REGIONAL STUDY

Current state of climate change policies and adaptation strategies in the Andes: a multi-sectorial view from the mountains

ADAPTATION AT ALTITUDE
Taking Action in the Mountains

Bosques Andinos
Manejo sostenible de paisajes de montaña frente al cambio climático

BOSQUES ANDINOS ES UN PROGRAMA DE:

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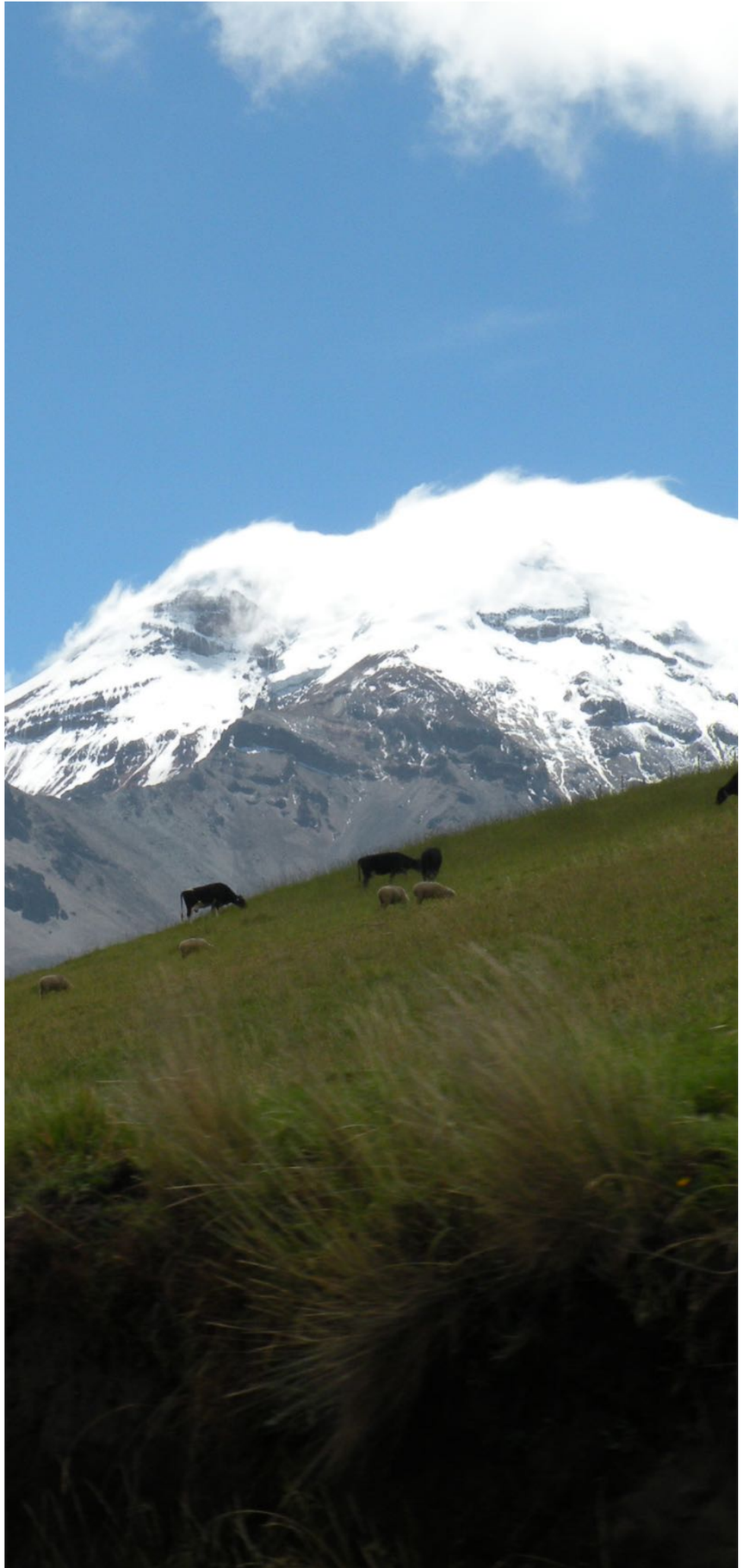
Current state of climate change policies and Adaptation strategies in the andes: A multi-sectoral view from the mountains

July 2021

— Émilie Dupuits



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ACRONYMS AND ABBREVIATIONS

2RP	Rural Resilience Programme
A@A	Adaptation at Altitude
AECID	Spanish Agency of International Cooperation for Development
AICCA	Andes Adaptation to the Impact of Climate Change on Water Resources Project
ANDESCLIMA	Project on Climate Change and the Environment in the Economic and Social Sector, CAN
ARIACC	Regional Initiative for Climate Change 'Resilient Andes'
ASAP+	Enhanced Adaptation for Smallholder Agriculture Programme
CAF	Andean Development Corporation
CAN	Andean Community
CAPRADE	Andean Committee for Disaster Prevention and Response, CAN
CAS	Summit on Climate Adaptation
CC	climate change
CCRI	Coalition for Climate Resilient Investment
CDB	Convention on Biological Diversity
CELAC	Community of Latin American and Caribbean States
CONDESAN	Consortium for the Sustainable Development of the Andean Ecoregion
CTCN	Climate Technology Centre and Network
EBA	Ecosystem based Adaptation
EFCC:	Financial Strategy for Climate Change
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gases
GLORIA-Andes	Network for Monitoring the Impact of Climate Change on Biodiversity in High Andean Ecosystems
GNOMO	The Global Network of Mountain Observatories
HLPF	United Nations High-level Political Forum on Sustainable Development
IAM	Andean Mountain Initiative
IAvH	Alexander von Humboldt Biological Resources Research Institute, Colombia
IDB	Inter-American Development Bank
IDRC	International Development Research Centre, Canada
IER	Institute for Regional Ecology, Argentina
IFAD	International Fund for Agricultural Development
IISD	International Institute for Sustainable Development
iMHEA	Regional Initiative on Hydrological Monitoring of Andean Ecosystems
INTEPH	Institute of Territorial and Technological Research for the Production of Habitat, Argentina
LAKI	Lima Adaptation Knowledge Initiative
NAP-GSP	National Adaptation Plan Global Support Programme
NAPs	National Adaptation Plans
NDCs	Nationally Determined Contributions
NWP	Nairobi Work Programme
OAS	Organization of American States
PBA	Andean Forests Programme
PNACC	National Adaptation Plans in Latin-America
PRAA	Adaptation to the Impact of Accelerated Glacier Retreat in the Tropical Andes Project
REGATTA	Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean
RICCC	Scientific Research Network on Climate Change
SCCF	Special Climate Change Fund
SDC	Swiss Agency for Development and Cooperation

SDGs	Sustainable Development Goals
TEP-A	The Technical Examination Process on Adaptation
UICN	International Union for Conservation of Nature
UNASUR	Union of South American Nations
UNDP	United Nations Development Programme UNDP
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute

CONTENTS

TABLES

LIST OF MAPS

LIST OF BOXES

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The Andean region presents fundamental challenges due to the increasing pressure on landscapes and ecosystems, which affect its globally important natural heritage and its diverse social systems, accentuated by the effects of climate change (CC). In the last decade, States in the region have been consolidating their climate policies at the (sub)national level, including Nationally Determined Contributions (NDCs), CC adaptation plans, strategies, laws, and sectoral regulations on the subject. At the regional level, the Andean Mountain Initiative (IAM) has been consolidating as a key space for the discussion and coordination of adaptation policies focused on mountain socioecosystems. In this context, the Andean Forests Programme (PBA, CONDESAN-Helvetas-SDC) and the Adaptation at Altitude Programme (A@A, CONDESAN-SDC) have promoted a process of knowledge synthesis at the regional level to update the current situation of the regulatory framework and climate policies in the Andean countries, from a multi-sectoral viewpoint and from the mountain socioecosystems perspective, with an emphasis on plans and strategies for adaptation to CC.

One of the main objectives of this study is to identify gaps, opportunities and priorities to guide the work of decision-makers and the political advocacy of those implementing projects and strategies to promote sustainability and adaptation to CC in mountain areas in the coming years. The central question is to understand the institutional challenges and local perceptions regarding the implementation of CC adaptation policies in the Andean countries.

