, and similar to forest loss in the protected areas of the landscape: 0.03%.

The greatest deforestation in the landscape occurred in areas close to three major roads, with an average annual rate of 2.6% for 2005-2014, especially along the Yucumo-Rurrenabaque road (4%).

Projected forest loss for 2021 was estimated using historical deforestation rates from the period 2005-2010, and considering three possible scenarios 1) the absence of land management efforts outside of the Tacana indigenous territory, 2) land management within the Tacana indigenous territory and 3) road infrastructure improvements along the Yucumo-Rurrenabaque road.

The results reveal that the lowest deforestation levels within 5 km of the San Buenaventura-Ixiamas road for the 2005-2010 period took place within the managed Tacana indigenous territory (0.5%), while forest loss was higher (2.3%) in private properties and migrant farmer land without land management. Nevertheless, the highest deforestation levels in the Bolivian portion of the Greater Madidi-Tambopata Landscape are found in areas within 5 km of the Yucumo-Rurrenabaque road (3.7%).

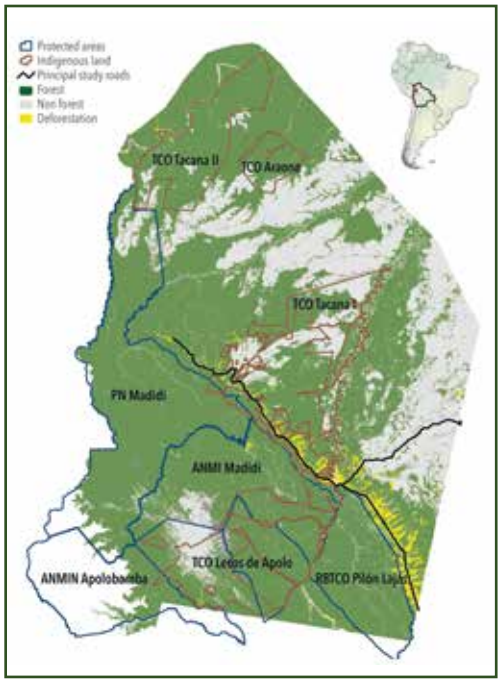
The study projects that deforestation for the Tacana indigenous territory will be 4.6 times less than in adjacent areas with no land management, and 7.4 times less than areas subject to improved road infrastructure. Thus, the active management of the Tacana indigenous territory would mitigate the loss of 22,219 hectares of forest between 2010 and 2021.

The study highlights the importance of indigenous territorial management for biodiversity and watershed protection, as well as connectivity corridors, that secure the flow of wildlife, protect habitats and threatened species populations, and ensure the sustainability of subsistence hunting.

It is important to point out that 87% of the indigenous territories of northern La Paz are forest, equivalent to an area of 1,667,640 hectares. Furthermore, on average each hectare stores 192 tons of carbon. In total 320,186,880 tons of carbon are stored, representing an enormous carbon deposit which contributes to mitigating the effects of climate change.

In 2015, the Tacana People received the Equator Prize for their efforts to reduce deforestation in their territory. This prize is awarded by the United Nations Development Program (UNDP) every two years in recognition of practical and local solutions that contribute to sustainable development and nature conservation.

Territorial management units and avoided deforestation in the Greater Madidi-Tambopata Landscape



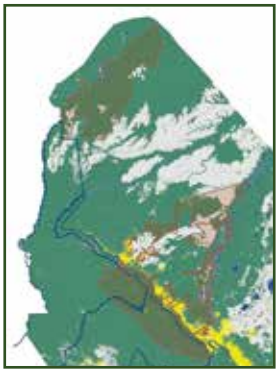
Deforestation in territorial management units (protected areas and indigenous territories): 0.06%.

Deforestation in areas without territorial management: 0.3%

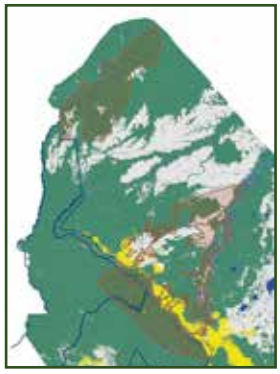
Indigenous territories ▶	TCO Tacana I	-0.241%
% average deforestation	TCO Tacana II	-0.034%
-0.09%	TCO Araona	-0.014%
	TCO Lecos de Apolo	-0.084%
Protected areas ▶	ANMI Madidi	-0.042%
% average deforestation	PN Madidi	-0.002%
-0.03%	RBTCO Pilón de Lajas	-0.112%
	ANMI Apolobamba	-0.012%
Areas in a buffer along roads ▶	Rurrenabaque-Yucumo	-3.98%
% average deforestation	San Buenaventura-Ixiamas	-1.78%
-2.6%	Rurrenabaque-Reyes	-2.06%

Deforestation scenarios 2010-2021

Scenario with Indigenous Territorial Management (Deforestation rate of 0.5%)



Scenario without Indigenous Territorial Management (Deforestation rate of 2.3%)



Scenario with improved road Yucumo-Rurrenabaque (Deforestation rate of 3.7%)

Wild cacao: heritage and genetic diversity in indigenous territories

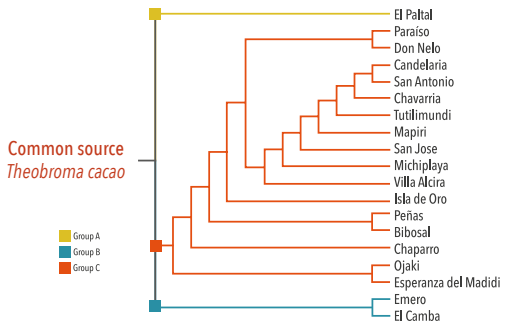
Dating back to pre-Hispanic times the gathering of cacao is a traditional activity for Amazonian indigenous communities of the northern La Paz Department. The forests harbor a great genetic variability that ensures the production of cacao of a high organoleptic quality recognized both in Bolivia and worldwide. The commitment of the Tacana indigenous people to the conservation of natural wild standings of cacao guarantees the preservation of genetic resources for the benefit of Bolivia and the world.

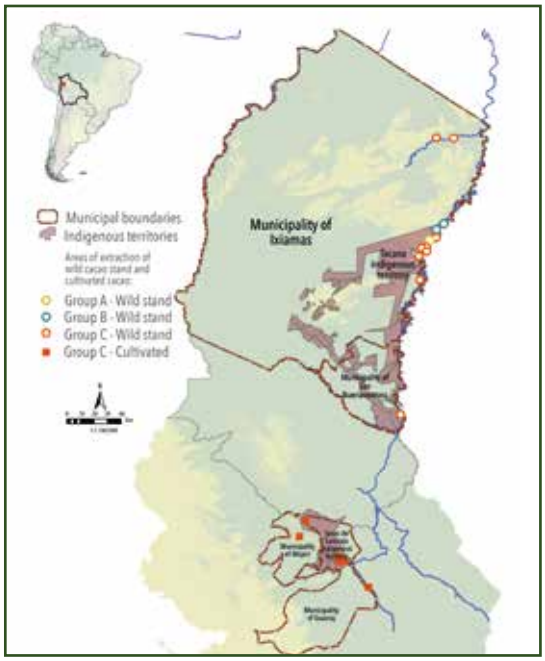
A study was carried out to record the genetic characteristics of Amazonian cacao (*Theobroma cacao*) from northern La Paz. To determine the structure and genetic diversity of the cacao, 201 plant leaves, tissue samples from 19 populations of cacao (11 wild stands and 8 cultivated) were analyzed. These samples came from various communities of the Tacana and Lecos Larecaja Indigenous Territories, and the municipalities of Guanay and Mapiri. Results indicate that cultivated populations originate from populations of wild cacao as a result of the traditional process of wild cacao domestication by indigenous peoples since pre-Hispanic times.

Another important result from the study is the establishment of a national protocol for the extraction of DNA from cacao leaf tissue samples, which will enable the development of a genetic database of all the cacao varieties found in Bolivia.

The Amazon forests of northern La Paz harbor a great genetic variability that ensures the production of high quality cacao. They are also a haven for Amazon species such as the jaguar, black spider monkey and the harpy eagle. The management of indigenous territories is key to their conservation and sustainable management for the long term.

