

International Journal of the Commons

Vol. 11, no 2 2017, pp. 969–991

Publisher: Uopen Journals

URL:<http://www.thecommonsjournal.org>

DOI: 10.18352/ijc.792

Copyright: content is licensed under a Creative Commons Attribution 3.0 License

ISSN: 1875-0281

## Trade-offs between conservation and development in community-based management initiatives

María Mar Delgado-Serrano

Department of Agricultural Economics, Universidad de Córdoba, Spain

[mmdelgado@uco.es](mailto:mmdelgado@uco.es)

**Abstract:** Community-based management (CBM) has attracted much interest as a conservation and development strategy in natural resource-dependent communities in recent decades. However, most initiatives fail to achieve both objectives. The most analyzed CBM strategies in the literature include donor- and government-driven initiatives, but other types exist as well. The research objective was to identify the internal and external factors that influence the trade-offs between conservation and development in three internally driven CBM initiatives in Latin America: a long-term indigenous-based conservation strategy, the constitutional recognition of ancestral land rights of Afro-American communities and artisanal fisheries management. The results showed that livelihoods depend on natural resources, but none of the cases identified a balance between conservation and development. Community activities are not the primary cause of natural resource degradation. Conservation is supported by ethnicity and cultural values and is challenged by current development models and worldviews that push intensification of resource use and by power asymmetries. Internal pressures include limited rule compliance and enforcement authority to stop free-riding and unauthorized activities. Internal challenges for development include the lack of capacities, rigid rules and non-inclusive CBM, and the inertia and risk aversion that prevail in many communities. External challenges include the lack of economic incentives and compensation models that enable welfare opportunities linked to sustainable management.

**Keywords:** Argentina, CBNRM, Colombia, common pool resources, Latin America, Mexico

**Acknowledgement:** This research was funded by the Seventh Framework Programme of the European Commission in the frame of the project “Community-

based management of environmental challenges in Latin America- FP7-ENV2011-282845 COMET-LA". The author acknowledges the collaboration of the people in the Community Council of Black Communities of Bajo Calima and Alto y Medio Dagua (Colombia), Santiago Comaltepec (Mexico), and Bahía Blanca Estuary and adjacent coasts (Argentina) in the research and of the different researchers participating in the project.

## 1. Introduction

In a context of increasing pressure to use natural resources and the urgency to foster their sustainable management, communities that interact daily with and base their livelihood on natural resources have an important role to play (Brondizio and Tourneau 2016; Delgado-Serrano et al. 2017). Past decades have shown how the abilities and knowledge of local people can be tapped to make conservation empowering and culturally compatible, leading to the emergence of different approaches, such as integrated conservation and development projects (IDCPs), community-based conservation (CBC) and community-based natural resource management (CBNRM) (Dressler et al. 2010).

These approaches emerged as a reaction to top-down government-based conservation strategies that prioritized conservation displacing people from protected areas, in favor of preserving natural resources and have attracted considerable attention from governments and funding agencies (Berkes 2007). They share a common understanding of community-based management (CBM) as a means for communities to regain control over the natural resources they rely on to promote livelihood security and conservation (Western and Wright 1994) and have been applied to a wide array of circumstances and models (Shackleton et al. 2010). However, the significance of CBM approaches in recent decades (Brosius et al. 1998; Berkes 2007; Dressler et al. 2010) has not correlated with its success in reaching both goals (Leach et al. 1999; Blaikie 2006; Berkes 2007). Many of the projects were biased towards conservation or development outcomes, and relatively few of these strategies can convincingly demonstrate achievement in both of these dimensions simultaneously (Fabricius 2004; Shackleton et al. 2010, 2). However, these results come primarily from donor- and government-driven initiatives based on the use of economic incentives to encourage conservation.

Other types of non-externally driven CBM strategies exist, including: (i) strategies aiming to devolve or recognize existing community rights and responsibilities based on concerns of environmental and social justice (Brosius et al. 1998; Myers and Muhajir 2015); (ii) long-term CBM strategies based on customary practices that result in conservation (Ostrom 1990; Ruiz-Mallén et al. 2015); and (iii) collective common pool resource management, often associated with co-management strategies (Hauzer et al. 2013; Ruiz-Ballesteros and Gálvez-García 2014). Fewer studies have investigated these internally-driven initiatives. Additionally, according to Pagdee et al. (2006); Shackleton et al. (2010) and

Brooks et al. (2013), CBM experiences in Latin America have received less attention than those in other geographical contexts.

The objective of the present study is to contribute to this research gap by assessing the performance of internally-driven CBM initiatives in Latin America and identifying the internal and external factors that influence the trade-offs between conservation and development. We identified three CBM initiatives that emerged as a result of the links between livelihood and sustainable management of resources and which are representative of the CBM types mentioned. These cases cover a diverse range of situations in which a community-based organization addresses the management of natural resources to support livelihoods using bottom-up governance structures, however, we do not aim to cover all the possible CBM types in the region.

In this research we analyzed: 1) a time-tested indigenous-based conservation strategy: *Santiago Comaltepec*, a small Chinantec community with a long tradition of customary natural resource protection practices in the Sierra of Oaxaca (Mexico); 2) the constitutional recognition of ancestral land rights of Afro-American communities in two Afro-Colombian Community Councils (CC): *Bajo Calima* (Calima) and *Alto y Medio Dagua* (AMDA) located in the Colombian Pacific and 3) the artisanal management of fisheries in Bahía Blanca estuary and adjacent coasts (Argentina).

The literature identified different factors as influencing the performance of CBM strategies, including the institutional settings (Ostrom 2002; Pagdee et al. 2006; Poteete et al. 2010; Brooks et al. 2012), the power relations and the alignment of interests (Fabricius 2004; Gruber 2010) and the threats and conflicts faced (Leach et al. 1999; Fabricius et al. 2007). Internal and external institutions (Dietz et al. 2003) also play a key role. For instance: property rights (Fabricius et al. 2013); the social capital, the incentives and the values for collective action (Adger 2003; Pretty 2003; Brondizio et al. 2009); the indigenous knowledge (Berkes 2004; Mistry and Berardi 2016); the leadership and management capacity (Armitage 2005; Blaikie 2006) and the networks and networking capacity (Lauber et al. 2008). Among the factors contributing to failures have been mentioned the elite capture of the benefits (Fabricius and Collins 2007), the failures in governance and leadership (Agrawal 2001; Bohensky and Lynam 2005), the withdrawal of technical and financial support (Balint and Mashinya 2006), the changes in policies and difficulties in replicating and scaling up a given approach (White et al. 2002) and the inequitable distribution of benefits (Suich 2013).

In this research, we propose an analytical framework to identify how settings and institutions influence the trade-offs between conservation and development. Several factors are characterized in the three case studies and we critically examine and discuss how the governance system, the specific histories of place and the political dynamics in the selected communities interact and influence the CBM, delivering different combinations of conservation and development in the analyzed social-ecological systems (SESs).