On the one hand, it analyses the regulatory, institutional and policy framework related to CC, as well as current international commitments in this area. To this end, a multi-scale governance and institutional gap analysis approach is adopted to synthesise and compare policies, strategies, plans and programmes relevant to CC adaptation as a cross-cutting issue. It also includes advances in monitoring and evaluation of adaptation, and takes into account policies and programmes in different sectors (environment, risk management, water, agriculture, forestry and other land uses, energy and health, among others). On the other hand, synergies and opportunities are analysed, as well as possible tensions and resistance that may be generated by the implementation of CC adaptation policies in the territories. For this purpose, the approach of co-production of knowledge and policies between public authorities at different levels, civil society organisations, international cooperation, academia and the private sector is applied. This analysis is carried out through seven case studies that reflect both the progress and challenges of the implementation of CC adaptation policies in the territories.

The study revealed that, in some cases, there is a disconnection between the instruments and spaces designed in national policies and their concrete implementation or use at the local level by municipalities and civil society organisations. There tends to be an excessive creation of instruments or spaces related to CC governance, described as a “climatisation” process, which tends to obscure the tools and spaces that are already being used locally. In addition, at the sub-national level, policies focused on a particular sector tend to be used more frequently without losing sight of the cross-cutting nature of CC (payment for hydrological services, land use planning, peasant family farming, among others).

One of the main results of the study emphasises the challenges related to the sustainability of CC adaptation programmes when it comes to closing and withdrawing from the areas of intervention. To remedy this problem, several examples show the efforts made to train the municipalities involved, the creation of collaborative spaces that can last over time (association of municipalities, management committees, technical roundtables, good governance platforms, among others) and the processes of appropriation by the beneficiaries, which in most cases are peasant, indigenous and/or livestock farming communities. However, governments must monitor these political spaces so that they do not decay over time and continue to fulfil their role. Another successful strategy to ensure the sustainability of CC adaptation projects in the territories are initiatives to strengthen participatory socio-environmental monitoring processes.

One of the critical points identified throughout the study is the need to generate effective mechanisms for social participation, institutionalisation of relevant local knowledge and co-production with techno-scientific knowledge. The study revealed the barriers that community-based organisations often face when it comes to expanding their local and historical knowledge, in terms of legitimacy, conflicting visions of territory and natural resources, and articulation with technical-scientific knowledge. While there have been initiatives from academia to promote ancestral knowledge related to climate measurement or watershed conservation, effective dialogue between diverse knowledge has not yet been consolidated to legitimise the scientific validity of relevant local knowledge and, in turn, promote the effective use of available technical-scientific tools by local actors.

1.
CONTEXT AND OBJECTIVES

Since 2015, the need to better articulate responses to the problems and challenges related to CC and its impacts on livelihoods, loss of ecosystem functionality and land degradation, among other sustainable development challenges, has become more evident. The Andean region presents particular challenges related to its globally important natural heritage and sources of pressure on landscapes and ecosystems that accentuate the effects of CC (Mathez-Stiefel et al. 2017). In this context, regional readings of Andean countries' responses from public policy and territories are needed to generate a multi-scale and multi-sectoral synthesis to guide work at regional, national and local levels.

The Covid-19 global pandemic unleashed in early 2020 further highlights the links between CC, globalisation and socio-environmental inequalities in Latin America (Finn et al. 2020, Ortiz 2020). For example, the connection between accelerated deforestation, loss of wildlife habitat, CC and increased risks associated with global health crises has been shown[1].

Since the ratification of the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, States in the region have been strengthening technical and political focal points, generating and presenting national communications and developing the regulatory, technical, monitoring and management framework through the formulation and implementation of national CC strategies or programmes. In turn, they have been progressively incorporating the CC issue into their national development plans and promoting the implementation of clean development mechanisms (Maldonado et al. 2012, Schoolmeester et al. 2016, Bárcena et al. 2019, Llambí & Garcés 2020).

In addition, since 2015, the *2030 Agenda for Sustainable Development* has come into force, which makes more evident the need to better articulate responses to the problems and challenges related to CC and sustainability goals. The Andean region presents a high institutional diversity, in the policy arrangements and tools at national and subnational levels that are relevant to promote the adaptive capacity of social-ecological systems, and important challenges of articulation between sectors and scales of governance.

In particular, adaptation to CC has been gaining in weight and importance[2], especially given the inefficiency or difficulty of implementing CC mitigation policies (Mills-Novoa et al. 2020). According to the UNFCCC, "Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change." Public funding for CC adaptation has increased globally by 35% between 2015 and 2018, reaching nearly USD 30 billion[3]. All countries should build instruments on the subject, including national adaptation plans or mechanisms and the submission of adaptation measures as part of their NDCs to the UNFCCC.

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1 https://forestsnews.cifor.org/65145/covid-19-pandemic-how-nature-steps-in-to-refill-empty-forests-when-animals-disappear?fnl=en

2 Global Commission on Adaptation. 2019. *Adapt Now: A Global Call for Leadership on Climate Resilience.* Amsterdam.

3 Climate Policy Initiative. 2019. *Global Landscape of Climate Finance 2019*, https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2019/

At the regional level, the Andean Mountain Initiative (IAM) has developed as a key space for the formulation of policies focused on promoting sustainability objectives in the region, including adaptation policies focused on mountain socioecosystems. CONDESAN currently serves as Technical Secretariat for the IAM. During the first IAM meeting in 2007 in Tucumán, the issue of CC was explicitly incorporated into the *Action Plan for Sustainable Development in the Andean Mountains*. In turn, the Tucumán Plan points to the need for joint strategies and cooperation in the region for monitoring impacts and adaptation to CC. In response to this need, the IAM member countries with the collaboration of UN Environment, CONDESAN and GRID-Arendal published in 2018 the *Strategic Agenda on Adaptation to Climate Change in the Andes Mountains*, presenting a very broad proposal of objectives and adaptation measures to guide the joint work of the countries of the region.

The IAM is currently in the process of consolidating this strategic agenda with an operational focus, as well as designing financial sustainability strategies and projects for the implementation of adaptation policies and sustainable management of Andean ecosystems. Therefore, a central objective at the regional level is to support the integration of the *Andean Mountain Agenda* into the CC adaptation policies of the countries of the region, by identifying knowledge gaps and knowledge transfer opportunities for interregional cooperation in the Andes and with other regions (Llambí & Garcés 2020).

There are some documents that summarise the CC policy framework in the case of the Tropical Andes, including Maldonado et al. (2012) and Schoolmeester et al. (2016). However, these analyses do not include the policies of countries in the Southern Andes (Chile and Argentina). Furthermore, an update is needed to assess especially progress in the last five years, including key aspects such as the implementation and status of monitoring and evaluation of CC adaptation plans, the level of cross-sectoral integration of policies that promote adaptive capacity, and the level of coordination between tools designed for different levels of governance. The objective is to generate a knowledge input that contributes to a regional dialogue aimed at identifying common ground around policy and implementation of initiatives relevant to CC adaptation in the Andes.

In this context, the Adaptation at Altitude (A@A) Programme and the Andean Forests Programme (PBA)—funded by the Swiss Agency for Development and Cooperation (SDC) and aiming to achieve these common objectives—have decided to work in synergy to combine efforts and resources in order to produce a feasible synthesis of regional scope to update the state of the art of the regulatory framework and CC policies in the Andean countries, with a multi-sectoral approach and from the perspective of mountain socioecosystems, with an emphasis on CC adaptation plans and strategies.

This regional survey aims to answer a key question: What are the institutional challenges and local perceptions regarding the implementation of CC adaptation policies in the Andean countries? To answer this question, the survey considers two main issues:

1. As a first issue, the aim is to review and analyse the regulatory, institutional and policy framework related to CC in the Andean countries, as well as current international commitments in this area. Based on available policy instruments and publications and interviews with key stakeholders in the field, the achievements, progress and challenges were identified, especially during the last five years. The main objective of this strand is to analyse, synthesise and compare policies, strategies, plans and programmes relevant to CC adaptation as a cross-cutting issue, including advances in monitoring and evaluation of adaptation, and taking into account policies and programmes in different sectors including environment, risk management, water, agriculture, forestry and other land use (AFOLU), energy and health, among others, both at the Andean regional and national scales, analysing their links to mountain landscapes and socioecosystems.

