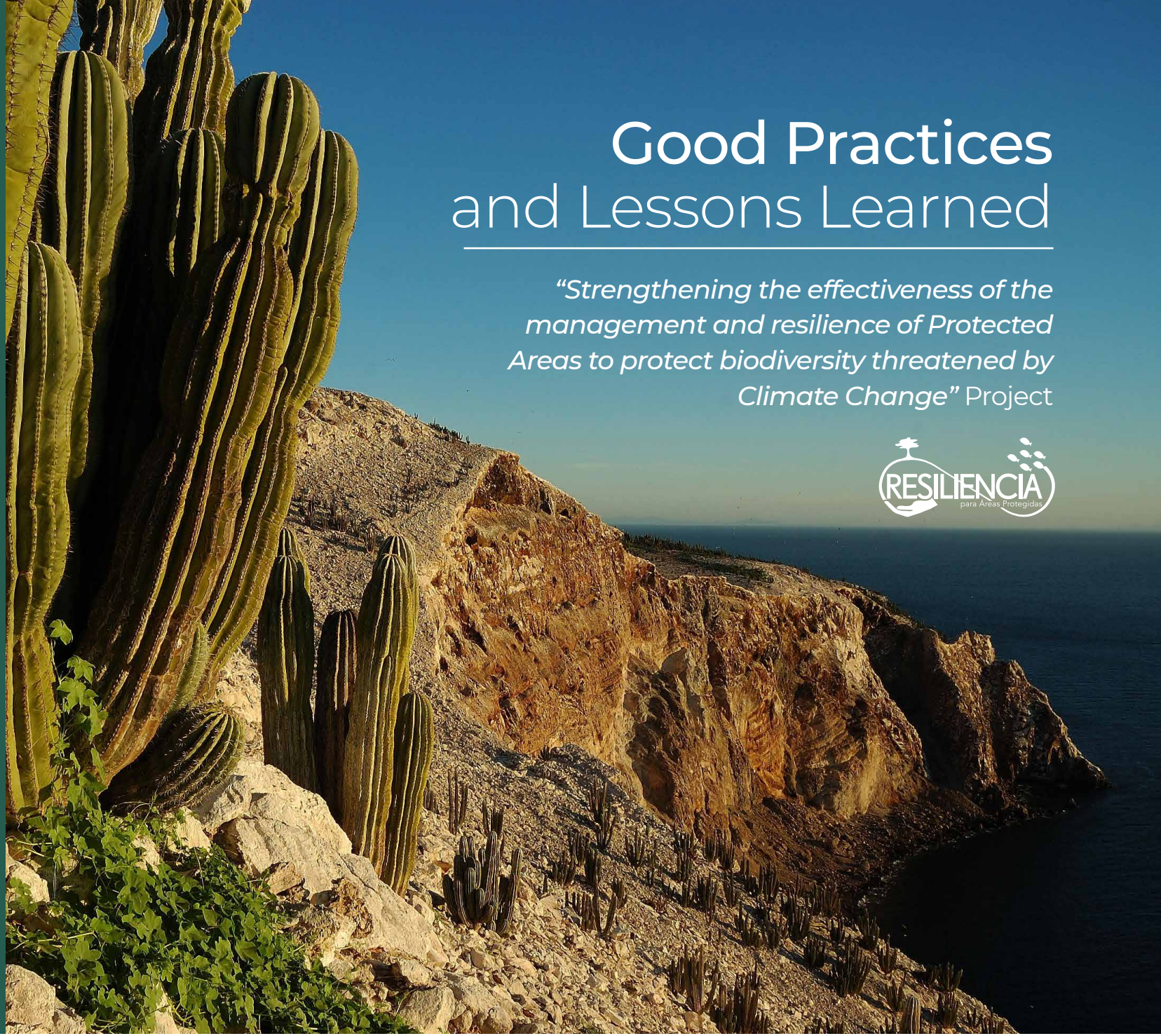

Good Practices and Lessons Learned

"Strengthening the effectiveness of the management and resilience of Protected Areas to protect biodiversity threatened by Climate Change" Project

RESILIENCIA para Áreas Protegidas

GOBIERNO DE MÉXICO | MEDIO AMBIENTE SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES | CONANP COMISIÓN NACIONAL DE ÁREAS NATURALES PROTEGIDAS | gef | PNUD

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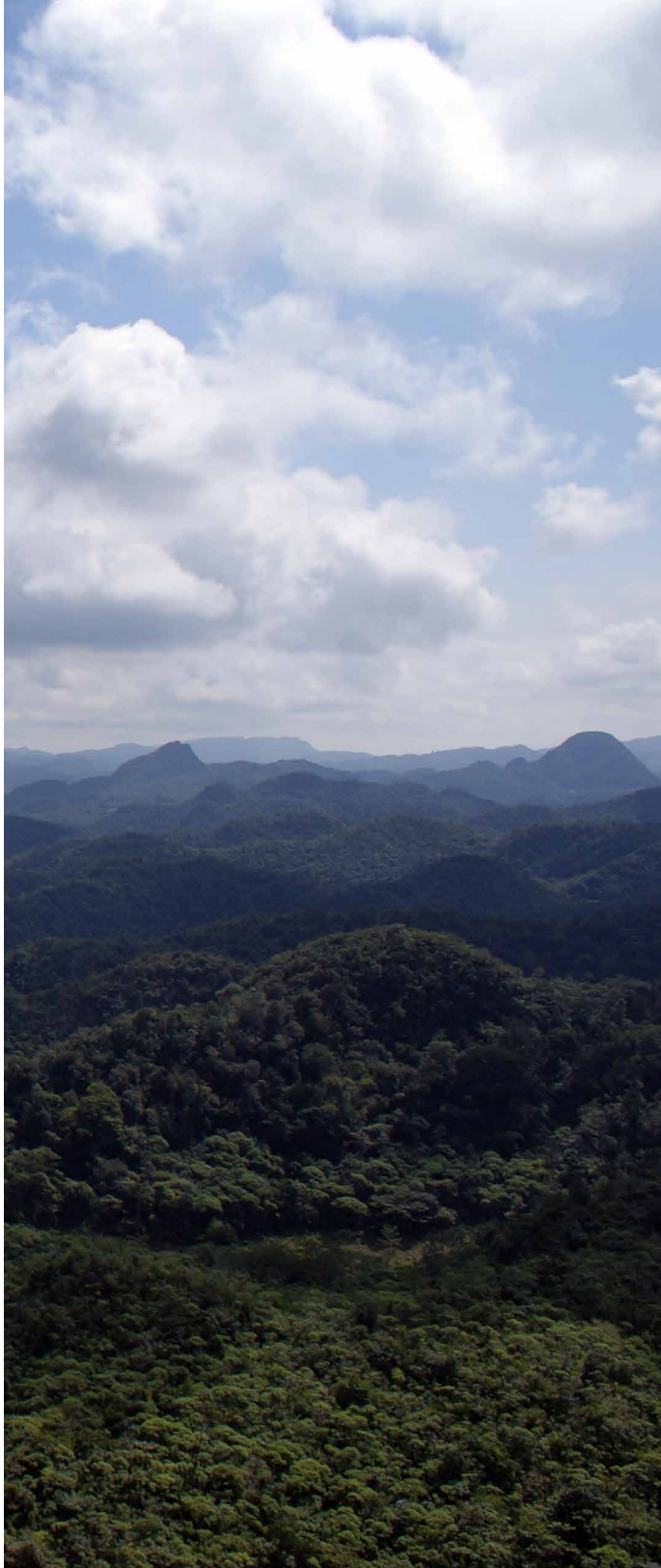

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Introduction

The Project: "Strengthening the effectiveness of the management and resilience of Protected Areas to protect biodiversity threatened by Climate Change," known as "Resiliencia" ("Resilience"), is executed by the National Commission of Protected Natural Areas (CONANP), implemented with the support of the United Nations Development Programme (UNDP) in Mexico and co-financed by a grant from the Global Environment Fund (GEF). This project has three components that address the resilience needs of biodiversity at the local, regional, and national levels, and seeks to strengthen three interrelated axes: institutional, socio-economic, and ecosystem.

