# Chapter 11
# Forgotten Social Issues for Achieving Long-Term Conservation in Protected Areas

**Daniel Torres-Orozco Jiménez, Benito Vázquez-Quesada, and Cecilia L. Jiménez-Sierra**

**Abstract** Protected areas (PAs) are probably the most important conservation instrument in Mexico. Historically, their planning and implementation have focused on ecological data ignoring values, attitudes, behaviors, and institutions of the people living in the PA, thus inhibiting its long-term effectiveness. Here, we review three social disciplines that might enhance the understanding of the social sphere around PAs: conservation psychology (CP), social-ecological system framework (SESF), and conservation marketing (CM). CP is crucial to understand human behavior toward nature or conservation. We present different tools for evaluating values, attitudes, and behaviors that are relevant for understanding conservation outcomes. SESF allows to systematically map and diagnose the pattern of interactions of relevant variables in search of factors that can be promoted or restricted to enable the involvement of local people in the planning and implementation of conservation programs and instruments. Finally, CM allows us to modulate and design conservation programs with specific end-state behaviors and target audiences to improve the success of the conservation actions. We proposed that using these disciplines in the design, implementation, and evaluation of the conservation programs, we will enable effective long-term conservation inside Mexican PAs.

**Keywords** Local governance · Co-management · Conservation marketing · Conservation psychology · Social-ecological system framework

D. Torres-Orozco Jiménez (✉) · B. Vázquez-Quesada
Facultad de Ciencias, Universidad Nacional Autónoma de Mexico, Mexico City, Mexico
e-mail: daniel.toj@ciencias.unam.mx; benitovq@ciencias.unam.mx

C. L. Jiménez-Sierra
Laboratorio de Ecología, Universidad Autónoma Metropolitana, Unidad Iztapalapa,
Ciudad de México, Mexico
e-mail: ceci@xanum.uam.mx

## 11.1    Introduction

Protected areas (PAs) are one of the most common tools for the conservation of biodiversity worldwide. Historically, PAs were created based on biological or eco-logical criteria (Halfter 2005), and human settlements within or adjacent to them were viewed as threats to their natural preservation (Redford and Sanderson 2000; Sarkar 1999). In this sense, the paradigm of early PAs was preservation of the envi-ronment, even if that meant removing the local communities from the area (Adams and Hutton 2007; Agrawal and Redford 2006). Following this preservation para-digm, policymakers aimed to create PAs in pristine habitats (Sarkar 1999), ignoring the social and economic impacts of their creation and management (Adams and Hutton 2007; Halfter 2005).

### *11.1.1    Protected Areas and the Paradigm Shift
from Preservation to Conservation*

The preservation paradigm has been questioned for its lack of long-term effective-ness. Even uninhabited, PAs can suffer harmful human influences such as climate change or the synergistic effect of fragmentation (Barnosky et al. 2012; Root and Schneider 2006; Vitousek et al. 1999). Moreover, the preservation approach is char-acterized by poor communication strategies and low participation with the local communities (Adams et al. 2004; Adams and Hutton 2007; Agrawal and Redford 2006; Wilshusen et al. 2002). Without communication or participation from local communities, PAs are still threatened by the effects from the surrounding areas. As a consequence, understanding the norms and factors that affect the management of the territory surrounding PAs is the best way to accomplish long-term conservation goals (Palomo et al. 2014). Analyzing communities that live inside or around PAs and studying how they manage the use of natural resources are vital aspects of a successful PA implementation.

Eventually, a new concept of PA management emerged, called the conservation paradigm. PAs created following the conservation paradigm have two goals: to con-serve biodiversity and to improve the quality of life of their inhabitants through sustainable use of natural resources (Adams and Hutton 2007; Brockington and Wilkie 2015). This sustainable development approach constitutes a complex sys-tem. Therefore, conservation efforts performed inside the PAs should address social, cultural, and political goals to alleviate poverty and improve economic development and political participation (Halfter 2005; Minteer and Miller 2011; Salafsky 2011).

### 11.1.2 Protected Areas in Mexico

Mexico has a long history of protecting biodiversity. Currently, there are seven legal methods to protect biodiversity: environmental impact assessment (MIA), wildlife management unit (UMA), national forestry program (PRONAFOR, PSA), fishing refuge area (ARP), voluntary scheme for forest certification (SCEFORMEX), program of ecological general panning of the territory (POEGT), and protected areas (PAs). Of the seven, PAs have the longest tradition of use in Mexico and are probably the most important, as the other six methods can be implemented within PAs.

Mexican federal PAs are still designated by decree mainly following the current conservation paradigm, without an understanding of the cultural and ecological context. Mexico has more than 180 PAs, and their management depends on the National Protected Areas Commission (SEMARNAT and CONANP 2017). A specific management plan (PM) and an annual operative program are the principle guidelines for the management of the Mexican PAs. The National Commission of Natural Protected Areas (CONANP) directs the human and economic resources to monitor, patrol, manage, and promote sustainable development in each PA (Pisanty et al. 2016).

### 11.1.3 Conservation Programs Inside PAs in Mexico

Ensuring conservation inside PAs is a challenge. The Ministry of Environment and Natural Resources (SEMARNAT) and CONANP have developed several conservation programs that aid PA managers in achieving their conservation goals. All these conservation programs emerged during the last 30 years. Following the conservation paradigm, most of the conservation programs focus on the social aspects of conservation, and only two of them, the fishing refuge area and the environmental impact assessment, focus mainly on the environment. All of these programs are targeted to the local communities living in areas with high conservation value, and most of them focus on economic incentives (i.e., subsides) to engage the targeted audience (Table 11.1).