2. As a second issue, the aim is to analyse local perceptions, appropriations or resistance to the CC adaptation policies implemented over the last five years, as well as the initiatives or experiments that have emerged from the territories, and the processes of co-production of knowledge and policies with public authorities at different levels. This analysis is carried out through seven case studies (see details of the selection in section 3.3.) at national and local level that reflect both the progress and challenges of the implementation of CC adaptation policies in the territories. The objective of this strand to study both the synergies and opportunities as well as the possible tensions and resistance that can be generated by the implementation of CC adaptation policies in the territories among diverse stakeholders (civil society organisations, local, peasant and indigenous communities, urban centres, local authorities, etc.). It is therefore essential to analyse the co-production processes of these policies, as well as the possible difficulties they face at a more localised level.

2.

CONCEPTUAL FRAMEWORK

To analyse the evolution of CC adaptation policies in the Andes, the two key concepts of multi-scale governance and knowledge co-production and their core indicators and sub-indicators are detailed below (see Table 1).

Table 1. *Survey's key concepts and indicators*

KEY CONCEPTS	INDICATORS	SUB INDICATORS
Multi-scale governance	Vertical arrangements	institutional rules, jurisdictional levels, decentralisation mechanisms.
	Horizontal arrangements	multi-sectoral interaction, CC adaptation/mitigation links, ecosystem interaction.
	Institutional gaps	effectiveness/legitimacy, inclusion of beneficiaries in decision-making/ capacity-building processes, reporting/accountability mechanisms, political stability over time, management of financing.
Knowledge co-production	Opportunities	collaborative processes, co-management/multi-stakeholder networks, political participation, visibility and recognition.
	Local perceptions	narrative production, professionalisation, commensurability.
	Territorial resistance	power relations, inequalities between stakeholders.

2.1. Multi-scale governance and institutional gaps

The notion of scale allows us to highlight the socio-political dynamics at work in the processes of change at the level of collective action and public policies (Swyngedouw 1997, Dufour & Goyer 2009). On the one hand, the scale is a geographical reality that facilitates the analysis of processes in local, regional, national, transnational/continental territories, as well as a legal-political structure of distribution of state responsibilities (municipalities/provinces/country, etc.). On the other hand, the scale is understood as a social construction and a process of interaction through power relations among stakeholders (Swyngedouw 2004, Smith 2008). According to Masson (2009, p. 117), the constitution and transformation of scales is the result of socio-political projects, struggles and disputes among stakeholders involved in power relations.

Different multi-scale governance processes include vertical arrangements—with institutions created between jurisdictional or geographic levels, and horizontal arrangements—with networks created between various actors and sectors at the same level (Andonova & Mitchell 2010). The multiscale governance approach makes it possible to break with the static conception of levels, their normative character, the hierarchy of levels involved and the lack of analysis of power relations (Smith 1993, Swyngedouw 1997, Swyngedouw 2004). Moss & Newig (2010) question, for example, the belief in the possibility of finding optimal scales inherent in economic and political science approaches. In this respect, Brondizio et al. (2009, p. 254) explain that "institutions at (and linking) multiple levels are essential for the long-term protection of ecosystems. Focusing only at a local, regional, national, or international level is itself a source of inadequate policy design".

Cash et al. (2006) identify three institutional arrangements to respond to potential tensions or overlaps between scales: institutional interaction, co-management and network organisations. These three institutional arrangements can be implemented by different actors in response to scalar misalignments in the implementation of CC adaptation policies.

Vertical scalar arrangements refer to links across institutional levels, jurisdictional levels, or geographical spaces. This approach makes it possible to observe either the articulations or the barriers in the implementation of CC adaptation policies by public authorities, as well as the relationships between the design of these policies at national and sub-national levels, and local perceptions and needs.

Within these vertical arrangements, decentralisation processes of environmental governance have multiplied and have served as a macro *action plan* in the Andes, but with different expressions in each country. However, these decentralisation processes are often characterised by inadequate capacity transfer, a high degree of institutional fragmentation and coordination challenges as many management and adaptation processes require supra-territorial visions. These barriers hinder the efficiency of environmental governance and participation mechanisms (Phelps et al. 2010, Kowler et al. 2016).

Horizontal scalar arrangements examine the interactions across stakeholders, sectors and programmes or policies at the same level, including either innovations or conflicts that may arise. Multi-stakeholder governance systems that integrate these relationships are characterised by discontinuities of scale, asymmetries of power and general challenges of communication, coordination and conflict resolution. This can mean co-management through the establishment of alliances between actors to avoid overlaps between institutions and scales of action (Armitage 2007). Similarly, multi-actor networks can be formed at sub-national scales (Cronkleton et al. 2011, Bray et al. 2012, Paudel et al. 2012).

In addition, horizontal arrangements consider the relationships among the State, the market and civil society, and their impact on environmental governance policies (Ostrom 1990). At the same level, these three categories of actors promote particular interests and narratives that can lead to both convergence and conflict. The private sector in particular can play a central role in fostering collaborative relationships given its influence on public policies and environmental regulations.

More broadly, institutional gaps may appear in the interaction between regional and national policies, and local needs and expectations regarding the implementation and performance of climate policies in the field (Dupuits & Cronkleton 2020). Specific challenges related to institutional gaps are linked to effectiveness and capacity development, legitimacy, inclusion of beneficiaries in decision-making processes, reporting mechanisms and accountability (Giudice et al. 2019). Furthermore, on the specific issue of climate policies, institutional gaps materialise with the lack of guidelines from national CC policy instruments and how they are implemented and articulated with instruments at the local level (e.g., development plans and land-use planning).

Moreover, the scalar politics approach pays particular attention to discursive processes by considering scale as a social construction shaped by actors' representations and discourses (Warner et al. 2015). Some authors use the concept of *grassroots scalar politics* (MacKinnon 2011) to analyse "grassroots organizations and movements engage at different spatial scales to defend their interests, autonomy, rights and voice"(Hoogesteger & Verzijl 2015, p. 14).

However, Brown and Purcell (2005) warn against the *local trap* into which many authors in the field of political ecology have fallen. They argue that the local scale should not be considered the most desirable scale for dealing with environmental problems in order to avoid reproducing the same assumptions made in the multilevel governance framework. This consideration is particularly relevant in the field of common pool resource management (Ostrom 1990), where a majority of authors have mainly studied community organisations at the local or sub-national level.

The multi-scale approach is particularly relevant in the case of adaptation to CC, as it highlights the challenges of inter-institutional and inter-sectoral articulation when designing, implementing and monitoring these policies at regional, national, sub-national and local levels. One of the biggest challenges is the connection between national regulatory frameworks and their adaptation to the realities and needs of the territories facing the effects of CC.

2.2. Co-production of knowledge, local perceptions and resistance

One of the fields that has been most concerned with the study of perceptions and power relations in relation to the environment is political ecology, which seeks "to understand the complex relationships between nature and society through detailed analysis of what can be called forms of access to and control over resources and their implications for environmental health and sustainable livelihoods" (Watts 2003, p. 257).

A key concept in the field of political ecology is that of co-production of knowledge for the management of natural resources and the environment (Budds & Zwarteveen 2020, Miller & Wyborn 2020). This concept is relevant in the field of CC adaptation to understand the processes of interaction and articulation between multiple actors with diverse interests involved in the design, implementation and monitoring of such policies. Goodwin (2019, p. 504) underlines how "poor citizens not only use coproduction as a mechanism to gain access to public services but to renegotiate their relationship with the state and strengthen their social and political rights". Co-production thus has the potential to challenge and reconfigure power relations. Another dimension of co-production processes relates to the practices and rationalities of social and material reproduction.