## 2. Methods

The three cases were selected in the context of a European Union 7th Research Framework project (COMET-LA, Community-based Management of Environmental Challenges in Latin America; [www.comet-la.eu](http://www.comet-la.eu)). Table 1 describes the main features of each case.

*Table 1: Case study description.*

Case Studies	Alto y Medio Dagua and Bajo Calima (Colombia)	Santiago Comaltepec (Mexico)	Bahía Blanca (Argentina)
Location	Chocó Biogeographic region→Pacific coast→ Buenaventura→Dagua and Calima Rivers' basins	Mesoamerican biocultural region→State of Oaxaca→Sierra Norte de Oaxaca→Chinantla	Southwestern coast of Buenos Aires region→Bahía Blanca Estuary region and adjacent coasts
Population	AMDA: 1502 Afro-Colombian inhabitants spread across six villages BC: 3550 Afro-Colombian inhabitants spread across six villages	1115 Chinantec inhabitants in a central nucleus (Comaltepec) and two agencies (La Esperanza and Soyolapam)	Approximately 100 artisanal fishers and 500 fisheries-dependent families. The area has 32,582 inhabitants in five urban centers
Area	AMDA: 12,335 hectares Calima: 77,724 hectares	18,366 hectares	230,000 hectares (estuary)
Livelihoods	AMDA: Agriculture, artisanal gold mining, and fishing. Incipient ecotourism initiatives Calima: Logging, artisanal gold mining, and fishing	Logging, subsistence agriculture, livestock, sawmill and ecotourism Payment for ecosystem services (water catchment) Remittances	Fishery for artisanal fishers. Other inhabitants depend on tourism, petrochemical industry, port, industrial fishery, livestock industry, fruit and vegetables
Socioeconomic features	High level of poverty and marginalization Lack of formal jobs Some job opportunities in cities, construction, infrastructures	High level of poverty Lack of employment opportunities Migration	High level of economic development Low unemployment level Diversified job structure, with artisanal fishery representing a small sector
Brief description of the SES	Tropical forest with high biodiversity and water resources Good road connections in AMDA (Buenaventura-Cali highway crosses the territory) but many settlements in Calima only accessible by boat Depletion of forest by a paper factory in the 1960s–1980s, now restored Armed conflict, paramilitaries and illegal activities	Temperate, mesophyll and tropical forests (the territory ranges from 200 to 3000 m.a.s.l.) Strong conservation values Depletion of forest by a paper factory in the 1960s–1980s, now restored. Important struggles to recuperate the use of forest Blocking of new initiatives and entrepreneurship Low provision of infrastructures and services at the two agencies	Important environmental and paleontological resources Strong urban influence Heterogeneous community in terms of natural resource use, power relations, conflicts Artisanal fishery considered as a non-efficient sector Disturbance of estuary ecological functions by economic activities Interferences in dune dynamics and coastal erosion by buildings

Table 1: (continued)

Case Studies	Alto y Medio Dagua and Bajo Calima (Colombia)	Santiago Comaltepec (Mexico)	Bahía Blanca (Argentina)
References	AMDA-CVC (2007) Farah et al. (2012) Calima-CVC (2008)	Chapela (2007) Escalante et al. (2012) INEGI 2010	London et al. (2012)

To answer the research objective questions, we first performed a thorough literature review to identify the elements that define the internal and external contexts influencing CBM and the factors that contribute to conservation and development. Figure 1 shows the framework used to structure the narrative of these case studies. The figure illustrates how the external settings and institutions, understood as sets of formal and informal rules for the management of the natural resources (Ostrom 1990), influence CBM and contribute to the delivery of different outcomes and trade-offs in conservation and development.

Second, we assessed the different aspects included in the framework. Data were gathered over a 3-year period, following a mixed-method approach (Broderstad and Eythorsson 2014). As shown in Table 2, fieldwork in these three case studies comprised in-depth interviews (N=24) and workshops (N=18), complemented by

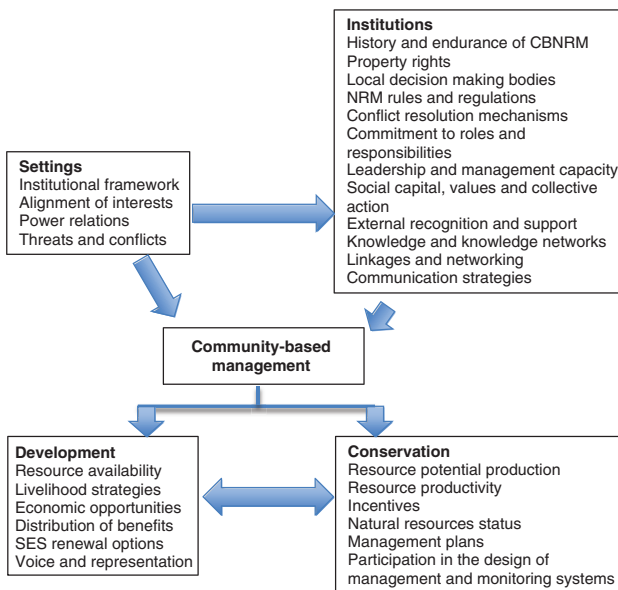


Figure 1: Framework of analysis.

Source: Own elaboration based on Fabricius (2004), Fabricius and Collins (2007), Brondizio et al. (2009), Gruber (2010); Shackleton et al. (2010).

Table 2: Summary of data collection methods.

	AMDA-Calima	Comaltepec	Bahía Blanca
Workshops (N)	6 (22 participants on average)	6 (20 participants on average)	6 (25 participants on average)
Interviews (N)	10	6	8
Participant observation	Yes	Yes	Yes
Participant selection methods	Stakeholder mapping using knowledge of territory and forests and biodiversity management, legitimacy, local inhabitants and leadership as criteria	Stakeholder mapping using knowledge of territory and forest management, legitimacy, local inhabitants, and leadership as criteria	Stakeholder mapping using knowledge of territory and fishery management, legitimacy, local inhabitants and leadership as criteria
Timing	January 2012–December 2014	January 2012–December 2014	January 2012–December 2014

participant observations. The researchers spent between 3 and 4 months working with the communities and the research was conducted in Spanish, the local language. Interviews, workshops and field notes were used to generate the local socio-environmental narratives, and to characterize each SES and the embedded CBM initiatives. The 6 participatory workshops hosted in each case study area aimed to characterize the SESs using an adaptation of the SES framework (Ostrom 2009; Delgado-Serrano et al. 2015); to identify the main variables and drivers in the evolution of the SESs (Delgado-Serrano et al. 2016) and to build scenarios (Waylen et al. 2015). Participants included local leaders and authorities, commoners, researchers and public employees (e.g. representatives of government agencies playing a role in the area) and members of NGOs and civil society organizations. A gender and age sensitive approach was applied in the selection of workshop participants and interviewees to balance men and women, and elders and youth, when possible.