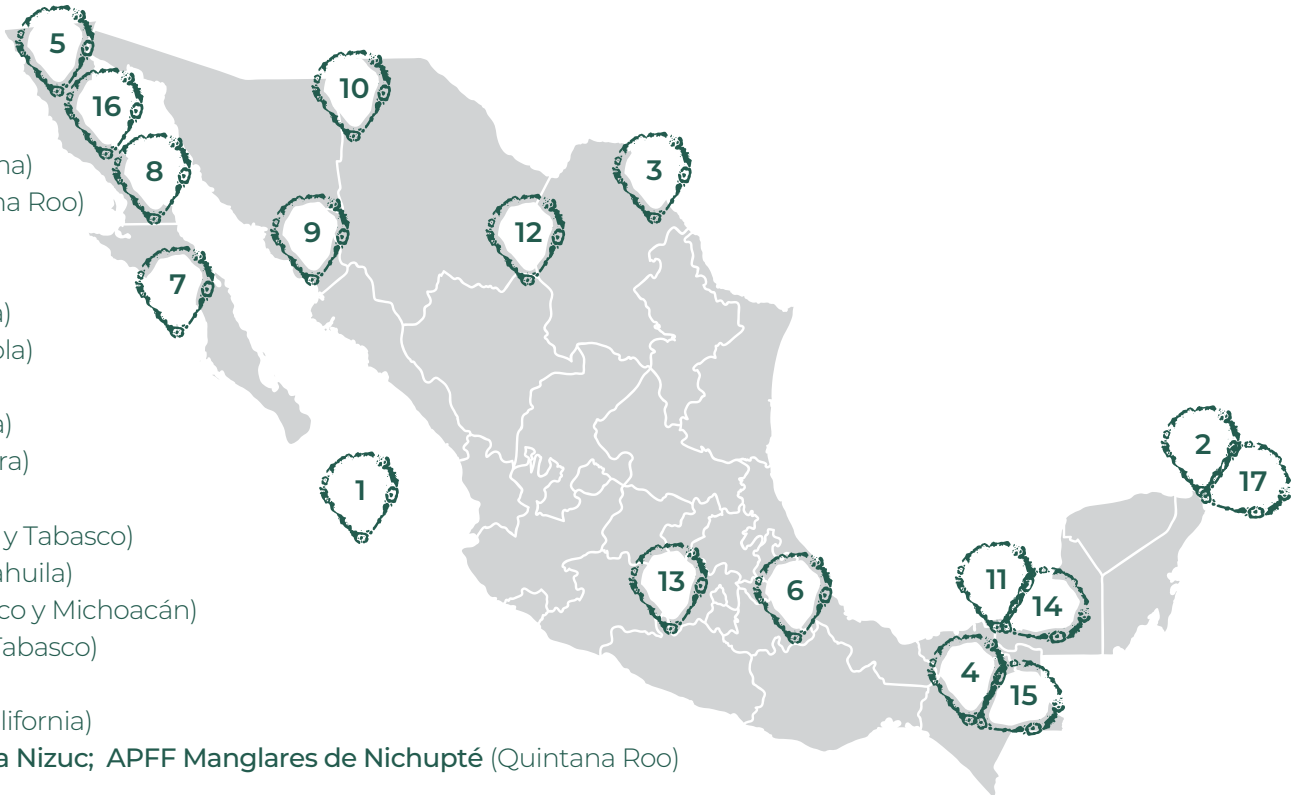
Resiliencia has been an innovative project: it promotes the adoption of climate change approaches in PNA management as natural solutions to the climate crisis; improves inter- and intra-institutional management; and promotes the participation of different sectors that contribute their knowledge and experiences toward the design of climate change adaptation and implementation strategies.

Execution of this project has been complex and has yielded important lessons, which have undoubtedly created a foundation for future interventions with a greater scope and impacts. That is why it is necessary to reflect on all the obstacles faced, the successful actions taken, and the challenges and solutions; all of these constitute the main lessons learned from the project. Consultants and local partners carried out a documentary review of previous systematization exercises and identified the lessons that can be learned from these experiences.

The objective is due to the need to convey the lessons learned in order to promote their replicability and give continuity to the results obtained in addressing climate change from ecosystems under conservation schemes.

The Resilience project

1. **RB Archipiélago de Revillagigedo** (Colima)
2. **PN Arrecife de Puerto Morelos** (Quintana Roo)
3. **APRN Don Martín** (Coahuila)
4. **PN Cañón del Sumidero** (Chiapas)
5. **PN Constitución de 1857** (Baja California)
6. **RB Tehuacán-Cuicatlán** (Oaxaca y Puebla)
7. **RB El Vizcaíno** (Baja California Sur)
8. **RB Bahía de los Ángeles** (Baja California)
9. **APFF Islas del Golfo de California** (Sonora)
10. **RB Janos** (Chihuahua y Sonora)
11. **APFF Laguna de Términos** (Campeche y Tabasco)
12. **RB Mapimí** (Durango, Chihuahua y Coahuila)
13. **RB Mariposa Monarca** (Estado de México y Michoacán)
14. **RB Pantanos de Centla** (Campeche y Tabasco)
15. **RB Selva El Ocote** (Chiapas)
16. **PN Sierra de San Pedro Mártir** (Baja California)
17. **PN Isla Mujeres, Punta Cancún y Punta Nizuc; APFF Manglares de Nichupté** (Quintana Roo)



A.P.F.F. Área de Protección Flora y Fauna
A.P.R.N. Área de Protección de los Recursos Naturales
P.N. Parque Nacional
R.B. Reserva de la Biosfera

Figure 1. Map of the 17 protected natural areas where the Resilience Project was implemented in Mexico.

The Resilience project was implemented in 17 protected natural areas, covering 7.8 million hectares, in 12 ecoregions and in three environments: terrestrial, coastal, and marine. The Project aims to:

Transform the management and coverage of land and marine PNAs in Mexico to mitigate direct and indirect impacts on biodiversity.

The goal was to achieve three major results:

1. Institutional framework of the Mexican PNA system, strengthened with climate change and resilience criteria to ensure the effective safeguarding of biodiversity.

2. Expand the PNA system in sites with strategic connectivity with climate change resilience criteria.

3. Promote effective management of PNAs to reduce climate threats to biodiversity.

The main achievements and processes derived from the implementation of the Resilience project are summarized in the following table:

Outcome 1. **Institutional framework**	Outcome 2. **Functional Connectivity**	Outcome 3. **Effective PNA management**
6 programmatic and strategic documents (E2040, ECCAP, National PNA Program and PECC) with the integration of the climate change approach		
9 Climate Change Adaptation Programs (CCAPs) with intersectoral and multi-scale participation and engagement, as well as capacity building in planning for the adaptation of more than 2,000 people from different sectors	600,000 ha of expansion of conservation areas by new decrees	Implementation of 15 adaptation measures implemented in 12 PNAs, in agreement with 8 CSOs. • 136 ha of integral fire management • 5 km of gallery forest • 5,309 ha of strategic land restoration and livestock exclusion areas • 147 ha of coastal implementation and restoration • 0.62 ha of coral reef restoration • 167 ha of sustainable land management implementation • 262 ha of implementation of actions for the management of exotic and invasive species • 24 benefited communities, 1,175 people, 522 women and 521 men
3 information platforms on ecosystems and climate change for decision-making and monitoring (ECCBIO, GeoPortal, and SIMAR)		
8 management programs with a climate change component	10,115 hectares certified as Voluntary Conservation Areas (VCAs), with 16,279 more hectares in the process of certification; this will lead to stronger connectivity between PNAs	
1 tool for preparing Climate Change Adaptation Programs with gender approaches, Ecosystem-based Adaptation (EbA), and Disaster Risk Reduction (DRR)	Landscape approach at the complex or ecoregion level	
Strengthened Advisory Councils (ACs) that support decision-making for effective PNA management		

Themes

For the purposes of this publication, the lessons have been grouped into six thematic areas based on the three major project outcomes. Please note that this is not an exhaustive list; rather, it is intended to provide relevant and manageable information for interested parties.