On the one hand, the co-production of knowledge, and the institutional and governance arrangements that emerge from these processes (e.g., community reserves, co-management of resources, etc.), can generate new opportunities for collaboration among diverse stakeholders, greater participation in decision-making processes, and benefits in terms of visibility and recognition for marginalised actors. In this way, knowledge co-production reveals the possibility for community-based movements to act within state and power structures, beyond traditional approaches to resistance (Laurie et al. 2005, Radcliffe 2012, Dupuits et al. 2020). Moreover, this concept makes it possible to break the dichotomy between expert knowledge and local knowledge in order to highlight their intersections and processes of mutual adaptation (Robbins 2003).

On the other hand, Goodwin (2019) stresses the need to study the historical roots of co-production processes, which are often linked to capitalist structures and imply a loss of autonomy for civil society organisations. Co-production often involves processes of professionalisation for community-based organisations in order to be able to adapt to state and modern structures, which leads to risks in terms of disconnection with their bases and abandonment of their initial demands (Dupuits et al. 2020).

The professionalisation produced by co-production processes tends to ignore particular interests as it translates and universalises them during scaling-up or institutionalisation strategies at the national level (Roth et al. 2015). Furthermore, some authors refer to *knowledge battles* as conflicts between different epistemologies, valuations, and beliefs around natural resources (Boelens et al. 2019). It is therefore necessary to analyse the stakeholders who design, finance, implement or participate in CC adaptation programmes in order to understand the interests and power dynamics at play (Mills-Novoa et al. 2020).

The *commensurability* of nature, territory and identities refers to processes of standardisation and homogenisation of the diversity of local knowledge and ways of relating to the environment. Often emanating from governments, development agencies and private companies, commensurability is linked to dynamics of commodification, the devaluation of local cultures, technologies and institutions, and the prioritisation of technical-scientific knowledge in decision-making (Espeland & Stevens 1998, Li 2015). This process is not neutral and serves specific interests related to control over natural resources. At the same time, community-based and indigenous movements can strategically use expert knowledge to gain credibility and recognition, revealing the complexity of these strategies (Hidalgo-Bastidas et al. 2018, Mills-Novoa et al. 2020).

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3.

METHODOLOGICAL FRAMEWORK

3.1. Qualitative methods

This study is framed within a participatory action research approach that seeks to involve the study's beneficiary stakeholders in the construction of the results in order to achieve greater depth and acceptance (Bonelli et al. 2016). It uses a qualitative and inductive methodology that aims to collect first- and second-hand data through literature review, participatory workshops, surveys and semi-structured interviews with key stakeholders of the survey, including regional and national decision-makers, experts, provincial and local public authorities, NGOs, civil society organisations, representatives of local and indigenous communities and academia.

As a first step, a review of grey literature and academic articles on CC adaptation policies (plans, strategies, NDCs, communications) designed at global, regional and national levels with an impact on the Andean region was carried out. The grey literature involves on the one hand laws, agreements and regulations approved at different levels; and, on the other hand, reports, proceedings of CC adaptation programmes produced by experts or authorities. In addition, the literature review included sectoral policies at national, regional and local levels that have a more or less direct link to CC adaptation (ecological restoration, monitoring, biodiversity, water resources, wetland conservation, family agriculture).

As a second step, a survey was conducted in November 2020 (see Annexes 1 and 2) aimed at regional and national decision-makers[4] to identify priorities and opportunities for advancing CC adaptation policies. The aim of the survey was to collect baseline information on the status and evolution of CC adaptation policies in the Andes over the past five years, assess the relevance of the pre-selected case studies and identify key contacts for participation in the workshops and subsequent interviews.

As a third method, on 9 December 2020, in the context of the International Mountain Day, a roundtable on *Climate Change Policies and Adaptation Strategies in the Andes: A Multisectoral View from the Mountains* was held. It was attended by 38 participants, including decision-makers, international experts and civil society leaders. The meeting had two objectives. First, it presented an overview of the current context based on a multi-sectoral analysis of CC adaptation policies in mountain socioecosystems over the last five years. Second, it identified gaps, opportunities and priority issues to guide work and advocacy on CC adaptation policies in the Andes in the coming years with national governments and regional dialogue spaces such as the IAM.

As a fourth step, 22 semi-structured interviews (see Annex 3) were conducted with key actors linked to the seven selected case studies, in order to deepen the exploration of local perceptions on the implementation of CC adaptation policies in the field, as well as possible resistance and the emergence of alternative proposals from the community level. The study focused on invisible, marginalised or excluded stakeholders who are often left out of classical analyses. In addition, *situated knowledge* (Haraway 1995) was taken into account, understood as the valorisation of localised knowledge and the need to translate scientific concepts into local

4 Twenty people completed the survey, including regional decision-makers (environment ministries, mountain and CC focal points) and experts (conservation NGOs, development agencies, academics and scientists).

knowledge. For the analysis of the semi-structured interviews, a discourse analysis method was used to identify the interests and perceptions of the stakeholders, as well as the power relations at play at different scales.

3.2. Mapping the stakeholders involved

For the purpose of facilitating the surveys, this section presents a preliminary mapping of actors by country covered by the study. At the regional level, the evolution and implementation of CC adaptation programmes and strategies by regional stakeholders is analysed, including the Andean Community (CAN) and the IAM. At the national level, CC adaptation focal points as well as mountain working groups in each country covered by the study are included in the study (see Table 2 for a partial list). At the provincial/local level, the analysis focuses on key actors involved in the selected case studies (see Table 3), including provincial and local public authorities, civil society organisations, NGOs, experts, private sector and academia.

Table 2. *Mapping key stakeholders at national level*

	National authorities
Argentina	Ministry of Environment and Sustainable Development, Government Secretariat for Environment and Sustainable Development, National Office for Climate Change, Secretariat for Climate Change and Sustainable Development; Ministry of Agriculture, Livestock and Fisheries; Mountains Focal Point.
Bolivia	Ministry of Environment and Water (MMAyA), Ministry of Development Planning, Vice-Ministry of Water and Basic Sanitation, Ministry of Rural Development and Land.
Chile	Ministry of the Environment, Climate Change Office, Climate Change Division, National Forestry Corporation (CONAF), Ministry of Agriculture.
Colombia	Ministry of Environment and Sustainable Development; Institute of Hydrology, Meteorology and Environmental Studies (IDEAM); National Agency for Risk Management (UNGRD), National Planning Department (DNP), Ministry of Agriculture and Rural Development, Mountains Focal Point.
Ecuador	Ministry of Environment and Water (MAAE), Climate Change Secretariat, Inter-Institutional Committee on Climate Change (CICC), National System of Protected Areas (SNAP), Ministry of Agriculture and Livestock (MAG), Mountains Focal Point.
Peru	Ministry of Environment (MINAM), General Directorate of Climate Change and Desertification, National System of Protected Areas (SERNANP), Ministry of Agriculture and Irrigation (MINAGRI), Technical Group on Mountains.
Venezuela	Ministry of People's Power for Ecosocialism, Ministry of People's Power for Productive Agriculture and Land, National Parks Institute (INPARQUES), Venezuelan Mountain Committee (COVEM).

3.3. Sample case studies at sub-national level

Seven case studies have been selected (see Table 3) that are representative of the Andean countries that are part of the study: Argentina, Bolivia, Chile, Colombia, Ecuador, Peru. The case studies selected at provincial/local level represent the diversity of socio-environmental, ecosystemic and institutional contexts across the Andes, in order to analyse the processes of implementing CC adaptation policies, the involvement of various actors (public sector, private sector, local organisations, NGOs, etc.) and the role of the institutional context and local capacities and visions.

The criteria used for the selection of the cases are detailed below:

1. The cases reflect the diversity of political-institutional contexts and the capacities of the implementers, in order to include different governance scenarios and to analyse the levels of incidence and appropriation of CC adaptation policies at sub-national and local levels.

2. All selected cases are directly linked to mountain ecosystems in the Andes, including paramos, high Andean wetlands, Andean forests, lakes, punas, salars, among others.

