Chapter 4
In Search of Long-Term Conservation: Objectives, Effectiveness, and Participation Schemes in Protected Areas

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Abstract Protected areas (PAs) are instruments designed to ensure in situ long-term conservation. However, the selection of their objectives, design, and implementation strategies has changed over time according to different environmental value systems. In this sense, the Mexican environmental value system has changed from preservation to conservation, contributing to the development of different categories such as National Parks, Biosphere Reserves, Voluntary Conservation Areas, and Biocultural Landscapes. This chapter aims to historically describe these environmental value systems and their effect in the pursuit of long-term conservation in protected areas. To achieve this, we relate the environmental value system with each stage of Mexican conservation and we describe the objective of PAs and we address the effectiveness, participation, and access to power mechanisms in decision-making of each stage.

Keywords Governance type · Management regimes · Environmental value system

4.1 Introduction

4.1.1 Protected Areas

Protected areas (PAs) are considered as the major public environmental policy to maintain habitat integrity and species diversity against the environmental crisis (Naidoo et al. 2006; Rodrigues 2006). Currently, most of the nations have pledge support to the designation of PAs. As a result, 15% of the Earth's surface (an area similar to the surface of Europe and Antarctica together) and 17% of the marine realm (a surface similar to all North America) are being formally protected (UNEP-WCMC, IUCN, and NGS 2018).

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Despite the rapid success on the expansion of the marine and terrestrial protected areas worldwide, the loss of biodiversity remains alarming (Barnosky et al. 2012; Beresford et al. 2011; Butchart et al. 2010). In fact, one third of protected land is under a high rate of human pressure (e.g., construction roads, agriculture, urbanization), compromising the ecosystem integrity and its ability to provide environmental services (Jones et al. 2018; Vitousek et al. 1999) and its role in achieving the Sustainable Development Goals (SDGs; Dudley et al. 2017).

The perception of the role of PAs in the conservation of landscape has changed since their origin due to the continuous shift of the environmental value system. Conservation areas have different objectives and purposes, ranging from strict conservation areas (Category Ia, Ib, and II of IUCN) to regions permitting human sustainable use (Category IV) (see Table 4.1). Presently, IUCN recognizes four different categories of PA governance: government, shared, private, and indigenous people and local communities. Currently, 83% of the PAs worldwide rely on the government of its governance; however, Latin America is the region with more percentage under indigenous and local community governance (7.1%). This puts Latin America in a unique position, since comparisons in the mechanisms and forms of action of PA should be different from other regions (e.g., Europe and North America) where there is no indigenous/local governance (UNEP-WCMC IUCN and NGS 2020).

4.1.2   Environmental Value System

Conservation means human behavior (Saunders 2003). Despite the fact that human behavior is not always rational, it is predictable (Ajzen 1991; Clayton and Brook 2005). In this sense, behavior can be analyzed through the individual or collective values, social norms, and attitudes toward the natural world.

Values are fundamental aspects to understand individual's behaviors; however, they are largely neglected within conservation (Jones et al. 2016). Collectively, societies form an *environmental value system* (EVS) that shapes the manner in which individuals and societies perceive and evaluate nature. It strongly influences their views as to how natural resources should be protected or managed (Jones et al. 2016; Reser and Bentrupperba 2005). Therefore, values are some of the more stable guidelines that underpin our behavior (Stern et al. 1999), and EVS is being continuously shaped by cultural, economic, and socio-political events in all societies and changes over generations. These shifts on EVS explain how the relationships between people and nature are viewed and have deep consequences on the conservation goals, policies, and institutions that are pushed forward (Mace 2014).

Thus, all behavior, divisions of power, planning, and execution of conservation actions vary according to the different EVS and result in distinct management regimes and conservation categories of PAs. Currently, the Mexican law recognizes seven different protected areas according to their usage and management: National Park (NP), Flora and Fauna Protection Area (FFPA), Natural Resources Protection Area (NRPA), Natural Monument (NM), Sanctuary and Biosphere Reserves (BR),

Table 4.1 Protected areas categories according to IUCN and CONANP type of management

IUCN			CONANP		Year of creation	Amount by 2019	Area by 2019 (ha)	Management scheme
	Category	Description	Category	Description				
Ia	Strict reserve nature	Protected to all but light human use (e.g., science, education)		Core areas of PAs				Strict
Ib	Wilderness area	Protected from human perturbation		Core areas of PAs				
II	Natural Park	Protection of ecosystems with educational, spiritual, and recreational purpose	NP	Matching description	1917	67	16,218,589	Strict/flexible
III	Natural Monument	Protection of a specific Natural Monument (e.g., cave, landform, ancient grove)	NM	Matching description	1991	5	16,269	Strict
IV	Habitat/species management area	Protection of species/habitat through active interventions	FFPA[b]	Protection of species/habitat within large areas where a small portion allows sustainable development	1936	40	6,996,864	Strict/flexible
			S	Protection of species/habitat within small areas	1986	18	150,193	Strict/flexible
V	Protected landscape/seascape	Protection of areas where the interaction of humans and nature has produced an area of novel character	BL	Protection of landscape promoting horizontal participation of all actors, sense of belonging, and an integral vision of the territory	2014	1	245,000	Flexible/anti-statist
VI	Protected areas with sustainable use of natural resources	Protection of large areas where a small portion is under sustainable management	BR[b]	Matching description	1972	44	62,952,750	Flexible/anti-statist

Table 4.1 (continued)

IUCN		CONANP				
Category	Description	Category	Description	Year of creation	Amount by 2019	Area by 2019 (ha)	Management scheme
No equivalence		NRPA	Protection of soils, basins, and natural resources that are not included in another category	1938	8	4,503,345	Strict/flexible
Other Effective Area-Based Conservation	Protection of ecosystems with biological, cultural, and spiritual relevance outside formal protected areas	ADVC	Areas Designated Voluntarily for Conservation Areas voluntarily assigned for its conservation by indigenous peoples, social organizations, and public or private entities	2000	352	545,067	Flexible/ anti-statist

NP Natural Park, *NM* Natural Monument, *FFPA* Flora and Fauna Protection Area, *S* Sanctuary, *BL* Biocultural Landscape, *BR* Biosphere Reserve, *RNPA* Natural Resources Protection Area, *ADVC* Voluntarily Designated Protection Area

[a]Data retrieved form UNEP-Protected Planet (https://www.protectedplanet.net/country/MX)

[b]CONANP categories that have more than one IUCN category equivalence

and Areas Designated Voluntarily for Conservation (ADVC) (see Table 4.1). These categories could be classified according to their management regimes as *hard, flexible*, or *anti-statist* (CNDH 2019). Here we aim to review how these different management regimes are the result of the change in the environmental value system, resulting in novel PA categories, models of participation, and conceptions about their effectiveness.