Outcome 1. **Institutional Framework**	
1.1 CCAP	1.1.1 Incorporation of the Ecosystem-based Adaptation approach 1.1.2 Social participation and governance
1.2 Climate Governance	1.2.1 Strengthening of Advisory Councils
1.3 Information platforms for decision-making	1.3.1 ECCBIO, GeoPortal, and SIMAR information platforms

Outcome 2. **Functional Connectivity**	
2.1. Expansion of the areas under conservation schemes based on connectivity criteria	2.1.2 Strengthening and creation of new VCAs
2.2 Comprehensive land management with a landscape approach	2.2.1 PNA complex approach

Outcome 3. **Effective PNA management**	
3.1 Adaptation measures with local partners	3.1.2 Reduced vulnerability in ecosystems and people's livelihoods 3.1.2 Local partnerships 3.1.3 PCommunity capacity development and participation 3.1.4 Gender perspective

Outcome 1: Institutional Framework

1.1 Climate Change Adaptation Programs (CCAPs)

1.1.1 Incorporation of the EbA approach

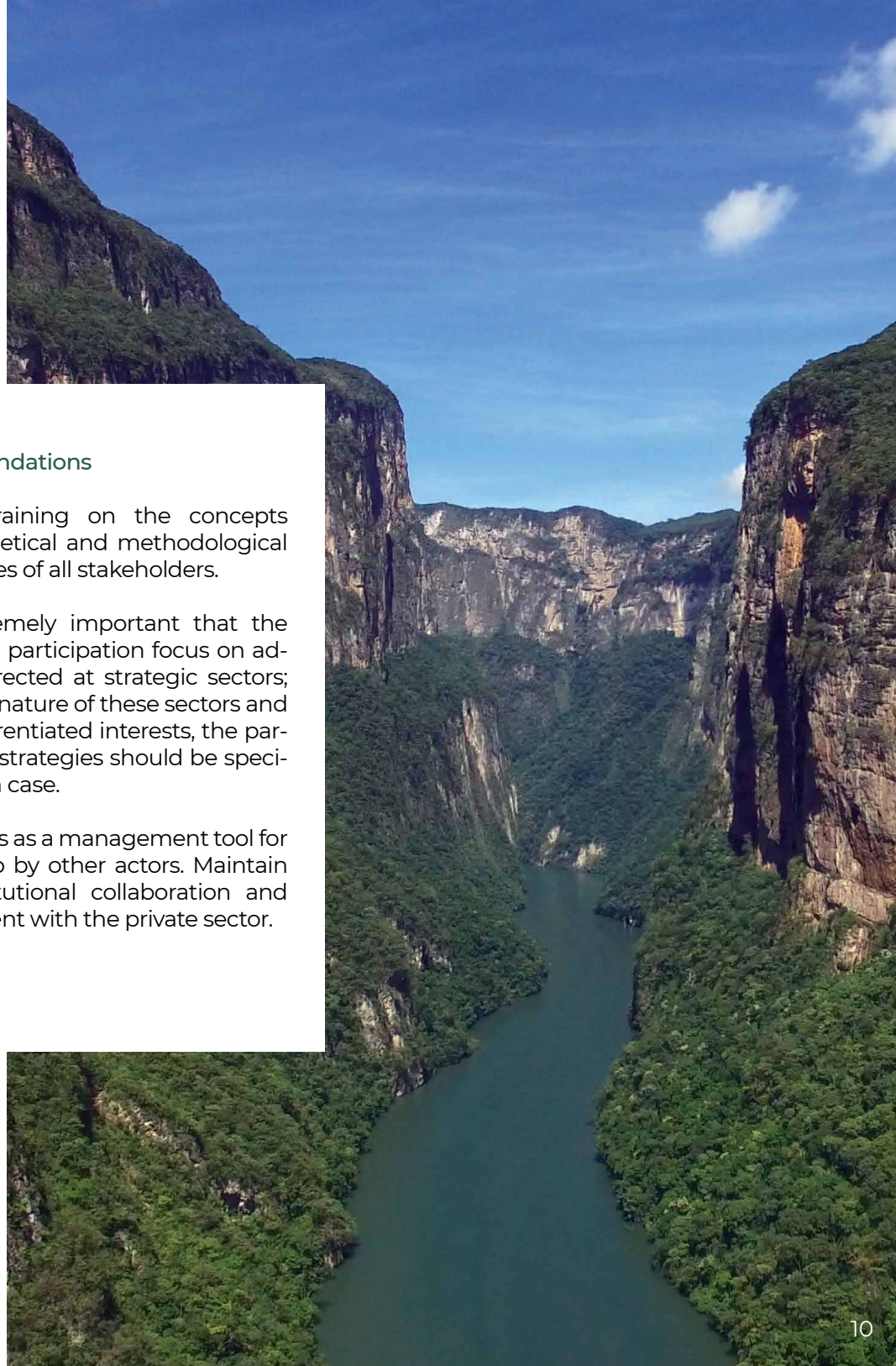
The Ecosystem-based Adaptation (EbA) approach is an adaptation alternative to face the adverse effects of climate change. It is defined as "the use of biodiversity and ecosystem services as part of a broader strategy that helps people adapt to the adverse effects of climate change".

During the process of creating the CCAPs, the aim was to demonstrate the link between the quality of the ecosystem services provided by PNAs and the livelihoods of people in rural and urban areas. Accordingly, PNAs were recognized as key instruments for climate change adaptation. The main lessons learned from the application of this approach within the Project are the following:

Lesson 1: The adoption of a conceptual framework–such as the EbA approach–must be supported by a methodological proposal to ensure its operability..

Lesson 2: The training of personnel involved in the design, development, and implementation of programmatic instruments (such as CCAPs) should use the theoretical and methodological approach of EbAs as a starting point for the process.

Lesson 3: The selection of the exposure unit, the Socio-Environmental Conservation Objects (SECO), must be based on the ecosystem services that contribute to strategic livelihoods. The experience



Recommendations

- Ensure training on the concepts and theoretical and methodological approaches of all stakeholders.
- It is extremely important that the spaces for participation focus on advocacy directed at strategic sectors; given the nature of these sectors and their differentiated interests, the participation strategies should be specific to each case.
- Use CCAPs as a management tool for ownership by other actors. Maintain inter-institutional collaboration and involvement with the private sector.

concludes that the criteria for SECO selection must be specific, so that there is a directed vision of the elements of the landscape that may or may not be considered.

1.1.2 Social participation

CCAPs are characterized by having a shared vision and interest and at different scales. During the design phase, there were research and consultation processes at different levels. In each territory, key actors participated through spaces where the exchange of ideas and dialogue were promoted through group dynamics, which allowed the construction of objectives and a shared vision of the instrument, as well as institutional agreements for the process of Program design and implementation.

Participants in these efforts included representatives of key public and private stakeholders for PNA management and their areas of influence, including: the academic sector, private companies, agricultural and fishing cooperatives, service providers, professional unions, NGOs, and governmental entities of the federal, state, and municipal levels, among others.

The creation of spaces for community engagement was also a fundamental step: this helped enrich scientific data based on traditional and experiential knowledge, as well as information on the livelihoods of communities, the ecosystem services that sustain them, the practices of use and exploitation of natural resources, as well as climatic and non-climatic threats that threaten the permanence of ecosystems and livelihoods.

