

ECOLOGICAL CONSERVATION AREAS ON THE GUERRERO MOUNTAIN CONSTITUTING AN EXPERIENCE IN INTEGRATED ECOSYSTEM MANAGEMENT

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ABSTRACT

The certification of Ecological Conservation Areas (ECA) was carried out in the Mountain region of Guerrero state, as part of an initiative to promote a new paradigm for conservation, consisting of integrated management of ecosystems, with the Integrated Ecosystem Management (IEM) Project in Three Priority Ecoregions, coordinated by the United Nations Development Program (UNDP). The objective of this study was to retrospectively analyze the certification process, in order to systematize the regional experience. The research followed a qualitative approach, applying the methodology of documentary research and the systematization of experiences in the researchers' own process. Results indicate that the project achieved ECA certification for 48,851.3 ha, of 18 agricultural nuclei; the certified area represents 57.5% of the total surface area, certified as Areas Voluntarily Destined for Conservation (AVDC) in the state of Guerrero. We conclude that considering the certified area, the ECA certification in the region represents a successful effort for the conservation of ecosystems, while also promoting processes of local and regional participation, organization for conservation and development and inter-institutional coordination.

Keywords: indigenous, management, natural resources, participation.

INTRODUCTION

The Mountain region of the state of Guerrero covers an area of 692,000 hectares, with elevated biological and cultural diversity. This biocultural abundance contrasts with the poor socioeconomic development of its communities and the poverty and marginalization of the majority of its population. Likewise, this area faces important problems in terms of loss of natural and cultural capital. Also, typically this region has limited presence and participation in government institutions. In this context, in 2001 the Integrated Management of Ecosystems Project was initiated in Three Priority Ecoregions of the region (IEM Project) of the United Nations Development Program (UNDP) with the objective of "Establishing an institutional framework and local capacity to manage a mosaic of land and resource uses that will not harm biodiversity and that includes new models for the protection of biodiversity, compatible agroforestry and agro-silvopastoral systems that will help restore ecology" (UNDP, 2001).

The IEM project, a project financed by the Global Environment Facility (GEF), was designed to be implemented over a period of 8 years (2001 to 2009), but which lasted for three years and ended in 2011. This was implemented with contextual adaptations in three eco-regions of Mexico: La Montaña (Guerrero), La Chinantla (Oaxaca) and Los

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Tuxtlas (Veracruz). Initially, it recognized the richness of species and ecosystems of the regions, as well as the threats that put their integrity and ecological functions at risk, adopting an integrated approach to ecosystem management.

From this perspective, the project integrated a series of specific projects and actions, in ecological, social and economic contexts, in order to conserve or restore ecosystems, but at the same time promote projects that help improve the well-being of the local population. One of the specific projects was the certification of Ecological Conservation Areas (ECA), corresponding to the category of Areas Voluntarily Destined for Conservation (AVDC), in accordance with that established Article 59 of the General Law for Ecological Balance and Environmental Protection (GLEBEP), which empowers “indigenous peoples, social, public or private organizations and other interested persons”, to promote the establishment on their property of, “areas intended for the preservation, protection and restoration of biodiversity” *Diario Oficial de la Federación* (Official Gazette of the Federation) -DOF, 1996.

The aim of this study was to analyze the experience of the certification of Ecological Conservation Areas in the Mountain region of the state of Guerrero, promoted and financed by the IME Project, within the framework of the integrated ecosystem management approach. This experience is considered to be extremely relevant, because it was pioneer in terms of the execution of an alternative approach to the traditional declarations of Protected Natural Areas and adopted a new conservation paradigm, based on regional and local participation.

THEORETICAL FRAMEWORK

Traditional models for Protected Natural Areas

Global government interest in the conservation and restoration of ecosystems and their particular biodiversity component dates back to the 19th century, when the first national parks in the United States were established, for example the iconic Yellowstone National Park. Later, at the beginning of the 20th century, the United States’ model for national parks expanded to other countries including Mexico, where in 1917, the Desierto de los Leones National Park was declared (González *et al.*, 2014). In the case of Mexico, the General Law of Ecological Balance and Environmental Protection of 1988, issued by the Ministry for Urban Development and Ecology, established the categories, declarations and regulations for Protected Natural Areas (PNA), which includes the pioneers of national parks and eight other categories (DOF, 1988). The established regulations correspond to a preservationist approach to the management of conventional Protected Natural Areas, focused on governmental stewardship for their planning, management and surveillance, without considering full local participation or the management of community conservation areas.

The conventional approach to conservation and management of the PNA follows the predominant global model, in which the state makes a declaration of the PNA in the *Diario Oficial de la Federación* (DOF) and PNA management is put in progress; responsible

for the formulation, execution and monitoring of the management program. Up until September 2023, this model decreed 203 federal Protected Natural Areas in Mexico, of which 166 have an exclusively terrestrial surface, 31 have a terrestrial-marine surface and six have an exclusively marine surface, covering a total of 91,608,327.23 ha (CONANP, 2023a).

Although the PNA indicate environmental and social aspirations to maintain important areas as much as possible, in environmental, economic and ethical terms, in reality the consequences can have opposite results, at least for some sectors of the population. The traditional PNA model has been questioned worldwide, both concerning its effectiveness and regarding the appropriation of territory by the state, to the detriment of legitimate owners and local communities. Regarding the first question, Geldmann *et al.* (2019), considered 12,315 protected areas from 152 countries, concluding that although there has been progress in protecting these spaces from threats to biodiversity, protection from threats such as hunting, climate change and the introduction of invasive species has been limited.

Explanations for the conflict between government administrators and the local population are diverse. They include: the size of the PNA geographical area (the traditional model or paradigm for the PNA requires extensive areas for those categories that aim towards the protection of biodiversity) and what the local population considers illegal government procedures (Stern, 2008). When communities feel displaced in terms of access to and use of natural resources and decision-making about their territory, they consider that their livelihoods are put at risk, meaning that particularly if they suffer from high levels of poverty, it is natural for them to reject PNA (Brockington and Wilkie, 2015).