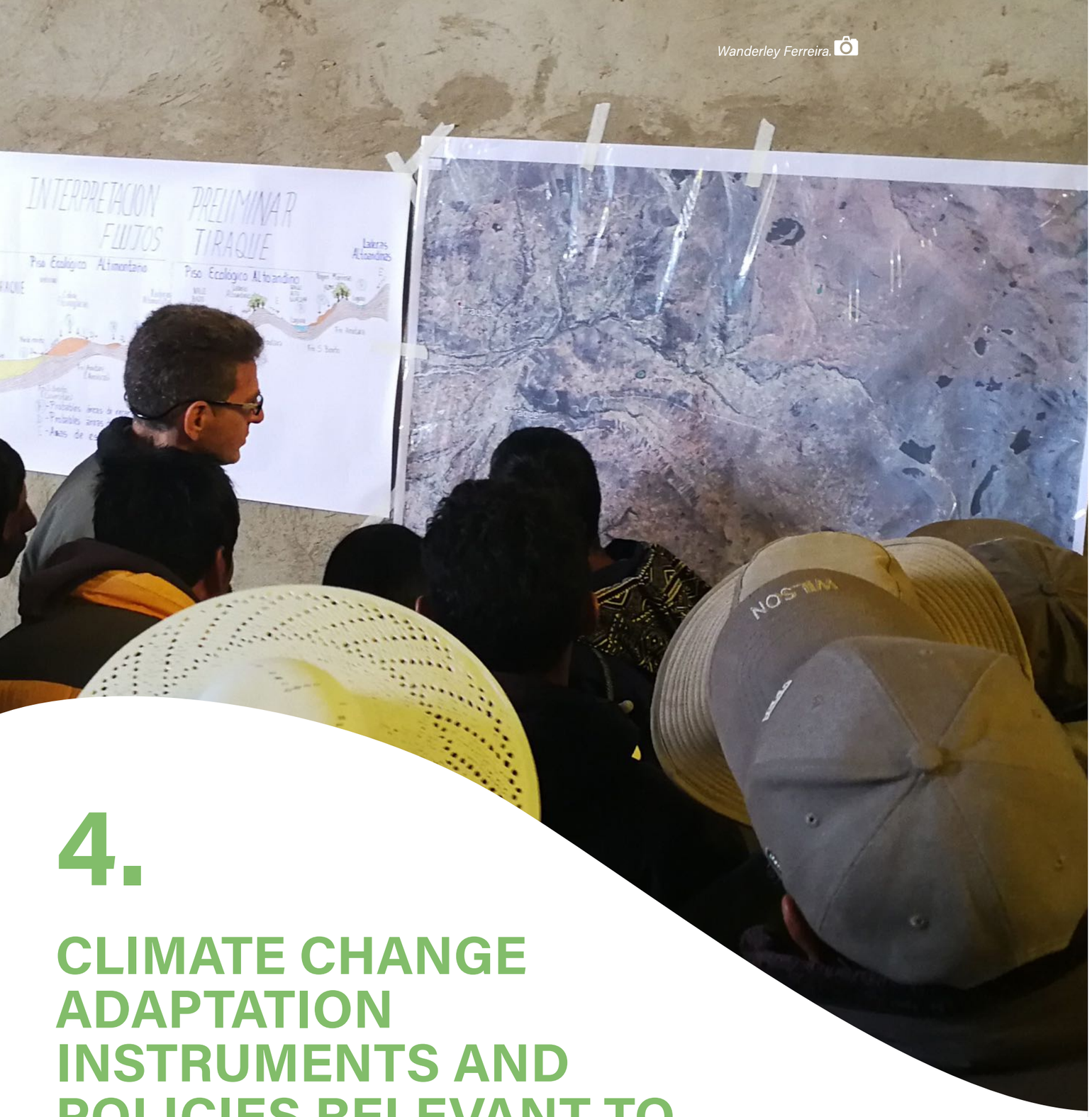
3. All the cases address the issue of adaptation to CC in a central way, in articulation with other sectors linked to the conservation of water resources, environmental restoration, reforestation, productive forest management or eco-territorial alternatives. The selected projects reflect the diversity of CC adaptation policies based on ecosystems, local knowledge or infrastructure.

4. We have sought to include cases of CC adaptation policies that emerge from a diversity of actors, in terms of financing, design, implementation or participation, including international cooperation, public authorities at national and provincial levels, academia, and ancestral and cultural practices of communities at the local level.

5. The selected CC adaptation programmes or initiatives are under implementation, or have been implemented in the last five years, in order to analyse recent challenges in their implementation, evolution, monitoring and follow-up.

Table 3. *Overview of the seven case studies representing implementation of CC adaptation policies across the Andes*

	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru
Geographical area	Laguna de los Pozuelos Biosphere Reserve, Jujuy Province.	Municipalities of Totora and Tiraque, Cochabamba Province.	Las Tórtolas Community, Municipality of San José de Maipo, Santiago Metropolitan Region.	Claro River Basin, Los Nevados National Park.	1. Andean Chocó Biosphere Reserve. 2. Kayambi Community Water Protection Area.	Cañete River Basin, Nor Yauyos-Cochas Landscape Reserve, Department of Lima.
Ecosystem	High Andean wetlands: puna, meadow, lake, lagoon, salt flat.	Humid puna, yungas, valleys.	High Andean mountains, lakes, glaciers.	Glacier, Andean paramo, wetland and high Andean forests.	1. Andean rain forests. 2. Andean paramo.	Steppe, tropical paramo, pluvial tundra, puna.
Priority sectors and actions	Sustainable livestock management, environmental restoration, water management.	Sustainable management of biodiversity, revaluation of ancestral knowledge, conservation of agrobiodiversity.	Sustainable agriculture, regenerative livestock farming, alternative production.	Environmental restoration, forestry; water resources, sustainable uses, environmental monitoring.	1. Conservation, reforestation, sustainable livestock farming. 2. Environmental conservation, water resources, irrigation.	Environmental conservation, water resources, reforestation, peasant agriculture, ecosystem services.
Policy tools for CC adaptation	National Monument and Biosphere Reserve Management *Plan, Wetland Law Proposal.*	Life Systems, Territorial Integrated Development Plans (PTDI), *Municipal Law for the Protection of Water Recharge Areas*.	Soil, Water and Forest Conservation District; Regional CC Action Plans, Local Scale Ecological Planning (Eco-Local Plan).	Joint Recovery Plan; Management, Maintenance and Conservation of Los Nevados National Park; Pilot Monitoring Strategy for High Andean Ecosystems, *Law 1,930 for the Comprehensive Management of the Paramos.*	1. Biosphere Reserve Management Plan; Commonwealth Territorial Plan, Andean Chocó Model Forest, Ordinance 137, Parish Land Management Plans. 2. Sustainable Management and Management Plans for Paramos, Plurinational Water Fund, Municipal Ordinance on Land Use and Management Plan.	Master Plan of the Reserve, Municipal Commonwealth, Management Committee of the Natural Protected Area, *Law on Mechanisms of Remuneration for Ecosystem Services (MERESE).*
Relevant CC adaptation programmes in the area	Conserving High Andean Wetlands in Argentina and Peru (Wetlands Foundation).	Biocultural and Climate Change (APMT), Applied Research Programme for Climate Change Adaptation (University of Cochabamba).	Protecting Mountain Biological Corridors Project (GEF-Mountain).	Paramos Project on Biodiversity and Water Resources in the Northern Andes (IAvH).	1. Socio-Bosque, PBA. 2. Paramo II: Local Capacity Building for the Sustainable Management of Andean Zones (HEIFER).	Conservation and Sustainable Use of Peruvian High Andean Ecosystems through PES- MERESE–IFAD Project (SERNANP).



Wanderley Ferreira.

4.

CLIMATE CHANGE ADAPTATION INSTRUMENTS AND POLICIES RELEVANT TO THE ANDES

4.1 International level

4.1.1 United Nations Framework Convention on Climate Change (UNFCCC)

4.1.1.1. The Paris Agreement 2015 – National Adaptation Plans (NAPs)

The Paris Agreement[5] sets as an overarching objective to enhance adaptive capacity, strengthen resilience and reduce vulnerability to CC, with a view to contribute to sustainable development and ensure an adequate adaptation response. It recognises that adaptation is a global challenge faced by all, and therefore all Parties should participate in adaptation efforts, through the formulation and implementation of National Adaptation Plans (NAPs), and should submit and periodically update an adaptation communication outlining their priorities, needs, plans and actions. The Agreement recognises that adaptation needs are consistent with mitigation efforts and that increased adaptation needs will entail higher costs. It also recognises the importance of global support and cooperation on adaptation and, in particular, the importance of taking into account the needs of the Parties, which are mostly developing countries and particularly vulnerable to the impacts of CC.