The following lessons can be identified from the participatory processes that took place:

Lesson 1: Community and stakeholder participation in consensus-building and decision-making regarding the adaptation measures that can be implemented and support the governance of protected natural areas. However, it is important to clearly define criteria for the selection of said participants, as well as their role in the process.

Lesson 2: The recognition of communities' adaptive initiatives and priorities to adjust their ways of life to climate problems allows us to contextualize the proposals with the particularities of each territory.

Lesson 3: Leadership in the process is a determining factor in the final product's quality. This leadership can be shared, but it must have high technical skills, a strategic vision, and legitimacy with the other stakeholders.

Lesson 4: Participation of the Advisory Councils in diagnostic processes and in the construction of programs such as CCAPs ensures the understanding and appropriation of the instruments for their execution.

Lesson 5: The spaces that were generated–an alternative to already-established governance platforms, such as the CCAP Working Groups–proved to be a good space for construction, but not for monitoring. We recommend linking the participatory and governance processes to the already-official platforms, such as the Advisory Councils.

Case study: Social participation in CCAP development of the Cañón del Sumidero-Selva El Ocote Complex

Location: Northeast part of Chiapas state

Ecosystem: Warm-humid forests

The Resilience Project strengthened the planning instruments and public policy on climate change through CCAP development, which will allow local stakeholders to guide efforts and work together to reduce the negative impacts of climate change with specific activities for the conservation of natural resources. In Chiapas, the CCAP preparation process was developed in a Complex of six PNAs: three of which are under federal administration through CONANP (Cañón del Sumidero National Park; Villa Allende Natural Resources Protected Area; and Selva El Ocote Biosphere Reserve), and three zones under state government ecological conservation (Cerro Meyapac, La Pera, and Cerro Mactumatzá). This combination meant a diverse number of participants.

Based on the first phases–and with the diagnosis of the current situation (Rapid Vulnerability Diagnoses and community diagnoses) and validation of future climate projections–participatory exercises were carried out, which included local communities, representatives from public and private sectors, academia, and Civil Society Organizations (CSOs).

In the livelihood vulnerability analysis phase, there was valuable participation by representatives of local communities, who contributed data based on their traditional knowledge and experience. This enriched and supported interpretations of the weather phenomena affecting the territory.

On the other hand, participation of the three levels of government was vital for the CCAP development process, since it was possible to obtain a common vision to implement coordinated actions under a landscape approach. Also, the importance of conserving PNAs and maintaining their connectivity was reaffirmed as a natural solution to the potential impacts of climate change. The academy, represented by the Network of Scientific Advisors (RAC) of the Selva Zoque Jungle Complex of Protected Natural Areas in Chiapas, participated in the process by validating the information collected and analyzed. Similarly, their representatives reaffirmed their commitment to generate information that contributes to decision-making for effective PNA management in a context of climate change.

Parallel to the process of creating CCAPs, a Strategy for the Mobilization of Financial Resources for the Complex was drawn up, in which the same stakeholders participated, along with others in the private sector. The results reflected the state of financing for the management of these PNAs, their challenges, and the main areas of opportunity to achieve financial sustainability.

One final outcome: a CCAP for the Complex was finalized with an Ecosystem-based Adaptation approach, where adaptation measures and lines of action validated and supported by these groups of stakeholders were established, who still continue to show their interest and commitment to implement actions under a common vision.

1.2 Climate governance

1.2.1 Strengthening of Advisory Councils

The Advisory Councils constitute spaces for participation that allow coordination of the three levels of government, involvement of organized civil society, and academic and research entities, for the development of projects and achieving resilience in Protected Natural Areas. They also allow the participation of representatives of different sectors who are owners and/or users of local ecosystems, to learn about the different programs that are executed in the areas under protection and participate in decision-making and evaluation.

Fostering capacities among the women and men of the advisory councils means having advisers who are engaged, motivated, and more aware of the priority needs of each region and also nurtured by the experiences of other PNAs. Accordingly, as part of the Project, the reactivation of councils, participatory sessions, and the creation of spaces and field visits to productive projects with a focus on climate change adaptation were promoted, where experiences could be shared and transmitted in a positive way. Lessons learned include the following:

Lesson 1: A formation process of the Advisory Councils facilitating interaction with other councils that share ecosystem conditions, environmental problems or similar management interests, and which foster the motivation and interest of the advisers, by learning about other experiences of governance and management in PNAs. On the other hand, this marks an opportunity to contrast one's own strengths and weaknesses, identifying the aspects that must be maintained and the areas of opportunity to improve within the councils themselves.

Lesson 2: A strengthened Advisory Council marks the difference in PNA management. But it is essential to favor their institutionalization through trai-

Recommendations

- Have/maintain a structured and standardized capacity-building and development system for the CAs, which in turn addresses the unique characteristics of those who form part of the councils, as well as those among the context of each PNA.
- Promote the creation of climate change sub-councils in the PNAs.
- Promote the consideration and mainstreaming of the gender and intercultural perspective.
- It is necessary to scale the participation of advisory councils to support and advise PNAs towards a more active and empowered governance mechanism.

ning processes, to guarantee representation of key sectors and the participation of the communities involved.

Lesson 3: A Council that has information and capacities on climate change issues facilitates the definition of pertinent strategies to address the vulnerability of PNAs and communities.

Lesson 4: The design of gender-responsive actions to promote equity in the Advisory Councils is not enough to increase the representation of women, but the actions should be directed towards favoring their participation and their true empowerment in the decision-making process in their role as councilors in PNAs.

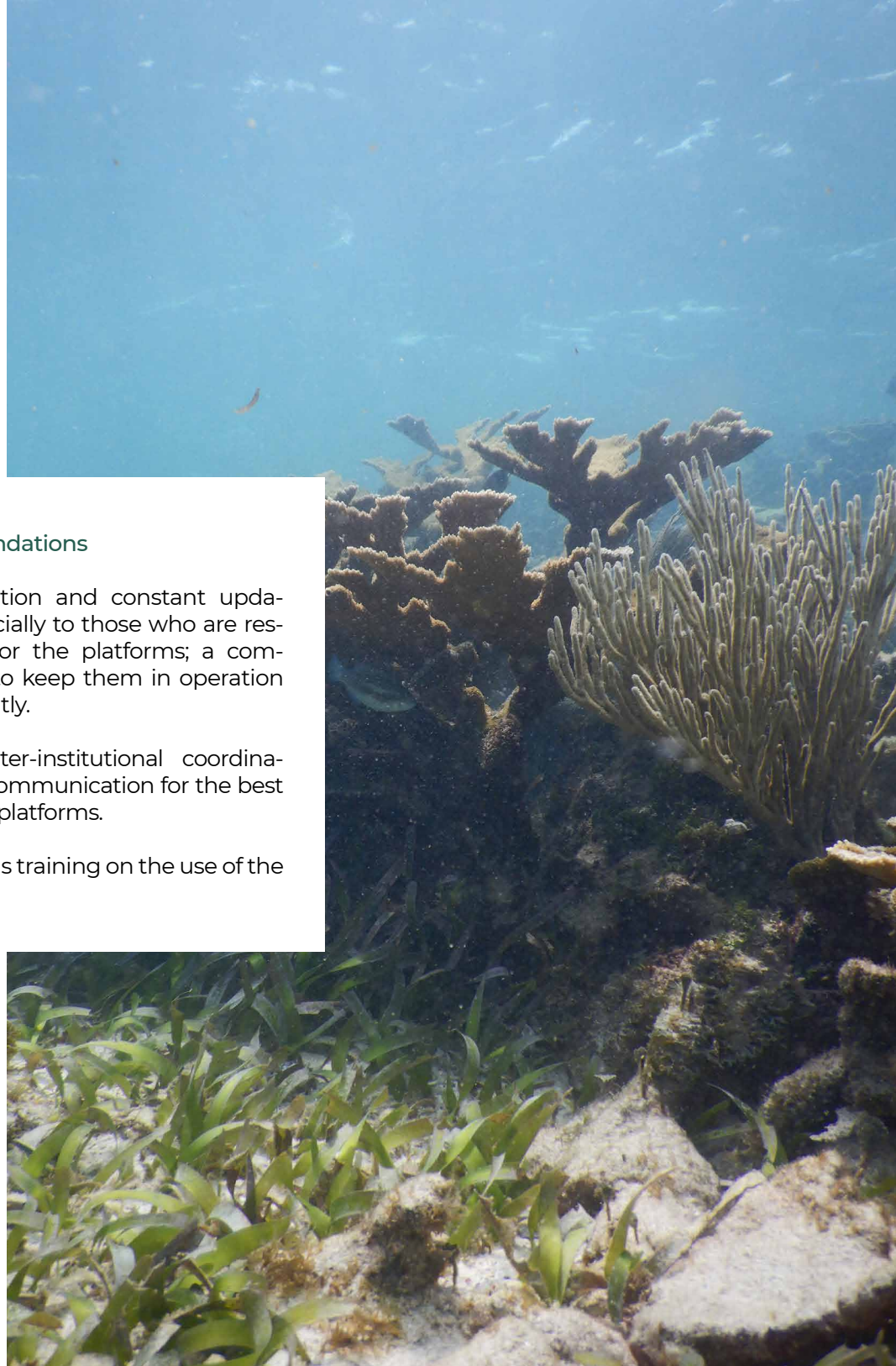
Lesson 5: The actions in which it is possible to reconcile the collaborative work between PNA management, technical entities, community groups and advisory councils, ensure the relevance of the intervention, the effectiveness of the actions taken, and the local appropriation and possibility of sustainability over time.