### 11.1.4 Long-Term Effectiveness of Mexican PAs and Its Conservation Programs

To ensure long-term conservation, it is compulsory to assess the effectiveness of PAs and the conservation programs; nonetheless, this is rarely done. There are plenty of methods to evaluate the effectiveness of PAs, such as the Effectiveness Index for the Management of PAs (Ortiz and Ortega-Rubio 2015) and WWF-IUCN-GTZ Effectiveness Measurement for PAs (Cifuentes et al. 2000). However, the most

**Table 11.1** Conservation instruments or programs in Mexico

| Conservation method or program | Aim | Year of creation | Beneficiaries | Type of benefits | Reference |
|---|---|---|---|---|---|
| Protected areas | To conserve areas of the national territory where the original environments have not been significantly altered by the activity of humans or that need to be preserved and restored | 1917 | Environment and local and/or regional community | Environmental and economic benefits | CONANP (2016b) |
| Environmental impact manifestation (MIA) | To determine the significant and potential environmental impacts related to construction work or activity as well as analyze the manner to avoid or mitigate this effect if it is detrimental to the environment or human health | 1988 | Environment m and local and/or regional community | Environmental benefits | SEMARNAT (2013) |
| Wildlife management unit (UMA) | To strength the integral management of habitat, populations, and native species with particular emphasis on threatened and priority species | 2000 | Citizens and social groups | Economic benefits gained by landowners (e.g., small entrepreneurs) due to the sustainable use of the wildlife | SEMARNAT (2016) |
| National forestry program (PRONAFOR) | To support the owners and holders of forests, jungles, mangroves, wetlands, and arid, to care, improve, and sustainably exploit forest resources present in these ecosystems | 2003 | Organizations and private or social landowners | Economic subsidies as payments for ecosystem services focusing on: 1. Hydric ecosystem services 2. Biodiversity conservation | CONAFOR (2015) |
| Program of Recovery and Repopulation of Species in Danger of Extinction (PROCER) | To contribute to the maintenance of species at risk and their habitat, promoting collaboration and participation of higher education institutions, research, and civil society organizations, *ejidos*, and communities, for sustainable development in the municipalities of the priority regions where these species are distributed | 2007 | Higher education and research institutions, civil society organizations, and users of the resources | Economic subsidies for: 1. Conservation of species at risk 2. In situ conservation of Criollo maize 3. Social compensation for the temporary suspension of fishing to contribute to the preservation of the vaquita porpoise | CONANP (2017a) |

| | | | Ecosystem and local and/or regional community | Environmental benefits | |
|---|---|---|---|---|---|
| Fishing refuge area (ARP) | To create specific zones where the fishing effort is controlled entirely or partially in defined geographical areas in any aquatic zone (marine or continental), allowing the conservation of the ecosystem and the natural restoration of its functions and structure | 2007 | Ecosystem and local and/or regional community | No direct economic benefit Contribute to the development of sustainable fishery | CONAPESCA (2012) |
| Voluntary scheme for forest certification (SCEFORMEX) | To create a voluntary process by which an independent third party ensures, through a certificate, that the management of a forest is sustainable and carried out in compliance with the preestablished criteria | 2008 | Private or social (*ejido* and communal) landowners | Economic benefit due to value-added products | SEMARNAT, CONAFOR (2015) |
| Temporary Employment Program (PET) | To contribute to the socioeconomic welfare of the inhabitants of PAs by paying wages equivalent to 99% of the current daily minimum wage to participate in a given conservation action | 2009 | Local community since the age of 16 | Economic subsidy for: 1. Conservation, restoration, and sustainable development (e.g., soil conservation, solid waste recycling, sustainable use of water and wildlife) 2. Actions to mitigate the impact of climate change (e.g., fire prevention) 3. Intermittent PET | CONANP (2017b) |
| Conservation Program for Sustainable Development (PROCODES) | To promote the conservation of ecosystems and their biodiversity through its sustainable use, with equal opportunities for women and men and with emphasis on the indigenous population | 2009 | Local community with preferences of women and indigenous groups | Economic subsidy for: 1. Conservation projects or infrastructure 2. Training courses 3. Technical studies 4. Environmental contingency brigades | CONANP (2015) |

**Table 11.1** (continued)

| Conservation method or program | Aim | Year of creation | Beneficiaries | Type of benefits | Reference |
|---|---|---|---|---|---|
| Management Program of Natural Protected Areas (PROMANP) | Promote the conservation of ecosystems and their biodiversity through the generation of information on biodiversity, the direct and effective participation of the local population, and the analysis of management strategies | 2011 | Academic and research institutions, centers of research, civil, social organizations, and citizens | Economic subsidy for: 1. Community surveillance 2. Strengthening of ANP through technical studies 3. Biological monitoring | CONANP (2016a) |
| Program of Ecological General Planning of the Territory (POEGT) | Ecological regionalization (which identifies the priority attention areas and the areas of sectoral aptitude) and the ecological guidelines and strategies for the preservation, protection, restoration, and sustainable use of natural resources | 2012 | Ecosystems, federal government, country | Environmental and economic benefits due sustainable development | SEMARNAT (2012) |

common method implemented in Mexican PAs relies on identifying patterns of land-use change (Figueroa et al. 2011; Figueroa and Sánchez-Cordero 2008). However, this method only focuses on the ecological success and should be paired with an assessment of socioeconomic changes. In 2001, CONANP founded the National System of Information, Monitoring and Evaluation for Conservation (SIMEC), with the aim to analyze geographic, biologic, social, and economic indexes to evaluate the effect of PAs; however, their information is still limited due to budgetary constraints (Pisanty et al. 2016). In general, studies have found that Mexican PAs tend to be effective in preventing land-use change but ineffective in improving the livelihood of their inhabitants (Figueroa et al. 2009; Jiménez-Sierra et al. 2017).