### 3. Results

#### 3.1. Settings

The analysis of the settings in the 3 cases studies (Table 3) shows that even if the rights of the community to use the natural resources are recognized by the national legal frameworks in all three cases, there remains a lack of alignment between the interests of the communities and those of the governments. In Mexico, Colombia and Argentina, economic development based on the extraction of natural resources is a national priority that conflicts with resource conservation. Likewise, the power relations between the communities studied and other actors are asymmetrical; local leaders have limited bargaining capacity and external actors do not respect community rules and decisions. In the Argentina case,

Table 3: Factors describing the settings.

	Calima and AMDA (CO)	Comaltepec (MX)	Bahia Blanca (AR)
Institutional framework	Collective rights recognised by National Constitution	Collective rights recognised by Mexican Constitution Direct administration of the territory by local inhabitants recognized by state and federal laws	Marine and coastal resources are public property Fishing activities developed by private actors and regulated by government
Alignment of interests	Partial, conflict between conservation (Biodiversity Policy) and economic development interests (mining)	No current collision of interests between government and community	Lack of alignment between artisanal fishers and government interests in industrial sectors
Power relations	Highly asymmetric	Asymmetric	Asymmetric and not well-defined
Threats and conflicts	Paramilitaries and guerrilla Richness of natural resources attracts powerful actors	No external threats or conflicts Migration as internal threat	Different sectors compete for natural resource use

there are numerous (and often overlapping) governmental organizations that do not coordinate; in addition, the government supports the change from artisanal to large-scale fishing. In the Colombian case, the strategic position of the territory (close to the main Colombian port) and the vastness of Calima facilitate coca’s growth and trade leading to conflicts with paramilitaries and guerrillas. AMDA’s rich gold resources also attracts the interest of these groups. In Bahia Blanca, different sectors (harbour, petrochemical pole, industries, small- and large-scale fishers, tourism, etc.) compete for natural resource use; this leads to a wide range of stakeholders with often-conflicting views. Artisanal fishers are not powerful players in this game. In Comaltepec, the most important threat is migration.

### 3.2. Institutions

The CBM institutions in the 3 cases studied are rather different (Table 4). Comaltepec has a long history; the lands were collectively managed prior to Spanish colonization and the customary governance regime is based on collective property rights, officially recognized by the Agrarian Law of 1953. The system has survived different pressures and threats, exhibiting considerable endurance. In contrast, the collective rights were only recently recognized in Colombia (Calima’s Community Council conformed in 2001 and AMDA’s in 2005), even if traditional management techniques existed for centuries. Artisanal fishers in Bahia Blanca have a long tradition of gathering in associations to exploit fisheries and defend their interests (first cooperative was formed in 1937), however, several cooperatives exist and do not act coordinated making it problematic to have a single voice representing their interests. Furthermore, collective action in Argentina is limited by the absence of unique cultural roots or strong territorial

Table 4: Factors describing institutions.

	Calima and AMDA (CO)	Comaltepec (MX)	Bahía Blanca (AR)
History and endurance of CBNRM	Short history	Long history	Long tradition of artisanal fishers' association but difficulties facing collective action
Property rights	Collective property of lands and natural resources, but minerals are state property	Collective ownership of lands and natural resources, but minerals are state property	Public ownership of natural resources but privately exploited following national rules
Local decision making bodies	General Assembly Rural neighborhood committees Sector committees Community leaders elected by the Assembly	General Assembly of Commoners Common Goods Commissioner elected by the Assembly Overseeing Council Council of Eldest ( <i>Characterizados</i> ) with strong influence	Fishers associations have assemblies and design representatives, but have limited decision-making power to influence resource regulation
NRM rules and regulations	Internal Regulation and Management Plans Access and use rights but no monitoring or sanctions Social sanctioning but not always rule compliance No rule compliance by external actors Youths and women encouraged to get involved	NRM rules decided in the Assembly of Commoners Well-defined access, use, monitoring and enforcement rights Obligatory collective activities Social sanctioning Internal and external rule compliance Weak role of women and young	Government regulates access, monitoring and sanctioning rights Internal rules respected by fishers but not by external actors Rangers and police control fishery extraction Social sanctioning partially work among artisanal fishers but free-riding predominates in other collectives
Conflict resolution mechanisms	Internal conflicts: face-to-face External conflicts: environmental authorities	Face-to-face	Conflicts solved with demonstrations, strikes and road cutting, creating large economic losses
Commitment to roles and responsibilities	High commitment Leaders and managers remunerated based on the funds attracted to the territory	High commitment Pro-bono work by commoners	Moderate commitment
Leadership and management capacity	Strong and recognized leaders internally, but limited external influence High legitimacy NGOs and national agencies support in management tasks	Uncontested leadership of <i>Characterizados</i> Management capacities developed by UZACHI, a technical organization hosted by four indigenous communities	Several fisher associations exist, weakening leadership and representation. Often, personal interests prevail over collective ones



Table 4: (continued)

	Calima and AMDA (CO)	Comaltepec (MX)	Bahia Blanca (AR)
Social capital, values and collective action	High bonding and bridging and limited linking social capital Collective action is part of people's idiosyncrasy Legitimacy and trust values	High bonding, medium bridging and low linking social capital Assembly's tight control on innovation and entrepreneurship Reciprocity, trust and legitimacy values	Medium bonding and linking and low bridging social capital. Individualistic and opportunistic behavior Local community involvement historically discouraged
External recognition and support	Rights of Afro-Colombian communities legally recognised, but no additional recognition	Closed community that does not foster external influences or external associations	Limited recognition of artisanal fishers but with a recent positive shift
Knowledge and knowledge networks	Collective knowledge transmission Learning activities	Customary knowledge transmission in the Assembly and the collective works	Limited knowledge transmission (fishing working conditions discourages younger generations)
Linkages and networking	Moderate	Limited (often based on community migrants)	Moderate in each town but limited between neighboring towns Networks created when environmental problems arise
Communication strategies	Well-developed internally, but not externally	Well-developed internally, but not externally	Lack of communication strategies and interaction spaces Local TV environmental program, with large audience and legitimacy

identity and the deterrence of collective action during the dictatorial periods of the last century.

Local decision-making bodies exist in all 3 communities; however, the Colombian system is most inclusive (it involves all the community members, without gender distinction), while in the Mexican case, only one representative from each native family (usually the father) attends the Assembly. Women and youth have no rights. In both communities, the General Assemblies have more decision-making power than the fisher's assemblies. The three communities have internal management rules, but the bundle of rights is broader in Comaltepec (access, use, monitoring and enforcement); further, social sanctioning and rule compliance are fully implemented. Commoners develop collective activities, such as *tequios* (short-duration organized work for collective benefits) and *cargos* (work for the administration of community and natural resources without receiving any payment). Monitoring, sanctioning and rule compliance is more limited

in the Community Councils. In Bahía Blanca, most of the rights are regulated by the Government. Conflicts are solved face-to-face in the Mexican and Colombian cases, but in Argentina no conflict resolution space exists for different actors to solve disputes. The predominant values (legitimacy, trust, reciprocity) are similar in Comaltepec and the Community Councils, but in Bahía Blanca individualistic and opportunistic behaviour is quite common. Internal social capital (bonding and bridging) is better developed in the three cases than external one (linking). The communities have reduced networking capacities and external recognition. Traditional knowledge transmission mechanisms exist, even if more emphasis is needed to engage youths in natural resources management.