The NAPs process was established by the Conference of the Parties at COP16 (2010) to enable Parties to formulate and implement the NAPs as a means to identify medium- and long-term adaptation needs and, in addition, to develop and implement strategies and programmes to address these needs. The NAPs process, as the only multilaterally agreed comprehensive adaptation process, seeks to reduce vulnerability to the adverse effects of CC that is integrated with national development planning processes and strategies. It is a continuous, progressive and iterative process that follows a country-driven, equity-sensitive, participatory and fully transparent approach.

In order to increase the availability of support for adaptation, the Conference of the Parties in 2015 called on the Green Climate Fund (GCF) to streamline support for the formulation and implementation of the NAPs. This process could play an important role in developing collaboration and coherence, as countries preparing their NAPs will need to build the capacity of in-country stakeholders while also clarifying the roles and responsibilities of ministries in the context of adaptation. The Scientific and Technical Advisory Panel (GEF-STAP) and the UN Environment Global Research Programme on Climate Change Vulnerability, Impacts and Adaptation initiated a process to assess the state of knowledge on monitoring and evaluation of adaptation to climate change[6]. Another area of further integration is climate data and information. The Global Climate Observing System, as mandated by the Convention, published its new implementation plan in 2016[7].

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5 https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement

6 STAP. 2017. *Strengthening Monitoring and Evaluation of Climate Change Adaptation: A STAP Advisory Document.* Global Environment Facility, Washington, D.C.

7 WWMO Global Atmosphere Watch (GAW). 2016. *Implementation Plan: 2016-2023:* https://library.wmo.int/opac/doc_num.php?explnum_id=3395

4.1.1.2. The Technical Examination Process on Adaptation (TEP-A)

The Technical Examination Process on Adaptation[8] (TEP-A) was established at COP21 (2015). TEP-A was conducted over the period 2016-2020, with technical expert meetings, technical papers and other events, with the aim of identifying concrete opportunities to strengthen resilience, reduce vulnerabilities and increase understanding and implementation of adaptation actions. International cooperation on adaptation also includes financial, technological and capacity building support for adaptation. Relevant agreements of the UN climate change regime in this regard are explained in the sections on climate finance, technology transfer and capacity building. Each year, topics of particular relevance to member states and stakeholders are addressed. The theme of TEP-A 2020 was "Education and Training, Public Participation and Youth for Enhanced Adaptation Actions". TEP-A 2020 took place over several months and included creative ideas for policy briefs and case studies, video messages, virtual talks and workshops, art competitions and more.

Under the leadership of the UNFCCC Adaptation Committee and in collaboration with the UNFCCC Secretariat, the Inter-American Development Bank (IDB), Libélula and the Regional Network for Climate Change and Decision Making organised a Technical Meeting on Adaptation[9] in the region (TEM-A) on 23 August 2019. This meeting took place during the Latin American and Caribbean Climate Week in Salvador de Bahia, Brazil. The objective was to share experiences and solutions through specific regional, national and local examples that can enable public and private investments for adaptation and resilience in the region to better inform the formulation and implementation of the NAPs.

4.1.1.3. The Adaptation Committee

As part of the Cancun Adaptation Framework, the Conference of the Parties established the Adaptation Committee[10] at COP16 (2010) to enhance work on adaptation in a coherent manner under the Convention. The functions of the Adaptation Committee include providing technical support and guidance to Parties; sharing information, knowledge, experience and good practices; promoting synergy and enhancing participation; providing information and recommendations for consideration by the Conference of the Parties; and reviewing information reported by Parties on their monitoring and review of adaptation action.

The year 2020 saw the launch of the first two deliverables of the Adaptation Committee in support of the Paris Agreement. One is a publication[11] that examines how developing countries are addressing climate risks, with a view to recognising adaptation efforts in those countries. The report cites the example of the Colombian state's efforts to formulate regional and sectoral CC adaptation plans to respond to disaster risks caused by the La Niña phenomenon. The second is the pilot inventory of methodologies for assessing adaptation needs[12], designed as an information hub for those seeking to understand the tools available for assessing adaptation needs in different contexts. A publication of data for adaptation at different time scales was also launched, aimed at helping Parties and practitioners navigate the complex landscape of data to support adaptation.

4.1.1.4. The Nairobi Work Programme (NWP) on impacts, vulnerability and adaptation to climate change

The Nairobi Work Programme[13] (NWP) was established at COP11 (2005) to facilitate and catalyse the development and dissemination of information and knowledge that will inform and support adaptation policy and practice. It is a network of over 400 organisations committed to closing knowledge gaps and scaling up climate adaptation action in countries. Through its diverse range of modalities, the NWP provides unique opportunities to link relevant institutions, processes, resources and expertise outside the Convention to respond to adaptation knowledge needs arising from the implementation of the various workstreams under the Convention and identified by Parties. Activities on local, indigenous and traditional knowledge practices have been carried out under the NWP. In addition, COP19 (2013) decided that activities under the Nairobi work programme should integrate gender, indigenous and traditional knowledge, and the role and impacts on ecosystems.

The Lima Adaptation Knowledge Initiative[14] (LAKI) is a joint action pledge under the NWP between the UNFCCC Secretariat and UN Environment through its Global Adaptation Network. Priority-setting workshops are convened with multi-stakeholder expert groups to identify, categorise and prioritise CC adaptation knowledge gaps for specific sub-regions and sectors/themes. LAKI works with global and sub-regional partners to catalyse activities to close these knowledge gaps. As part of LAKI implementation for the Andean sub-region, the International Center for Tropical Agriculture (CIAT) collaborated with UN Environment and the UNFCCC Secretariat to organise a priority-setting workshop that took place in September 2014 in Bogota, Colombia. The purpose of this workshop was to identify a set of prioritised adaptation knowledge gaps and a preliminary list of response actions and partner institutions to address these gaps in the sub-region (Becerra 2015). In 2018, UNFCCC Parties welcomed the next phase of LAKI that aims to reduce the 85 identified knowledge gaps and expand LAKI to new sub-regions.

4.1.2. The 2030 Agenda – Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development aims to achieve full implementation of the SDGs by 2030. It makes the link to CC very clear by stating that CC is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development.

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8 http://tep-a.org/

9 *Report of the Regional Technical Meeting on Adaptation (TEM-A) Adaptation Finance,* Latin America and Caribbean Climate Week, 19-23 agosto 2019, Salvador de Bahía, Brazil.

10 Adaptation Committee | UNFCCC

11 UNFCC, Adaptation Committee. 2020. *How developing countries are addressing hazards, focusing on relevant lessons learned and good practices* [Synthesis report by the Adaptation Committee in the context of the recognition of adaptation efforts of developing countries].

12 UNFCC, Adaptation Committee. 2020. *Data for adaptation at different spatial and temporal scales* [Technical Paper].

13 The Nairobi work programme: The UNFCCC Knowledge-to-Action Hub for Climate Adaptation and Resilience | UNFCCC

14 https://www4.unfccc.int/sites/NWPStaging/Pages/laki.aspx

4.1.2.1. SDG 13 Climate Action

The 17 SDGs and 169 targets, including SDG 13 on Climate Action, demonstrate the scale and ambition of this universal agenda. SDG 13 aims to "take urgent action to combat CC and its impacts". Since the 2015 adoption of the 2030 Agenda, there has been progress in implementing the SDGs. However, to achieve the 2030 Goals and Targets, progress needs to be made faster and more uniformly across countries and regions. The United Nations High-level Political Forum on Sustainable Development (HLPF) annually reviews progress on the implementation of the 2030 Agenda, informed by country-led voluntary national reviews, and thematic reviews of progress on the SDGs, including cross-cutting issues and cross-linkages. The first in-depth review of SDG 13 took place at the HLPF in July 2019[15]. In April 2019, the Global Conference on "Strengthening synergies between the Paris Agreement and the 2030 Agenda for Sustainable Development: maximising co-benefits by linking SDG implementation and climate action" was held in Copenhagen.