The ineffectiveness to reach the social goals in the PAs is not related to a lack of understanding of nature but rather to a lack of understanding of humans. PA conservation research should be less about answering ecological questions (such as what are the threats to diversity or how does specific threat affect the species or ecosystem?), and more about solving social problems (as how do humans value biodiversity; what are the current values, attitudes, beliefs, and actions of a community; and how can we change the current unsuitable practices to conservation actions?).

The PA issues and their inefficiency result from human behavioral choices; therefore, their solution requires behavioral changes at different scales. For achieving a long-term conservation, it is compulsory to understand how do the local communities, managers, and policymakers inside and outside the PAs relate with nature, how can they organize, and how can we sell this conservation idea in the future. For this reason, in this document, we aim to introduce three disciplines that could help us to achieve long-term conservation in protected areas: the conservation psychology, the social-ecological system framework, and the conservation marketing.

## 11.2 Conservation Psychology

> The challenges ahead for biodiversity conservation will require a better understanding of one species: our own. (Saunders et al. 2006)

Most of the programs in PA have been created without considering how the local community relate, feel, speak, and act toward conservation. Despite human actions are complex, behavior is predictable. Knowing the community's physique could aid in developing efficient and long-term conservation programs inside the PAs. In this sense, it is crucial to understand the values, attitudes, concerns, beliefs, and actions of a community toward nature or a conservation program.

Conservation psychology (CP) is a relatively new mission-driven field that emerges from psychologists being worried about the current conservation crisis. In this sense, conservation psychology has a double aim: (1) understanding the behavior of humans toward nature or conservation action and (2) promoting human well-being by developing better conservation strategies (Clayton and Myers 2009;

Saunders 2003). It is a social research, based on the description and experimentation, designed for achieving sustainability. It can focus either on the individual or the collective level. At the individual's level, it searches to understand someone's environmental identity, values, attitudes, or behaviors; meanwhile at the aggregate level, it investigates the social norms and collective actions (Saunders 2003).

The use of CP in PAs would help (1) to understand the personal connections with nature (e.g., Connectedness to Nature Scale (Mayer and Frantz 2004) or Inclusion of Nature in Self (Schultz 2001)), (2) to develop better conservation strategies based on the current values or social norms, (3) to understand the attitudes toward specific conservation program, (4) to enable efficient communication, (5) to evaluate the long-term effectiveness of the conservation action, and (6) to recognize the benefits and barriers in conservation behavior.

Despite these potential benefits, CP is still an underutilized tool for conservation policy (Clayton and Brook 2005). In this section, we will focus on three crucial aspects of CP: values, attitudes, and behaviors.

### 11.2.1   Values

In psychology, values are desirable goals or end-states, usually stable over time and situations, which serve to a person as guiding principles to evaluate different behaviors, people, or objects (Schwartz and Bilsky 1987). All individuals rank or prioritize their values to form the individual's value system which underlies someone's attitudes and behaviors (Dietz et al. 2005).

Values have been measured either by performing questionnaires or experiments since the last 50 years (for an extended review of values, see Dietz et al. 2005). The Schwartz Value System (SVS) is probably one of the most common way to retrieve the values of the inhabitants in PAs. SVS allow cross-cultural comparisons; this would be specially useful as humans residing inside and surrounding Mexican PAs have different cultural identities (Sarukhán and Larson 2001). The Schwartz Value System includes the application of a questionnaire focusing on the relevance of 56 values as guiding goals of someone's life, using a rating scale from 7 (value is of supreme importance) to −1 (opposed to my values) (Schwartz 1994; Struch et al. 2002). After, researchers preform a multidimensional scaling, traditionally a smallest space analysis (SSA), to obtain each value as a point in a multidimensional space. Values that are similar will have the same rating, and therefore they will appear close to each other inside the SSA. These points tend to be organized in ten different clusters called *motivational value types* such as power, achievement, hedonisms, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. Furthermore, those ten value types can be classified into four higher order groups (i.e., openness to change, conservation, self-transcendent, self-enhancement) according to their ultimate motivational goals. There is an opposition between these four categories. In this sense, people that care about freedom and detachment (e.g., openness to change) tend to oppose to the values like sense of

belonging or stability of society (e.g., conservation). In the same way, people that value ambition and wealth (e.g., self-enhancement) tend to ignore values as the unity of nature or equality (e.g., self-transcendent) (Schwartz 1994; Schwartz and Bilsky 1987; Schwartz and Cieciuch 2016).

Current Western societies tend to follow self-enhancement motivational values (i.e., power and personal achievement) and are reflected in the economic system which threatens biodiversity. To reverse this crisis, values must be shifted to self-transcendent values (i.e., benevolence and universalism) (Martin et al. 2016). However, value systems are reasonably stable, and even if there is an abrupt social-ecological change, they are not entirely replaced by others (Manfredo et al. 2017). Nonetheless, identifying the values of the inhabitants of PAs would assist to understand the actions and attitudes threating the biodiversity and to forge effective long-term conservation strategies (Manfredo et al. 2016). The application of SVS in Mexico has been rare (Arciniega and González 2000; Bilsky and Peters 1999; De-la-Garza-Carranza et al. 2014; Schultz and Zelezny 1998), and none of them focus on understanding the values of the people living in or depending on PAs. Conservation managers could develop better long-term conservation strategies by considering the specific values of each cultural group living or depending on PAs.