Evolutionary history of cacao populations and their location in the municipalities of northern La Paz





Mileniusz Spanowicz/WCS

Julie Larsen/WCS

ECONOMIC
VALUE

Mileniusz Spanowicz/WCS

ECONOMIC VALUE

The contribution of territorial management to the economic income of local households

Over the past 15 years (2001-2015) the legal consolidation of part of the Tacana traditional territory and the development of a territorial management vision has enabled the Tacana to diversify their economic sources and to increase household incomes by 100%. This is shown in a study on the economic income of the households of 19 of the 20 communities of the Tacana Indigenous Territory which confirms the diverse character of their economy, a feature shared with other indigenous peoples of the Amazon. One of the factors that has allowed this growth is the diversified Tacana economic system. This system is characterized by its flexibility and ability to operate a mix of reciprocity and market, sustained by a diversity of natural resources conserved in the territory, and ensuring that the indigenous population improves their living conditions.

The main sources of monetary and non-monetary income are based on 12 economic activities: agriculture, livestock, hunting, fishing, timber harvesting and firewood collection, extraction of non-timber forest resources, native bee honey collection, by-products (chancaca molasses), local chivé and chicha drinks, chocolate, charque (dried meat) and handicrafts, tourism, laboring, businesses (stalls, restaurants, services), and others (rents, bonuses, pensions, donations, remittances).

Households have been estimated to receive a net average annual income of US$ 3,349. The most important sources of income are working for others (24%), timber harvesting and firewood collection (20%), fishing (16%) and hunting (13%). Although livestock, agriculture and the use of non-timber forest resources contribute less to the average annual net income per household, they are productive activities in which the vast majority of households participate.

It is important to note that 52% of net income comes from natural resource use (timber and non-timber, firewood, fishing, hunting, tourism and native bee honey), that conserves forests and wildlife populations. Productive commercial enterprises based on natural resource management (forestry, native cocoa production and tourism) contributed 14% of income, and are carried out within the framework of the territorial management of the Tacana Indigenous Territory.

Eleanor/WCS

Mileniusz Spanowicz/WCS

The contribution of women to the household economy is fundamental. Their participation accounts for 40% of the Tacana household income (without considering household duties). However, the distribution of costs and benefits between women and men is not equal. Considering all income sources, women's wage levels are 6% lower than men's.

A comparative analysis of income between 2000 and 2012 shows that in the territorial management process there was a 93% increase in income per household and a 109% increase in monthly income per capita. The average net daily income (monetary and non-monetary) per capita is US$1.80 a figure that exceeds the extreme poverty standard defined by the World Bank: US$1.25. This is significant and shows that the communities and their organizations have achieved positive results through the management of renewable natural resources and the identification of natural products with economic potential.

The sustainable harvest of wild cacao and its contribution to the Tacana household economy

The harvest of wild cacao is a traditional activity of the Tacana people, and an important source of family income and food security. From the cacao fruit the cacao beans are left to ferment in wooden boxes and then spread out on table to dry in the sun. This process intensifies the aroma and flavor released by the beans. The production of cacao combines tradition and technological innovation and contributes towards biodiversity conservation.

A study on the production and economic value of wild cacao in the Carmen del Emero community of the Tacana indigenous territory identified 13 cacao stands (forest areas where native varieties of local cacao grow naturally) covering an area of around 3,500 ha. Eight of these stands, covering an estimated 1,290 ha are harvested because of their proximity to the community. Their management provides an important alternative income for 45 families in the community enabling them to access niche and specialist markets that add more value to the production chain.

Since 2013, with the application of a range of technological innovations along the productive chain -shade management; pruning; the use of appropriate tools to cut the fruit (pod) using a knife or short machete (to recycle nutrients); controlled fermentation in wooden boxes; controlled drying on tables- family harvest rates and cacao bean quality improved. As a result, the commercial value of their harvest increased by 83%, from US$ 2.4 to US$4.4 per kilogram of dry cacao beans.

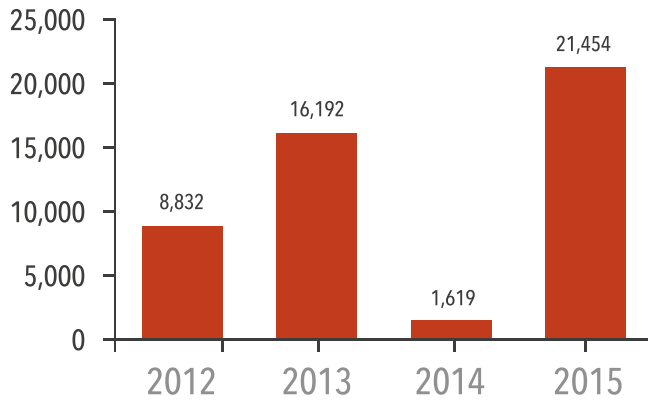
In 2013 the community commercialized 3,680 kg. In 2014 due to flooding 368 kg were commercialized. In 2015 the figure was 4,876 kg representing a 32.5% increase compared to 2013. This meant that the cocoa value chain rose from US$16,192 in 2013, to US$ 21,454 in 2015.

With the implementation of the management plan, production costs increased by 87% over previous years, especially due to investments in infrastructure and tools. However, it also improved incomes approximately by 150%. These figures confirm that the sustainable use of wild cacao stands is an important potential source of income for the families of Carmen del Emero.

In October 2015, a cacao sample collected and processed by the Carmen del Emero Association of Wild Cacao Producers (APROCACE), received the international prize for Cacao, which recognized their work and the diversity of chocolate aromas and flavors ranking the chocolate within the top 17 in the world.

Also noteworthy is that in northern La Paz Department, the production of cacao under agroforestry systems benefited 200 families from 25 indigenous communities, including tacanas, lecos, t'simanes and mosetenes, who are organized into different local associations: Wild Cacao Producers Association of Villa Fátima (APROCASVI), Native Ecological Cacao Producers Association of the Leco of Larecaja People (CHOCOLECO), Native Ecological Cacao Producers Association of the Municipality of Mapiri (APCAO Mapiri), and the T´simane Mosetene Regional Council (CRTM). Their efforts and organization have contributed to their success in producing an excellent cacao, while at the same time conserving forests and wildlife.

Value of the wild native cacao in Carmen del Emero (US$)



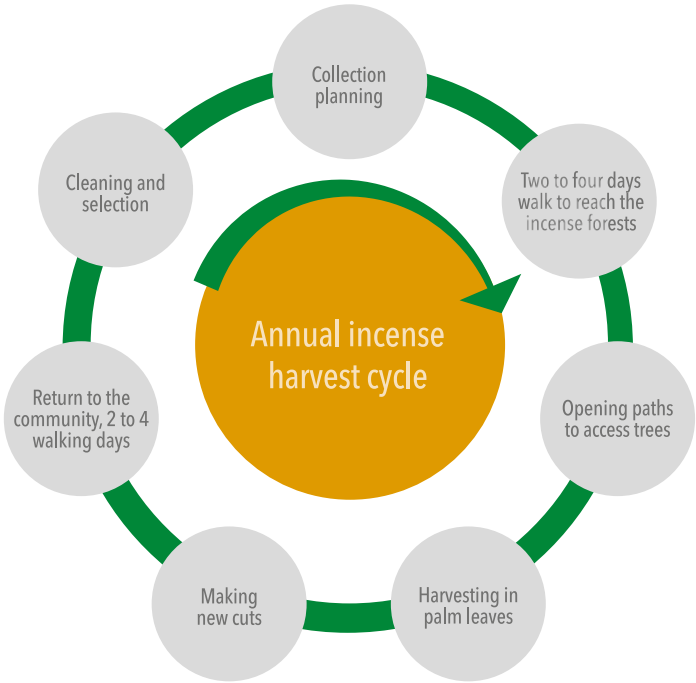
The collection and commercialization of incense while protecting forests

The gathering of incense is a traditional activity kept alive by indigenous communities of the Lecos Apolo Indigenous Territory. The incense tree (*Clusia pachamamae*), is an endemic species of the humid montane forests of northern La Paz Department. The incense produced is of high quality and is used in religious festivals, rituals and purification rites. Its collection contributes to the conservation of forests, whilst supporting local livelihoods.