4.2 Hard Statism

Hard statism proposes that regions with greater biodiversity should become *public entities and seeks to relocate human populations* while compensating them for conservation (CNDH 2019).

4.2.1 Environmental Value System, 1917–1970s

Even though the protection of Mexican landscapes has been done since Pre-Columbian times in areas like Chapultepec and Oaxtepec (De la Maza 1999), the modern protected area movement started in Mexico using hard statism as a form of governance in the form of the National Parks.

In this sense, the *Desierto de los Leones*, an area near Mexico City, was designated as the first Mexican PAs in 1917 by President Venustiano Carranza under the Natural Park category with the objective of preserving the landscape's beauty and ensuring a future reservoir of water for the capital (De la Maza 1999). It would not be until almost two decades later that another protected area was declared as President Lazaro Cardenas (1934–1940) promoted the creation of Natural Parks. In fact, 49% of the current National Parks (n = 67) were created during this period of government.

The instauration of these PAs relies principally on the influence of Miguel Angel de Quevedo (1862–1946) and his efforts transmitting the relevance of these relatively untouched areas to the sitting Mexican Presidents in this period. From the institutional point of view, the appreciation of physical appeal and beauty of nature (e.g., aesthetic) and structure, function, and relationships of this ecosystems (e.g., ecologistic-scientific) were the main values that explain the creation of these Natural Parks (Kellert 1996). In the statism regime, nature is appreciated on its own (Mace 2014). For that reason, Natural Parks were conceived as areas set up to protect beautiful landscapes and wildlife, usually in areas of little economic potential (Watson et al. 2014). However, these areas did have a large potential for tourism. In fact, the current aim of Natural Parks is to designate and preserve areas that are relevant for their scenic beauty and scientific, educational, recreational, and historical value and where *only* activities related to the protection of natural resources as well as research and tourism are allowed (LGEEPA 2018).

The creation of two other PA categories during the 1930s, Flora and Fauna Protection Area (FFPA) and Natural Resources Protection Area (NRPA), also followed the statism regime. In both categories, the government aims to ensure the preservation of the resources from potential threats (see Fig. 4.1., focus on the period between 1917 and 1970).

4.2.2   Mechanisms of Participation and Governance

It would seem that conservation institutions formed by the government following the statism regime regard local communities as the enemy to defeat. The National Park model is characterized for ownership of resources in the hands of the government, which functions as administration agency and is funded based on public resources and usually has an expropriatory character. The FFPA and NRPA categories allow different zoning which is determined by the government in a Management Plan (LGEEPA 2018).

4.2.3   Effectiveness

During this first stage, management of effectiveness was not considered. There was an increment on the extension of PAs; however, during this initial instauration, neither the effectiveness on the biological outcomes nor its management was assessed.

By the end of the 1960s, only three PA categories were recognized: Natural Parks, Flora and Fauna Protection Area, and Natural Resources Protection Area, all managed using a hard statism. However, hard statism is difficult to maintain. During the end of the 1960s and early 1970s, the Mexican government put aside the protection of the environment. Instead, the State focused on promoting economic development by creating institutions such as the *Comisión Nacional de Desmonte* that aimed to transform the rainforest into agricultural and cattle lands. These new State policies caused great commotion among the scientific community. As such, scientist began to look for new governance schemes and new forms of participation where ecosystem protection does not exclusively depend on the will of the State (De la Maza 1999). Additionally, they emphasized the need of systematically evaluating the effectiveness of PAs.