## *11.2.2 Attitudes*

Attitude is a latent psychological construct mentally attached to a concrete or abstract object built by affective, conative, and cognitive elements (Breckler 1984; Gifford and Sussman 2012). An environmental attitude is a person's favorable or unfavorable valuation toward the natural environment per se or a conservation action (e.g., reduction of waste, adoption of a conservation program, PA decree) (Kaiser et al. 1999). Therefore, the attitudes toward the environment or a specific conservation program depend on the feelings or concerns, actions or behavioral intentions, and thoughts or beliefs toward nature or toward the objectives and institutions proposing them. It has been argued that attitudes do not determine behavior (Gifford and Sussman 2012). However, they could aid in the identification of possible misinformation in beliefs, conservation behaviors, and the level of public support toward an environmental cause.

The measurement of environmental attitudes toward a specific action or program has been done since the 1970s. This assessment is usually accomplished by the application of scales, questionnaires, interviews, and inventories; nevertheless, they typically have a context-specific design inhibiting cross-study comparisons (Gifford and Sussman 2012; Hawcroft and Milfont 2010). Probably the most common method to retrieve the environmental attitudes is the New Ecological Paradigm scale (NEP) (Dunlap et al. 2000). NEP usually focuses on the agreement and disagreement of 15 environmental-related beliefs, the cognitive element of the attitude, using a scale from 1 to 5 where 5 highly agrees and 1 profoundly disagrees (Dunlap et al. 2000; Hawcroft and Milfont 2010). It is possible to retrieve an average NEP

showing the individual or collective pro-environmental attitude. NEP scale has been used in more than 30 countries and 58,279 participants including Mexico (Corral-Verdugo and Armendáriz 2000; Hawcroft and Milfont 2010). Assessing NEP has the advantage of being fast to retrieve and allows cross-study comparisons. Nonetheless, it does not consider the whole multidimensionality of the environmental attitudes.

Another tool for assessing environmental attitudes is the Environmental Attitudes Inventory (EAI) that was proposed by the early 2000s extended in 2010 (Milfont and Duckitt 2004, 2010). EAI searches to understand the beliefs of an individual, or community, towards the environment. According to its latest method developed by Milfont and Duckitt (2010), EAI assesses the multidimensionality of environmental attitudes by using a 120-item questionnaire answered on a 7-point rating scale ranging from 1 (strongly disagree) to 7 (strongly agree). The survey searches the environmental attitude by analyzing 12 specific facets, or primary factors, including the individual's enjoyment of nature, support of conservation policies, activism, confidence in technology, motivation due to anthropocentric concern, eco-centric concern, environmental threats, conservation behavior, utilization of nature, support of population growth policies, dominance over nature, and altering nature. Furthermore, EAI relates the primary factors with a higher dimensional order structure, often called secondary factors of the environmental attitudes, by simplifying the attitudes to either preservation or utilization of nature. Relating EAI to either a preservation or utilitarian attitudes enhances the link between attitudes and values as it can be easily translated into biocentric or anthropocentric values (Kaiser and Scheuthle 2003).

In Mexico, few studies have evaluated the environmental attitudes (Bechtel et al. 2006; Corral-Verdugo and Armendáriz 2000; Schneller et al. 2015; Schultz and Zelezny 1999), and none have focused on the individuals living inside or around PA. The systematic application of NEP and EAI tests to the communities inside PAs could assist in the identification of possible promoters (early adopters) and detractors (laggards) of a conservation program and would enable cross-study comparisons. Still, it would be recommended to develop a novel attitude test explicitly designed for Mexican PAs to ensure asking relevant questions that assist in the elaboration of more efficient long-term conservation strategies.

### 11.2.3    Behavior

Human behavior (e.g., inaccurate decision-making) is the principal cause of the environmental problems. Therefore the conservation solutions rely on changing behavior. PA evaluation rarely considers the understanding of human behavior, but if conservation means behavior (Schultz 2012), conservation psychologists should play a crucial role in the design, implementation, and evaluation of conservation programs inside PAs.

Human behavior has multiple causes. Despite behavior is not always rational, meaning that people sometimes act against what is on their best benefit, there is a logical pattern in their actions so that it can be predicted. There are plenty of theories to explain behavior, but probably the most relevant to understand conservation behavior is the Theory of Planned Behavior (Ajzen 1991) and Value-Belief-Norm Theory (Stern et al. 1999). According to Ajzen (1991), a person will be more likely to engage in a conservation program if the individual (1) believes that his/her inner circle would approve that behavior (i.e., subjective norm), (2) perceives the behavior as easy (i.e., perceived control), and (3) has a favorable valuation toward conservation program (i.e., attitude). Instead Stern et al. (1999) propose that an individual will engage in a conservation program if this action agrees with their values and beliefs that there are negative consequences of not joining to the program (i.e., awareness of consequences) and that its activities are likely to have a positive impact (i.e., the ascription of responsibility). Those values and beliefs create a duty to act (i.e., norm) in the conservation program. Using these theories could help us to understand why some people play an active role in conservation and others do not.

Fortunately, the behavior is susceptible to change. If there is a shift on the values, attitudes, or social norms or there is a decrease in the barriers or an increase in the benefits, people are likely to change their behavior (Steg and Vlek 2009). However, promoting conservation behavior is a challenge.