Model for Community Conservation Areas

In the 1990s, there was increasing interest concerning the issue of protected areas and local communities, particularly indigenous ones. Initiative was taken to analyze the traditional PNA paradigm from alternative perspectives, such as ethnography, power relations, redefinition of cultural and ethnic identities, and the contrast between Western values and those of indigenous communities. In this framework, in 1993 Phillips published a chapter in his book “Turning ideas on their head: the new paradigm for protected areas” (Langton *et al.*, 2005). Previously, in Africa, alternative conservation strategy initiatives had already been initiated, such as the Communal Area Management Program for Indigenous Resources (CAMPFIRE), which allowed communities and private landowners to use wildlife as a natural resource, mainly for tourist activities (Frost and Bond, 2008; Tchakatumba *et al.*, 2019); this is a reference to the initiation of community conservation areas.

The model for community conservation areas, perceives the involvement of actors and co-management as essential (Dzvimbo *et al.*, 2018). The CAMPFIRE experience revealed the advantages of a strategy that considers strengthening the ownership, control and decision-making power of rural, often indigenous communities (Biggs *et al.*, 2019). Both the

World Wildlife Fund (WWF) and the International Union for Conservation of Nature (IUCN) have played a relevant role in the development of a new paradigm for protected natural areas in regions with indigenous communities. They have promoted principles and guidelines, based on indigenous rights and knowledge systems, consultation processes, transparency, responsibility for consequences and distribution, benefits and international responsibilities (Beltrán, 2000).

In Mexico, the General Law of Ecological Balance and Environmental Protection (GEBEP), decreed in 1988 (DOF, 1988), states that the federation, entities and municipalities must establish measures for the protection of natural areas, to ensure the preservation and restoration of ecosystems. This law considers the participation of local inhabitants, through social consultation agreements; however community conservation areas are not contemplated and the conventional model continues to grant federal, state or municipal entities the right to declare, administer and manage protected natural areas.

The modification of the GLEBEP IN 1996 (DOF, 1996) incorporated Article 59, which makes it possible for indigenous peoples, public or private social organizations, and other interested persons, to advocate protected natural areas on its lands to the Secretariat of the Environment and Natural Resources (SEMARNAP). When this occurs, the Federal Executive issues the declaration of the protected natural area, although the promoter is responsible for its management. The promoters voluntarily allocate the properties for actions, which will preserve ecosystems and biodiversity and request a certificate from SEMARNAP that is valid for a time period and these properties are considered to represent productive areas, destined to public benefit.

In the 2008 modification (DOF, 2008), the GEBEP recognized these Voluntary Conservation Areas (AVDC) as a formal category of the PNA (Article 46). They are promoted by indigenous peoples, social, public or private organizations or other individuals. Although SEMARNAT issues a certificate, the promoters maintain full ownership of the property. In this situation, they are responsible for the administration of the AVDC, in contrast to the way conventional PNAs are managed.

Ecosystem management perspective

Likewise, with respect to natural resources, from 1992 onwards an ecosystem management approach was developed, to move away from a reductionist vision, focused on the production of goods and services, towards a holistic and systemic approach, combining people's needs, with environmental values (DeFries and Nagendra, 2017). For the management of protected natural areas, this represented an important change in relation to the traditional preservationist outlook, which perceives PNAs as islands of biodiversity. In the new paradigm, ecological theories, nature-society interaction, the protection of biodiversity and other environmental services become relevant. The actor is recognized as representing a central decision maker. In this conception, ecosystems are spaces that have ecological functions, but they also provide goods and services for society, in line with their ecological limits (Lopoukhine *et al.*, 2012).

Ecosystem management aims for a radical change in decision-making, planning and management of natural resources. Central aspects of ecosystem management include the direct participation of local actors (co-management), planning and decision-making at the lowest level (communities) upwards (meaning; from the communities up to government bodies). Also, the participation of government institutions in regulation and management; through the concept of adaptive management (which recognizes the role played by uncertainty in the planning, management and decision-making process); this includes the valuation of local knowledge and considers management as an ongoing learning process (Meffe *et al.*, 2002).

The systematization of experiences and continuous learning in the process of planning, decision-making and execution of programs, projects and activities are an inherent part of adaptive and ecosystem management. The experience and knowledge generated are relevant to improving how management is implemented, as well as for guiding other managers, who are implementing similar programs or projects (Rogers and Macfarlan, 2020).

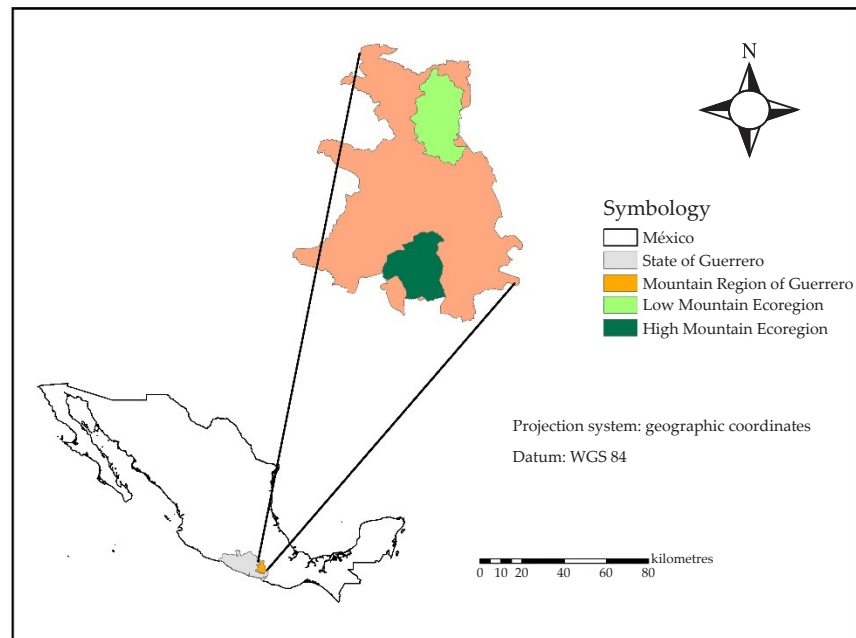
METHODOLOGY

Study Area

The Mountain region is located in the north of the state of Guerrero, comprising 19 municipalities with a territorial area of 692,000 hectares. In the region, 281,332 hectares have natural forest cover, consisting of various types of vegetation. The predominant ecosystems include: pine forests, pine-oak forests, mesophilic mountain forests, dry forests (low deciduous forests) and riparian vegetation. In terms of relief, altitude and type of ecosystems, the IEM Project delimited two eco-regions: the Low Mountain eco-region and the High Mountain eco-region (Figure 1), areas to which specific projects and activities were directed, including the certification of Community Ecological Conservation Areas. In the Mountain region of Guerrero state, there are four ethnic groups: Me'phaa (Tlapaneco), Na Savi (Mixtec), Nahuatl and Amuzgo. The total population in the region consists of 406,028 inhabitants. In the High Mountain eco-region, more than 85% of the population speaks some original or indigenous language; whereas in the Mountain eco-region, the municipal average percentage of people who speak an original language is less than 50%, in Xochihuetlán, only 1.92% of people were registered as speaking an original language. In the High Mountain eco-region, Tlapanec and Mixtec predominate as original languages; whereas in the Low Mountain region, Mixtec and Nahuatl predominate (INEGI, 2021).