4.3   Flexible Statism

In flexible statism, the State maintains its leadership in the creation of PAs, but it is accompanied by multiple initiatives to seek the sustainable development of the area and to transform the local communities into potential conservation allies (Carabias et al. 2015). However, in this case, the State keeps monopoly on the legitimate use of force (CNDH 2019).
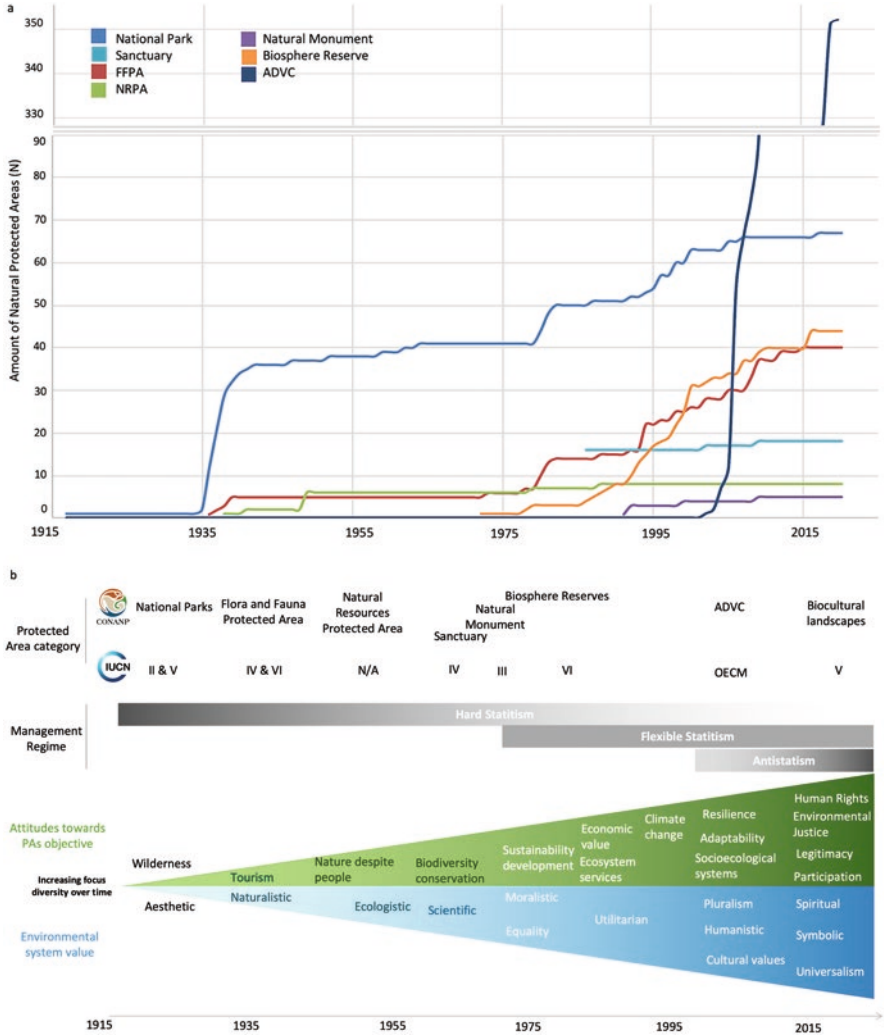
Fig. 4.1 Mexican natural protected areas time trend shows how (**a**) the category of protected areas (PA) and its amount have changed since 1917 (data from CONANP 2019, 2020). (**b**) The design and implementation of these categories have been influenced by several factors such as the environmental value system (EVS; blue) that determined the attitudes toward the PA's goal (green). The institutional EVS and attitude toward nature determine a specific management regime (e.g., hard, flexible or anti-statism) that has been translated in different international (e.g., IUCN) or national (e.g., CONANP) management categories. This time trend shows how the diversity of values, attitudes, management regimes, and PA categories underpinning conservation has shift and diversified through time

4.3.1   Environmental Value System, 1980–2000

During the end of the 1970s, the EVS began to focus more on the benefits of the sustainable use of nature (e.g., utilitarian), on ethical concerns of protecting nature (e.g., moralistic), and in the equality in the distribution of the benefits received from nature between individuals (e.g., equality) (Kellert 1996). This allowed new ideas to emerge such as sustainable development, to serve as new goals for environmental conservation. In other words, the motivation for protecting nature started to be seen as a way to contribute to the livelihood of local communities and as a way to close the social inequality gap. Sustainability sets a new conservation paradigm that recognizes the interconnectedness of ecological, social, economic, political, and cultural aspects. A new category of PA, the Biosphere Reserve (BR), was created in order to match this new conservation goal. *Laguna Ojo de Liebre* and *Montes Azules* became the firsts BRs in Mexico, in 1972 and 1978, respectively. Since then, the category of BR has been widely used as a tool to protect the natural landscape and enhance the socioeconomic development of the communities living on it (CONANP 2020; De la Maza 1999). Currently, the category with more area under protection is Biosphere Reserves, covering more than 70 million hectares (approx. 173 million acres) by 2020 (CONANP 2020) (see Fig. 4.1., focus on the period between 1980 and 2000).

4.3.2   Mechanisms of Participation

In flexible statism, participation of local communities is more relevant than in the hard statism. In order to ensure participation inside the PAs and to reach the goal of sustainability, the Mexican government created the General Law of Ecological Balance and Environmental Protection (LGEEPA) in 1988. The LGEEPA in the 15th Article regulates the participation inside the environmental policy and establishes the means for the interested population to be informed and participate in environmental public policy decisions.

According to the law, the State must recognize (1) that ecosystems are common heritage of society; (2) that the government must take responsibility for protecting the ecological balance; (3) that the coordination between agencies and entities of the federal public administration of the different levels of government and the agreement of society are indispensable for the effectiveness of ecological actions; (4) that individuals and societies are the main actors in the ecological consultation and the mechanism to redirect the relationship between nature and society; and finally, (5) that the eradication of poverty is necessary for sustainable development.

Moreover LGEEPA, in its Article 157, also establishes that the Federal Government must promote the *co-responsible participation* of society in the planning, execution, evaluation, and monitoring of environmental policy and also include mechanisms of public consultation (Art. 159) in which entities and agencies of public administration, academic institutions, and physical and moral individuals (e.g., social, business, organizations) participate.

Since the creation of the LGEEPA, all PAs, despite their category, must involve local participation to a certain degree. Still, the state remains the most powerful entity in the decision-making process. In this sense, PA participation is done by three types of *advisory councils* to ensure participation: (1) National PA Council, (2) Advisory PA Council, and (3) other councils to address specific issues.

4.3.2.1 National PA Council

The National Council is made up of representatives of the secretariat, other agencies and entities of the Federal Public Administration, academic institutions, research centers, producer and business groups, civil society organizations, and other social or private organizations. This council serves as a *consulting body* of the Ministry of Environment in the formulation, execution, monitoring, and evaluation of the policy for the establishment, management, and monitoring of the ANP of its competence.

4.3.2.2 Advisory PA Council

The Advisory Council, on the other hand, is the instrument that promotes and guarantees the organized participation of society inside a specific PAs. It aims to support and advise the governmental directors of the PA in the formulation of the Management Plan (MP), in the management and evaluation of the actions undertaken, as well as in the negotiation for decision-making, problem solving, search for sources of financing, and project development (Art. 18). This congress is made up of an Honorary President (Governor or Representative), an Executive President elected by the members, a Technical Secretary (Director of the PAs), Municipal Presidents, representatives of *ejidos* and communities, owners and holders, social organizations, and academic institutions. It consists of a maximum of 21 members. The decisions are taken by the vote of the majority of the members present, and the information and evaluations that are generated must be public and open for consultation and evaluation according to the National Transparency Law. The council must meet at least once a year.