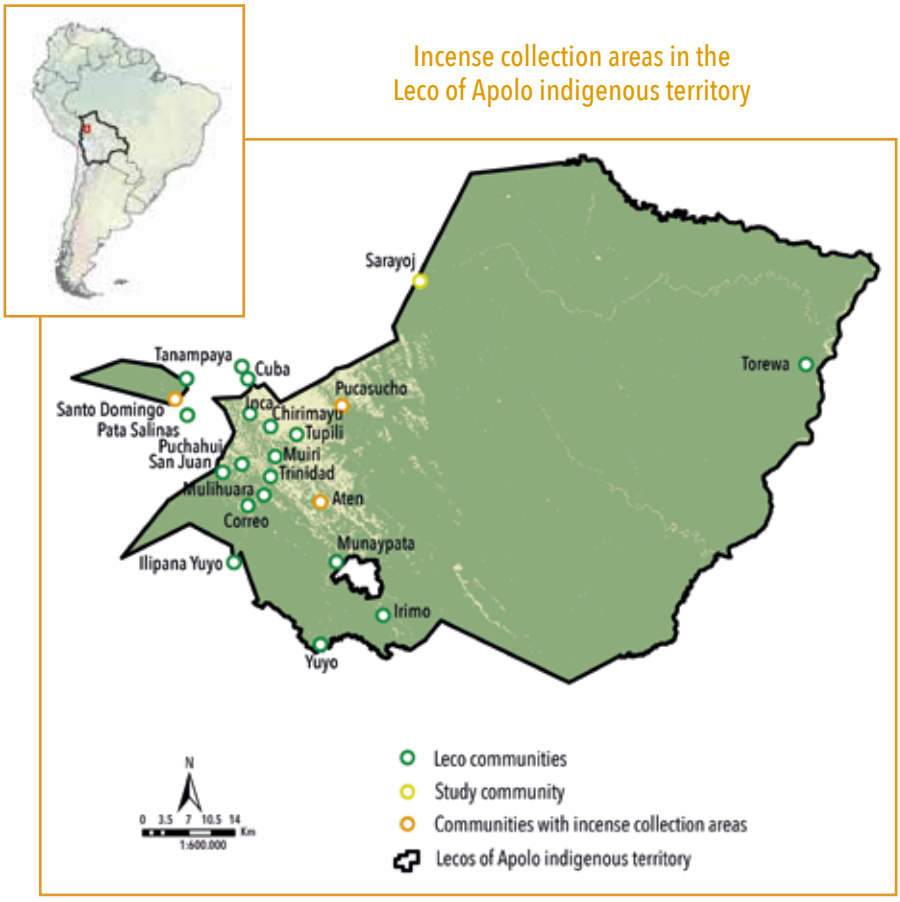
An estimated 3,149 hectares of incense forest occur within the Leco Apolo Indigenous Territory -around 1.5% of the total territory, around the communities of Sarayoj, Atén, Pucasucho and Santo Domingo. Incense collection is carried out under management plans that promote the natural regeneration of the species. Each visit to the "rumbeos" lasts approximately six days. The dried resin is collected in a container made of tola palm leaf and transported to the community where women, girls and children participate in the cleaning and sorting of the crystals of resin for sale.

Sarayoj is the community with the largest number of families participating in incense collection. Fourteen of these families, form part of the Association of Incense Gatherers of the Leco of Apolo People (ARIPLA). The harvest area extends over 160 hectares and an average of 9 hectares is harvested per collector family. With the aim of supporting planned collection and better market prices for incense, the Sarayoj collectors attempted to improve the price by directly selling in the La Paz, Cochabamba and Potosi markets. An ARIPLA administrated fund for the cash purchase of incense at a set price of US$11.5 per lb of resin was also established.

Incense harvesting process



Mileniusz Spanowicz/WCS



Incense collection data in Sarayoj, for 2015 and 2016, reveal an average annual harvest per collector of 17 lb. The total harvest was 486 lb, sold at US$14 per pound weight (20% more tan the local Price) giving a gross income of US$6,804.

These results confirm that the development, collection and organised commercialization of incense enabled the incense collectors of the Lecos Indigenous Territory access to improve incomes. The collection of incense contributes to the conservation of forests protecting watersheds and helps preserve the diversity of wildlife including the Andean bear, woolly monkey, dwarf brocket deer, giant armadillo, and Andean cock-of-the-rock.

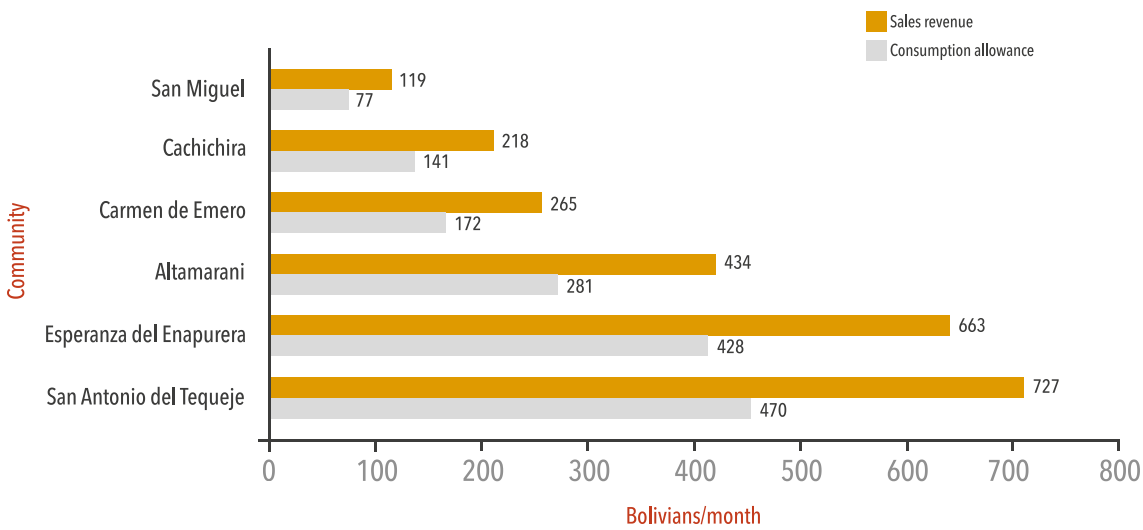
The economic value and contribution of fishing to the food security of Tacana communities

Fishing, along with hunting and forestry product gathering, is a traditional activity of the Tacana people and an essential element of their culture. The communities have preserved their fishing methods, including the use of the bow and arrow, hook and trap, along with other methods such as nets and line fishing. Fishing is an important source of dietary protein and a source of income for the Tacana communities of the Beni river.

Over six years, 2001-2007, the fishermen of the San Miguel del Bala, Cachichira, San Antonio del Tequeje, Carmen del Emero, Copacabana and Altamarani communities monitored their fishing activities. During this time, the fishermen registered 42.5 tons of fish. Of the 43 species commonly harvested, the principal fish species were the granulated catfish (*Pterodoras granulosus*), the sorubim catfish (*Pseudoplatystoma* spp.), the pacú (*Piaractus brachypomus*), the sábalo (*Prochilodus nigricans*) and the gilded catfish (*Zungaro zungaro*). Each of the communities caught a monthly average of 240 kg of which 65% was destined for commercialization, and 35% for family consumption.

The economic value of fishing was derived from the monetary income resulting from the direct sale of fish and the contribution of fish to household food (expressed in monetary terms). Each family caught about 25 kg of fish per month. Of this amount, 16 kg were traded in the Tacana communities and other local markets, representing an average monthly income of US$58. Fish consumed by families represented an average subsidy of US$38. Adding the income generated from the direct sale of fish and the subsidy from the consumption of fish, the economic value of fishing amounted to more than US$95.7 per month. In some communities, such as San Antonio del Tequeje, the income and subsidy total reached almost US$172, equivalent to 65% of the 2016 national minimum wage in Bolivia.

Monthly income from fishing sales and subsidies in Tacana communities

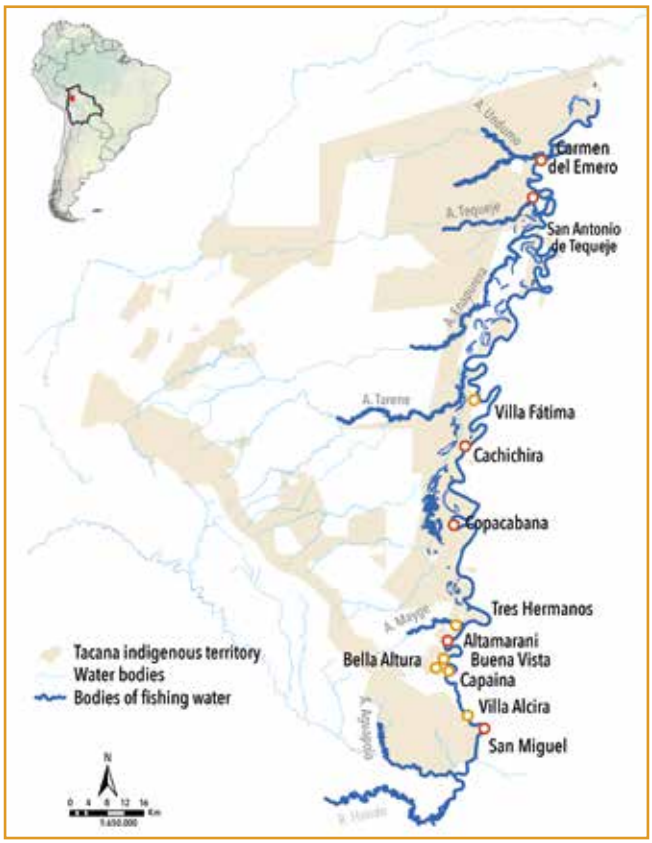


Eleanor Briggs/WCS

This data shows that fishing is an economically sustainable activity, and as such is essential for the development of the Tacana communities. It also demonstrates the contribution of fishing to the food security of Tacana families, and consequently to the integral management of their territory.