Documental research and systematization of experiences

Documental research was carried out to identify, analyze and interpret documents with information on the certification process of the Ecological Conservation Areas, promoted by the Integrated Management of Ecosystems Project (IEM Project). The documents considered included institutional reports, photographs, cartographic material or any



Source: self-elaborated.

Figure 1. Location of IEM Project area.

other available document. Aspects necessary to investigate documents were considered: authenticity, representativeness and credibility of the documents, together with their significance. Documents were analyzed within the framework of experience derived from the certification of ecological conservation areas and that related to theoretical ecosystem management. It became apparent that documentary research is not only an enumeration of facts, but rather a reflective process and that the documents must be placed in a theoretical and contextual framework, in order to understand their content (Ahmed, 2010). In this sense, the certification process was analyzed in relation to the principles of ecosystem management: project objective, community participation, learning process, adaptive management and compliance with certification goals.

Besides this, we organized researcher's experience in the certification process of ecological conservation areas. With questions and topics related to the process, we systemized the information from their notes and files, created during field and office work. Usually, the systematization of experiences, as a qualitative technique, is carried out by the researcher in order to analyze the experience of other individuals (Mera, 2019). However, in this research, the experience of the researchers themselves was systemized. Considering the guidelines proposed by ALBOAN (2008); the certification process of Ecological Conservation Areas was defined as an experience to be systemized; stages and activities in the process were specified; information from the researcher's experience was recorded, the recorded information was reflected on, and the stage or activity was synthesized.

RESULTS

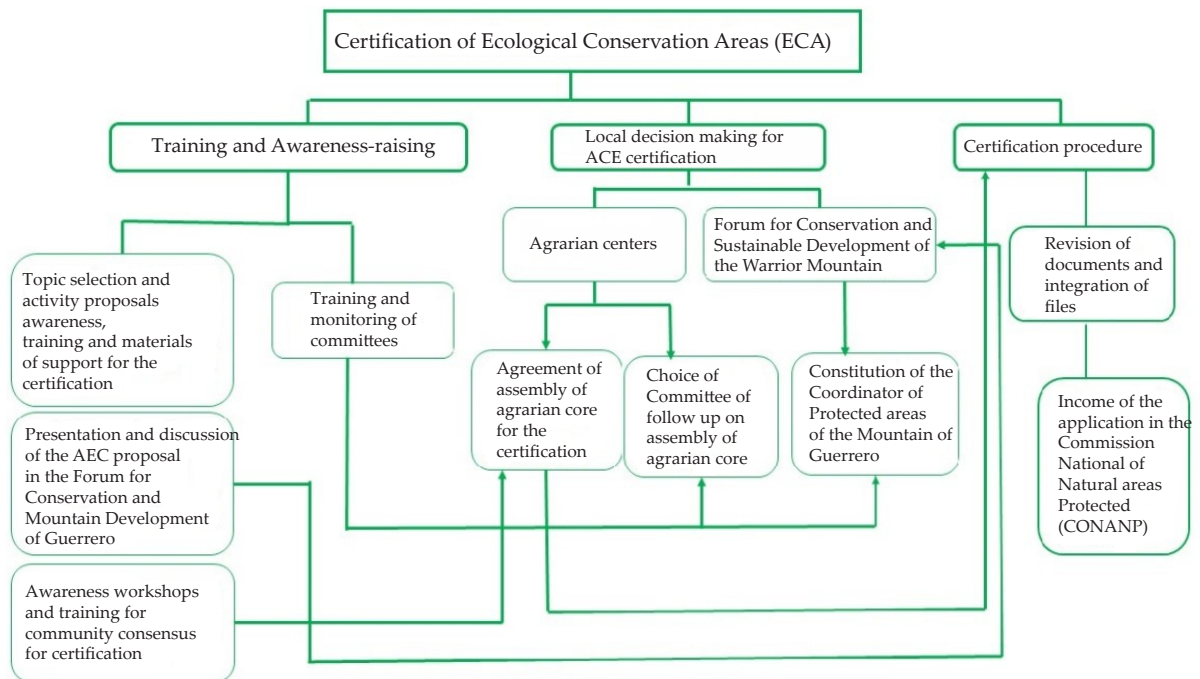
ECA certification forming part of the IEM Project

The certification of Ecological Conservation Areas was assigned a general framework by the IEM project. Because the region is important for its diversity in species and ecosystems, but is also subject to a series of threats to their integrity and health; the project sought to strengthen and recreate the Sustainable Regional Development Program (SRDP), by means of pilot models for integrated management of replicable eco-systems, which conserve biodiversity, capture carbon and ensure against soil degradation. An explicit effort was made to “Link global environmental protection and the objectives of sustainable rural development, through the implementation of an integrated ecosystem management paradigm to expand the environmental management approach at the bioregional level”. The IEM Project identified that no protected areas existed and there were no plans to create them, even though they were necessary for the protection of wildlife. Due to the region’s characteristics, it was anticipated that the selection of the protected area category should be undertaken with care and an agreement reached between local communities and state and federal entities. The choice of category as Ecological Conservation Area, the name used in the applications for certification of the areas (although in some IEM Project documents, the terms community reserves, ecological conservation areas and conservation areas are also used), currently corresponds to the category of Areas Voluntarily Destined for Conservation (AVDC), recognized by the GLEBEP (DOF, 1996; DOF, 2008). This is consistent with the intention to change to the most recent paradigm; integrated ecosystem management, which seeks both the strengthening of inter-institutional relationships and the full participation and involvement of communities and local inhabitants in initiatives and projects for the protection of ecosystems and development.

Coordination and execution of the certification process

The general coordination of the certification of the Ecological Conservation Areas was the responsibility of the Regional Coordinator of the IEM Project and his team of collaborators in Guerrero. Initially, an essential procedure for ECA certification was established (Figure 2). The regional coordination staff carried out the information phase, raising awareness and reaching agreements for the creation of Ecological Conservation Areas, both at the regional level (Forum for the Conservation and Sustainable Development in the Guerrero Mountain), and at the local level (agrarian nuclei).