4.3.3 Effectiveness

The term "effectiveness" as it relates to PAs is ambiguous because it could be assessed in several terms, such as ecological (e.g., animal population trends, changes in land cover), social (e.g., poverty relive, education level), or management (e.g., inputs in terms of staff or budget and the actions done) outcomes of creating PAs (Eklund and Cabeza 2017). The Mexican government did not assess the effectiveness of the PAs on any of these terms during their first eight decades of implementation. However, since the 1990s, the amount of research that justifies the existence of PAs has steadily increased.

4.3.3.1 Biological and Social Outcomes

Literature focusing on the biological effectiveness or outcomes of PAs is common. In general, global and Mexican, terrestrial PAs have been effective on reducing habitat cover change (Figueroa and Sánchez-Cordero 2008; Jiménez-Sierra et al. 2017) but have been inconclusive on their effect to halt species population declines (Geldmann et al. 2013). On the other hand, the evaluation of the effectiveness of PAs to influence socioeconomic characteristics is scarce but is conclusive on the increasing benefits of empowerment and co-management of the local communities (Berkes 2004).

4.3.3.2 Management Effectiveness

Probably the most common type of effectiveness measurement in PAs is the "management" measure. Currently, there are several systems for assessing effectiveness of management in PAs (see Hockings 2003 for review). The IUCN World Commission on Protected Areas (WCPA) has developed an evaluation framework for management effectiveness assessment (PAME).

PAME evaluations assess how well management inside the PAs aids to achieve the conservation goals (Hockings et al. 2006). PAME exposes areas of improvement on PA's management, accountability, and communication with public and assists in prioritization between conservation actions and equivalent PAs (Hockings et al. 2006; Leverington et al. 2010). Nowadays, 169 countries assess the management effectiveness of PAs using around 95 different methodologies as reported in the Global Database on PAME (UNEP-WCMC 2020).

Management Effectiveness Tracking Tool (METT) is the most common PAME approach to assess management effectiveness around the globe (Geldmann et al. 2015). METT is a questionnaire usually completed by a park manager and stakeholders that collect info on the objectives, threats (e.g., human settlements, farming, mining, transportation, tourism, natural system modifications, pollution, invasive species), budgets, staffing, size, and designations (e.g., legal status, law enforcement, management plan) (Stolton et al. 2007).

In Mexico, it wasn't until 2001 that CONANP founded the System of Information, Monitoring and Evaluation for Conservation (SIMEC) that focuses on (a) giving information to managers and general public, (b) monitoring population trends, and (c) evaluating the management effectiveness of PAs. By then, more than 21,448,190 hectares (approx. 53 million acres) were under a PA status without knowing if PAs were effective or not. Currently, less than 10% of the Mexican PAs have been assessed for its management effectiveness (UNEP-WCMC 2020), and globally only 20–50% of protected areas are effectively managed (Leverington et al. 2010).

Coad et al. (2019) analyzed the Global Datasets of PAME to understand the development of PA worldwide. Their study shows that around 60% of the Neotropical PA have inadequate funding and staff, becoming the most inadequately managed region of the world. Moreover, the global METT scores showed an improvement

over time in the biological terms and in the planning, design, and establishment of formal user rights. However, local communities and indigenous people involvement in the decision-making process and the actual conservation outcomes showed the least improvement (Geldmann et al. 2015).

Despite the fact that flexible statism governance follows the ideas of sustainability, there is still a poor integration between social and biological outcomes. Management effectiveness evaluations show that involvement of local communities is rare (Geldmann et al. 2015). This could be related to the notion that the State should regulate the relationship between society and the PAs. Other regimes of governance, such as anti-statism, could be more effective in achieving a positive long-term outcome. Anti-statism policies emerge from the relationship between the environment and the people that live, own, depend on, and manage it. This scheme of governance is more prone to acceptance of the property rights of people to their land and consequently, increasing participation and legitimacy of PAs.

4.4 Anti-statism, 2000–Current

Some authors point out that the communities that inhabit the PAs are frequently associated with indigenous people identities (Boege 2008; Garnett et al. 2018), and these communities should be those who carry out the necessary actions to achieve environmental sustainability (Toledo 2005), with little to non-state intervention other than the guarantee of property rights over land and its natural resources (CNDH 2019). Anti-statism PAs should also be accompanied by recognition of self-determination and autonomy of indigenous peoples and similar communities under equal conditions (Borrini-Feyerabend et al. 2004; Boege 2017).

4.4.1 Environmental Value System

Since the beginning of the new century, conservationists started to question the flexible statism environmental governance. Now, the underpinning values determining the goals, forms of participation, and effectiveness of PAs rely more on the humanistic, spiritual, symbolic, and pluralistic values (Kellert 1996). Current conservation actions are rooted on the idea that there is not a central view of the environmental issues and that we should embrace the plurality of viewpoints in different socio-ecosystems. In this way, each society should be able to manage their resources as they best see fit.

Under these new EVS, the conservation goal is to create a community by enriching bottom-up (participatory) decision-making and recognizing Other Effective Area-Based Conservation Measures (OECM). In spite of the great complexity of involving several actors in the process, several authors agree that without the involvement and participation of the local population in the planning, management, evaluation, and

decision-making, it will not be possible to achieve the social and ecological goals that are expected from a PA in the long term (Brenner 2010; Andrade and Rhodes 2012; Borrini-Feyerabend et al. 2013; Oldekop et al. 2016). It would also prevent the PA socio-ecological resilience or adaptation to change (Olsson et al. 2004).