An analysis of the self-monitoring data has shown that fishing is environmentally sustainable. The constant capture rates (fishing volume and number of fishermen) are an indicator of fish abundance. Another indicator is the size of the fish, which in general were found to be of constant size over the sampling period.

Fishing areas of the Tacana indigenous territory



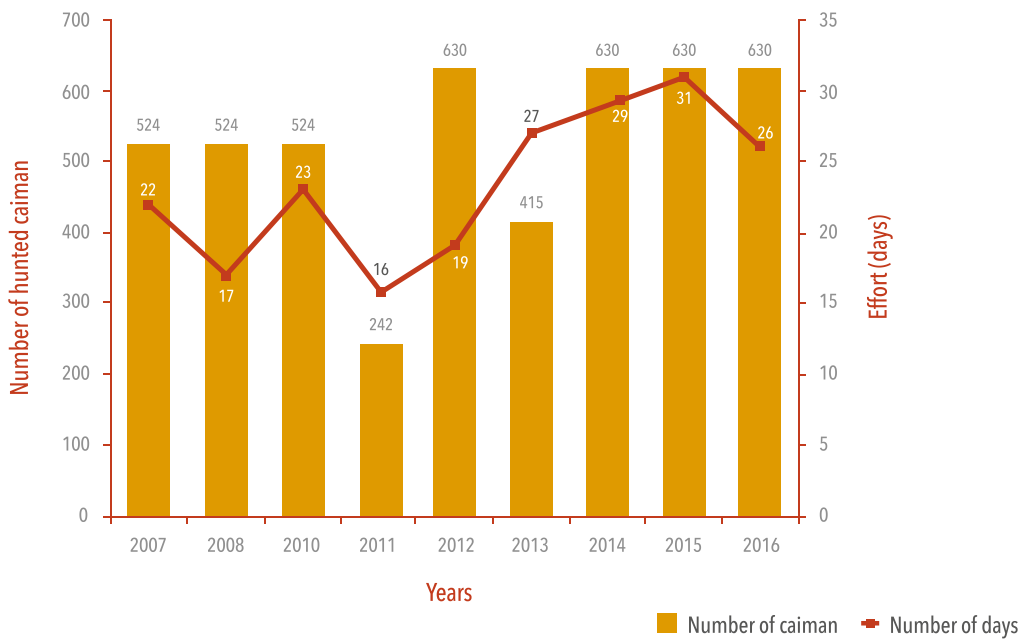
Sustainable harvest of spectacled caiman and its contribution to conservation and income generation

The harvest of the caiman (*Caiman yacare*) by the Matusha Aidha Productive Association (Matusha Aidha in Tacana means "big caiman") sets out to generate economic benefits for the most isolated Tacana communities, and at the same time carry out an effective control of the water bodies of their territory where illegal hunting is threatening the species. The association's objective is environmental, social, and economic sustainability through: 1) the maintenance of viable caiman populations; 2) development of actions directed at the livelihoods of the communities; and 3) the commercialization of caiman products that value the management activities of the indigenous communities.

The Matusha Aida Productive Association is composed of 27 members from four Tacana communities, Cachichira, San Antonio del Tequeje, Carmen del Emero and Copacabana, however, other families also participate in caimán harvest activities. Between 2007 and 2015 there have been eight caiman harvests carried out according to established management plans and approved harvest quotas and benefiting 63 families.

The harvest area of the caiman in the Tacana indigenous territory covers a surface area of 1,298 km^2 (34% of the Tacana territory), including sectors of the Beni River, streams, ponds and lakes. The total harvestable population is of male adults only, conserving females, and is estimated to be 3,884 male individuals (15% of the caiman population). The approved annual harvest is for 630 adult males (16% of the adult male population), with a minimum capture size of 180 cm length (snout-tail). Another conservation measure is the regulation of the hunting season which takes place in October at the end of the dry season, so as not to interfere with the reproductive period of the species.

Monitoring of harvested hunting effort



The monitoring indicators of the harvests, such as capture sites (selection of water bodies), sex, average capture size and weight, and time spent hunting, show that in general the populations of spectacled caiman are stable and that their harvest is sustainable. The success of the management of caiman in Tacana is also contributing to the control of water bodies, the reduction of illegal hunting of the caiman and the vulnerable black caiman (*Melanosuchus niger*).

The commercial strategy for caiman products has generated valuable experience and provided communities with access to differentiated markets that favor products that support the sustainable management of natural resources, are environmentally friendly, and also support the responsible development of local communities.

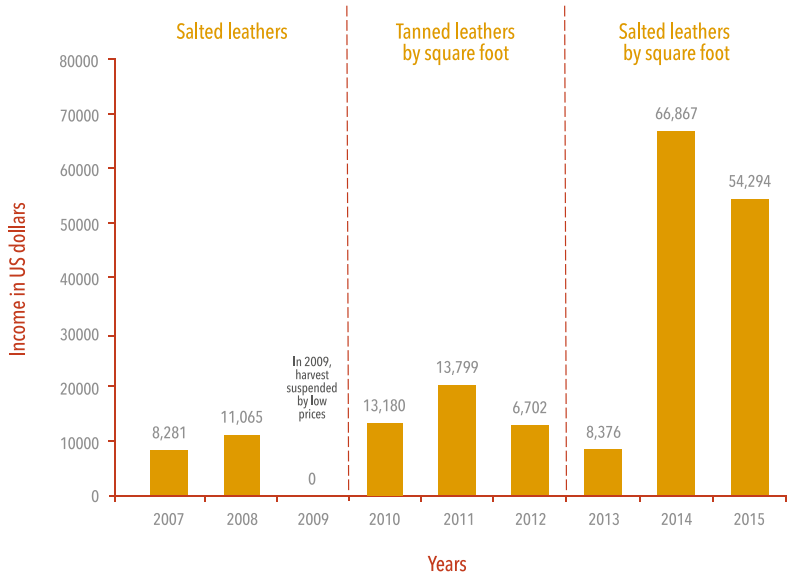
The export to Europe of cured (salted) leather during the 2014 and 2015, generated an average income per member of US$1,803 for one month's work. This represents 58% of the annual national minimum wage. It meant a fivefold increase in the typical family income of participating communities, contributing greatly to their livelihoods.

Furthermore, the alliance with the nationally and internationally acclaimed "Gustu" restaurant in La Paz has provided women members with a market to sell fresh caiman meat at three times the traditional market price (from US$2.58 to US$7.18 per kilogram). Put in perspective, between 2014 and 2015, the average income per member from the sale of caiman meat was was US$220 and was obtained with only one week of work per year.