In order to implement certification activities, the IEM Project issued the petition; SDC 14-2007, “certification of lands for conservation in the Guerrero Mountain” and awarded the corresponding contract to the Interdisciplinary Group of Professionals Associated with Biology (Grupo Interdisciplinario de Profesionales Asociados a la Biología, GIPAB S.C.). This consultancy group was responsible for integrating the documentation required for certification and carrying out the corresponding procedure as defined by the National Commission of Protected Natural Areas (Comisión Nacional de Áreas, CONANP).



Source: self-elaborated.

Figure 2. Critical procedure for ECA certification in the Guerrero Mountain.

Actors involved

The main actors involved in the ECA certification process were the staff from the Regional Coordination of the IEM Project, the agrarian authorities of the ejidos and communal properties (bienes comunales), the Regional Mountain Council, the ejido and communal area members, the National Forestry Commission (Comisión Nacional Forestal CONAFOR), the Union of Ejidos and Communal areas for Biodiversity in the Mountain of Guerrero, Ejido and Communal organization for the Mountain of Guerrero with Protected Areas Grouped within a Coordinating group of municipal presidents and the consulting firm, GIPAB.

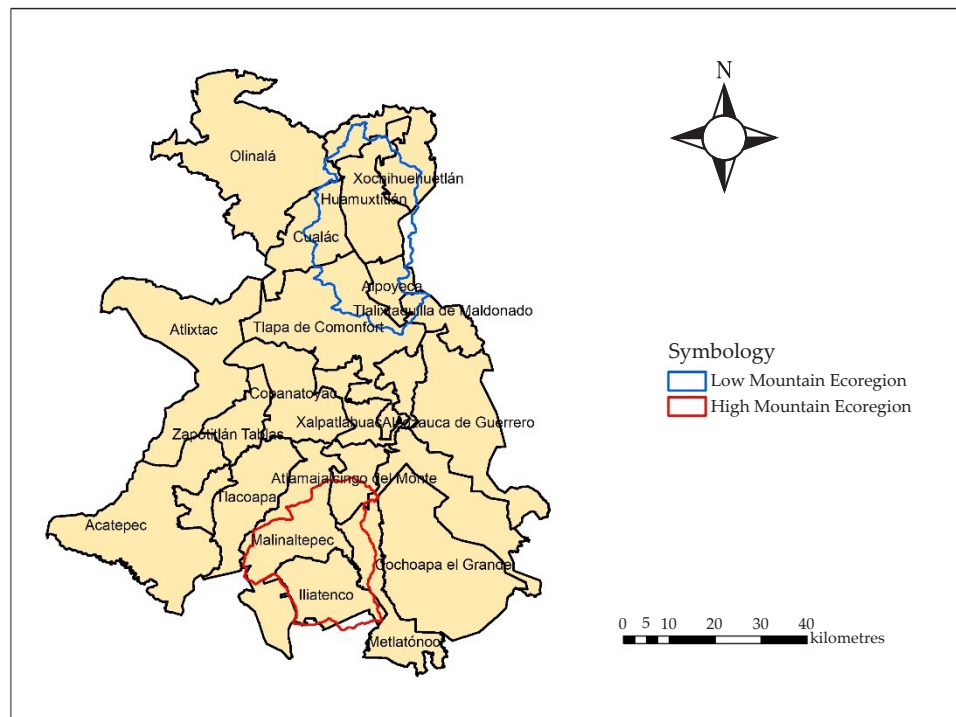
The Regional Coordinator had the power to convene; financed most of the activities and monitored the activities of the consulting firm hired to formalize and certify the ECAs. The Mountain Regional Council assisted with the petitions and participation on the part of rural communities in the region and loaned its facilities to convene the Mountain Natural Resources Forum, which was held monthly. The National Forestry Commission participated through the Community Forestry Development Program (CFDP), making petitions for the monthly forum.

The Union of Ejidos and Communal areas for Biodiversity in the Mountains of Guerrero and the authorities pertaining to agrarian centers and municipalities

participated in the monthly forum and in the local assemblies, providing a direct link with the ejido managers and members of communal areas in the region. The government of the state of Guerrero participated, through its institutions, mainly, the Ministry for the Environment and Natural Resources (Secretaría del Medio Ambiente y Recursos Naturales, SEMAREN) and the Ministry of Rural Development (Secretaría de Desarrollo Rural, SDR). The National Commission for the Development of Indigenous Peoples also participated, as well as Educational institutions, including the Technological Institute of the Mountain, the Autonomous University of Guerrero, the Intercultural University of the Mountain, the Campus Puebla Postgraduate College, the College of San Luis AC and the National Autonomous University of Mexico, among others.

Territorial extent of certification activities

The potential area for ECA certification included 19 municipalities (Figure 3), covering a territorial area of 692,000 ha. ECA certification activities were successfully undertaken in 18 agricultural centers, distributed among 12 municipalities (Table 1), both in priority ecoregions and as well as in neighboring territories.



Source: self-elaborated.

Figure 3. Municipalities influenced by the IME Project.

Table 1. Agrarian centers with valid ECA certification.

Municipality	Agrarian center
Atlamajalcingo del Monte	Huehuetepec
Alpoyeca	Tecoyo
Malinaltepec	Colombia de Guadalupe
Malinaltepec	Malinaltepec
Malinaltepec	San Miguel del Progreso
Atlixac	San Lucas Teocuitlapa
Malinaltepec	Comunidad Paraje Montero
Alpoyeca	San José Buenavista
Tlacoapa	Totomixtlahuaca
San Luis Acatlán	Pueblo Hidalgo
Alcozauca	San Vicente Zoyatlán
Metatlonoc	Zitlaltepec
Acatepec	Acatepec
Cualac	Cualac
Iliatenco	San José Vista Hermosa
Malinaltepec	Santa Cruz del Rincón
Huamuxtitlán	San Bartolomé Tlaquiltepec
Huamuxtitlán	Santa Cruz

Source: self-elaborated.