In this way, the management of PAs *must incorporate a strong participatory, co-management, and representation component*. To address the inequalities and omissions by state institutions, a new value system associated with the conservation and sustainability in the management of PAs is necessary and is based on three fundamental changes (Merçon et al. 2019): (i) *ontological* that recognizes diverse ways of conceiving and experiencing nature and its cultural roots; (ii) *epistemological* that recognizes the interdependence between nature and culture as well as that the construction of knowledge and decision-making must be collaborative; and (iii) *ethical-political* that explicitly considers the plurality of values, governance systems, and power relations.

In this way, PAs will overcome the socio-structural conditions of injustice that have prevailed over indigenous people and local communities since (a) they have historically been deprived of interference in the public policies that affect them (Ruiz-Mallén and Corbera 2013; Garnett et al. 2018) and (b) they suffer from the worst conditions of poverty and marginalization (Paz-Salinas 2005; West et al. 2006; Adams and Hutton 2007; Brockington and Wilkie 2015). Paradoxically, indigenous and similar communities have control of the best preserved territories (Boege 2008; Garnett et al. 2018).

Since 2018, OECM were formally defined as "a geographically area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services and, where applicable, cultural, spiritual, socioeconomic, and other locally relevant values" (UNEP-WCMC 2020). This is a great step on understanding the relevance of indigenous and similar communities worldwide.

Anti-statism governance in Mexico is exemplified by better bottom-up PAs, such as the Areas Designated Voluntarily for Conservation (ADVC) and the implementation of Biocultural Landscape (BL) PAs. In ADVC, local people decide to include their land on a formal protection scheme for a determined period of time (ranging from 15 years to perpetuity). On the other hand, Biocultural Landscape is a widely unexplored category that searches to conserve an area where "the interaction of people and nature over time has produced an area of distinct character... where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation" (Dudley 2008). In this sense, this category seeks to preserve the environment, meanwhile maintaining the cultural and spiritual values and fomenting social cohesion and economic improvements to allow the long-term conservation of the area (Borrini-Feyerabend et al. 2004; Mitchell 2006).

These new types of governance have had a positive reception in society. Today, ADVC are the most common PA in Mexico (n = 353) and cover an area of 544, 106 ha (i.e., an area equivalent to the surface of the Alcaldies of Tlalpan and Milpa Alta together) (see Fig. 4.1, focus on the period between 2000 and 2019).

4.4.2 Mechanisms of Participation

In the anti-statism conservation, the participation of the government is being reduced, and the local people increase in power of the decision-making processes. During the last decade, it has begun to be used by indigenous peoples and similar communities as a legal strategy to claim a different relationship with the territory and commons (Borrini-Feyerabend et al. 2004). Through the defense of human rights, they seek to create and maintain identities, local symbolic resources (festivities, rituals, spiritualities, values), their own fields of action, links, and self-management to face common needs (Boege 2017).

This situation establishes a fundamental challenge to comply with the SDGs through PA since it involves breaking with the top-down protection schemes (hard statism) and establishing a bottom-up relationship based on respect for the human rights of the indigenous and similar communities as well as their forms of organization and particular livelihoods. Today, we see an increase in novel views on conservation, focusing on protecting indigenous rights to traditionally manage their common goods, self-determination, and autonomy (Borrini-Feyerabend et al. 2004; CNDH 2019). This focus might increase the effectiveness of PAs through the co-management of the territory (Berkes 2004) while reducing the social, economic, and political inequalities that indigenous and similar communities have historically suffered and allow biodiversity and agrobiodiversity conservation over the long term (Oldekop et al. 2016; Martínez-Esponda et al. 2019).

4.4.3 Effectiveness

The novelty and complexity of anti-statism conservation initiatives, such as OECM, ADVC, or Biocultural Landscapes, have limited the amount of studies focusing on their effectiveness. Currently, further research is being developed to understand how to determine the extent, governance type, and measurement of effectiveness.

4.5 Discussion

Historically, the Mexican PA's decree has been the main source of conflict for its implementation (CNDH 2019) because PAs have often been created without consulting the local population. Normally, the PAs decree imposes a new legal classification on the territory that consolidates its public interest and a new regulatory framework (CNDH 2019). This commonly overlaps previous classifications and activities that were carried out in the territory and establishes new regulations that affect directly the relationship that its inhabitants have established with the commons (e.g., water, forests, fisheries, food systems, seeds) mainly related to

restrictions on the use of their common goods, access to sacred sites, as well as the ability to make decisions about their territories (Alcorn and Toledo 1998; Anaya and Espírito-Santo 2018; CNDH 2019).

The current EVS promotes changes that have also resulted in the emergence and consolidation of *new forms of physical and symbolic appropriation of territories, management*, *and governance frameworks* (Walkid 2011). To achieve the modern social, economic, political, and environmental goals through PAs, it is necessary to recognize the relevant role that *indigenous people and similar communities* (i.e., peasants and afro-descendants) have in the conservation of nature (Boege 2008; Garnett et al. 2018). Indigenous communities own or manage over 40% of the PA's territory worldwide, placing them as the group with the most territory inside these institutions (Garnett et al. 2018). This is not a coincidence, since in many cases, the collective practices of the indigenous and similar communities have given rise to multifunctional landscapes and particular forms of land management that increase the diversity of habitats, biodiversity, and agrobiodiversity that is necessary to address climate change (Borrini-Feyerabend et al. 2004; Robson 2007; Toledo and Barrera-Bassols 2008; Berkes 2009; Martínez-Esponda et al. 2019) and the current environmental crisis. Even when ecosystems are subject to a high degree of human pressure, indigenous territories perform better than PAs in protecting biodiversity and environmental services (Nolte et al. 2013). Paradoxically, indigenous and similar communities are also the group with the greatest social lag and greater vulnerability to climate change (Swiderska and Palmer 2015; IPCC 2018) and in many cases low participation or neglected participation inside the PA management.