Similarly, SDG 15 addresses life on land with a strong focus on ecosystems, while support is growing for ecosystem-based approaches to disaster risk reduction that apply ecosystem-based solutions, such as conservation, restoration and sustainable use and management of land, wetlands and other natural resources, in managing climate and disaster risks. Ecosystem-based adaptation (EbA) has emerged as an important concept within the adaptation dialogue and promotes conservation, sustainable management and restoration of ecosystems to help people adapt to the impacts of CC.

In addition, it is important to highlight the need to localize the SDGs across prioritized goals in the context of resilience and adaptation in mountains (Wymann et al. 2018). Some of these prioritized goals include strengthening the resilience of communities living in mountain areas, the conservation and sustainable use of mountain ecosystems, the promotion of sustainable tourism, or the implementation of resilient agricultural practices for sustainable food production.

Box 1. *G 13: Climate Action – Summary of progress*

A total of 85 countries reported having a national disaster risk reduction strategy according to the Sendai Framework for Disaster Risk Reduction 2015-2030, adopted in 2015. In 2018, 55 countries reported that at least some of their local governments had a local disaster risk reduction strategy aimed at contributing to sustainable development and improving socioeconomic well-being and environmental resilience, focusing on poverty eradication, urban resilience and CC adaptation.

As of 31 March 2020, 186 Parties (185 countries plus the European Union) had notified their 1st NDCs and several Parties had communicated their 2nd or updated NDCs to the UNFCCC. Parties have been asked to update existing NDCs or notify new contributions by 2020, giving them an opportunity to set more ambitious targets for climate action. By 2019, at least 120 of 153 developing countries had undertaken activities to formulate and implement NAPs, an increase of 29 countries from 2018. NAPs will help countries achieve the global adaptation goal envisaged in the Paris Agreement.

In terms of global climate finance, there was an increase of $584 billion (up 17 %) from 2013 to 2014 and $681 billion from 2015 to 2016. The high volume of private investments in renewable energy explains the strong growth and represents the largest segment of the global total. However, investments in climate activities recorded across all sectors were still lower than those related to fossil fuels in the energy sector alone ($781 billion in 2016).

Source: HLPF, 2020.

4.1.2.2. Climate Adaptation Summit (CAS) 2021

In January 2021, more than 30 world leaders, 50 ministers and 50 international organizations came together with scientists, the private sector, civil society, youth representatives and more than 18,500 registered participants at the Climate Adaptation Summit[16]. They joined forces in 27 different sessions to share knowledge, create action and drive the agenda towards a climate resilient future in 2030. They formed the Adaptation Action Agenda that will serve as a directive over the coming years to accelerate adaptation actions. During the opening session, several instruments were presented and launched to support increased financing and investment for adaptation:

· the Adaptation Financing Integration Programme for low- and middle-income developing countries was launched to improve their capacity to understand and manage climate risk;

· the recently created private sector-led Coalition for Climate Resilient Investment (CCRI) committed to developing and testing solutions for resilient investment decisions.;

· new Global Ecosystem-based Adaptation Fund, supported by Germany and implemented by UN Environment and the International Union for Conservation of Nature (IUCN), was developed with an initial capitalization of 15 million euros, and a first call for proposals scheduled for 2021;

· the International Fund for Agricultural Development launched a new umbrella fund: the Rural Resilience Programme (2RP) with a key pillar, the Enhanced Adaptation for Smallholder Agriculture Programme (ASAP+);

· the Global Environment Facility's Special Climate Change Fund (SCCF) approved 2 million dollars for innovative projects to support the monetary valuation of nature-based infrastructure, with the aim of demonstrating economic interest and catalysing further private investment.

15 UN, Secretary General's Report. 28 April 2020. *Progress made towards achieving the Sustainable Development Goals.*

16 Climate Adaptation Summit. 2021. *Decade of action launched at Climate Adaptation Summit* [Press Release], https://www.cas2021.com/binaries/cassummit-en/documents/media-articles/2021/01/26/cas-2021-wrap-up/CAS_2021_PRESS_RELEASE_210126.pdf

4.1.3. Sendai Framework for Disaster Risk Reduction 2015-2030 and Aichi Targets (Convention on Biological Diversity)

The Sendai Framework contains seven goals and four priorities for action. It notes that "disasters, many of which are exacerbated by CC and which are increasing in frequency and intensity, significantly impede progress towards sustainable development". The Sendai Framework was adopted by the UN General Assembly following the Third UN World Conference on Disaster Risk Reduction, held in Sendai, Japan, in March 2015. It solidifies a paradigm shift from disaster management to the management of current and future risks, incorporating resilience building as the overarching goal for 2030.

Target 15 of the Aichi Targets under the Convention on Biological Diversity (CBD) states: "By 2020, the resilience of ecosystems and the contribution of biodiversity to carbon stocks are enhanced through conservation and restoration, including restoration of at least 15% of degraded lands, thereby contributing to CC mitigation and adaptation and to combating desertification".

Restoration activities are already underway in many parts of the world and will increasingly be needed to restore ecosystem functioning and the provision of valuable services such as carbon sequestration. Policy consolidation and wider implementation of these efforts could contribute significantly to achieving the objectives of the Convention and generate important synergies with the UNFCCC, the UN Convention to Combat Desertification and the UN Forum on Forests. However, restoration should not be seen as a substitute for conservation. Nor should it be used as a justification for allowing intentional destruction or unsustainable use. Rather, it should be seen as a last resort to improve degraded ecosystems.

4.1.4. Discussion on progress and challenges of CC adaptation policies at the international level

At the international level, CC adaptation policies have advanced in terms of (1) supporting countries in formulating their NAPs and NDCs, (2) launching new climate finance instruments for developing countries, and (3) global reporting and evaluation of progress on CC adaptation. One of the important advances achieved through the international negotiations has been to make available to countries, alongside national efforts, relevant information and funds to accelerate adaptation to CC (Bárcena et al. 2020).

In the Andean region, several countries have received support from different international organisations for the formulation or implementation of their NDCs. For example, Argentina and Chile are beneficiaries of the Latino Adapta project funded by the International Development Research Centre (IDRC) in Canada, which seeks to strengthen government capacities to implement NDCs. Another example is the EU-funded EUROCLIMA+ project[17] , which provides support at regional and country level for the design of national climate laws and strategies, as well as NDC planning (Chile, Ecuador). With regard to climate funds, several instruments have been created for developing countries, such as the Global Ecosystem-based Adaptation Fund, which provide opportunities to strengthen CC adaptation policies in the Andean region. Finally, in the last five years, several global events have been held to update and evaluate progress on CC adaptation, through various consolidated spaces such as the UNFCCC Adaptation Committee, the High-Level Political Forum on the SDGs and the Global Climate Action Summit.

On the other hand, the international level presents some challenges related to the complexity of the institutional architecture that results in the multiplication of policy tools at the national level and the difficult monitoring of the effectiveness of their concrete implementation. As explained below, a priority at the regional level is the consolidation of instruments and platforms in the Andes that can play a coordinating role between the different levels.

4.2. Regional level – the Andes

4.2.1. Strategic Agenda on Climate Change Adaptation in the Andean Mountains – Andean Mountain Initiative (IAM)

The construction of the Strategic Agenda[18] was developed in parallel to the IAM Annual Meeting, with the participation of experts and official representatives from Argentina, Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela. The main objectives of the Strategic Agenda are to reduce the vulnerability of the groups most affected by CC, to strengthen the adaptation and resilience processes of communities through sustainable agriculture, grazing and food, and to adapt water management to more extreme climate conditions, among others. For the development of this Strategic Agenda, the Andean countries requested the collaboration of CONDESAN and UN Environment, with financial support from the European Union's EUROCLIMA+[19] programme.

In addition, a study on climate finance sources and mechanisms (Bustamante 2019) was funded to develop an EbA initiative for the Andean countries (Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile and Argentina) aligned with the Strategic Agenda. A tangible expected outcome is the design of a regional adaptation fund for the Andes to be managed by the IAM. In the Andean region, a total of 46.75 million dollars has been channelled through regional or multi-country adaptation projects[20]. In this context, the IAM has opportunities to access regional CC adaptation funds as a macro-regional platform that already promotes collaboration and coordination among Andean countries, through programmes such as the A@A and the CONDESAN-SDC's PBA.