Stakeholder participation process

The participatory process for the certification of ECAs took place at the regional and local level. At the regional level, the principal opportunity for participation was at the “Mountain Natural Resources Forum” and through the organization “Ejidos and Communal areas in the Guerrero Mountain with Protected Areas grouped under a Coordinator.” The Forum meetings initiated in 2004; they were held monthly and presented both project proposals and activities in the IEM Project, as well as follow-up in these contexts. Besides this, representatives of federal and state institutions attended to present their projects at meetings, as local agrarian authorities participated in the forum, sometimes accompanied by other ejido managers or community members and members of organizations in the region. The latter formed the link with the rest of the members of their communities and with the institutional representatives. At each meeting, the minutes for agreements were signed.

During the certification process for the Ecological Conservation Areas, the organization “Ejidos and Communities of the Guerrero Mountain with Protected Areas Grouped under a Coordinator” was established on February 10, 2010. They signed the constitutive act in the presence of public notary 60, ejido managers and community members from 15 agrarian centers and eight municipalities (Table 2). The organization’s objective is to strengthen the management of certified Ecological Conservation Areas and promote the certification of new areas, in order to become an agent for dialogue between community bases and governmental and non-governmental institutions.

Table 2. Founding agrarian nuclei of the organization Ejidos and Communities of the Guerrero Mountains with Protected Areas, Grouped under a Coordinator.

Agrarian center	Regime	Municipalities
Alpoyeca	Communal property	Alpoyeca
San José Vista Hermosa	Communal property	Malinaltepec
Acatepec	Communal property	Acatepec
Ixcateopan	Ejido	Alpoyeca
Tecoyo	Ejido	Alpoyeca
San José Buenavista	Ejido	Alpoyeca
San Lucas Tecuanipa	Communal property	Atlixac
Cochoapa el Grande	Communal property	Cochoapa el Grande
San José Vista Hermosa	Ejido	Iliatenco
Iliatenco	Ejido	Iliatenco
San Miguel del Progreso	Communal property	Malinaltepec
Paraje Montero	Communal property	Malinaltepec
Malinaltepec	Communal property	Malinaltepec
Pueblo Hidalgo	Communal property	San Luis Acatlán
Santa Cruz	Ejido	Huamuxtitlán

Source: self-elaborated.

At the local level, the participation of the communities, particularly the ejido and communal members, was through formal agrarian assemblies and informative meetings. These centers for participation form part of the local institutional arrangement in the region, they combine formal regulatory aspects with uses and customs and are binding in nature for their members. Assembly agreements are mandatory and enforced.

For the purpose of certifying the ECAs, dissemination, awareness, information and debate were carried out at meetings of the agrarian nuclei. In order for the assemblies to agree that the agrarian nucleus would participate in the ECAs certification project, it was necessary to complement the activities carried out during the assemblies, with other informative meetings and awareness-raising and training workshops. A recurrent concern expressed in the assemblies, meetings and workshops was the fear on the part of the ejido and communal members that by certifying their lands as ECA, the government would remove their lands. In this sense, the protected natural area procedure was a determining factor for communities to make the decision to participate in the project.

History of conservation of communal areas in the region

In several communities in the region, particularly in the High Mountain ecoregion, the presence of protected communal areas was recorded, prior to the project initiating its activities. The communities do not call this a protected area, but rather they are places or sites to which they give a common name, and they are clear that it is important to conserve them, above all, because they provide some important environmental service. A notable example is the area known as “Portezuelo del Clarín”, in the communal property of Iliatenco (Figure 4). This area is protected by the community, because there are springs



Source: photograph taken by Karina Velázquez Muñoz
Figure 4. Site Portezuelo del Clarín under communal property management of Iliatenco.

which supply water to the town. The community of Mixtecapán, which ultimately did not participate in the ECA certification, includes a protected area called “El Manguito.” Tecuitlapa, Acatepec, Paraje Montero and other agrarian centers in the Montaña Alta ecoregion also include protected communal areas.

Conservation awareness and training

The IEM project initiated a strong movement towards awareness, training and dissemination of conservation areas, in the years 2006 to 2007. During this period, four communities, two from each ecoregion, began the process sanctioned by the federal government of certifying their community ecological reserves through CONANP: Iliatenco de Montes de Oca Ejido, Iliatenco Communal Property, Ixcateopan Ejido and Alpoyecá Communal Property. Awareness-raising was fortified by dissemination workshops and discussion of experiences. Dissemination materials were produced, such as posters, brochures, radio programs and information pamphlets about the abundance of natural resources in the Mountain and the importance of their conservation. Cleaning and recycling campaigns were promoted, issues not previously addressed in the region. Information about protected natural areas and their importance for agricultural centers and society was also provided.

Institutional certification process of the areas

The IEM Project staff carried out prior awareness and information work with the agrarian nuclei, so that communities could decide whether or not to participate in the Ecological Conservation Areas certification project. The communities that decided to participate formalized their intentions in an assembly agreement containing the corresponding minutes, in accordance with agrarian regulations. Subsequently, the documentation required by CONANP was included and the application process was undertaken with this authority. The deliberative and assembly agreement process to allocate their areas for conservation took longest, as at times, more than one assembly was required. No difficulties were encountered for obtaining the other documents, such as the principal folder pertaining to the ejido nucleus.

For the first four certified areas, the entire process was carried out by IEM Project staff. Starting in 2008, the project supported the achievement of agreements and assembly minutes, but the consulting firm, GIPAB S.C. was responsible (manager) for reviewing and integrating the documentation and processing the certification with the CONANP.

Certified Ecological Conservation Areas

To select areas for certification, each community established an area of its property with good vegetation coverage, which registered the greatest biodiversity. Some agrarian nuclei, such as the ejido and communal property of Iliatenco, defined these areas when they undertook their community ecological planning, another activity promoted by the IEM Project. The communities paid special attention to areas that provide them with water, such as the springs that supply drinking water to the communities.

In 2007, the first four Ecological Conservation Areas were certified by CONANP (Table 3), covering a total area of 11,068 ha, the Iliatenco Ejido of Montes de Oca (3,250.18 ha), Iliatenco Communal Property (6,537.62 ha), Ixcateopan Ejido (1,001.00 ha) and the Alpoeyca Communal Property (279.50 ha). They were certified for 10 years (valid up until 2017); however none renewed their certification, so currently they are no longer registered in the CONANP AVDC list.

Table 3. ECA certified by the IEM Project but currently not valid.

Agrarian nuclei	Eco-region	Year of certification	Valid (years)	Surface (ha)
Iliatenco Ejido of Montes de Oca	High Mountain	2007	10	3,250.18
Communal property of Iliatenco	High Mountain	2007	10	6,537.62
Ixcateopan Ejido	Low Mountain	2007	10	1,001
Communal property of Alpoeyca	Low Mountain	2007	10	279.5
Total				11,068.3

Source: self-elaborated.