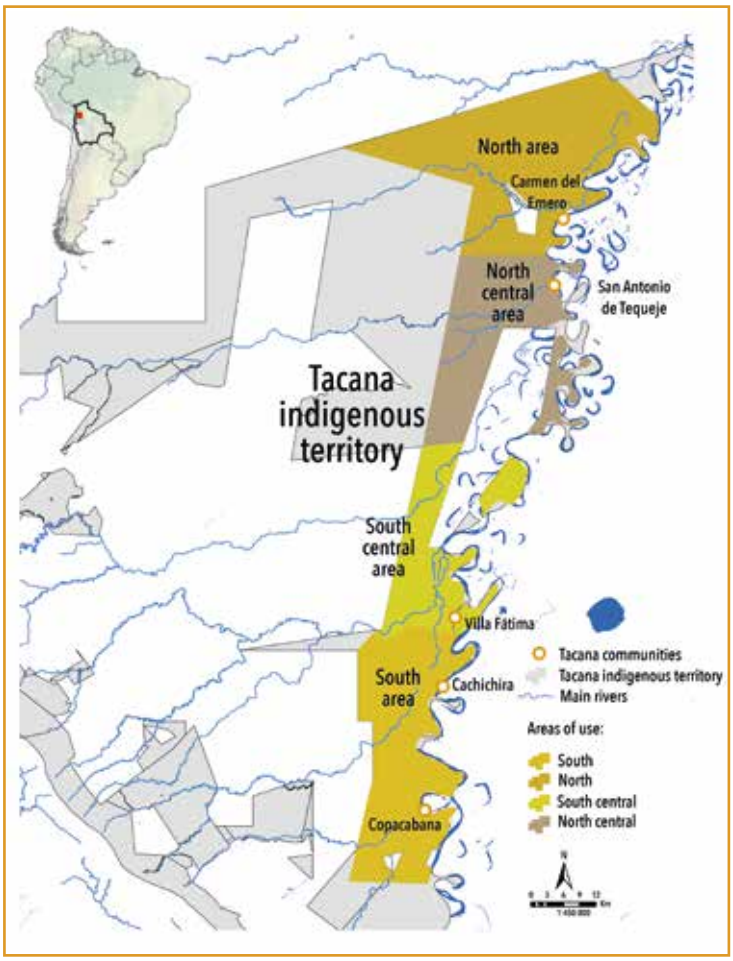
These alliances open up prospects for the Matusha Aidha association to secure just and fair markets and provide significant incomes for their families and communities. In turn the businesses recognize the accomplishments of the Tacana people in the sustainable management of the caiman species, securing the future viability of the species.

In May 2015, the Matusha Aidha association received a special recognition by the Ministry of Environment and Water for its contributions to science, improved organization and management techniques, as well as, their achievements in the commercialization of leather and meat within the framework of the National Program for the Conservation and Sustainable Harvest of the Caiman.

Harvest increased profits from the sale of tanned and/or salted leathers of the caiman between 2007-2015 in US dollars



Spectacled caiman harvesting areas in the Tacana indigenous territory



Gustavo Álvarez/WCS

Restaurante Gustu

Eleanor Briggs/WCS

SOCIOCULTURAL VALUE

Carla Rodas/CIPLA/WCS

SOCIOCULTURAL VALUE

The territorial management and the strengthening of the democratic participation of indigenous peoples

For indigenous people, land tenure security for their territories is intrinsically connected to the preservation of their cultural and ethnic identity. This aspect was an essential part of their territorial proposals, since their territory is regarded as a collective cultural space governed according to traditional norms and customary practices.

The experiences of indigenous territorial management were carried out in parallel with land organisation and titling processes. The formulation of life plans or territorial management plans emphasized natural resource management and integrated the cultural dimension allowing for the integral recovery of the territory.

The development of indigenous territorial management tools contributed to a governance system that, within a unique and representative organizational structure, linked different preexisting and recently created organization levels, such as community enterprises and territorial organizations. This enabled the fulfillment of development objectives, the consolidation of territory, and the revalorization of ethnic and cultural identity.

The Tacana indigenous people's territorial management experience is a valuable example of territorial consolidation and autonomy in Bolivia. Between 2000 and 2012 a critical pathway was identified for implementing management tools: planning, zoning, regulation, demarcation and territorial control. This was orientated towards a system of governance articulated at different organic levels.

The territorial titling process and the elaboration and application of territorial management tools have been important in territorial administration and self-government. Also, because of the way in which they were implemented, they created spaces for communication and dialogue between the Tacana communities themselves, as well as with their territorial organizations. Dialogue was facilitated in social conflict situations with those against the recognition of indigenous rights and land, thereby strengthening the Tacana identity.

The Tacana people are positive about their territorial management experience. In particular, they value the titling process and the development of managment tools. Also, they appreciate the secure access to natural resources and the promotion of commercial productive enterprises.

Eleanor Briggs/WCS

Eleanor Briggs/WCS

For the Leco People of Apolo the reconstitution of the Leco nation, through the recovery of their ethnic and cultural identity and their ancestral territories, was a central objective of their territorial claim. It was also an integral part of their Life Plan which lays out a visión and development proposals agreed amongst the Leco communities.

In the implementation of their Life Plan, the Leco Apolo Indigenous People´s Council (CIPLA) promoted alternative sustainable productive activities which benefit their communities, among them coffee, incense, tourism, livestock and handicrafts. These activities were developed within the framework of territorial organization at the communal, intercommunal and TCO levels, and also the application of established regulations on the access and use of natural resources.

The joint protection of areas that overlap with the Madidi National Park and Protected Area is implemented through a shared management agreement signed between CIPLA and the National Protected Areas Service (SERNAP) in 2013. This enabled the development of joint protection actions with the active participation of park rangers and CIPLA community members.

Within this context, the territorial management experience of the Marka Cololo Copacabana Antaquilla indigenous organization is also relevant. The reconstitution of the organization, made up of eight Ayllus, brought with it several challenges for the recovery of its people's indigenous identity and history as a Pukina nation. The overall purpose of the organization was to achieve autonomy and self-determination. It set out to obtain the recognition of ancestral rights of the original Ayllus over their traditional territory. Other objectives included the participatory development of territorial management tools and the implementation of alternative sustainable productive activities. Reflecting on their experience Marka indigenous leaders and community members, highly value their achievements in strengthening community participation in decision making, the judicial security of their lands, and their rights as an indigenous people to continue managing their territory.

The application of territorial management tools in the Tacana Territory

The territorial management of the Tacana Indigenous Territory was achieved through the development of a consensual participatory process involving the 20 communities that live within the territory. Initial planning activities resulted in the Tacana Indigenous Territory Sustainable Development Strategy or Life Plan 2001-2005, which established management concepts and tools for territorial zoning aimed at regulating the access and use of natural resources and consolidating land tenure limits. The process was systematized with the aim of analyzing the territorial managment experience, and studying in greater depth aspects that have facilitated and hindered the experience.

Preliminary zoning (2000-2001) applied a participatory methodology for the spatial analysis of the different comunal land uses. Drawings by women and men from the communities were used to produce a set of thematic maps, in digital format, of current and potential land use and a matrix to analyze the compatibility of potentially overlapping or neighboring land uses. This information enabled the identification of reserve areas and conservation corridors.

The zoning was adjusted to specific titled areas through a process called micro-zoning. Micro-zoning (2003-2008) considered the proposed land use categories in the territory's zoning, along with communal jurisdictions and traditional land use. This enabled agreement for the definition of areas of current and potential use, their terms of management, and their compatibility with the territorial planning technical standards.

After more than a decade since its design and application, the communities continue to use the territorial management plan and tools to guide their activities. The reserve areas have been respected, and most zones have been used according to the zoning plans. Although, forestry and tourism have become prefered activities over other more traditional uses, such as hunting, forest cover has not been affected.

A set of regulations for the use of natural resources in the Tacana Indigenous Territory was drawn up through a collaborative process involving all the communities. The regulations establish the principles and criteria of environmental, social and economic sustainability for natural resource use. It identifies who has rights and duties regarding access and use of natural resources. It defines general rules for each type of zone: tourism, hunting and fishing, timber and non-timber forest harvesting, agriculture, agrosilvopastoral, livestock, reserve and historical cultural areas. It also determines those practices that are allowed or not allowed for the use of wildlife, forest, agricultural and livestock resources. The regulation lays out procedures for the commercial use of natural resources, the distribution of benefits, as well as penalties for infractions.

An analysis of regulation compliance shows that the rules are widely known in the communities. Unfortunately, the effectiveness of their implementation is largely affected by the actions of people from outside the territory who illegally enter to extract resources. Nevertheless, the elaboration and implementation of specific management plans for the sustainable use of natural resources is successful and ongoing.

An equally important next step in the consolidation of the Tacana Indigenous Territory was to physically demarcate territorial limits (2003-2010). This was necessary given that the territory's polygons had been titled in a discontinuous manner. The titled land borders 600 private properties and 5 forest concessions, fueling permanent conflicts due to the entrance of outsiders to indigenous areas for the purposes of hunting, fishing and logging. It was important to define communal jurisdictions for the control and monitoring of the territory and to manage conflicts of access between communities and individual families.

Between 2004 and 2010, 252 km of boundary limits were defined, prioritizing critical places in 11 communities of the Tacana Indigenous Territory. Areas were delineated according to the community necessities, especially in the urban area of Tumupasa and timber extraction areas. The Tacana Indigenous People's Council (CIPTA) coordinated the task, with support from communities to open trails and mark the boundaries with stones, trees, and signs.

Through the implementation of control and surveillance activities, with the active involvement of authorities and community members, the Tacana Indigenous Territory successfully achieved a 70% reduction in the illegal extraction of natural resources, in particular, wildlife hunting and timber logging, as well as the unauthorized settlement of outsiders.