Evolutionary psychologists believe that the ineffectiveness of several conservation programs arise from the mismatch between the world where humans evolved and the current world. In this sense, the adaptive behavior that enables humans to survive and thrive during their evolution could also explain the reason why humans do not engage in conservation behaviors. For this reason, if conservation programs in PA aim to reach a long-term effectiveness, they must consider five evolutionary human biases: (1) the propensity of self-interest, (2) the motivation of relative status over absolute, (3) the proclivity to imitate, (4) the predisposition to focus on short-sighted benefits, and (5) the tendency to discard impalpable to ensure long-term actions (Griskevicius et al. 2012; Van Vugt et al. 2014).

Effective conservation strategies would be more efficient if they match with the evolutionary mechanism driving the problem. For example, if conservationists aimed at mainstreaming the Wildlife Management Unit program (UMA; see Table 11.1), it would be necessary (1) to create interdependent UMA network enhancing the self-interest, (2) to encourage competitions between different UMAs by ranking the most effective ones improving the motivation for relative status, (3) to depict the numerous UMAs installed in the country to promote the social norm, and finally (4–5) to emphasize current and local benefits of establishing an UMA.

The study of conservation psychology has not only identified values, attitudes, and behaviors in different countries. It has also recognized several tools to promote behavioral changes. Incentives, competitions, education, prompts, feedbacks, cognitive dissonance, social norms, convenience, and commitments are tools that have been proven effective to provoke changes in behavior (Mckenzie-Mohr 2000; McKenzie-Mohr and Schultz 2014). Schultz (2014) made an excellent review of the

effectiveness of these strategies promoting sustainable practices. As seen in Table 11.1, most of the conservation programs in PAs depend on giving incentives. Research on conservation psychology, social-ecological systems, and conservation marketing has demonstrated that incentives are a useful tool in changing behavior in a short term; however, they do not reduce the conservation threats in the long term, and they usually discourage other conservation behaviors (i.e., if I am not paid, why should I do it) (Evans et al. 2013).

PA managers should use these tools to reduce or change the unsustainable behaviors and to increase the adoption of the current conservation programs. Managers should aid from conservation psychologists and marketers to design of *when* and *where* to use each strategy and evaluation of an effective long-term conservation program. CP may also assist in recognizing the values, attitudes, and behavior that allow the community to organize themselves and form new types of governance. Some of these tools will be further discussed in following sections of *Social-Ecological System Framework* and *Conservation Marketing.*

## 11.3   Social-Ecological System Framework

> There is no reason to believe that bureaucrats and politicians, no matter how well-meaning, are better at solving problems than the people on the spot, who have the strongest incentive to get the solution right. (Elinor Ostrom).

Conservation programs in PAs are complex. Each PA has a different social, ecological, economic, and political context. In this sense, the interaction between these components will differ according to each temporal and spatial scale (Agrawal and Ostrom 2006; Ostrom 2007). Ostrom's social-ecological system framework (SESF) is useful to understand and model the interactions between these components and the possible outcomes of each conservation program by identifying, organizing, and simplifying relevant factors and variables of the SES (Schlager 2007).

Since the past decade, the form of governing the environment has changed dramatically due to empirical failure. The common theory demonstrates that controlling the resources from the state (i.e., state theory and command-and-control governance) is inefficient in the long-term compared to the collective action. Therefore, it is necessary to build up more collaborative and nonlinear conservation programs, to involve all actors (e.g., state, communities, civic organizations) to engage on a hybrid form of governance (Berkes 2004; Lemos and Agrawal 2006).

SESF might be especially relevant for Mexican PAs. The populations that live within and surrounding PAs are predominantly rural (<2500 inhabitants) and are dispersed into small communities with the highest marginality and poverty indexes (CONEVAL 2016). Usually, these populations already have systems of governance based on common land tenure (e.g., *ejidos* and communities) where the resource units are the material, social, and cultural basis of their livelihood (Boege 2009; Cumming and Allen 2017). Furthermore, common land tenure represents 60% of

the national territory of all Mexican PAs (Bezaury-Creel and Gutiérrez-Carbonell 2009), where 26.3% are the property of indigenous groups (Boege 2009). This form of land tenure generates a patrimonial perspective because land cannot be transferred to a single individual allowing (1) a stronger communal-environmental identity (Sarukhán and Larson 2001) and (2) the emergence of particular forms of governance and organization (e.g., the assemblies). In the assemblies, each owner can participate in the planning and management of the territory, and, because of that, the rules-in-use for the appropriation of their collective resources are diverse and function under different institutional arrangements in each community (Aguilar et al. 2011; Boege 2009). Thus, to understand the economic and social context, as well as, the way the community appropiates the natural resources given the particular ecological dynamics is crucial to ensure the long-term effectiveness of each PA (Hansen and DeFries 2007).

The SESF aims to systematically analyze the complexity of SES as a diagnostic approach to understand small-scale environmental governance (Ostrom 1990). In other words, the SESF focuses on understanding the set of regulatory processes by which individuals, organizations, and political actors **create rules** to influence behavior and biological outcomes (Lemos and Agrawal 2006). These rules interact in an intricate pattern, where the removal or reinforcement of one rule may affect the whole governance outcome (Cox 2011). The SESF is a nested framework that integrates cumulative knowledge on variables and their effects on environmental governance and sustainability (Cumming et al. 2015; Epstein 2015). Applying SESF in PAs could aid in understanding how to build efficient long-term conservation programs.