In 2008, the agrarian centers of San José Vista Hermosa (459.51 ha), Malinaltepec (253.17 ha) and Paraje Montero (667.85 ha) began certification procedures. In 2009, this continued with Colombia de Guadalupe (631.19 ha), San Miguel del Progreso (277.00 ha), the ejido of Huehuetepc (978.55 ha), San Lucas Teocuitlapa (1024.00 ha) and Tecoyo (1025.71 ha). Likewise: the communal property of Acatepec, the communal property of Tenamazapa, the communal property of Pueblo Hidalgo, the communal property of Santa Cruz del Rincón, the communal property of Zitlaltepec, the ejido of Santa Cruz, the communal property of San Bartolomé Tlaquiltepec, the ejido of San José Buena Vista, the ejido of San Vicente Zoyatlán and the communal property of Cualac, which altogether cover an area of 46,906.66 ha decided to participate. The intention to certify 63,651.94 ha was declared. Of these agrarian nuclei, only the communal property of Tenamazapa did not certify their ECA, but the agrarian nucleus of the communal property of Totomixtlahuaca, not mentioned in the previous group, did. The Ecological Conservation areas or AVDC, currently registered with CONANP, consist of a total of 18 (Table 4), most of them valid for 30 years, although three areas have agreed

Table 4. ECAs certified by the IEM project and currently valid.

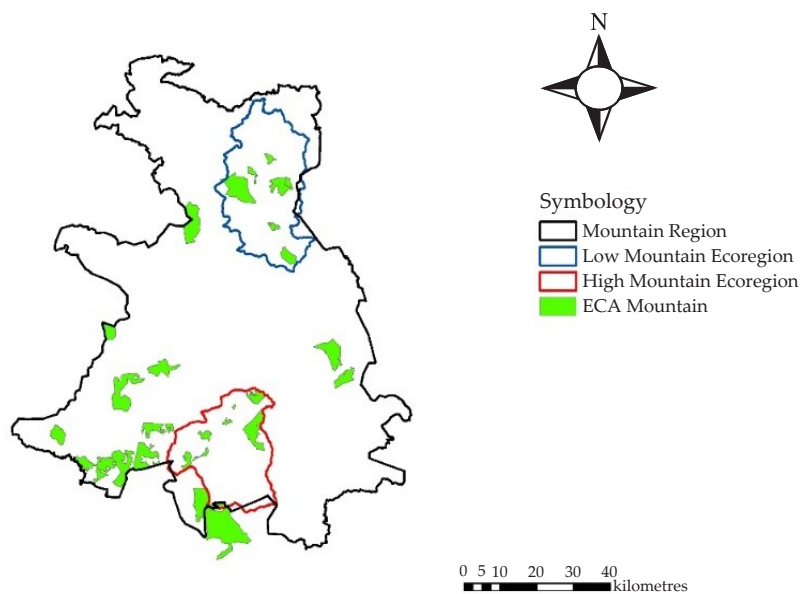
ECA	Not cert	Exp date	Valid (years)	Surface area (ha)	Ecosystem	Type of property
Huehuetepc	188	30/04/2009	30	978.55	POF	Communities
Tecoyo	187	14/04/2009	30	1,025.71	LDF	Communities
Colombia de Guadalupe	185	14/04/2009	30	631.19	LDF	Communities
Malinaltepec	174	20/11/2008	15	253.17	MEF, CF, POF	Communities
San Miguel del Progreso	184	14/04/2009	30	277.00	POF, CF, MSEF	Communities
San Lucas Teocuitlapa	186	14/04/2009	30	1,024.00	OF	Communities
Comunidad Paraje Montero	173	20/11/2008	30	667.85	MSEF Q, CF, POF	Communities
San José Buenavista	248	09/02/2011	50	358.55	OF, LDF	CUL
Totomixtlahuaca	261	06/07/2011	30	4,160.87	CF, MEF	Communities
Pueblo Hidalgo	257	30/05/2011	30	7,907.64	CF, MEF, POF	Communities
San Vicente Zoyatlán	255	13/05/2011	30	3,913.10	CF, MEF, POF, LDF	Communities
Zitlaltepec	259	30/05/2011	30	2,648.89	CF, MEF, POF	CUL
Acatepec	258	30/05/2011	30	12,655.71	CF, MEF, POF	Communities
Cualac	308	27/01/2012	15	6,958.04	CF, MEF, POF	Communities
San José Vista Hermosa	175	20/11/2008	30	459.51	MSEF, CF, POF	Communities
Santa Cruz del Rincón	256	13/05/2011	30	2,379.86	CF, MEF, POF	Communities
San Bartolomé Tlaquiltepec	307	24/01/2012	15	1,537.80	CF, MEF, POF	Communities
Santa Cruz	326	19/07/2012	30	1,013.89	CF, MEF, POF	Communities

POF: Pine oak forest, LDF: low deciduous forest, EF: evergreen forest, CF: Cloud forest, MSEF: Medium sub-evergreen forest, OF: Oak forest, CUL: Common use lands.
 Source: self-elaborated.

for only 15 years and only one for 50 years. In total, the certified ECAs cover a territory of 48,851 hectares. Notably (Figure 5) several of the ECAs are located outside the two priority eco-regions initially proposed for the project, indicating the replication effect of the ECAs and also because the IEM Project staff applied the concept of adaptive management, as for the operation of the project the importance of other areas for conservation and community participation was acknowledged, so that they were included in the activities and projects carried out.

Table 5 presents a comparison of the ECAs certified in the state of Guerrero; the Mountain region and the rest of the territory of the state of Guerrero. In the case of the Mountain, there are 18 valid ECAs, covering an area of 48,852.3 ha.

The ECAs in the Mountain are habitats for species of special conservation interest. ECA records indicate which species of flora and fauna, present in their ecosystems, are listed in NOM-059-SEMARNAT-2010. Floral species with special protection status include: *Quercus deserticola*, *Carpinus caroliniana*, *Magnolia mexicana*, *Podorcus matudai*, *Astronium*



Source: self-elaborated.

Figure 5. Location of current ECAs in the Guerrero Mountain.

Table 5. Current ECAs in Guerrero state.