### 3.3. Conservation

Natural resource conservation results are displayed in Table 5. Resources are abundant in the Community Councils (high average rainfall of 7000–7500 mm supports tree and biodiversity regeneration and species richness) and Comaltepec

Table 5: Factors describing conservation.

	Calima and AMDA (CO)	Comaltepec (MX)	Bahia Blanca (AR)
Resource potential production	High	High	Could be higher if rules and regulations were respected
Resource productivity	Low-medium	Low	Decreasing fisheries' productivity
Incentives	Links with nature Pride and self-esteem in having recognized rights to manage the territory Empowerment and capacity building linked to decision-making	Community values and believes, intimately linked to nature Legitimacy and reputation based on collective duties accomplishment Water catchment PES	Environmental problems lead to conservation initiatives
Natural resources status	Water pollution Riverbanks and habitats destruction Glyphosate aerial spraying Illegal logging and hunting Reforestation schemes	Biodiversity, natural habitats and water protected by community rules Forests restoration Management system certified as Smart and Sustainable Wood under FSC international standards	Changes in marine biodiversity Dunes affected by building activities Water pollution Dredging disturbs estuary New protection areas
Management plans	Ethno-development management plans	Forest management plans developed by UZACHI	No integrated management plans, but increasing demand to create them
Participation in monitoring systems	Community members report to authorities on illegal activities, but family ties prevent to reports on relatives' activities	Community members monitor and patrol the territory	Regional and local authorities monitor. Fishers monitor, but have no enforcement authority

(10,300 hectares are included in a protection reserve and 1726 hectares are used as production area, of which only 453 hectares are intensively exploited), but are overexploited and polluted in Argentina. Resource productivity is low in all three cases, but for different reasons. In Mexico the Assembly is very conservative when establishing the harvesting rate (the community only harvests 2500 cubic meters of logs per year, well below the natural growth rate); and the case is similar but to a lesser extent in Colombia. However, in Argentina resource degradation has decreased system productivity.

The conservation status is highly influenced by the internal and external economic activities. In Mexico natural resources are well conserved thanks to a strong environmental awareness and an absence of polluting activities. Several problems exist in Colombia (e.g. waste management, water pollution due to untreated wastewater and mercury used in gold extraction, habitats destroyed to grow coca or extract gold from the riverbanks and glyphosate spraying to eradicate coca). Natural resources are more degraded in Bahia Blanca (fishers describe changes in marine biodiversity; the dunes are affected by building activities; the water is polluted by industrial activities and sewage and the estuary dredging disturbs the ecosystem). Poor rule compliance in Colombia and Argentina lead to illegal activities and to free-ride and opportunistic behavior, not only by external actors but also by some commoners and fishers. On the upside, new protection areas (ecological reserves such as the Villa del Mar wetlands) are being established in Bahia Blanca and the forests have been restored in Comaltepec and the Community Councils. Furthermore, environmental education is a priority in the Community Councils.

The incentives for conservation in Comaltepec and the Community Councils are intimately associated with the communities' values and beliefs and to their links with nature: preserve natural resources for future generations is a duty. Comaltepec receives (limited) Payment for Ecosystem Services (PES) linked to water catchment. In Bahia Blanca, environmental problems (decrease of captures, pollution, overexploitation by large vessels using banned trawling techniques) have increased the people's environmental awareness and led to conservation initiatives such as fishing bans or restrictions on building close to the dunes.

The Community Councils have Ethno-Development Natural Resource Management Plans based on ancestral and traditional management, but other administrative levels do not use these Plans to channel investments in the area nor coordinate their actions with the Councils' authorities. In Comaltepec, four indigenous communities have joined to create UZACHI a technical unit that manage forests and elaborates forest management plans; however, these plans require approval from environmental authorities. In Bahia Blanca, no integrated management plans exist; each town has an individual plan that does not recognize the influence nor the problems associated with neighboring areas. However, several actors are demanding the development of integrated plans that include the different economic sectors (fisheries, industries, tourism) and towns in the area.

Finally, in all three cases, community members participate in monitoring activities, but only Comaltepec's members have enforcement authority. The oth-

ers have to report to authorities on any illegal or non-authorized activities detected in the territory, but family ties make this difficult in the Community Councils.

### 3.4. Development

The livelihood strategies in the three case studies are based on natural resources exploitation (Table 6). Their availability is higher in the Colombian and Mexican cases thanks to the rules that limit use, but also due to the limited economic oppor-

Table 6: Factors describing development.

	Calima and AMDA (CO)	Comaltepec (MX)	Bahia Blanca (AR)
Resource availability	Abundant	Abundant	Limited by poor management and lack of control
Livelihood strategies	Entire population relies on natural resource exploitation Hunting, fishing, agriculture and artisanal gold mining Legal and illegal wood commercialized with low added value	Entire population relies on natural resource exploitation Forest production, livestock and subsistence agriculture. Remittances Communal enterprises	Fishers' livelihood strategies linked to natural resources, but other economic sectors exist
Economic opportunities	Few development opportunities and high levels of marginalization No formal jobs Armed conflicts undermined development possibilities No PES	Lack of economic opportunities and poverty Absence of qualified jobs force migration Communal enterprises provide (limited) jobs and incomes Lack of technology to add value to wood Emergent individual development initiatives (vegetables, orchids, and gourmet coffee) Water catchment PES	Job opportunities exist Good performance of socioeconomic indicators Ecological fish processing plant
Distribution of benefits	Community members individually profit from resources following the internal rules for extraction	Incomes from forest exploitation and communal enterprises not distributed to inhabitants	Benefits follow market principles Conflicts of interests between sectors
SES renewal options	High-medium	High	Highly dependent on environmental management.
Voice and representation	Limited externally, but increasing All inhabitants have a voice in the Assembly	Limited (reduced interactions with other communities, rejection of new ideas and initiatives...) Restricted participation of youth and women in the Assembly	Increasing voice and representation of artisanal fishers New interaction spaces that increase collective action

tunities. The areas face high levels of poverty and marginalization, leading to migration, especially in Comaltepec where most of the people have migrated at least once and remittances are essential for the community economy. The strict community rules block individual entrepreneurship efforts. Commoners can use resources for household needs but not for commercial purposes and the existing communal enterprises (sawmill and ecotourism) provide limited community income sources that are invested in common infrastructures rather than being distributed to the commoners. Until now, the armed conflict has undermined the development possibilities (e.g. ecotourism) in AMDA and Calima. In Argentina development options exist in other sectors and there is a good performance in the socioeconomic indicators. The actors develop activities on a private basis to generate incomes; however, this create conflicts of interest between artisanal fishers, tourism activities and environmental protection sometimes. The government has constructed an ecological fish processing plant that creates economic opportunities for more than 200 families.