### 11.3.1 Method

The SESF as a tool helps to organize the social and ecological variables that are relevant to each SES. Traditionally, the SESF considers four core components: (1) resource system (e.g., fishery, forest), (2) resource units (e.g., fish bank, wood), (3) users (e.g., local community), and (4) governance system (e.g., rules, institutions, government). Each core component can be unpacked in second-tier variables. For example, for the resource unit component, some of their second-tier variables are the mobility, growth, and replacement rate of the unit or for the governance system the collective choice rules, property rights system, and governmental and nongovernment institutions (for further insight on the variables in each component, see Ostrom 1990). A virtue of SESF is that each manager could include different second-tier variables if it considers it necessary.

The four core components and their second-tier variables interact with each other. The possible interactions can benefit the environment and promote the collective action (e.g., networking activities, information sharing among users) or obstruct them (e.g., conflict among users, differential investment activities). The specific

moment of those interactions is called action situations and when they happen arose different outcomes (e.g., social equity, ecological resilience, overharvest) (McGinnis and Ostrom 2014).

SESF recognizes the PA as a complex and open system, therefore, it considers the possible feedbacks between the outcomes and the four components, as well as, the relationship between the external social, economic, and political settings (e.g., government resource policies, economic development) and related ecosystems (e.g., climate and pollution patterns) with the social-ecological system (McGinnis and Ostrom 2014; Ostrom 2007, 2009).

The application of SESF has shown that co-management between the government and the local community is the most efficient way to conserve. To engage the community's participation in conservation programs, PA managers should (1) examine the links between resource management, social organization, and property right systems, (2) acknowledge the traditional institutions built by resource users and complement with scientific knowledge, (3) recognize different forms of relationship with nature other than the Western perspective, (4) analyze power relationships among actors in the made decision and shared benefits in relation to political agendas, (5) interpret the landscape as historical processes for understanding the ecological sense of actual resource use practices, and (6) integrate economic view and values as a subset of the environmental system in long-time periods (Berkes 2004). By considering these variables, conservation programs will avoid conflicts related to the replacement or subsume of pre-existing communal management regimens (Alcorn and Toledo 1997) and allow the empowerment, equity, and distribution of the benefits between the different users (Agrawal and Gibson 1999; Berkes 2004).

## 11.3.2   *Advantages of SESF for Long-Term Conservation in Mexico*

SESF can be a powerful tool with several advantages for managing social-ecological systems as PAs (McGinnis and Ostrom 2014; Ostrom 2007, 2009). First, the SES is a holistic framework allowing cross-cultural comparisons (Berkes 2004). Second, SESF allows to find familiar typologies of governance and facilitates the identification of critical variables for achieving long-term conservation (Basurto et al. 2013; Basurto and Ostrom 2009; Cumming and Allen 2017; Thiel et al. 2015). Third, PA managers could detect systematically the components or variables that inhibit the capacity of self-organizing for achieving conservation by implementing this framework in different case studies (Basurto et al. 2013). We will propose that conservation managers design a useful generic framework for federal PAs that could be adapted for each PA. In this sense, it would be necessary to select and explicitly define the relevant second-, third-, fourth-tier variables to explain and characterize PA governance.

## 11.4 Conservation Marketing

> Conservation is primarily not about biology but about people and the choices they make. (Balmford and Cowling 2006)

Marketing is a practical discipline that focuses on the relationship between consumers and the products. It aims not only to describe how transactions between the consumer and the producer are created, facilitated, and stimulated by value offerings but also to obtain specific responses in consumers through the creation and offering of values (Kotler 1972). The role of marketing is to promote an efficient communication between producers (i.e., product) and consumers. Marketing analyzes this consumer-producer relationship by focusing on four components: (1) product design, (2) pricing, (3) place (e.g., distribution), and (4) promotion (i.e., communication) strategies (Kotler 1972). Effective marketing is an evaluative process that arises from analyzing the consumers' demands, designing a successful product, organizing the distribution, and evaluating the marketing efforts.

Most marketing focuses on products (i.e., goods and services) that are tangible and that have clear property rights for the producers and apparent benefits to the consumers. Nonetheless, since the 1960s, social marketing uses common marketing tools with the objective to sell, as a product, an idea or a behavioral change for social good (Andreasen 2003; Kotler and Levy 1969). For example, an NGO (i.e., organization) aims to improve the quality of life of the fertile public (i.e., consumers or target audience) by promoting the birth control (i.e., product). This technique has been proven effective in shifting behavior to increase the community's health and security (for an extensive review on this topic, read Stead et al. 2007).

Conservation marketing is the use of social marketing tools to promote a behavioral change to reduce unsustainable habits and the current threats to biodiversity (Smith et al. 2010). In this sense, the behaviors (i.e., products) CM sells are the protection of the environment and sustainable development. As it is a practical discipline, it uses several techniques and findings from social (e.g., conservation psychology) and biological research (e.g., ecology) to plan, implement, and evaluate its marketing plan.

The success of a CM strategy relies on understanding and segmenting the target audience (e.g., gender, age, values, attitudes), selecting end-state desirable behaviors (e.g., that would directly cause a decrease of the conservation's threat), developing a strategy that understands the audience context (e.g., barriers and benefits to engage to the selected behavior), removing the obstacles, evaluating the results, and building a relationship with the intended audience (e.g., promoting a fidelity loop) (Mckenzie-Mohr 2000; Wright et al. 2015).

There is plenty of research concerning conservation marketing and community-based social marketing. In Mexico, conservation marketing is increasing and is mainly being used by environmental NGOs (e.g., WWF and RARE) and governmental institutions (e.g., CONANP) to produce a behavioral change in inhabitants of the PAs. Probably the best application of CM in Mexico is the detection of flagship species, the Pride Campaigns, and the building of brands of sustainable products developed in PAs.