Territory	Number of AVDC	% of the total	Surface area (ha)	% area
Mountain Region	18	25.7	48,852.3	25.5
Other regions in Guerrero	52	74.3	36,126.5	42.5
Guerrero State	70	100.0	84,978.8	100.0

Source: self-elaborated.

graveolens, *Licania arborea*, *Cyathea divergens*, *Crysopjila nana* and *Cyathea fulva*, whereas species of fauna with special protection status include: *Leopardus wiedii*, *Potos flavus*, *Boa constrictor*, *Lampropeltis triangulum*, *Heloderma horridum*, *Sclerurus mexicanus*, *Pionus senilis*, *Aratinga holochlora*, *Tamandua mexicana mexicana*, *Coendou mexicanus*, *Amazona finschi*, *Aratinga canicularis*, *Aquila chrysaetos*, *Lontra longicaudis*, *Dendrotyx macroura* and *Panthera onca*.

DISCUSSION

The certification process for Ecological Conservation Areas (ECA), corresponding to the category of Areas Voluntarily Destined for Conservation (AVDC), turned out to be apt for the framework of the territorial context where it was implemented and conformed with the proposed paradigm for conservation. As a region with little institutional presence, especially in the environmental sector, suffering from conditions of social marginalization and poverty but with an abundance of variety concerning biodiversity and culture, as well as factors contrary to its conservation, this project represented a novel proposal.

This was analyzed within the theoretical integrated ecosystem management framework that supported the project, whose principles were applied to the process of ECA certification. Although ultimately, the initiative originated from agents external to the region, the process was directed towards decision-making from the bottom (agrarian nuclei) up to (institutions such as the IEM Project itself, CONANP or others). The communities decided whether or not to participate and certify their lands. This is unusual in the conventional approach, where institutions or other organizations try to convince communities to accept the declarations of the PNA, but the final decision corresponds to the various levels of government.

It was a relevant precedent that in the region, there were communal conservation areas, viewed as informal from the orthodox perspective of a PNA. The communities take care of these spaces, because they know that they are important for their own survival, and many of these areas are associated with the provision of environmental services such as water replenishment and supply. Therefore, a proposal to formalize these areas, through their certification as ECA, is less alien to them and they may perceive this as less risky than a proposal for a conventional PNA, such as a national park or a biosphere reserve.

A strength concerning the ECA certification process was that it represented one more component in other efforts for conservation and development of the region, such as local or community ecological regulations, exploitation projects such as the establishment of Wildlife Conservation Management (WCM), payment for environmental services and ecotourism projects. This made it possible to relate the conservation of natural areas with the possibility that the population would not only take care of the ecosystems and their biodiversity, but also have the possibility of receiving economic income to improve their livelihoods. The possibility of providing jobs and improving their livelihoods and economic income is essential, if local actors are going to participate and for the objectives of conservation initiatives to be achieved (Rajasekar *et al.*, 2008).

A relevant contribution made by this process was also the promotion of spaces for participation and deliberation at regional and local levels. In particular, the creation and formalization of the organization “Ejidots and Communities of the Mountain of Guerrero with Protected Areas Grouped under a Coordinator” represents an effort to promote self-management concerning the issue of ECAs. The ECA certification processes of other regions of the state (Almazán-Núñez *et al.*, 2011) placed greater emphasis on the formalization and representativeness of biodiversity, with limited attention to the promotion of self-management, deliberation and the link between conservation and development. The finances provided by the IEM Project for the various activities involved in the certification process, in addition to the human resources that participated, were essential for achieving the certification of the ECAs and other processes, such as the constitution and formalization of the organization “Ejidots and Communities of the Mountain of Guerrero with Protected Areas Grouped under a Coordinator.” The lack of financing and shared management (CO-NANP – land owners) is a strong limitation to the management of ECAs (Peña-Azcona *et al.*, 2022).

If we compare the number of certified ECAs in the Mountain region, with the total number of ECAs in the state of Guerrero, it is low, as it represents only 25.7%. However, by area, it represents 57.5% of the entire ECA area in the state. This is indicative of the overall result for IEM Project in the state of Guerrero. If we compare the number and total national area of areas voluntarily designated for conservation (559 on a national scale, covering a total area of 1,228,170.5 ha) (CONANP, 2023b), the number of ECAs in the Guerrero Mountain region represents 3.2 % (of the number) and 4.0% (of the surface), respectively. This does not include the 11,068.3 hectares certified in 2007 that are no longer valid.

CONCLUSIONS

The certification of Ecological Conservation Areas in the Mountain region of Guerrero was relevant as a process for strengthening conservation in a region that receives little attention from government institutions. Its achievements, in the certified territorial extension, are important, but associated with this, there are contributions that are little visible and valued, such as the experience of putting into practice a new conservation paradigm, the integrated management of ecosystems, which was new in Mexico during the years when the IEM Project began activities in the region. Also, the experience generated in aspects of community participation, organization, inter-institutional coordination and training is relevant, particularly concerning issues of ecosystem conservation and biodiversity.

The study systematized part of the information on the ECA certification process, but the systematization of the experiences of other actors, particularly the participating communities, remains pending, together with, the monitoring of the activities that the participating agricultural nuclei have undertaken or are currently carrying out, derived from the existence of the ECAs.