In general, the opportunity for environmental renewal in the three SESs is high, especially in Comaltepec where the limited logging has little impact on renewability and the population density and growth do not currently create resource pressures. In AMDA and Calima, gold extraction techniques and sewage and untreated waste pollute rivers; however, total population and population growth are not very high either. The communities only have a direct and limited responsibility to mitigate for the first activity (gold mining). In contrast, in Argentina, the SES renewal options are highly dependent on the environmental decisions taken by the governmental authorities and industries. Artisanal fishers control and respect fishing bans and capture quotas. In this case, population density and growth might create resource pressures.

Finally, none of the three communities have a real voice or representation at the regional or national levels. They have limited bargaining positions to defend their interests, even while their participation is increasing (e.g. Bahía Blanca artisanal fishers have been invited to participate in the discussions of a new Act for Artisanal Fishers). Internally, representativeness in the Assembly is higher in the Community Councils than in Comaltepec and the emergence of interaction spaces that increase collective action and may led to integrated development initiatives is occurring in Bahia Blanca.

## 4. Discussion

### 4.1. Strengths and weaknesses of CBM

The three case studies analyzed here reveal that context and power asymmetries strongly influence the effectiveness of CBMs. The institutional and political dynamics are intertwined with the particular local histories and community concerns (Brosius et al. 1998). Enabling political processes have impacted the recognition of local rights to manage natural resources. National legislations have provided avenues for the recognition of community rights in AMDA, Calima and

Comaltepec, where the links between ethnicity and territory (Malkki 1992) and between nature protection and culture, rights and livelihoods form the bases of the CBM (Farah et al. 2012). In Bahía Blanca, the social and geopolitical conditions create a wide range of stakeholders and reinforce the lack of community-oriented behavior. The overarching presence of government organizations and their lack of coordination make long-term decision-making difficult and stimulate a prevailing vision that the government should act to solve problems. This mirrors the defeated attitude regarding perceived insurmountable problems described by Zanetell and Knuth (2004).

The young institutional building process in AMDA and Calima suggests that local management rules and norms need strengthening. Both Councils followed a long path of claims and vindication before having their lands entitled; this effort was backed by the strong leadership of community representatives and corresponded to an emerging process that requires *champions* to take hold (Fabricius and Collins 2007). The CBM has articulated the meta-narratives of ethnicity, autonomy and conservation (Conklin and Graham 1995), creating an inclusive system that fosters the participation of women, even as community authorities, and young people. Management plans based on common values and ethnicity have led the communities to engage in conservation without economic incentives (Berkes 2009). However, these Councils have limited bargaining power to face internal and external threats to unsustainable natural resource use and to voice and stake claims over governmental or external actors (Cash et al. 2006).

In Comaltepec, local institutions are strong, accepted and have more autonomy to establish and change the governance and the resource management systems. The governance system, based on *cargos* and commonality (Merino and Martínez 2014), has contributed to forest regeneration, nature preservation and enhanced management capacity (Chapela 2007). Through time, people have learned that collective decision-making is better than individual acting (Escalante et al. 2015), and community issues are discussed and decided at the Assembly. This long-term perspective has created important inertia, and the high turnover of authorities (due to the lack of remuneration that force changes every 1–2 years) has made the system less dependent on individual actors but, at the same time, created difficulties when new ‘cargos’ must become familiarized with the duties of the position and the planning and execution of projects. *Characterizados* act as a memory bank and serve as the foundation of the community organization (Bohensky and Lynam 2005). Their opinion is highly valued; however they are often illiterate and lack formal education, basing their decisions on experience and collective memory (Fabricius and Collins 2007) and often resisting innovation and entrepreneurial initiatives. Some commoners, particularly the youngest individuals, question the prevalence of these ideas among the elderly and will welcome economic development opportunities derived from sustainable natural resource exploitation. Additionally, the system is not fair. Gender and age create social differences (Leach et al. 1999) and deliver poorer results to people with less voice. Moreover, the low capacity to create jobs fosters migration, which

in return weakens this governance system based on unremunerated activities of commoners.

The scope of the problems faced in Bahía Blanca are beyond the ability of the fisher associations to effectively manage (Ostrom et al. 1999). The fragmented institutional landscape, the absence of a culture of working together and the diversity of stakeholders with conflicting views create what Davis and Bailey (1996) have called a *complex array of vested interests*. The lack of interactions among the different towns make it difficult for the different communities to understand the SES as a whole and to recognize the impact of the actions of the different actors' and sectors' actions over the others and the influence that the economic activities might have on natural resources. The primary challenge is to align market-based solutions, state interests and conservation; Dressler et al. (2010) observed similar situations in South Africa and the Philippines. Nevertheless, some elements of collective action and social capital are emerging in the region. The dependence on the resources provided by the estuary and the growing threats they face have led stakeholders to come together to address some of the conflicts. The involvement of fishermen's organizations in the present study provided a space for communication and discussions of problems (London et al. 2012). Different actors met and began to understand the views of the others. Specifically, these individuals recognized the importance of participation in the process of creating rules and laws, in triggering changes in the attitude and decisions of policymakers, and in fostering actions to build their future (Delgado-Serrano et al. 2016). These stakeholders realized the need to build a common identity and create spaces for dialogue and interaction with decision-makers, where community problems can be jointly discussed. Fishermen are aware that joint CBM strategies are not an easy challenge to overcome, but collective understanding could be a first step. As Cronkleton and Larson (2015) observed, collective and individual property rights and behaviors are not inherently associated, and the allocation of individual rights can lead to collective behavior. However, CBM should not be considered as a transfer of power but, rather, as a collaborative process between resource users and government that fosters stewardship values and an enduring commitment to sustain natural resources (Zanetell and Knuth 2004).

#### **4.2. Trade-offs between conservation and development**

Welfare depends on natural resource extraction in the three case studies but balancing resource conservation and economic needs is inherently difficult. AMDA and Calima inhabitants face a continuous dilemma between generating incomes and protecting resources and culture. These communities have few employment opportunities outside natural resource exploitation, and their natural capital (biodiversity, forest and water) neither generates income nor creates jobs or economic activities. The CBMs have difficulties translating environmental resources and services into individual and communal well-being (Leach et al. 1999; Dressler



et al. 2010). The need for income, economic activities developed by external actors, loose environmental values and the lack of enforcement authority make the unsustainable exploitation of resources more likely. An important part of the revenues in both CCs derives from negotiations to permit the development of infrastructures and megaprojects (e.g. Cali-Buenaventura road, ports in Calima) (Ortiz et al. 2015). These projects provide incomes and jobs for the communities but also threaten environmental sustainability, generating more traffic, pollution and fragmentation of the territory, among other effects, and are not associated with long-term or skilled jobs. Furthermore, community members are treated as passive recipients of project activities (Pimbert and Pretty 1997; Campbell and Vainio-Mattila 2003).