Therefore, it is necessary to adapt the governance schemes, legal frameworks, and governmental structures that are involved in the management of PAs (Oldekop et al. 2016; Geldmann et al. 2015) because, on occasion, their implementation has come into conflict with local governance practice groups and institutions (Alcorn and Toledo 1998; Berkes 2004, 2009; Anaya and Espírito-Santo 2018). In order to achieve sustainable development, it is essential to recognize the socio-political context at local, regional, and national levels, as well as to establish mechanisms of participation that consider the inequalities and the underlying power structures in the decision-making and agency capacity of the actors involved in the management of environmental public policy instruments (Holmes 2007; Oldekop et al. 2016; Merçon et al. 2019).

4.6 Conclusion

4.6.1 Lessons Learned

4.6.1.1 Environmental Value System

Conservation and management of natural resources have undergone a change in recent decades and have moved away from *centralism of state* (hard statism) and regulation schemes *top-down* in environmental matters toward *bottom-up participatory schemes* (flexible statism and anti-statism). Novel schemes value the different

cosmovisions of local population and believe that the power of decision-making and in the benefits of natural resource management should be shifted toward them (Shackleton et al. 2002; Dovers et al. 2015).

In addition, the objectives of the PAs have been expanding to *include economic, social, spiritual*, *and cultural goals* by using transdisciplinary knowledge and always aiming to reach a *more just and equitable society* that advances toward sustainability (Merçon et al. 2019).

Current conservation strategies must take into consideration the local institutions, collective practices, and biocultural heritage to provide culturally appropriate mechanisms for decision-making (Borrini-Feyerabend et al. 2013; Toledo 2015; Boege 2017). If considered, new conservation policies will allow the right to autonomy and self-determination to enhance sustainability (Martínez-Esponda et al. 2019).

4.6.2   Participation

Biosphere Reserves, FFPA, and other categories have participation mechanisms that are designed under a hard or flexible statism regime. Even though there is participation, the state maintains the control over strategic resources, financing, and development plans in detriment of the traditional land management systems and natural resources (Shackleton et al. 2002; Durand et al. 2014; Monterrubio-Solís 2019; Brenner 2010). And in some cases, an effective participation of society is not established as decision-making does not consider inequality in the exercise of power of the different actors involved (Brenner 2010; Durand et al. 2014; Toledo 2015). For example, in the advisory councils, some members (e.g., international and national agencies and civil society organization) have the monopoly of the information and decision-making and are usually not culturally appropriate (Durand et al. 2014; Monterrubio-Solís 2019).

Novel conservation strategies, ADVC and Biocultural Landscape, shift the participation mechanisms and give more autonomy to the local people. Now, it is important to analyze the underlying power structure and the potential conflicts in the management of natural resources between actors to develop effective conservation strategies (Durand et al. 2014).

4.6.3   Effectiveness

Historically, most Mexican PAs follow the hard or flexible statism. As discussed before, these schemes focus on the biological-ecological realm and neglect, at least in some degree, people's cultural practices and political organization. As a result, most of these PAs have shown more effectiveness on the biological or management fields than on the social ones. New effectiveness methods to assess flexible or anti-statism schemes should evaluate the *power relationships* between the different

actors inside the PAs (Merçon et al. 2019) and be guided by ethical principles to achieve "good governance," based on the principles of efficiency, social justice, and legitimacy (Brenner 2010).

References

Adams WM, Hutton J (2007) People, parks and poverty: political ecology and biodiversity conservation. Conserv Soc 5(2):147–183

Ajzen I (1991) The theory of planned behavior. Org Behav Human Decision Proc 50. https://doi.org/10.1016/0749-5978(91)90020-T

Alcorn J, Toledo VM (1998) Resilient resource management in Mexico's forest ecosystems: the contribution of property rights. In: Berkes F, Folke C (eds) Linking social and ecological systems. Cambridge University Press, Cambridge, pp 216–249

Anaya FC, Espírito-Santo MM (2018) Protected areas and territorial exclusion of traditional communities: analyzing the social impacts of environmental compensation strategies in Brazil. Ecol Soc 23(1). https://doi.org/10.5751/ES-09850-230108

Andrade GSM, Rhodes JR (2012) Protected areas and local communities: an inevitable partnership toward successful conservation strategies? Ecol Soc 17(4). https://doi.org/10.5751/ES-05216-170414

Barnosky AD, Hadly EA, Bascompte J, Berlow EL, Brown JH, Fortelius M, … others (2012) Approaching a state shift in Earth's biosphere. Nature 486(7401): 52–58. https://doi.org/10.1038/nature11018

Beresford AE, Buchanan GM, Donald PF, Butchart SHM, Fishpool LDC, Rondinini C (2011) Poor overlap between the distribution of protected areas and globally threatened birds in Africa. Anim Conserv 14(2):99–107. https://doi.org/10.1111/j.1469-1795.2010.00398.x

Berkes F (2004) Rethinking community-based conservation. Conserv Biol 18(3):621–630. https://doi.org/10.1111/j.1523-1739.2004.00077.x

Berkes F (2009) Community conserved areas: policy issues in historic and contemporary context. Conserv Lett 2(1):20–25. https://doi.org/10.1111/j.1755-263x.2008.00040.x

Boege E (2008) El patrimonio biocultural de los pueblos indígenas de México: hacia la conservación in situ de la biodiversidad y agrodiversidad en los territorios indígenas. Instituto Nacional de Antropología e Historia (INAH) Comisión Nacional para el Desarrollo de los Pueblos Indígenas (CDI) Mexico City: Mexico

Boege E (2017) El patrimonio biocultural y los derechos culturales de los pueblos indígenas, comunidades locales y equiparables. Diario de Campo 0(1):39–70

Borrini-Feyerabend G, Kothari A & Oviedo G (2004) Indigenous and Local Communities and Protected Areas: Towards Equity and Enhanced Conservation IUCN Gland, Switzerland and Cambridge, UK. xviii + 111pp. 2–8317–0675-0

Borrini-Feyerabend G, Dudley N, Jaeger T, Lassen B, Broome NP, Phillips A, Sandwith T (2013) Governance of protected areas: from understanding to action. IUCN, Gland