1.3 Information platforms for decision-making

1.3.1 ECCBIO, Geoportal, and SIMAR

These platforms are online consultation tools that provide useful information for PNA management at the territorial level, as they serve as a basis for making decisions and implementing actions to safeguard unique and vulnerable species and ecosystems in areas of high importance for biodiversity. By providing data on global climate change trends in Mexico and its potential effects on biodiversity and ecosystems, they can support the promotion and development of productive activities that do not imply irreversible or severe transformations of ecosystems and that preserve the connectivity of the landscape.

Within the framework of the Resilience Project, three platforms created by the National Commission for the Knowledge and Use of Biodiversity (CONABIO), in conjunction with the National Commission for Protected Natural Areas (CONANP): The "Climate Change and Biodiversity Explorer" (ECCBIO) is an online consultation tool on global climate change trends in Mexico and their potential effects on various elements of biological diversity; the GeoPortal or "Biodiversity and Degradation Monitoring System Platform (SMBD)" of terrestrial ecosystems in Mexico offers cartography and updated information on ecosystems, types of vegetation and land use, ecosystem integrity, loss of vegetation cover, and quality of species habitat, in order to disseminate products that reveal changes in ecosystem stability; and the "System of Information and Analysis of Marine Ecosystems of Mexico" (SIMAR) allows the monitoring of the health of marine ecosystems within 7 PNAs (including areas within the Resilience project) and along the coast of both coasts through a network for remote observation of marine biodiversity.



Recommendations

- Dissemination and constant updating, especially to those who are responsible for the platforms; a commitment to keep them in operation permanently.
- Ensure inter-institutional coordination and communication for the best use of the platforms.
- Continuous training on the use of the platforms.

The following lessons learned were identified:

Lesson 1: To take full advantage of the platforms' potential, it is important to promote the interests and capacity of PNA personnel to make management and conservation decisions that promote landscape connectivity.

Lesson 2: Promote coordination with other sectorial and intersectoral initiatives enhances the use of platforms and decision-making based on science-based data.

Lesson 3: Close support must be provided for the use of these platforms, so that they are inserted into CONANP's day-to-day operations.

Outcome 2: Functional Connectivity

2.1 Expansion of areas under conservation schemes with connectivity criteria

2.1.2 Strengthening and creation of Voluntary Conservation Areas (VCAs)

CONANP has promoted the creation of conservation spaces through the certification of properties where owners voluntarily assume the responsibility of caring for and maintaining natural resources, recognized as Protected Natural Areas (PNAs) under federal jurisdiction. These are shielded and contemplated within the General Law on Ecological Balance and Environmental Protection (LGEEPA), but they are administered directly by their owners.

VCAs favor the connectivity of natural ecosystems and the maintenance of environmental services that allow communities to increase their adaptive capacity to face climate change. For this reason, through the Resilience Project, the creation of VCAs in the PNA complexes were incentivized, yielding the following lessons learned from this process:

Lesson 1: Strategies for establishing VCAs in sites close to PNAs–in addition to strengthening connectivity for conservation–have benefits such as shielding the area from exploitation projects, making use of resources in a sustainable way, and strengthening social fabric and local governance.

Recommendations

- The certification process at the central level takes a long time to process, which causes a lack of interest among owners. We recommend shortening these processing times.

Lesson 2: Expansion of PNAs through the VCAs requires close support from PNA offices so that these schemes can play a complementary role and can be certified in Central Offices.

Lesson 3: The involvement of potential stakeholders through awareness-raising actions and negotiation strategies with owners serve as measures to consolidate and give permanence to these conservation actions.

Lesson 4: The search for complementary resources is necessary to encourage the replication of these voluntary conservation schemes.

Case study: Certification of VCA Ranch "El Quemado" in the Janos Biosphere Reserve area of influence

Location: Northwest part of Chihuahua state

Ecosystem: Semi-arid grasslands

The Janos Biosphere Reserve's grasslands are one of the most threatened ecosystems in the country, which is why the Reserve is seeking strategies that help promote sustainable practices favoring conservation. Accordingly, some of the Resilience project's main tasks was that it promoted certification of the first Voluntary Conservation Area (VCA) in Chihuahua state: The "El Quemado" ranch–with a surface area of 1,896 hectares–is seeking to carry out sustainable livestock production practices to improve pastures and earn recognition for the conservation activities occurring on the site, as well as favor connectivity thanks to its location.

The Resilience project provided a major boost to the El Quemado ranch: even though it was already on that path, those efforts joined forces to face a common goal, which is sustainable livestock management. The VCA contributes to ecosystem services through water filtration and carbon capture, and serves as a habitat for birds whose ecosystems are threatened. The VCA also promotes best practices for integral VCA management.

Expanding PNAs through the VCAs has biological and cultural importance: it requires significant work to create an inventory of flora and fauna. The VCA management and monitoring program represent committed practices to ensure best practices in conservation, according to the director and site official.

2.2 Comprehensive land management with a landscape approach

2.2.1 Protected natural areas complex approach

The protected natural areas complex approach arises from the need to maintain connectivity between PNAs and their areas of influence under a comprehensive vision of landscapes through ecological (or biological) corridors. This connectivity increases the resilience of ecosystems by maintaining ecological processes and genetic flows; these are key factors in a context of climate change since they will increase the adaptive capacity of ecosystems and human communities.

The Resilience project was executed with the vision of these PNAs in mind. The main lessons learned are described below.

Lesson 1: To face the threats posed by climate change, the complex approach allows establishing strategic collaborative interventions favoring connectivity between areas.

Lesson 2: Work under a Complex scheme, and under the same vision allow various PNAs–in addition to collaborating and avoiding duplication–create economies of scale, focusing efforts on the same goal.

Lesson 3: In the context of climate change, the original polygons of PNAs tend to be outdated and need to be an instrument where the issue of climate change must be linked in the Management Programs.

Lesson 4: Recognize the diversity of approaches in integrated landscape management, with different motivations, processes, and institutional arrangements, but all require the participation of relevant stakeholders, negotiation around objectives and

Recommendations

- Increase the levels of cooperation and coordination between institutions to enable the application of multisectoral and broad land-based approaches to support the resilience and adaptation of PNAs.

strategies, as well as adaptive capacities based on collective learning.