### 11.4.1 Flagship Species

A flagship species is a charismatic species that conservation managers use as a symbol to raise awareness about biodiversity loss. The purpose of such species is to maximize the impact on the targeted audience and to raise funds for conservation actions. In this sense, the term is not related to its ecological role or threatened status (Smith et al. 2010). For this reason, Verissimo et al. (2011) define a flagship species as "a species used as the focus of a broader conservation marketing campaign based on its possession of one or more traits that appeal to the target audience." The selection and promotion of a flagship species do not depend on its ecological characteristics nor represent biodiversity better than selecting another species at random (Williams et al. 2000). The use of flagship species is prevalent inside the Mexican PAs.

Managers at CONANP should be careful at denominating flagship species. Unplanned arousal of flagship species could detriment the ecosystem's conservation by favoring strategies toward a single species or by creating resentment between the community (Walpole and Leader-Williams 2002). Verissimo et al. (2011) proposed a seven-stage flagship species selection framework that elects this species through the analysis of the relationship between the conservation issue, the target audience, and the possible flagship species. Despite that favorite flagship species include big-sized furry animals with eyes facing forward (e.g., apes, big cats, and pandas) which might not be present in all PAs, research inside PAs should aid to identify a currently overlooked charismatic species, or *Cinderella species*, that could assist in raising conservation awareness (Smith et al. 2012). In the rare case, a PA lacked a charismatic species; marketing campaigns could focus on noncharismatic species (e.g., rodents and toads) and still raise funds and awareness (Veríssimo et al. 2017).

As every marketing campaign, it is compulsory to assess the effectiveness of the flagship species. This can be done by performing surveys to the target audience about the recognition (i.e., what species do you recognize or recall?), the appeal (i.e., do you find it charismatic?), and the protection (i.e., how can we protect this species?) (Veríssimo et al. 2014). Another way to assess its effectiveness is by measuring the number of people that join the conservation program or the amount of money raised after the campaign.

### 11.4.2 Pride Campaigns from RARE

Probably the most useful example of conservation marketing in PAs is the Pride Campaigns from RARE. RARE believes that people are connected to nature, but because of complicated reason, people sometimes behave in unsustainable ways (RARE n.d.-b). RARE developed a conservation marketing strategy to that considers six phases: (1) engaging stakeholders, (2) understanding the context, (3) rating the conservation threat, (4) mapping the problem, (5) creating a theory of change, and (6) evaluating the results (for further details, see RARE n.d.-a, -b). During the fifth step, conservation marketers plan, implement, and evaluate the desired strategy for the behavior change. The theory of change includes the assessment of the knowledge

(beliefs) and attitudes of the community, the promotion of places where the targeted audience can interchange communication, the removal of the behavioral barrier, the enhancement and evaluation of the behavioral change, and its effects on reducing the conservation threat (RARE n.d.-b). Pride Campaigns uses different tools to produce the behavioral change. The strategies used by RARE include social modeling and social norms to improve motivation and the creation of flagship species and education to increase awareness. All strategies are adapted to specific target audiences.

Managers of Mexican PAs have already recognized the relevance of Pride Campaigns for achieving behavioral changes. For example, *Pronatura* and RARE led a conservation marketing Pride Campaign to reduce the deforestation rate of the costal lands of Veracruz (i.e., threat) to conserve this habitat for migratory birds (e.g., falcon). The campaign aimed to increase the amount of voluntarily conservation areas decrees (i.e., product) by the landowners of the region (i.e., target audience). To do that, there was a conservation marketing strategy to increase the knowledge and awareness about the benefits of protecting the land and removal of the barriers to perform this certification. The campaign used the falcon as flagship species. At the end of the Pride Campaign, 14 landowners join their lands in the voluntary conservation areas, protecting more 1500 ha for the following 10 years (Balcazar-Arias 2010). Other successful examples of the application of RARE in Mexican PAs include the use of flagships species as the prairie dogs (*Cynomys mexicanus*) in Llano la Soledad (Lopez Ventura 2007), the grouper (*Epinephelinae*) in Sian Ka'an, the common snook (*Centropomus undecimalis*) in La Encrucijada, the quetzal (*Pharomachrus mocinno*) in El Triunfo (Contreras et al. 2001), the "sotolin" (*Beaucarnea gracilis*) in Tehuacán-Cuicatlán (Beléndez-Hernández 2008), and the "viejito" cactus (*Cephalocereus senilis*) in Metztitlán (Sánchez-García 2008).

## 11.5  Conclusions

The problems of conservation are complex. They involve different actors, interests, and scales; consequently, their solution must recognize this multiple level interaction to achieve long-term goals (Ostrom 1990, 2007). The use of social disciplines and theories, as conservation psychology, environmental governance, and conservation marketing, in the design, implementation, and evaluation of PAs would improve its management (Bennett et al. 2017). Up to now, tools have not been fully involved in helping to address conservation threats (Clayton and Myers 2009). However, we believe that conservation managers could reinforce their strategies by applying them to ensure effective long-term conservation.