The development of administrative capacity for indigenous territorial management

From the start of the process of institutional development for indigenous territorial management the Tacana developed agreements with different cooperation institutions and this led the Tacana Indigenous People's Council (CIPTA) leadership to prioritize the need to develop its own administrative system. An administrative system is understood as a set of interrelated elements (human, technical and material resources) and procedures that define the administrative steps necessary to allow forthe transparent management of financial resources to support priority technical activities.

The process to develop administrative capacities involved four phases: the first phase (2000-2004) developed the foundations for the administrative system. The second phase (2005-2007) transferred administrative responsibilities to CIPTA, including the establishment of an accounting system and the operation of a technical team. The third phase (2007-2011) focused on administrative management including self-generated funds. Finally, the fourth phase (2011-2013) established an independent management of resources outlined in the Financial Administration and Management Manual.

A number of essential elements in the internal workings of the CIPTA leadership were identified as crucial in describing the Tacana experience in constructing an administrative system, for example, inter-institutional relations based on the administration of funds, management of professional and technical personnel, administrative support to productive enterprises and other grassroots organizations within the territory. Throughout this process, the CIPTA leadership decentralized its administrative and technical decision making systems, involving the board and secretariats of the organization, the communities themselves and productive enterprises.

Accountability is a fundamental requirement for the operation of the administrative system. The CIPTA board of directors reports at annual meetings. Similarly, the productive enterprises, when concluding with the production and/or exploitation activities, are accountable each year to their partners, community authorities and representatives of the CIPTA board of directors.

In the management of the technical teams, the administrative figure of partnership and complementarity involving specialized professionals working with local technicians was consolidated. In addition, different modalities were identified according to the phase: 1) technical assistance contracted by CIPTA and based in Tumupasa, the main center of the Tacana indigenous territory; 2) technical assistance contracted by external institutions, but based in Tumupasa; and (3) technical assistance provided by the staff of cooperation. institutions.

In order to strengthen administrative capacities in territorial management, 12 training courses were held in basic administration, with the participation of 94 representatives of the 20 communities and productive associations: 56 men and 38 women. Through this capacity, CIPTA was also able to provide administrative and technical services to its productive enterprises and organizations and basic institutions, assuming the operating costs, and ensuring that efforts were framed within their administrative system.

The analysis of administrative progress in the period 2000-2013 reflects the growth and strengthening of the Tacana People´s Indigenous Council (CIPTA) in the management of its financial resources, as well as in the organization of its technical teams. This challenge is still a priority today and they continue strengthening a reliable, responsible and effective management system that responds to the expectations and needs of the members of its territory and to financial institutions or sources of finance.

Tacana household gardens and their importance for food security

The Tacana traditional agricultural system is based on three management units: the field (el chaco), fallow land (el barbecho) and the household garden (el patio), each distinct in size and purpose. Fields are larger pieces of land used for annual crops, fallow lands are left to rest or planted with crops that demand less nutrients, while gardens are small extensions, usually 700m^2, where a diversity of plants are cultivated close to the home. To assess the importance of household gardens for the diet and nutritional health of Tacana families, a study was carried in 122 household gardens and 14 Tacana communities on the contribution of women to biodiversity conservation and family food security.

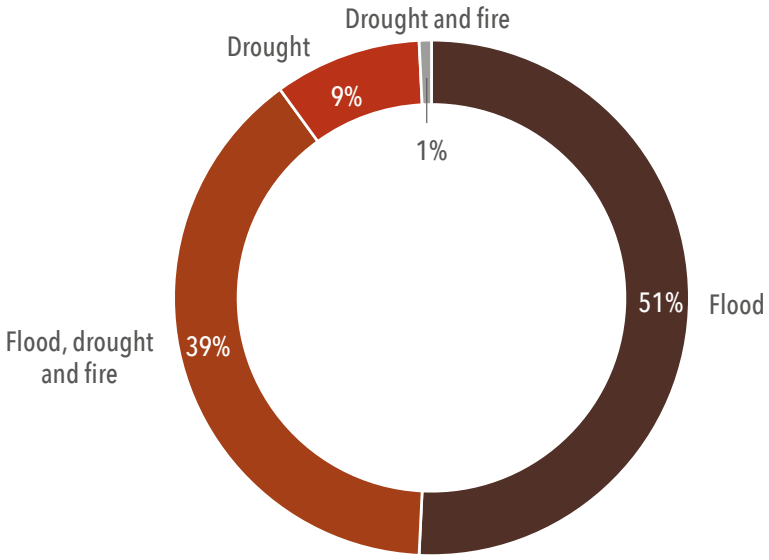
Gardens have many uses. They are an important source of food that contributes to the basic nutritional needs of Tacana families. Also, they are reserves for the biological and productive diversity of small scale crops. In addition, gardens have valuable social and cultural functions, providing areas for recreation, relaxation and social exchange, and preserve a wide variety of plants. Such plants include *Walusa*, which is an ancient Amazonian plant resistant to floods.

The agricultural management of Tacana gardens has essential characteristics associated with indigenous territorial management, such as their role in community efforts to ensure food security. Gardens also support the revalorization of cultural practices and knowledge that promote the role of women in productive activities, strengthen cultural identity, as well as, family and community cohesion.

Study results indicate that gardens contain cultivated, wild and semi-wild plants for food, medicinal, ornamental and artisanal purposes. Fruit trees are most common, especially orange, grapefruit, mandarin and lemon. Other garden trees are coconut, cacao, pacay, achachayrú, avocado and banana. Also, commonly cultivated are a variety of roots and tubers, chili peppers and palms. More than one hundred species were identified, of which 28 are more commonly cultivated. Gardens are also priviledged places for rearing small domestic animals such as chickens, pigs and ducks. These animals are an important source of protein contributing to family subsistence and reducing the need to hunt wildlife.

Eighty-three percent of Tacana households state that at least part of their daily dietary needs come from their garden, confirming their contribution to food security, by ensuring a varied and nutritional diet for their families.

Environmental resistance
of plants in tacana household gardens



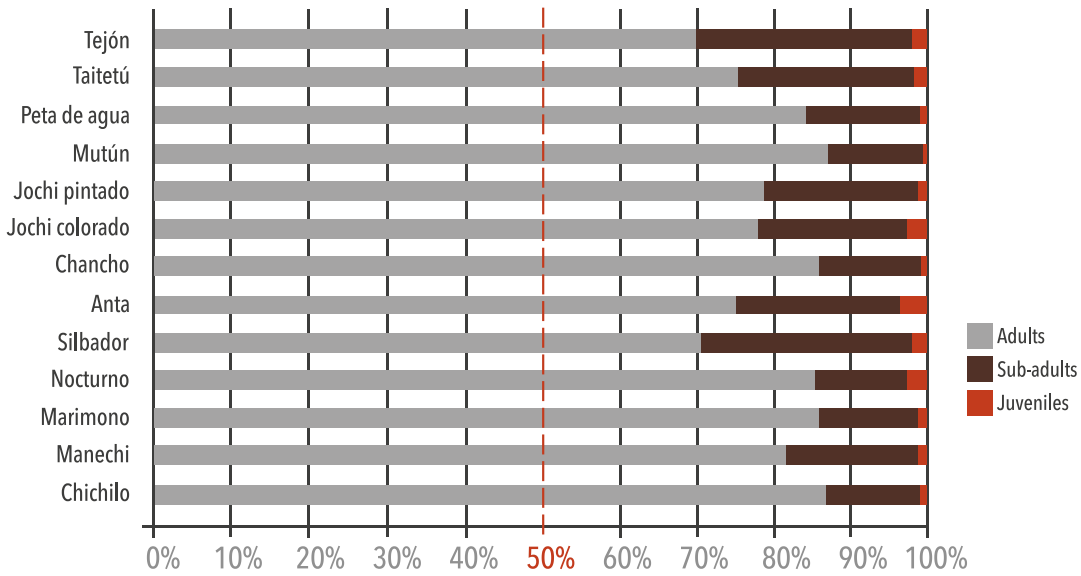
Telma Solares/WCS

Subsistence hunting in the Tacana Indigenous Territory

Hunting has always had an important role in the social, cultural and economic life of the Tacana people. Their hunting knowledge, beliefs and practices have enabled the Tacana people to endure over time and strengthened their close relationship with wildlife and its conservation.