Lesson 5: Integrated land management with a landscape approach that harmonizes land ordinances and economic development policies is necessary, as well as alignment of conservation objectives with local development strategies. This requires participation by local communities: cultural and gender-sensitive considerations are essential for effective PNA resilience.

Lesson 6: Working at the landscape level promotes the creation of intersectoral partnerships with productive sectors that could traditionally put pressure on PNA polygons; considering this vision, it is possible to work with these sectors in a coordinated manner to prevent PNA deforestation and degradation.

Outcome 3: Effective PNA management

3.1 Adaptation measures with local partners

3.1.2 Reduce the vulnerability of ecosystems and people's livelihoods

The CCAPs of the various PNA complexes include intervention proposals for adaptation, aimed at addressing climate stress elements (threats) and non-climatic and anthropogenic factors that contribute as vulnerability triggers (probability, consequence) for each Socio-Environmental Conservation Item (SECI). Some of these adaptation strategies are aimed at increasing adaptive capacities to address these vulnerabilities. Implementation of some of these adaptation measures was promoted in the Resilience project; this was possible through agreements and arrangements with local partners and stakeholders.

Execution with local partners and stakeholders, as well as with communities at the territorial level, made it possible to find opportunities for sustainability and replicability of actions, strengthening the development of local capacities and innovating in traditional management and conservation actions, taking into account the climate projections in each ecosystem.

Lesson 1: In adaptation projects, it is necessary to have long-term collaboration and measurement mechanisms to be able to measure and interpret results on the reduction of community vulnerability to the effects of climate change and the increase in the resilience of ecosystems.

Recommendations

- Plan collaborative efforts with local partners in advance: these processes tend to be long and complex.
- Structure project viability based on the analysis of field data, as well as the design and monitoring of activities to yield performance and actions-completed records.
- Establish good communication between the stakeholders involved (CSOs, local communities, government organizations and foundations) when executing the project.
- Strengthen the design and implementation of indicators that can measure the long-term progress of the adaptation strategies implemented.

Lesson 2: The retrospective analysis and investigation of social memory, and the socio-environmental study of the state of ecosystem conservation, are diagnostic tools with technical information; these strengthen the informed decision-making of PNA personnel, and contribute to the definition of strategies for the use, management, and conservation of the ecosystems within protected territories, thereby guaranteeing the protection of ecosystem services.

Lesson 3: The measurement of indicators, such as tree cover and soil transplantation, are activities that should be replicated in any other project focused on reforestation or ecological restoration.

Lesson 4: Consideration of the cycles and temporality of the different ecosystems to design intervention strategies is one way to obtain optimal and successful results. Funding agencies must also consider this to deliver resources on time..

Lesson 5: Carrying out a diagnosis of the condition of ecosystems prior to implementing adaptation measures is essential to define a baseline and to be able to measure the success of the measures over time.

Lesson 6: Use local restoration science and knowledge as the basis of the project to ensure successful adaptation measures.

Lesson 7: Involving the private sector in adaptation measures and local communities is an area of financial opportunity that allows linking and reconciling the needs of local communities, CONANP, and the areas of social and environmental responsibility of the companies themselves. This creates opportunities for partnerships and collaboration frameworks, such as agreements for the implementation of actions.

Lesson 8: Carrying out demonstrative actions and establishing pilot sites are essential to determine costs and benefits, and convey to other stakeholders the validity and importance of adaptive measures, and thereby promoting replication.

Lesson 9: Local knowledge of the communities is essential for the design and implementation of EbA measures; adaptation is a local and collaborative process. Accordingly, ensuring participation in all project phases by local communities is a key element for successful implementation.

Case study: Dune restoration in the Isla Mujeres-Puerto Morelos Corridor

ULocation: Caribbean Sea Coast, State of Quintana Roo

Ecosystem: Coastal marine

Among the actions identified in the CCAP of the Isla Mujeres-Puerto Morelos corridor is the coastal dune restoration (AbE approach) to reestablish the coastline protection service and reduce the coastal zone's vulnerability to climate change. Coastal dunes are sandy ecosystems found in the transition between the continent and the ocean; they are extremely dynamic, fragile and vulnerable to human action and are of great relevance because they provide very important environmental services, such as a natural barrier to protect the coast from flooding caused by hurricanes and reducing beach erosion. They are also the habitat of many bird and plant species.

The measures were designed taking into account published scientific information, in consultation with experts and reports of oceanographic and economic studies that demonstrate the function and value of coastal protection of dunes and reefs.

This measure was implemented with an agreement with The Nature Conservancy (TNC) and with collaboration of the "Dr. Alfredo Barrera Marín" Botanical Garden from ECOSUR. The activities carried out within the framework of this agreement are:

- Development of local capacities to produce native plants
- Establishment of a dune plant nursery in the Puerto Morelos area
- Agreements with coastal dune property owners to advise them on the restoration process
- Linking the hotel sector for the propagation of plants in their nurseries
- Pilot restoration at two sites in Puerto Morelos: Technical High School No. 7 and at the Regional Center for Aquaculture and Fisheries Research (CRIAP). To date, 21,385 plants have been produced, of which 11,126 plants have already been delivered for the revival of EST-7 and CRIAP, and the collection of seeds and cuttings for the production of 10,000 additional plants has begun. Between August and September 2020, 8,227 plants were planted in the EST-7 and 2,899 in the CRIAP

The project was created based on prior knowledge and experiences on dune restoration and plant reproduction, as well as reef restoration. It was being developed by CONANP and TNC, along with other partnerships. It was based on extensive local experience in coral reproduction with different techniques and approaches.

These actions have been complemented by the participation of a group of women who, with the support of a grant from CONANP (PROCODES), have been trained to propagate the plants in the dune, as well as in nursery management to monitor restoration tasks.

It is important to highlight that one of the success factors in the implementation of this measure has been inter-institutional collaboration and, above all, the involvement of the private sector and landowners.

3.1.2 Partnerships between local stakeholders

Climate change is a factor that alters the development of a territory and the role of each of the stakeholders present. To implement actions for resilience and reduce impacts on ecosystems and people's well-being, local alliances are necessary. The articulation of efforts between diverse stakeholders enables actions based on shared objectives. Working through alliances multiplies the available resources to generate actions, enhances capacities and seeks sustainability.

In each territory where adaptation measures were implemented, it was essential to have partnerships and good relationships between local stakeholders, where the continuity and permanence of actions depend on the commitments established with other institutions, governments, civil society organizations, and above all the trust generated in the communities, who are the ones making decisions to manage territories based on their needs and possibilities.

Below are the main lessons learned from the process of implementing adaptation measures with local stakeholders:

Lesson 1: The strategic involvement of the PNA Directorate was key to facilitating communication with local people, particularly at a distance.

Lesson 2: Establishing alliances and agreements at the institutional and local levels favors the adoption of the proposed adaptation measures by the different stakeholders involved, but particularly by the communities.

Lesson 3: Involving ejido authorities and local organizations is key to guaranteeing the timely implementation of activities and ownership by the communities.

Lesson 4: Implement activities to strengthen organizational capacities and create collaboration networks with community groups and associations, and favor the continuity and permanence of actions implemented at the territory level.

Lesson 5: Communicate with communities the results obtained, sharing the visions and capacities for the future.

Lesson 6: Communication among peers often has a greater impact. Identifying the leaders and communicators of this information is very important.

Lesson 7: The formation of internal social networks in communities and ejidos by means of field school methodology strengthens territorial interventions.

Lesson 8: Promoting collaborative work between PNA leadership, academia, the technical body responsible for the project, and consultants, ensures good coordination, effective intervention actions, and long-term local ownership.

Lesson 9: Managing complementary resources and fostering synergies is essential for the replication of adaptation measures.