Brenner L (2010) Gobernanza ambiental, actores sociales y conflictos en las Áreas Naturales Protegidas mexicanas. Rev Mex Sociol 2(55):283–310

Brockington D, Wilkie D (2015) Protected areas and poverty. Philos Trans R Soc B: Biol Sci 370(1681). https://doi.org/10.1098/rstb.2014.0271

Butchart SHM, Walpole M, Collen B, Strien A, Bastian B, Brown C, Watson R (2010) Global biodiversity: indicators of recent declines. Science 328(May):1164–1168

Carabias J, De la Maza J, Cadena R (2015) Conservación y desarrollo sustentable en la Selva Lacandona. Natura y Ecosistemas Mexicanos AC, México

Clayton S, Brook A (2005) Can psychology help save the world? A model for conservation psychology. Anal Soc Issues Public Policy 5(1):87–102. https://doi.org/10.1111/j.1530-2415.2005.00057.x

CNDH (2019) Estudios sobre el cumplimiento e impacto de las recomendaciones generales, informes especiales y pronunciamientos de la CNDH (2001–2017) TOMO VI. Áreas naturales protegidas y derechos humanos Ciudad de México: Universidad Nacional Autónoma de México; Cordinación de Humanidades, UNAM; Programa Universitario de Derechos Humanos, UNAM; Comisión Nacional de Derechos Humanos, México City: México

Coad L, Watson JEM, Geldmann J, Leverington F, Hockings M, Knights K, Di Marco M (2019) Widespread shortfalls in protected area resourcing. Front Ecol Environ 17(5):259–264

CONANP (2019) Áreas Destinadas Voluntariamente a la Conservación. Retrieved from the web https://advc.conanp.gob.mx/listado-de-advc/

CONANP (2020) Listado de las Áreas Naturales Protegidas de México (LISTANP) Retrieved form the web site: http://sig.conanp.gob.mx/website/pagsig/listanp/

De la Maza ER (1999) Una historia de las áreas naturales protegidas en México. Gaceta Ecológica 51:15–34

Dovers S, Feary S, Martin A, McMillan L, Morgan D Tollefson M (2015) Engagement and participation in protected area management: who, why, how and when. Protected Area Governance and Management 413–440 Retrieved from https://www.jstor.org/stable/pdf/j.ctt1657v5d.21.pdf

Dudley N (2008) Guidelines for applying protected area management categories International Union for Conservation of Nature, Gland, Switzerland

Dudley N, Ali N, Ketiunen M, MacKinnon K (2017) Editorial essay: protected areas and the sustainable development goals. Parks 23(2):10–12. https://doi.org/10.2305/IUCN.CH.2017.PARKS-23-2ND.en

Durand L, Figueroa F, Trench T (2014) Inclusion and exclusion in participation strategies in the montes azules biosphere reserve, Chiapas, Mexico. Conserv Soc 12(2):175–189. https://doi.org/10.4103/0972-4923.138420

Eklund J, Cabeza M (2017) Quality of governance and effectiveness of protected areas: crucial concepts for conservation planning. Ann N Y Acad Sci 1399(1):27–41. https://doi.org/10.1111/nyas.13284

Figueroa F, Sánchez-Cordero V (2008) Effectiveness of natural protected areas to prevent land use and land cover change in Mexico. Biodivers Conserv 17(13):3223–3240. https://doi.org/10.1007/s10531-008-9423-3

Garnett ST, Burgess ND, Fa JE, Fernández-llamazares Á, Molnár Z, Robinson CJ et al (2018) Indigenous lands for conservation. Nat Sustain 1(July):369–374. https://doi.org/10.1038/s41893-018-0100-6

Geldmann J, Barnes M, Coad L, Craigie ID, Hockings M, Burgess ND (2013) Effectiveness of terrestrial protected areas in reducing habitat loss and population declines. Biol Conserv 161:230–238. https://doi.org/10.1016/j.biocon.2013.02.018

Geldmann J, Coad L, Barnes M, Craigie ID, Hockings M, Knights K et al (2015) Changes in protected area management effectiveness over time: a global analysis. Biol Conserv 191:692–699. https://doi.org/10.1016/j.biocon.2015.08.029

Hockings M (2003) Systems for Assessing the effectiveness of Management in Protected Areas. Bioscience 53(9):823–832

Hockings M, Stolton S, Leverington F, Dudley N, Courrau J (2006) Evaluating effectiveness: a framework for assessing management effectiveness of protected areas, 2nd edn. IUCN, Gland/Cambridge UK

Holmes G (2007) Protection, politics and protest: understanding resistance to conservation. Conserv Soc 5(2):184–201

IPCC (2018) Summary for policymakers. In: Masson-Delmotte V, Zhai P, Partner HO, Roberts D, Skea J, Shukla PR, Pirani A, Moufouma-Okia W, Pan C, Pidcock R, Connors S, Matthews JBR, Chen Y, Zhou X, Gomis MI, Lonnoy E, Maycock T, Tignor M, Waterfield T (eds.) Global warming of 1.5°C. an IPCC special report on the impacts of global warming of 1.5°C above

pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. World Meteorological Organization, Ginebra

Jiménez-Sierra C, Torres-Orozco D, Martínez JC, Toledo-Guzmán AD (2017) A socioecosystemic view to the natural reserves: Case Study of Metztitlan's Biosphere Reserve. In Calderón-Contreras (Coordinator) In: Los sistemas socioecológicos y su resiliencia: casos de estudio. Mexico City Mexico

Jones NA, Shaw S, Ross H, Witt K, Pinner B (2016) The study of human values in understanding and managing social-ecological systems. Ecol Soc 21(1)

Jones KR, Venter O, Fuller RA, Allan JR, Maxwell SL, Negret PJ, Watson JEM (2018) One-third of global protected land is under intense human pressure. Science 791(May):788–791

Kellert SR (1996) The value of life: biological diversity and human society. Island Press, Washington, DC, 263 p