Given the importance of hunting for the Tacana, between 2001 and 2008, hunters from five Tacana communities: Cachichira, Villa Fátima, San Antonio del Tequeje, Esperanza and Carmen del Emero, carried out periodic monitoring of their hunting activities. Through self-monitoring, 55 species were registered including 27 mammals, 24 birds and four reptiles. The greatest number of recorded entries (49.5%), relate to six species: the white-lipped peccary (*Tayassu pecari*), the Bolivian red howler monkey (*Alouatta sara*), the South American coati (*Nasua nasua*), the yellow-spotted river turtle (*Podocnemis unifilis*), the brown capuchin monkey (*Sapajus apella*) and the Bolivian squirrel monkey (*Saimiri boliviensis*).

Age proportion of hunted individuals by species



Hunting is considered sustainable if the percentage of adults is greater than 50%.

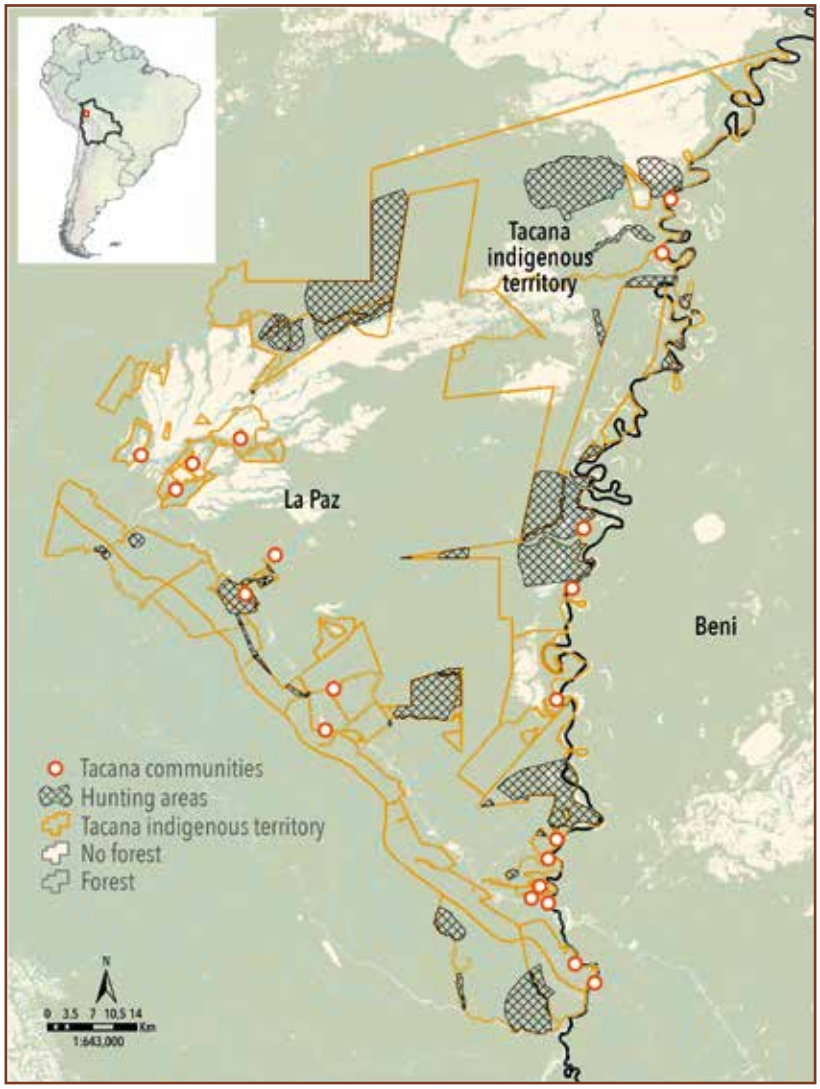
Three species were preferred for their meat: the white-lipped peccary, followed by the tapir (*Tapirus terrestris*) and the collared peccary *(Pecari tajacu*). These three large mammal species account for 56% of the total harvested volume of bush meat. Another 13 species account for 40% of harvested biomass, and the remaining 39 species represent just 4% of harvested bush meat.

Over seven years the total biomass of bush-meat obtained through hunting by 77 Tacana households is estimated at 182,135 kg. The economic value of hunting is calculated by the weight of the animals in kg multiplied by the cost of a kilo of beef sold in the market US$5. This gives a total value of US$910,675, providing an average total income for the study period of US$11,827 per household, which represents an approximate average annual bush meat subsidy per household of BUS$1,690.

The monitoring program results show that subsistence hunting provided 150 g of meat daily per person, or an average 30 g of protein per person. This demonstrates the important contribution of land management in the Tacana territory to the food security of families, in particular those isolated from population centers.

It is important to highlight that for all species more than 70% of hunted individuals were adults, which is an evidence that wildlife populations remained stable. This is an indicator of the sustainability of hunting and forest health. It also demonstrates the contribution of territorial management by the Tacana people to the conservation of wildlife and the food security of their households.

Hunting areas within the
Tacana Indigenous Territory



Mileniusz Spanowicz/WCS

Mileniusz Spanowicz/WCS

Revalorization of the traditional medicine of Amazon indigenous peoples

Traditional medicine is part of the cultural legacy of the Tacana and Leco indigenous peoples who have specialized knowledge of a variety of medicinal plants using leaves, roots, barks, flowers, seeds, resins, and oils, and combinations of these parts to prepare infusions, syrups, plasters and powders, which they use to heal different physical ailments. In earlier times they had plant specialists and healers called "tata hanana" by the Tacana and "mitami" by the Leco. For these peoples, health and healing were closely linked to their spiritual world and connected with nature. In the Tacana world, there were spirits or "edutzis" in charge of ensuring the health of people.

It integrates knowledge about the healing qualities of plants and their link with the protective spirits of health. This knowledge has been transmitted through the generations. The natural diversity of their territories facilitates access to a variety of plants with important medicinal properties. The use of medicinal plants is widespread and several of these plants have achieved recognition in modern pharmaceutical practices, such as quina quina (*Cinchona calisaya*), uña de gato (*Uncaria tormentosa* and *U. guianensis*) or evanta *(Angostura longiflora*). Thus, forest conservation and the valuation of indigenous knowledge help guarantee human health care.

Although many of these traditions were losing strength over time, the Tacana and Leco have maintained ancestral knowledge linked to traditional medicine and integrated into the cultural activity of their communities. Healing rituals are still practiced by the tata hanana who possess a special power transmitted by the spirits. The Tacana and Leco communities use between 40 and 150 species of plants for medicinal purposes, for example, uña de gato, sangre de grado (*Croton* cf. *lechleri*), motacú (*Attalea princeps*) and copaibo (*Copaifera* sp.). However, not only are the medicinal properties of plants (and some animals) known, but there is also experience in identifying common diseases and attending childbirth and children.

It is important to mention that indigenous peoples developed knowledge about the healing properties of plants that are used in the treatment of parasitic diseases, such as evanta (*Galipea longiflora*) for leishmaniasis, and quina quina (*Cinchona officinalis*) for malaria, which are recognized in modern medicine.

Traditional medicine continues to be an alternative to Western medicine, and provides communities, especially those in remote areas, with greater access to health care. It is intrinsically linked to the natural environment and its practice strengthens indigenous peoples' cultural identity and connection with their territory. It also promotes territorial management through the use and conservation of natural resources.

Eleanor Briggs/WCS

Mileniusz Spanowicz/WCS

Cultural revalorization and indigenous peoples in Amazonian northern La Paz

Language, myths, traditional celebrations, customs and artistic production are creative expressions that bear witness to the deep cultural roots of the indigenous peoples of the Amazon region of Bolivia. Culture instills a sense of belonging, preserves traditional knowledge of land and natural resource management that in turn create a respect for forest, wetlands and wildlife. The need to keep culture alive, to reclaim it and strengthen its values within communities is a driving principle within indigenous territorial management.