Lesson 10: Communicating with the Advisory Council was a useful mechanism for feedback and ownership of key stakeholders.

3.1.3 Community capacity development and participation

Adaptation to climate change is an ongoing process of adjusting the different livelihoods of people to avoid risk and reduce the impacts of current and anticipated changes in climate variables. By creating a challenge for the people and stakeholders of a territory, participation in and strengthening of capacities is essential.

In each PNA where adaptation measures were implemented, the knowledge and capacities of local stakeholders, particularly community representatives, were strengthened through an active learning process. This made it possible to increase the potential and skills of people to carry out new actions, under a comprehensive vision with expectations for long-term sustainability.

Lesson 1: The diagnostic capacity assessment offers important elements to identify the capacities strengthened and acquired by local partners at the end of the project.

Lesson 2: To promote community participation in the identification and implementation of adaptation measures, practical efforts are necessary to strengthen their knowledge about climate change.

Lesson 3: The strengthening of local residents' technical capacities in restoration actions through training workshops and the creation of community restoration manuals is strengthened, and collaboration between PNA staff and the communities is influenced.

Lesson 4: The use of economic incentives for getting involved in ecosystem restoration actions instead of paying for just participating in workshops also ensures that those are the most interested get involved and stay engaged throughout the process, and even after the work is accomplished.

Lesson 5: Strengthening the capacities of local groups and associations to improve their organizational capacities favors the continuity and permanence of the actions carried out around adaptation measures.

Lesson 6: The implementation of adaptation measures with an EbA approach and involving communities helps reduce social vulnerability of people whose livelihoods depend on the ecosystem services of the protected area.

Lesson 7: Initiating capacity-building processes with exchanges of experiences facilitates the identification of the capacities to be developed, and also helps the stakeholders involved to be encouraged to participate and commit to the process.

Lesson 8: Community participation in the planning and execution of activities favors the appropriation and motivation of the stakeholders involved to replicate the activities proposed in the project.

Lesson 9: Involving key actors in the tourism sector in the implementation of adaptation measures favors the understanding and valuation of the services provided by these ecosystems at the local level.

Lesson 10: Working with local partners who have experience and presence at the territorial level in the implementation of concrete actions based on a particular project favors relations between partners and other actors to expand and strengthen.

Case study: Community involvement for the restoration of the mangrove in the Laguna de Términos Flora and Fauna Protected Area

Location: Southern part of the Gulf of Mexico, Campeche state

Ecosystem: Mangroves

The Laguna de Términos Flora and Fauna Protected Area (APFFLT) in the state of Campeche is one of the largest mangrove ecosystems in Latin America, making it a priority and strategic area at the local, regional and national levels. The mangrove is a critical and highly relevant habitat due to the series of ecological products and functions it generates; they are a source of food, maintain water quality, recharge groundwater, and play a fundamental role in protecting against storms and hurricanes.

The APFFLT mangrove ecosystems have been affected by strong pressure from the use of natural resources and land use change, as well as by extreme hydrometeorological events, which have caused deterioration and alteration in the ecological dynamics. Through the Resilience Project, a local diagnosis was developed and mangrove ecosystem restoration measures were implemented as a measure of adaptation to climate change. The rehabilitation of 600 m of canals and the desilting of 800 m were achieved, with a total of 1400 m of restored tidal channels, which allowed the recovery of connectivity between different sites on Isla del Carmen, Campeche.

In the restoration process, a community organization called “Group of Restorers of the Mangrove Ecosystem in Isla de Carmen” was created, made up of 11 people, mostly women, with significant empirical knowledge about the ecosystem and the intervention site. By their own initiative and with CONANP’s support, they have worked for several years on various projects to protect and restore this ecosystem.

Through the project, it was possible to strengthen the capacities of the group of restorers to monitor environmental and biological variables, which allowed the group to be involved in the entire process from the development of the diagnosis to the implementation of adaptation measures. Involvement of this organized group made it possible to take advantage of the local knowledge and skills, achieving optimal results in less time.

3.1.4 Gender perspective

Access to and management of natural resources is expressed in different ways between men and women. Considering gender perspective when implementing adaptation measures for climate change supports the reduction of the vulnerability of families and communities to possible risks and impacts.

For the adaptation of livelihoods to climate change, it is necessary to recognize gender roles in order to establish processes of awareness and training on gender, not exclusively for women.

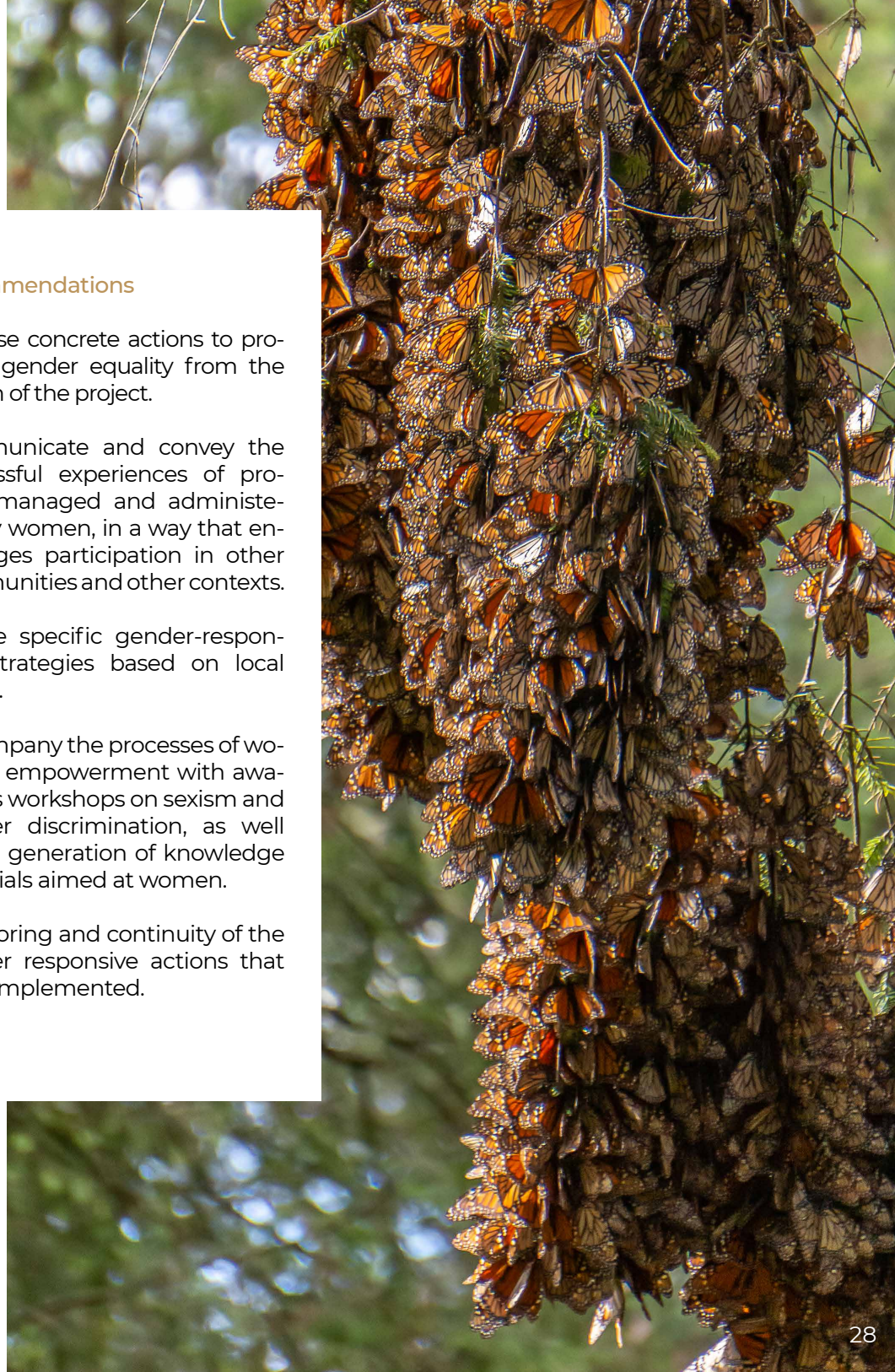
In the Resilience Project, equitable participation was promoted both in decision-making and in participation in the strengthening of capacities and exchanges of experiences. This helped reduce gaps by prioritizing the most vulnerable groups, such as rural women.