Social ineffectiveness found in Mexican PAs could be related to the form the conservation programs are designed. Mexican conservation programs were created in a *top-down* scheme aiming to solve the conservation problem or to reduce the threat as fast as possible. Table 11.2 gives a summary of the potential tools to investigate how human relates to their environment. We believe this information would be crucial to design target-specific programs. For example, to stop habitat loss and fragmentation, the PROCODES program gives subsidies to the landowners as payment for the

**Table 11.2** Social disciplines and tools that are relevant for long-term conservation

| Discipline | Social tools | Aim | Target groups |
|---|---|---|---|
| Conservation psychology | Connectedness to Nature Scale (CNS) and Inclusion of Nature in Self (INS) | Determine individual's affections, experiential connection to nature | Individuals, the local community inside PAs, external population threating PA conservation |
| | Schwartz Value System (SVS) | Determine the personal motivations that are driving someone's actions | Individuals, the local community inside PAs, external population threating PA conservation |
| | Environmental Attitudes Inventory (EAI) and New Ecological Paradigm scale (NEP) | Determine the environmental attitude, or the favorable or disfavorable evaluation, attached to nature or conservation program | Individuals, the local community inside PAs, external population threating PA conservation |
| | Theory of Planned Behavior (PB) and Value-Belief-Norm Theory (VBN) | Understand the reasons for unsustainable or conservation behaviors | Individuals, the local community inside PAs, external population threating PA conservation |
| | Psychological evolutionary biases (PEB) | Design better conservation programs fit the human's psychological, evolutionary biases | Individuals, the local community inside PAs, external population threating PA conservation |
| Social-ecological system framework | Mapping social-ecological systems | Diagnose case studies to propose governance interactions that have to be improved for long-term sustainability | Cross-scale institutions, between local and national scales |
| | Community-based conservation | Promote horizontal planning and management of conservation programs to empower local people and promote their engagement in sustainability conservation | Individuals, the local community inside PAs, external population threating PA conservation |
| Conservation marketing | Flagship species | Raise awareness, change attitudes, and promote behavioral change by selecting useful charismatic species | Local and external community of PAs |
| | RARE Pride Campaigns | Promote the behavioral change and adoption of a conservation program by using enhancing the pride related to the natural capital of the communities | Local community inside PAs |

ecosystem services provided by the conservation status of their habitat. This program searches to stop habitat loss in the short term, because, despite ending the threat and provoking a conservation outcome, the program does not consider the long-term biological effects and the social feasibility (e.g., founding). This type of reactive conservation strategies needs to be perpetually applied to have an impact; in such

cases, even if the species' extinction risk may be reduced (e.g., by increasing its survival and/or reproduction) in few generations, the program's associated costs may render it financially unsustainable, and ultimately the species would return to its endangered status after management actions are terminated (Cardador et al. 2015; Torres-Orozco et al. 2016). As PROCODES, most of the conservation programs in Mexico depend on subsidies, which are inefficient for achieving long-term conservation benefits and do not advocate to change people values, attitudes, and behaviors after the program has stopped. Therefore, we suggest that conservation programs in PAs might be conservation traps instead of conservation solutions.

To avoid funding possible conservation traps, conservation strategies should advocate changing the values, attitudes, and behaviors of the population that live inside or in the surroundings of PA and of the society in regional and national scales (Fig. 11.1). We believe that Mexican conservation managers in PAs are doing exceptional work and that the inclusion of social disciplines and tools as presented in this chapter would allow reaching to long-term conservation.
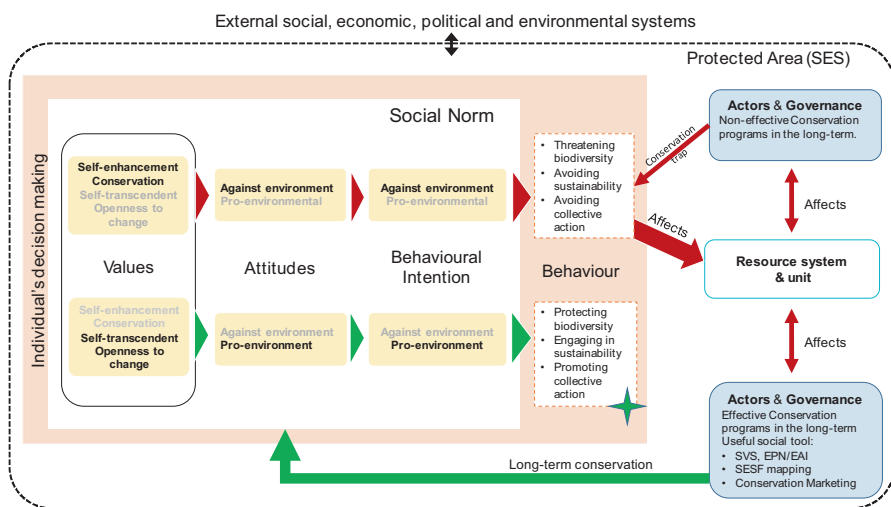


**Fig. 11.1** Understanding human behavior to improve the conservation programs long-term efficiency inside PAs. Protected areas are social-ecological systems (SES, external dotted line) embedded in external social, economic, political, and environmental systems. Each PA has different actors, governance, resource system, and units. Individual's unsustainable actions emerge from self-enhancement values (e.g., power and ambition), disfavoring nature or conservation programs (e.g., attitudes), having behavioral intentions against the environmental protection, and believing the other people act unsustainably (e.g., social norm). That unsustainable behavior affects the resource unit and its system provoking the decrease or depletion of the resource unit (red arrows). Actors and governance may design, apply, and evaluate two types of strategies to change the threatening behavior: (1) short-term goals conservation programs (e.g., reactive programs based on subsidies) that might act as conservation traps (red feedback loop at the right top corner) or (2) long-term goals conservation programs that search to promote self-transcendent values, pro-environmental attitudes, and behavioral intentions by applying proactive programs considering the Environmental Attitudes Inventory (EAI), the social-ecological system framework mapping (SESF), and conservation marketing to meet long-term pro-environmental behaviors (green arrows) (*SVS* Schwartz Value System, *EPN* New Ecological Paradigm scale)

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