Comaltepec's CBM strategy can cope with forest management but fails to address people's needs; it does not provide enough welfare and development for community members. Forest exploitation has ensured what Campbell and Vainio-Mattila (2003) defined as the *minimum sustainable livelihood*. Community values have created a system that provides what used to be the household needs (agriculture and forests provide subsistence, and the community provides basic services, such as education, healthcare and infrastructures) but has not improved living standards not actual welfare levels, which are associated with cash and consumption capacity. In addition, the *cargo* system obliges the families to have an active investment in the management system (Berry 1989). The conflict between the individual and the collective likewise creates important tensions. The low prices received for the efforts supporting common conservation make individual alternatives appear as more profitable, but the risk aversion prevailing at the Assembly blocks individual decisions that could improve living conditions through entrepreneurial activities. The situation is even more complicated for women, who are expected to play a traditional role in the household and not to participate in CBM strategies (Chen et al. 2013), and in combination with the lack of jobs, many women are forced to migrate.

Industrialization in Bahía Blanca has resulted in changes in the patterns of resource exploitation and has increased external pressures such as pollution and overfishing on the artisanal fishery. Development comes at the cost of the unsustainable use and depletion of natural resources (London et al. 2015). A utilitarian approach to natural resources use that does not account for the social (Zilio et al. 2013) and environmental costs and effects, nor the local needs, prevails in this area. The activities promoted by the government or large companies align with a livelihood design based on free-market principles, where traditional activities are considered as activities that should be modernized and replaced with market-based activities (Dressler et al. 2010). Large vessels and trawling techniques create overexploitation and induce changes in species and seabed destruction, increasing pressures on fishers' livelihoods. However, the pressures applied by the artisanal fishers have led local authorities to construct a fish processing plant and regulate fishing seasons, contributing to development and conservation.



## 5. Conclusions

Local livelihoods depend on sustainable management in the three cases analyzed, but in all of them, a trade-off between conservation and development was identified. Comaltepec and the Community Councils are more similar in several aspects and deliver better conservation results. Internal factors supporting conservation are rooted in ethnicity and cultural values where the links with nature prevail. However, the longer tradition of collective management and endurance of Comaltepec's CBM, the rule acceptance and compliance and the lack of external threats and economic activities led to better conservation outcomes there than in the Councils. Nevertheless, conservation comes at the cost of development. Rigid internal rules, non-inclusive CBM, inertia and risk aversion to entrepreneurial activities prevent the execution of economic development options. Argentina fishers have higher welfare levels, but the natural resource management in the area is unsustainable. Market-based strategies, national development priorities and individualistic behaviours push the intensification of resource use. Power asymmetries in all three cases result in limited recognition of internal rules and decisions and few options to influence the economic activities of external actors.

In all three cases, the community activities are not the primary cause of natural resource degradation. Conservation is threatened by the absence of economic opportunities beyond resource exploitation and the external pressures exerted by the current development models and worldviews, such as globalization and the market economy. Communities have financial needs that traditional management forms do not support. Economic development is blocked by the lack of economic incentives and compensation models that support the sustainable management of natural resources and enable economic opportunities and welfare. Global stakeholders demand the conservation of natural resources necessary to regulate ecosystem functioning, but they need to integrate local views where livelihood options and incomes are a necessity. Sound natural resource management cannot rest on the shoulders of the local communities without any compensation.

The results are specific for these cases, but similar situations to those analyzed exist in Latin America. We hope to highlight the importance of natural-resource dependent communities in resource preservation and the difficulties they face in establishing a sustainable livelihood based on these resources.

## Literature cited

- Adger, W. N. 2003. Social Capital, Collective Action, and Adaptation to Climate Change. *Economic Geography* 79(4):387–404. <https://doi.org/10.1111/j.1944-8287.2003.tb00220.x>.
- Agrawal, A. 2001. Common Property Institutions and Sustainable Governance of Resources. *World Development* 29(10):1649–1672. [https://doi.org/10.1016/S0305-750X\(01\)00063-8](https://doi.org/10.1016/S0305-750X(01)00063-8).

- AMDA-CVC. 2007. *Formulación del Plan de Administración y Manejo de los Recursos Naturales en el territorio colectivo del Consejo Comunitario Mayor de la Cuenca Alta y Media del Río Dagua*. Buenaventura: Corporación Autónoma Regional del Valle del Cauca.
- Armitage, D. 2005. Adaptive Capacity and Community-Based Natural Resource Management. *Environmental Management* 35(6):703–715. <https://doi.org/10.1007/s00267-004-0076-z>.
- Balint, P. J. and J. Mashinya. 2006. The Decline of a Model Community-Based Conservation Project: Governance, Capacity, and Devolution in Mahenye, Zimbabwe. *Geoforum* 37(5):805–815. <https://doi.org/10.1016/j.geoforum.2005.01.011>.
- Berkes, F. 2004. Rethinking Community-Based Conservation. *Conservation Biology* 18(3):621–630. <https://doi.org/10.1111/j.1523-1739.2004.00077.x>.
- Berkes, F. 2007. Community-Based Conservation in a Globalized World. *Proceedings of the National Academy of Sciences of the United States of America* 104(39):15188–15193. <https://doi.org/10.1073/pnas.0702098104>.
- Berkes, F. 2009. Community Conserved Areas: Policy Issues in Historic and Contemporary Context. *Conservation Letters* 2(1):20–25. <https://doi.org/10.1111/j.1755-263X.2008.00040.x>.
- Berry, S. 1989. Social Institutions and Access to Resources. *Africa* 59(1):41–55. <https://doi.org/10.2307/1160762>.
- Blaikie, P. 2006. Is Small Really Beautiful? Community-based Natural Resource Management in Malawi and Botswana. *World Development* 34(11):1942–1957. <https://doi.org/10.1016/j.worlddev.2005.11.023>.
- Bohensky, E. and T. Lynam. 2005. Evaluating Responses in Complex Adaptive Systems: Insights on Water Management from the Southern African Millennium Ecosystem Assessment (SAfMA). *Ecology and Society* 10(1):11. <http://www.ecologyandsociety.org/vol10/iss1/art11/>. <https://doi.org/10.5751/ES-01198-100111>.
- Broderstad, E. G. and E. Eythorsson. 2014. Resilient Communities? Collapse and Recovery of a Social-Ecological System in Arctic Norway. *Ecology and Society* 19(3):1. <https://doi.org/10.5751/ES-06533-190301>.
- Brondizio, E. S. and F.-M. L. Tourneau. 2016. Environmental Governance for All. *Science* 352(6291):1272–1273. <https://doi.org/10.1126/science.aaf5122>.
- Brondizio, E. S., E. Ostrom, and O. R. Young. 2009. Connectivity and the Governance of Multilevel Social-Ecological Systems: The Role of Social Capital. *Annual Review of Environment and Resources* 34(1):253–278. <https://doi.org/10.1146/annurev.environ.020708.100707>.
- Brooks, J. S., K. A. Waylen, and M. Borgerhoff Mulder. 2012. How National Context, Project Design, and Local Community Characteristics Influence Success in Community-Based Conservation Projects. *Proceedings of the National Academy of Sciences of the United States of America* 109(52):21265–21270. <https://doi.org/10.1073/pnas.1207141110>.