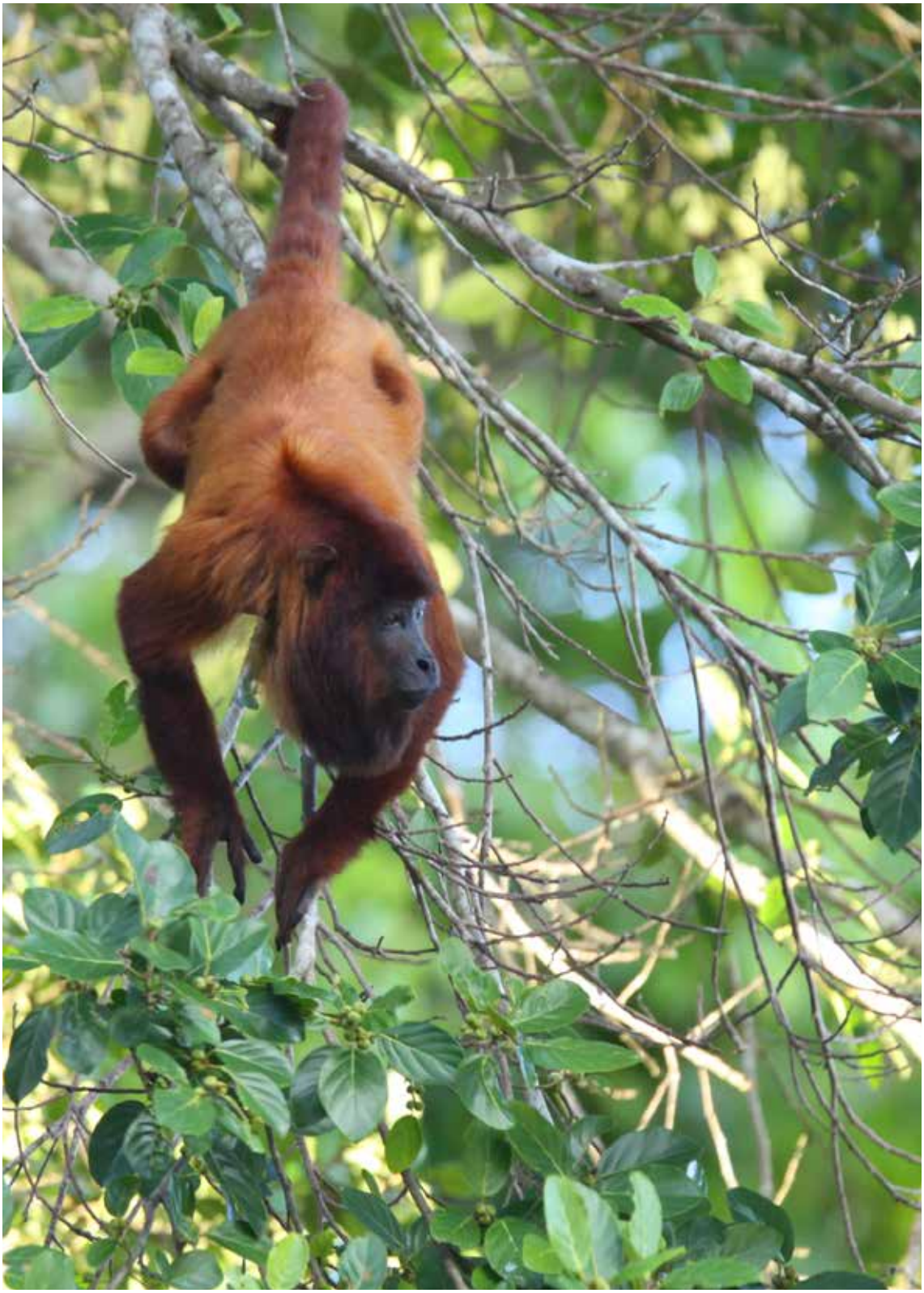
Territorial management plans provide a framework for the development of strategies to revalorize and strengthen the cultural identity of Amazonian indigenous peoples in northern La Paz Department. The recovery of native languages is a key element of this process, articulated through actions to encourage the rescue, dissemination and practice of native language within communities.

The Tacana Indigenous People's Council (CIPTA) and the Tacana Language and Culture Institute (ILC) led linguistic research to regularize and standardize the Tacana alphabet. Research involved documenting and describing the grammatical aspects of the language. The ILC guided content for the Regional Curriculum, approved by the Ministry of Education in 2016. It has also promoted the training of 111 bilingual teachers from seven educational units in Tumupasa, San Buenaventura, Ixiamas and Rurrenabaque.

Likewise, efforts have been made to recover and strengthen the Leco native language. The Lecos of Apolo Indigenous People's Council (CIPLA) developed a first linguistic map which found that the language is in decline and in immediate danger of disappearance. As an immediate action a basic vocabulary of the Leco language was compiled. Further actions were recommended to recover the language taking into account existing linguistic studies.

The elaboration of handicraft products from recovered art traditions has also been promoted. The Tacana Indigenous Women's Council (CIMTA) is working to recover Tacana textile art by supporting women artisans who produce woven cotton textiles that incorporate Tacana signs and symbols. Similarly, Aten artisans of Leco of Apolo keep art traditions alive, sculpting small human and animal figures from tree bark, as part of the Leco Life Plan.

Mileniusz Spanowicz/WCS



Final reflections

Indigenous peoples maintain traditions of land use and natural resource management that are compatible with biodiversity conservation objectives and contribute to the stewardship of forests and wildlife, as well as, the protection of cultural heritage. The integrated studies carried out on the value of territorial management illustrate this from different perspectives, environmental, economic and sociocultural. The selected case studies deal with core issues that reflect the governance capacity of indigenous organizations to define policies and strategies with the participation of communities, to investigate key aspects of management, and to implement actions within their territorial management plans or Life Plans.

In order to understand the relevance of indigenous territories for conservation and development, it is necessary to understand the extent of these territories. In the Bolivian Amazon basin 27.5% of its surface area is made up of indigenous territories, either already titled or in the process of titling, this is a larger surface to that covered by protected areas (national and sub-national) in this region: 22.6%. A further 6.4% is taken up by areas where indigenous territories overlap with protected areas and buffer zones (WCS, 2016).

Although the first priority of protected areas is to conserve natural patrimony and that of indigenous territories is the integrated development of its indigenous peoples, in practice both priorities are significantly connected. Indeed, the way of life practiced by indigenous peoples contributes to and is crucial for conservation. This is seen through their actions to protect important extensions of forest, the headwaters of watersheds and wildlife populations using an innate logic of sustainable use of resources that is part of their heritage. The data support this: in both indigenous and protected areas forest loss is significantly lower than in other areas and regions of the country. Reduced rates of deforestation resulting from the implementation of zoning and the controlled access and use of natural resources, has helped to maintain the connectivity between ecosystems and habitats ensuring an ecological balance of those ecosystems.

Indigenous territories not only contribute to biodiversity conservation, but they also contribute significantly to improving community household incomes. The use of natural resources is part of a strategy for biodiversity conservation, and one of the foundations of indigenous territorial management, which recognizes the value of wildlife and which controls the impact of human activities. The diversification of community economies and household incomes, as well as the demonstrable profits obtained from community enterprises shows important results for the improvement of community livelihoods. It also highlights the characteristics of the indigenous economy in which reciprocity (non-monetary) and the market (monetary) coexist, and points to the diversity of natural resources as the foundation for diverse incomes sources, and ultimately more secure and resilient livelihoods.

These results would not be possible without the valorization of Tacana and Leco culture which play a central role in indigenous territorial management and formed the basis for building a future stamped with a distinct cultural identity. Culture is at the heart of indigenous territorial management proposals. Its importance stems from the cohesive nature of their cultural identity, promoting solidarity, social equality and developing institutional capacities for territorial management.

Indigenous peoples are increasingly aware, and accept with greater understanding and depth, that it is possible to combine the deep roots of their identities and the values that represent them today, with new elements and management tools that are compatible with ancestral knowledge.

The development of environmental management tools has involved important challenges in the design of methodologies that link cultural traditions and everyday practices with new technical concepts for spatial and natural resource management. The use of participatory processes has been pivotal in attaining the involvement of an important majority of people of the indigenous territories. Their experiences and inputs in discussions have enabled the definition of territorial management strategies. This was evident during activities to analyze land use types and the compatibility of those uses. The process for zoning and regulation of natural resource access and use required consensus building internally and with other communities. The process design constitutes an important methodological contribution for the territorial organization of indigenous territories and conservation units, ensuring effective participation of relevant local actors.

A fundamental pillar of indigenous territorial management has been the development of governance capacities by the indigenous peoples, linking traditional organizations at the community level with new supra-communal organizations, leading to a fundamental change in the governance of their territories. These experiences have provided several lessons learnt: firstly, the above changes produced a consciousness of the urgent need to respond to external pressures, and secondly, the challenges of adapting organizational systems to create new structures that respond to the integral management of territories.

The experiences gained and results obtained show the growing importance of indigenous peoples' role within the regions they inhabit. It is clear that territorial management is a strategy that provides effective results for the integral development of indigenous communities. Indigenous peoples' history, language, value systems and accumulated knowledge are being recovered and strengthened. New tools, used to recover ancestral knowledge and practices, invigorate results and ensure their sustainability. In short, indigenous territories are essential cultural spaces for effective conservation and development, ensuring the long-term environmental, economic and sociocultural sustainability of management activities.

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