Leverington F, Costa KL, Courrau J, Pavese H, Nolte C, Marr M et al (2010) Management effectiveness evaluation in protected areas – a global study second edition – 2010 (Second). University of Queensland, Brisbane

LGEEPA (2018) Diario Oficial de la Federación. Ultima reforma publicada DOF 05–06-18

Mace GM (2014) Changes in the perception and goals of nature conservation require a solid scientific basis. Science 345:1558. https://doi.org/10.1126/science.1254704

Martínez-Esponda FX, García-Maning G, Vázquez-Quesada B, Colmenero S, Bracamontes-Nájera L (2019) In: Tornel C (Coordinator) Alternativas para limitar el calentamiento global en 1.5°C. Henrich Böll-Stiftung, Mexico City, México

Merçon J, Vetter S, Tengö M, Cocks M, Balvanera P, Rosell JA, Ayala-Orozco B (2019) From local landscapes to international policy: contributions of the biocultural paradigm to global sustainability. Global Sustain 2. https://doi.org/10.1017/sus.2019.4

Mitchell R (2006) Environmental governance in Mexico: two case studies of Oaxaca's community forest sector. J Lat Am Stud 38:519–548

Monterrubio-Solís C (2019) Formalización de Áreas Destinadas Voluntariamente a la Conservación en territorios comunitarios e indígenas, avances y reveses. EntreDiversidades Revista de Ciencias Sociales y Humanidades 6(12):79–110. https://doi.org/10.31644/ed.12.2019.a03

Naidoo R, Balmford A, Ferraro PJ, Polasky S, Ricketts TH, Rouget M (2006) Integrating economic costs into conservation planning. Trends Ecol Evol 21(12):681–687. https://doi.org/10.1016/j.tree.2006.10.003

Nolte C, Agrawal A, Silvius KM, Britaldo SSF (2013) Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon. Proc Natl Acad Sci U S A 110(13):4956–4961. https://doi.org/10.1073/pnas.1214786110

Oldekop JA, Holmes G, Harris WE, Evans KL (2016) A global assessment of the social and conservation outcomes of protected areas. Conserv Biol 30(1):133–141. https://doi.org/10.1111/cobi.12568

Olsson P, Folke, Berkes (2004) Adaptive comanagement for building resilience in social-ecological systems. Environ Manag 34:75–90. https://doi.org/10.1007/s00267-003-0101-7

Paz-Salinas MF (2005) La participación en el manejo de áreas naturales protegidas. Actores e intereses en conflicto en el Corredor Biológico Chichinautzin, Morelos. Centro Regional de Investigaciones Multidisciplinarias, Cuernavaca

Reser JP, Bentrupperba JM (2005) What and where are environmental values? Assessing the impacts of current diversity of use of 'environmental' and 'world heritage' values. J Environ Psychol 25:125–146. https://doi.org/10.1016/j.jenvp.2005.03.002

Robson JP (2007) Local approaches to biodiversity conservation: lessons from Oaxaca, southern Mexico. Int J Sustain Dev 10(3):267–286. https://doi.org/10.1504/IJSD.2007.017647

Rodrigues ASL (2006) Are global conservation efforts successful? Science 313(5790):1051–1052. https://doi.org/10.1126/science.1131302

Ruiz-Mallén I, Corbera E (2013) Community-based conservation and traditional ecological knowledge. Ecol Soc 18(4):12. https://doi.org/10.5751/ES-05867-180412

Saunders CD (2003) The emerging field of conservation psychology. Hum Ecol Rev 10(2):137–149

Shackleton S, Campbell B, Wollenberg E, Edmunds D (2002) Devolution and community-based natural resource management: creating space for local people to participate and benefit? Nat Resour Persp 76(76):1–6. https://doi.org/10.1016/j.ecolecon.2012.09.001

Stern PC, Dietz T, Abel TD, Guagnano GA, Kalof L (1999) A value-belief-norm theory of support for social movements: the case of environmentalism. Res Human Ecol 6(2):81–97. https://doi.org/10.2307/2083693

Stolton S, Hockings M, Dudley N, MacKinnon K, Whitten T, Leverington F (2007) Management effectiveness tracking tool (second). WWF International, Gland

Swiderska K, Palmer M (2015) Climate change and biocultural adaptation in mountain communities. Second international learning exchange of the international network of mountain indigenous people. International Institute for Environment and Development, London

Toledo VM (2005) Repensar la conservación : ¿áreas naturales protegidas o estrategia bioregional ? Gaceta Ecológica 77(77):67–83

Toledo VM (2015) ¿De qué hablamos cuando hablamos de sustentabilidad? Una propuesta ecológico política. Interdisciplina 3(7):35–56

Toledo VM, Barrera-Bassols N (2008) La memoria biocultural. Junta de Andalucía, Icaria editorial, Perspectivas Ecológicas, Barcelona

UNEP-WCMC (2020) Protected area country profile for Mexico from the world database of protected areas. Available at: www.protectedplanet.net

UNEP-WCMC IUCN & NGS (2018) Protected planet report 2018. UNEP-WCMC IUCN NGS, Cambridge UK/Gland/Washington, DC

UNEP-WCMC IUCN & NGS (2020) Protected planet live report 2020. UNEP-WCMC, IUCN and NGS, Cambridge UK/Gland/Washington, DC

Vitousek PM, Mooney HA, Lubchenco J, Melillo JM (1999) Human domination of earth' s ecosystems. Science 277(5325):494–499. https://doi.org/10.1126/science.277.5325.494

Walkid E (2011) Revolutionary Parks. Conservation, social justice, and Mexico's National parks 1910–1940. The University of Arizona press, Tucson

Watson JEM, Dudley N, Segan DB, Hockings M (2014) The performance and potential of protected areas. Nature 515:67–73. https://doi.org/10.1038/nature13947

West P, Igoe J, Brockington D (2006) Parks and peoples: the social impact of protected areas. Annu Rev Anthropol 35(1):251–277. https://doi.org/10.1146/annurev.anthro.35.081705.123308