- Brooks, J., K. A. Waylen, and M. B. Mulder. 2013. Assessing Community-Based Conservation Projects: A Systematic Review and Multilevel Analysis of Attitudinal, Behavioral, Ecological, and Economic Outcomes. *Environmental Evidence* 2(1):2. <https://doi.org/10.1186/2047-2382-2-2>.
- Brosius, J. P., A. L. Tsing, and C. Zerner. 1998. Representing Communities: Histories and Politics of Community-Based Natural Resource Management. *Society & Natural Resources* 11(2):157–168. <https://doi.org/10.1080/08941929809381069>.
- Calima-CVC. 2008. *Formulación del Plan de Administración y Manejo de los Recursos Naturales en el territorio colectivo del Consejo Comunitario Mayor de la Cuenca Baja del Río Calima*. Buenaventura: Corporación Autónoma Regional del Valle del Cauca.
- Campbell, L. M. and A. Vainio-Mattila. 2003. Participatory Development and Community-Based Conservation: Opportunities Missed for Lessons Learned? *Human Ecology* 31(3):417–437. <https://doi.org/10.1023/A:1025071822388>.
- Cash, D. W., W. N. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. *Ecology and Society* 11(2):8. <http://www.ecologyandsociety.org/vol11/iss2/art8/>. <https://doi.org/10.5751/ES-01759-110208>.
- Chapela, F. 2007. El manejo forestal comunitario indígena en la Sierra de Juárez, Oaxaca. In *Los bosques comunitarios de México. Manejo sustentable de paisajes forestales*, eds. D. Bray, L. Merino, and D. Barry, 123–145. Mexico, City. Mexico: Instituto Nacional de Ecología.
- Chen, H., T. Zhu, M. Krott, and D. Maddox. 2013. Community Forestry Management and Livelihood Development in Northwest China: Integration of Governance, Project Design, and Community Participation. *Regional Environmental Change* 13(1):67–75. <https://doi.org/10.1007/s10113-012-0316-3>.
- Conklin, B. A. and L. R. Graham. 1995. The Shifting Middle Ground: Amazonian Indians and Eco-Politics. *American Anthropologist* 97(4):695–710. <https://doi.org/10.1525/aa.1995.97.4.02a00120>.
- Cronkleton, P. and A. M. Larson. 2015. Formalization and Collective Appropriation of Space on Forest Frontiers: Comparing Communal and Individual Property Systems in the Peruvian and Ecuadorian Amazon. *Society and Natural Resources* 28(5):496–512. <https://doi.org/10.1080/08941920.2015.1014609>.
- Davis, A. and C. Bailey. 1996. Common in Custom, Uncommon in Advantage: Common Property, Local Elites, and Alternative Approaches to Fisheries Management. *Society and Natural Resources* 9(3):251–265. <https://doi.org/10.1080/08941929609380970>.
- Delgado-Serrano, M., E. Oteros-Rozas, P. Vanwildemeersch, S. London, and R. Escalante. 2015. Local Perceptions on Social-Ecological Dynamics in Latin America in Three Community-Based Natural Resource Management Systems. *Ecology and Society* 20(4):24. <https://doi.org/10.5751/ES-07965-200424>.
- Delgado-Serrano, M. d. M., P. Vanwildemeersch, S. London, C. E. Ortiz-Guerrero, R. Escalante Semerena, and M. Rojas. 2016. Adapting Prospective Structural

- Analysis to Strengthen Sustainable Management and Capacity Building in Community-Based Natural Resource Management Contexts. *Ecology and Society* 21(2):36. <https://doi.org/10.5751/ES-08505-210236>.
- Delgado-Serrano, M. d. M., J. Mistry, B. Matzdorf, and G. Leclerc. 2017. Community-Based Management of Environmental Challenges in Latin America and the Caribbean. *Ecology and Society* 22(1):4. <https://doi.org/10.5751/ES-08924-210449>.
- Dietz, T., E. Ostrom, and P. C. Stern. 2003. The Struggle to Govern the Commons. *Science* 302(5652):1907–1912. <https://doi.org/10.1126/science.1091015>.
- Dressler, W., B. Büscher, M. Schoon, D. Brockington, T. Hayes, C. A. Kull, J. McCarthy, and K. Shrestha. 2010. From Hope to Crisis and Back Again? A Critical History of the Global CBNRM Narrative. *Environmental Conservation* 37(1):5–15. <https://doi.org/10.1017/S0376892910000044>.
- Escalante, R. I., S. Basurto, S. I. Brugger, Y. Lara, F. Chapela, and I. Hernández. 2012. *Stakeholders' Vision on the Social-Ecological System situation in Mexico. A Case Study. COMET-LA Working paper*. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- Escalante, R., A. Cruz, and S. Basurto. 2015. *Community-Based Sustainable Management and Governance Models in Forest Systems. COMET-LA Working Paper*. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- Fabricius, C. 2004. The Fundamentals of Community-Based Natural Resource Management. In *Rights, resources and rural development: Community-based natural resource management in Southern Africa*, eds. C. Fabricius, E. Koch, H. Magome, and S. Turner, 3–43. London: Earthscan.
- Fabricius, C. and S. Collins. 2007. Community-Based Natural Resource Management: Governing the Commons. *Water Policy* 9(suppl. 2):83–97. <https://doi.org/10.2166/wp.2007.132>.
- Fabricius, C., C. Folke, G. Cundill, and L. Schultz. 2007. Powerless Spectators, Coping Actors, and Adaptive Co-Managers: A Synthesis of the Role of Communities in Ecosystem Management. *Ecology and Society* 12(1):29. <http://www.ecologyandsociety.org/vol12/iss1/art29/>. <https://doi.org/10.5751/ES-02072-120129>.
- Fabricius, C., E. Koch, S. Turner, and H. Magome. 2013. *Rights Resources and Rural Development: Community-Based Natural Resource Management in Southern Africa*. London: Routledge.
- Farah, M. A., E. Garrido, D. L. Maya, C. Ortiz, and P. Ramos. 2012. *Stakeholder Vision on Social-Ecological System Situation in Colombia Case Study*. COMET-LA Working Paper. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- Gruber, J. S. 2010. Key Principles of Community-Based Natural Resource Management: A Synthesis and Interpretation of Identified Effective Approaches for Managing the Commons. *Environmental Management* 45(1):52–66. <https://doi.org/10.1007/s00267-008-9235-y>.