REFERENCES

- Ahmed, JU. 2010. Documentary research methods: new dimensions. *Indus Journal of management & Social Sciences (IJMSS)*, 4(1). 1-14. <https://ideas.repec.org/a/iij/journal/v4y2010i1p1-14.html>.
- ALBOAN. 2008. The systematization adventure. How to look and learn about our practices from our practices. Fundación ALBOAN, Iniciativas de Cooperación y Desarrollo, Instituto de Derechos Humanos Padre Arrupe, Hegoa. <https://centroderecursos.alboan.org/es/registros/7312-the-systematization-adventure-how>.
- Almazán-Núñez RC, Almazán-Juárez A, Ruiz-Gutiérrez F. 2011. Áreas comunitarias para la conservación de los recursos biológicos de la Sierra Madre del Sur, Guerrero, México. *Universidad y Ciencia*, 27(3). 315-329. <https://www.scielo.org.mx/pdf/uc/v27n3/v27n3a6.pdf>.
- Beltrán J (ed). 2000. *Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies*. IUCN, Gland, Switzerland and Cambridge, UK and WWF International, Gland, Switzerland. https://www.uicnmed.org/web2007/CDMURCIA/pdf/ingles/interestingdocuments/Indig_people.pdf. 133 p.
- Biggs D, Ban NC, Castilla JC, Gelcich S, Mills M, Gandiwa E, Etienne M, Knight AT, Marquet PA, Posingham HP. 2019. Insights on fostering the emergence of robust conservation actions from Zimbabwe's CAMPFIRE program. *Global Ecology and Conservation*, 17. e00538. <https://doi.org/10.1016/j.gecco.2019.e00538>.
- Brockington D, Wilkie D. 2015. Protected areas and poverty. *Philosophical Transactions of the Royal Society B*, 370. 20140271. <https://doi.org/10.1098/rstb.2014.0271>.
- CONANP. 2023a. Áreas Naturales Protegidas decretadas. http://sig.conanp.gob.mx/website/pagsig/datos_anp.htm.
- CONANP. 2023b. Áreas Destinadas Voluntariamente a la Conservación. Niveles de certificación Junio 2023. <https://advc.conanp.gob.mx/wp-content/uploads/2023/11/Niveles-de-certificaci%C3%B3n-ADVC-Junio-2023.pdf>.
- Defries R, Nagendra H. 2017. Ecosystem management as a wicked problem. *Science*, 356. 265-270. <https://doi.org/10.1126/science.aal1950>.
- DOF (Diario Oficial de la Federación). 1988. Ley General del Equilibrio Ecológico y la Protección al Ambiente. Diario oficial de la Federación del 28 de enero de 1988.
- DOF (Diario Oficial de la Federación). 1996. Decreto que reforma, adiciona y deroga diversas disposiciones de la Ley General del Equilibrio Ecológico y la Protección al Ambiente. Diario Oficial de la Federación del 13 de diciembre de 1996.
- DOF (Diario Oficial de la Federación). 2008. Decreto por el que se reforma y adiciona diversas disposiciones de la ley general del Equilibrio Ecológico y la Protección al Ambiente, para fortalecer la certificación voluntaria de predios. Diario Oficial de la Federación del 16 de mayo de 2008.
- Dzvimbo MA, Monga M, Magijani F. 2018. The dilemma on reconceptualising natural resources in Campfire areas in Zimbabwe. *Advances in Social Sciences Research Journal*, 5(8). 522-533. <https://doi.org/10.14738/assrj.58.5043>.
- Frost, PGH, Bond I. 2008. The CAMPFIRE programme in Zimbabwe: payments for wildlife services. *Ecological Economics*, 65(4). 776-787. <https://doi.org/10.1016/j.ecolecon.2007.09.018>.
- Geldmann J, Manica A, Burgess ND, Coad L, Balmford A. 2019. A global-level assessment of the effectiveness of protected areas at resisting anthropogenic pressures. *PNAS*, 116(46). 23209-23215. <https://doi.org/10.1073/pnas.1908221116>.
- González OHA, Cortés-Calva P, Íñiguez DLI, Ortega-Rubio A. 2014. Las áreas naturales protegidas de México. *Investigación y Ciencia*, 22(60). 7-15. <https://www.redalyc.org/pdf/674/67431160002.pdf>.
- INEGI (Instituto Nacional de Estadística y Geografía). 2021. Censo de Población y Vivienda (2020). Panorama sociodemográfico de Guerrero. Instituto Nacional de Estadística y Geografía. México. https://www.inegi.org.mx/contenidos/productos/prod_serv/contenidos/espanol/bvinegi/productos/nueva_estruc/702825197858.pdf. 187 p.
- Langton M, Rhea ZM, Palmer L. 2005. Community-oriented protected areas for indigenous peoples and local communities. *Journal of Political Ecology*, 12(1). 23-50. <https://doi.org/10.2458/v12i1.21672>.
- Lopoukhine, N, Crawhall N, Dudley N, Figgis P, Karibuhoye C, Laffoley D, Miranda LJ, MacKinnon K, Sandwith T. 2012. Protected areas: providing natural solutions to 21st century challenges. *Surveys and Perspectives Integrating Environment and Society*, 5(2). 117-131. URL: <http://journals.openedition.org/sapiens/1254>.

- Meffe GK, Nielsen LA, Knight RL, Schenborn DA. 2002. Ecosystem management: adaptive, adaptive, community-based conservation. Island Press, Washington. USA. 313 p.
- Mera RK. 2019. La sistematización de experiencias como método de investigación para la producción del conocimiento. *ReHuso: Revista de Ciencias Humanísticas y Sociales*, 4(1). 99-108. <https://dialnet.unirioja.es/servlet/articulo?codigo=7047150>.
- Peña-Azcona I, Ortega-Argueta A, García-barrios R, Elizondo C. 2022. Áreas de conservación voluntaria en México. Alcances y desafíos. *Revista de Ciencias Ambientales*, 56(2). 122-147. <https://doi.org/10.15359/rca.56-2.7>.
- PNUD (Programa de las Naciones Unidas para el Desarrollo). 2001. Proyecto del Gobierno de México y el Fondo para el medio Ambiente Mundial (GEF) Manejo Integrado de Ecosistemas en 3 Ecorregiones Prioritarias. Proyecto MEX/00/GA/A/IG(GEF), MEX-Secretaría del Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP). 97 pp.
- Rajasekar D, Sharma J, Yogalakshmi J. 2008. Participatory wildlife conservation in Keshopur Chhamb community reserve (India's first) in Punjab – past, present and future management strategies. *Proceedings of Taal 2007. The 12TH World Lake Conference*, 1247-1253. https://www.academia.edu/28041208/Participatory_Wildlife_Conservation_in_Keshopur_Chhamb_Community_Reserve_Indias_First_in_Punjab_Past_Present_and_Future_Management_Strategies.
- Rogers P, Macfarlan A. 2020. What is adaptive management and how does it work? *Monitoring and Evaluation for Adaptive Management Working Paper Series, Number 2*, September. https://www.betterevaluation.org/sites/default/files/2021-11/MandE_for_Adaptive_Management_WP2_What_Is_AM_%26_how_does_it_work_202009.pdf.
- Stern MJ. 2008. Coercion, voluntary compliance and protest: the role of trust and legitimacy in combating local opposition to protected areas. *Environmental Conservation*, 35. 200-210. <https://doi:10.1017/S037689290800502X>.
- Tchakatumba PK, Gandiwa E, Mwakiwa E, Clegg B, Nysasha S. 2019. Does the CAMPFIRE programme ensure economic benefits from wildlife to households in Zimbabwe? *Ecosystems and People*, 15(1). 119-135. <https://doi.org/10.1080/26395916.2019.1599070>.