Below are the main lessons learned on the importance of incorporating the gender perspective and generating actions for empowerment.

Lesson 1: It is necessary to start from the training of PNA personnel so as to generate strategies from the perspective of gender equity.

Lesson 2: In practice, enacting gender issues implies having a solidly based strategy conceptually and methodologically, as well as a plan to implement them.

Lesson 3: Designing a proposal to implement adaptation measures under a gender equity vision is undoubtedly a procedure that contributes to equal participation, and leads to innovative work tools.



Recommendations

- Propose concrete actions to promote gender equality from the design of the project.
- Communicate and convey the successful experiences of projects managed and administered by women, in a way that encourages participation in other communities and other contexts.
- Define specific gender-responsive strategies based on local needs.
- Accompany the processes of women's empowerment with awareness workshops on sexism and gender discrimination, as well as the generation of knowledge materials aimed at women.
- Monitoring and continuity of the gender responsive actions that were implemented.

Lesson 4: The participation of men and women in the design, planning, and implementation involving decision-making in activities allows their interests, needs and suggestions to be integrated, resulting in a greater appropriation of the process and perception of the various benefits that can be obtained from maintaining these actions over time.

Lesson 5: Including an activity focused only on women in the project design greatly facilitates their active participation since men and women do not normally carry out mixed activities.

Lesson 6: Strengthening the technical and organizational capacities of women's groups is empowering, and increases both their visibility and recognition in the community.

Lesson 7: Having a gender specialist to design specific recommendations makes it easier to address the various needs and conditions of men and women so as to guarantee equity in their participation and involvement.

Lesson 8: It is necessary to consider good examples of women's participation in different settings to motivate engagement, always with an attitude of respect for cultural contexts.

Lesson 9: Holding workshops on a gender approach contributes to the recognition and revaluation of women's roles in the community, and their capacities to carry out complementary and additional activities to those carried out by men.

Case study: Productive opportunities and gender equity in the Monarch Butterfly Biosphere Reserve

Location: Eastern part of Michoacán state and western part of Mexico State

Ecosystem: Oyamel, pine, oak and cedar forests

The Monarch Butterfly Biosphere Reserve (RBMM) is a World Natural Heritage site, whose main objective is to conserve and protect the monarch butterfly (Danaus plexippus) and its habitat; year after year, it is the site of migration, reproduction, and hibernation of this species.

The RBMM also contains about 100 ejidos and communities of Mazahua and Otomí origin that are dedicated to the use of natural resources for their subsistence. Since 2012, CONANP has promoted the development of sustainable productive activities to strengthen economic development among women and men from the region. In 2016, PNA staff identified five collective groups who demonstrated organizational capacity and interest in economic, social, and environmental efforts:

- Yeje Z´ana: natural herbal products
- El Manantial: handcrafted pieces of recycled glass
- Acahualli: honey and products derived from beehives
- Minajoo: ocoxal crafts (pine or pine needle products)
- Shitamo: Mazahua textiles and embroidery

In 2018, CONANP and the Resilience Project identified the importance of strengthening the identity of their products to reduce socio-economic vulnerability and natural heritage to climate change. The origin and sustainability of the products were certified through a collective seal and the trademarks were registered with the Mexican Institute of Intellectual Property.

The positioning of the products and the strengthening of capacities of the collective groups led to them becoming a window opportunity for women and men, who received the same economic benefits and strengthened their skills. This made it possible to break from traditional gender roles, and has led to men getting involved in work that was traditionally for women and vice versa.

This experience was carried out without the claim of being a gender strategy, but it shows that by promoting productive diversification with equal opportunities for women and men, it enables individual and collective empowerment, where the recovery of self-esteem and confidence are part of well-being and give hope towards the path of sustainability.

Acronyms and Abbreviations

Abe	Ecosystem-based adaptation
PNA	Protected Natural Area or its equivalent in plural
AB	Advisory Board
CC	Climate change
CONANP	National Commission of Protected Natural Areas
CCSPA	Climate Change Strategy for Protected Areas
E2040	Strategy 2040
SECI	Socio-environmental conservation item or its equivalent in plural
FO	Field Officer
NGO	Non-Governmental Organization
CSO	Civil Society Organization
CCAP	Climate Change Adaptation Program
MP	Management Program
UNDP	United Nations Development Program
SEMARNAT	Ministry of Environment and Natural Resources
PCU	Project Coordination Unit

Sources

- Quarterly and final reports from local partners with whom we collaborated with throughout the project.

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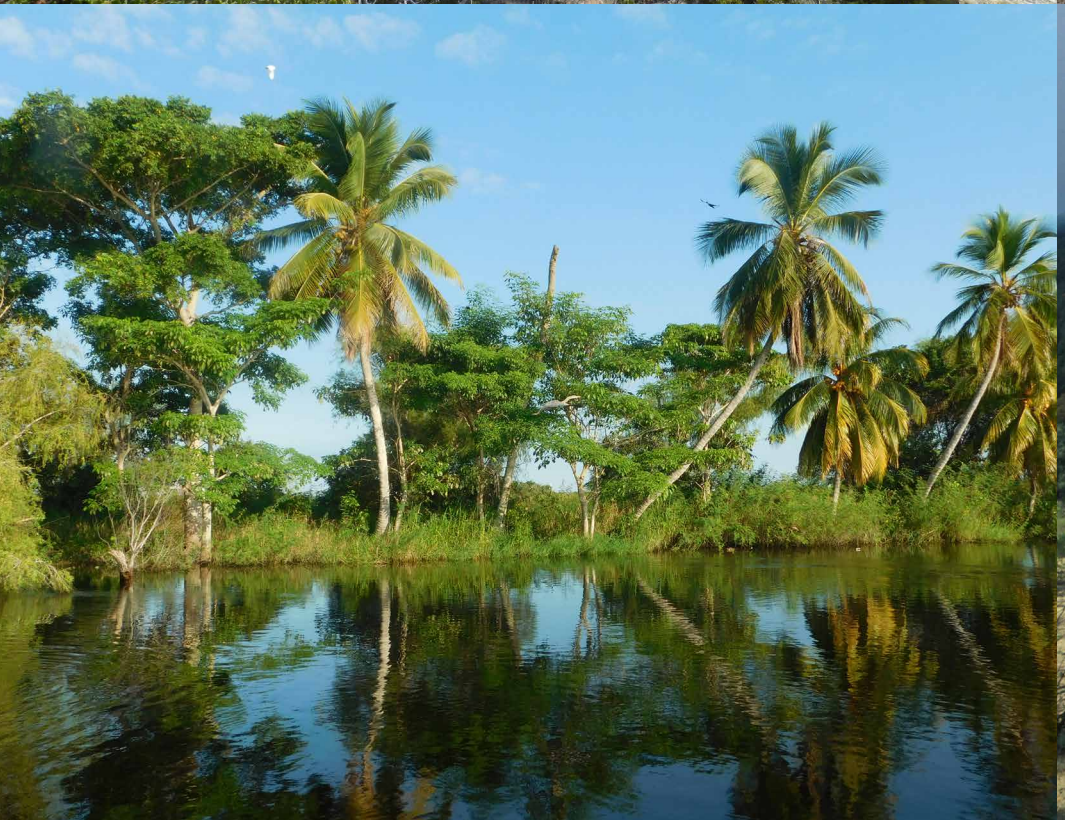
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