- Hauzer, M., P. Dearden, and G. Murray. 2013. The Effectiveness of Community-Based Governance of Small-Scale Fisheries, Ngazidja Island, Comoros. *Marine Policy* 38:346–354. <https://doi.org/10.1016/j.marpol.2012.06.012>.
- INEGI. 2010. *Censo de Población y Vivienda 2010*. Mexico: Instituto Nacional de Estadística y Geografía.
- Lauber, T. B., D. J. Decker, and B. A. Knuth. 2008. Social Networks and Community-Based Natural Resource Management. *Environmental Management* 42(4):677–687. <https://doi.org/10.1007/s00267-008-9181-8>.
- Leach, M., R. Mearns, and I. A. N. Scoones. 1999. Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. *World Development* 27(2):225–247. [https://doi.org/10.1016/S0305-750X\(98\)00141-7](https://doi.org/10.1016/S0305-750X(98)00141-7).
- London, S., M. Recalde, M. Rojas, M. Zilio, G. M. E. Perillo, M. L. Bustos, M. C. Piccolo, C. Rodriguez, G. Fidalgo, J. C. Pascale, L. Berninsone, M. A. Huamantincó, M. C. Vaquero, and P. Bordino. 2012. *Stakeholder Vision on Social-Ecological System Situation in Argentina Case Study. COMET-LA Working Paper*. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- London, S., M. Rojas, M. Zilio, G. Perillo, M. C. Piccolo, F. Scordo, A. Huamantincó Cisneros, M. L. Bustos, F. Ferrelli, J. C. Pascale, V. Vitale, L. Berninsone, and P. Bordino. 2015. *Community Based Sustainable Management and Governance Models in Marine and Coastal Areas. COMET-LA Working Paper*. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- Malkki, L. 1992. National Geographic: The Rooting of Peoples and the Territorialization of National Identity among Scholars and Refugees. *Cultural Anthropology* 7(1):24–44. <https://doi.org/10.1525/can.1992.7.1.02a00030>.
- Merino, L. and A. E. Martínez. 2014. *A vuelo de pájaro: las condiciones de las comunidades con bosques templados en México*: Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Mexico: CONABIO.
- Mistry, J. and A. Berardi. 2016. Bridging Indigenous and Scientific Knowledge. *Science* 352(6291):1274–1275. <https://doi.org/10.1126/science.aaf1160>.
- Myers, R. and M. Muhajir. 2015. Searching for Justice: Rights vs Benefits in Bukit Baka Bukit Raya National Park, Indonesia. *Conservation and Society* 13(4):370–381. <https://doi.org/10.4103/0972-4923.179886>.
- Ortiz, C., M. A. Farah, N. Ocampo, B. Avendaño, P. Ramos, D. L. Maya, and L. Pinzon. 2015. *Community Based Sustainable Management and Governance Models in Water and Biodiversity Systems. COMET-LA Working Paper*. Retrieved from <http://www.comet-la.eu/index.php/en/publications.html>.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511807763>.
- Ostrom, E. 2002. Common-Pool Resources and Institutions: Toward a Revised Theory. *Handbook of Agricultural Economics* 2:1315–1339. [https://doi.org/10.1016/S1574-0072\(02\)10006-5](https://doi.org/10.1016/S1574-0072(02)10006-5).

- Ostrom, E. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science* 325(5939):419–422. <https://doi.org/10.1126/science.1172133>.
- Ostrom, E., J. Burger, C. B. Field, R. B. Norgaard, and D. Policansky. 1999. Revisiting the Commons: Local Lessons, Global Challenges. *Science* 284(5412):278–282. <https://doi.org/10.1126/science.284.5412.278>.
- Pagdee, A., Y.-S. Kim, and P. J. Daugherty. 2006. What makes Community Forest Management Successful: A Meta-Study from Community Forests throughout the World. *Society and Natural Resources* 19(1):33–52. <https://doi.org/10.1080/08941920500323260>.
- Pimbert, M. P. and J. N. Pretty. 1997. Parks, People and Professionals: Putting ‘Participation’ into Protected Area Management. *Social Change and Conservation* 16:297–330.
- Poteete, A. R., M. A. Janssen, and E. Ostrom. 2010. *Working Together: Collective Action, the Commons, and Multiple Methods in Practice*. Princeton and Oxford: Princeton University Press. <https://doi.org/10.1515/9781400835157>.
- Pretty, J. 2003. Social Capital and the Collective Management of Resources. *Science* 302(5652):1912–1914. <https://doi.org/10.1126/science.1090847>.
- Ruiz-Ballesteros, E. and C. Gálvez-García. 2014. Community, Common-Pool Resources and Socio-Ecological Systems: Water Management and Community Building in Southern Spain. *Human Ecology* 42(6):847–856. <https://doi.org/10.1007/s10745-014-9705-1>.
- Ruiz-Mallén, I., C. Schunko, E. Corbera, M. Rös, and V. Reyes-García. 2015. Meanings, Drivers, and Motivations for Community-Based Conservation in Latin America. *Ecology and Society* 20(3):33. <https://doi.org/10.5751/ES-07733-200333>.
- Shackleton, C. M., T. J. Willis, K. Brown, and N. V. C. Polunin. 2010. Reflecting on the Next Generation of Models for Community-Based Natural Resources Management. *Environmental Conservation* 37(1):1–4. <https://doi.org/10.1017/S0376892910000366>.
- Suich, H. 2013. The Effectiveness of Economic Incentives for Sustaining Community Based Natural Resource Management. *Land Use Policy* 31:441–449. <https://doi.org/10.1016/j.landusepol.2012.08.008>.
- Waylen, K. A., J. Martin-Ortega, K. L. Blackstock, I. Brown, B. E. Avendaño Uribe, S. Basurto Hernández, M. B. Bertoni, M. L. Bustos, A. X. Cruz Bayer, R. I. Escalante Semerena, M. A. Farah Quijano, F. Ferrelli, G. L. Fidalgo, I. Hernández López, M. A. Huamantínco Cisneros, S. London, D. L. Maya Vélez, P. N. Ocampo-Díaz, C. E. Ortiz Guerrero, J. C. Pascale, and M. I. Zilio. 2015. Can Scenario-Planning Support Community-Based Natural Resource Management? Experiences from Three Countries in Latin America. *Ecology and Society* 20(4):28. <https://doi.org/10.5751/ES-07926-200428>.
- Western, D. and R. M. Wright. 1994. *Natural Connections: Perspectives in Community Based Conservation*. Washington DC: Island Press.



- White, A. T., C. A. Courtney, and A. Salamanca. 2002. Experience with Marine Protected Area Planning and Management in the Philippines. *Coastal Management* 30(1):1–26. <https://doi.org/10.1080/08920750252692599>.
- Zanetell, B. A. and B. A. Knuth. 2004. Participation Rhetoric or Community-Based Management Reality? Influences on Willingness to Participate in a Venezuelan Freshwater Fishery. *World Development* 32(5):793–807. <https://doi.org/10.1016/j.worlddev.2004.01.002>.
- Zilio, M. I., S. London, G. M. E. Perillo, and M. Cintia Piccolo. 2013. The Social Cost of Dredging: The Bahia Blanca Estuary Case. *Ocean & Coastal Management* 71:195–202. <https://doi.org/10.1016/j.ocecoaman.2012.09.008>.