17 EUROCLIMA+ es un programa financiado por la Unión Europea - Planes y políticas (euroclimaplus.org)

18 https://www.unenvironment.org/es/events/evento-de-onu-medio-ambiente/avances-de-la-agenda-estrategica-sobre-adaptacion-al-cambio

19 http://www.euroclimaplus.org/fortalecimiento-del-dialogo-politico-y-la-cooperacion-regional-en-materia-adaptacion-para-la-implementacion-de-la-agenda-estrategica-de-adaptacion-al-cambio-climatico-en-los-andes-multipais

20 www.climatefundsupdate.org

4.2.2. Research Agenda for Comprehensive Monitoring and Analysis of Socio-Environmental Indicators in the Andes

There are already several long-term monitoring networks and platforms that generate useful information for understanding CC impacts in the region, such as the Network for Monitoring the Impact of Climate Change on Biodiversity in High Andean Ecosystems (Red GLORIA-Andes), the Andean Forests Network, and the Regional Initiative on Hydrological Monitoring of Andean Ecosystems (iMHEA). However, these platforms tend to operate more or less independently and a more comprehensive information management system that includes both environmental and social dimensions is still lacking. To this end, CONDESAN—within the framework of the A@A and the PBA, in collaboration with the Institute for Regional Ecology (IER, UNT-CONICET), the Institute of Territorial and Technological Research for the Production of Habitat (INTEPH, UNT-CONICET) of Argentina and the KEW Botanical Garden of England, and in collaboration with the MRI—is working on the design of a research agenda and a comprehensive socio-environmental information platform for the Andes[21].

4.2.3. Andean Environmental Charter – Andean Community (CAN)

A recent step towards regional integration on CC adaptation is the adoption in December 2020 of the Andean Environmental Charter in the framework of the XXV Ordinary Meeting of the Andean Council of Foreign Ministers[22]. This document aims to develop joint actions to address the problems arising from CC. In addition, a new Andean Environmental Technology Platform project was launched, which will centralise environmental indicators available to the CAN countries, making it a major centre for early warnings and information. The charter establishes six thematic focal points: (1) integrated management of water resources, (2) conservation and sustainable use of biodiversity, (3) disaster prevention and response, including integrated management of fire and forest fires; (4) combating illegal mining and related crimes, (5) promoting the circular economy, and (6) strengthening the environmentally sound management of chemicals and waste throughout their life cycle. One of the central objectives is the need to promote coordinated actions within the framework of the Andean Community to address the problems arising from climate change, taking into account the global and crosscutting nature of its effects through appropriate adaptation and mitigation measures.

This Environmental Charter strengthens instruments developed by the CAN, such as the Andean Committee for Disaster Prevention and Response (CAPRADE)—with the participation of Bolivia, Colombia, Ecuador and Peru—which approved the Andean Strategy for Disaster Risk Management for the period 2017-2030.

4.2.4. Forum of Ministers of the Environment of Latin America and the Caribbean (CELAC)

The Forum of Environment Ministers of Latin America and the Caribbean was established in 1982 and is the oldest cooperative body for environmental authorities in the region, which are part of the Community of Latin American and Caribbean States (CELAC). The XXII Forum of Ministers of Environment of Latin America and the Caribbean[23], which took place on 1-2 February 2021, in Barbados, aimed to address priority environmental challenges in the region, opportunities for sustainable recovery and actions to achieve the SDGs. Member countries also considered restructuring the Inter-Agency Technical Committee and adopting a Latin American and Caribbean action plan for the implementation of the UN Decade on Ecosystem Restoration as integral dimensions of post-COVID-19 green recovery.

4.2.5. Pacific Alliance

With the Pacific Alliance Presidents' Declaration on Climate Change at COP 20 / CMP 10, the Pacific Alliance declares its recognition of the great challenge posed by CC at the global level, its willingness to take mitigation and adaptation measures at the national level, and its commitment to the sustainable management of natural resources. In 2016, following the Cartagena Ministerial Declaration and the Puerto Varas Presidential Declaration, the Pacific Alliance adopted the concept of green growth as the group's trade and growth promotion framework[24]. Subsequently, the Alliance expressed its conviction to continue promoting a green growth strategy as a way to address the challenges of CC, reaffirmed its support for the Paris Agreement and declared its commitment to identify possible voluntary market mechanisms in the region[25].

It seeks to work with initiatives that contribute to CC mitigation and adaptation and sustainable development, in particular in experience sharing, technical collaboration, technology transfer and integration, and joint bilateral or multilateral plans, building on the experience of the Scientific Research Network on Climate Change (RICCC). Created in 2012, the RICCC aims to exchange experiences and advances in research, as well as to determine and monitor opportunities for future collaboration, explore the application of scientific knowledge and develop capacities in CC management.

4.2.6. Most relevant climate change adaptation programmes in the Andes

The most relevant CC adaptation programmes and projects of international cooperation in the mountain socioecosystems of the Andes over the last five years are listed below (see Table 4).

21 Hacia una agenda de investigación para el monitoreo integrado de los socioecosistemas andinos - Condesan

22 http://www.comunidadandina.org/Prensa.aspx?id=12277&accion=detalle&cat=NP&title=paises-de-la-can-aprueban-carta-ambiental-andina

23 XXII Foro de Ministros de Medio Ambiente de América Latina y el Caribe (unep.org)

24 UN Environment, Pacific Alliance. 2019. *La Alianza del Pacífico y el Medio Ambiente: Hacia un modelo de Desarrollo Sostenible basado en el Crecimiento Verde* [The Pacific Alliance and the Environment: Towards a Sustainable Development Model based on Green Growth].

25 Pacific Alliance. June 2017. *Cali Presidential Declaration.*

Table 4. *Relevant climate change adaptation programmes in the Andes, 2015-2021*

Programme	Goals
Regional Ecosystem-based Adaptation Programme – UICN (2014-2018)	It aimed for national and local government authorities in selected sites in Colombia and Ecuador to integrate the EbA approach into relevant policies, plans or strategies, implement them and thereby contribute to reducing the vulnerability of local communities in coastal regions and increase the resilience of populations and ecosystems to CC. The programme is part of the International Climate Initiative (IKI) funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).
EcoAndes Project – CONDESAN (2014-2018)	The governments of Peru and Ecuador agreed on a project that sought to enhance the multiple environmental and social benefits provided by the biodiversity and carbon pools of high Andean ecosystems by overcoming scientific, institutional and financial barriers that undermine sustainable soil and forest management in the Andes. To this end, the project focused on land use and land cover change trends to maintain carbon stocks in high Andean soils and ecosystems through sustainable land and ecosystem management practices and policies. They worked with several monitoring systems in the two countries hosting the project: three in Ecuador and two in Peru. They collect continuous information on various variables related to carbon, biodiversity, productivity and ecosystem dynamics.
Paramo Project: Biodiversity and Water Resources in the Northern Andes – EU, IAvH, UICN (2015-2018)	Between 2015 and 2018, the Paramos Project on Biodiversity and Water Resources in the Northern Andes was implemented, a regional initiative co-funded by the European Union and a network of organisations from these countries, led by the Alexander von Humboldt Biological Resources Research Institute (IAvH), Colombia, and coordinated in Ecuador and Peru by IUCN South America with its members Ecopar and Instituto de Montaña, respectively. This initiative counted with the participation of the Colombian Ministry of Environment and Sustainable Development and the National Natural Parks of Colombia, as technical advisors of the action. The overall objective was to contribute to the maintenance of the water regulation capacity and biodiversity of the paramo ecosystem in key targeted areas of the Northern Andes.
Andes Adaptation to the Impact of Climate Change on Water Resources Project (AICCA) – CONDESAN (2018-2021)	The AICCA Project is implemented by the Andean Development Corporation (CAF) and executed by CONDESAN in Bolivia, Colombia, Ecuador and Peru. This regional initiative aims to generate and carry out pilot investments in priority areas in order to share information based on relevant experiences for adaptation to variability and CC, positively impacting the formulation of policies at the service of communities and the environment. The implementation sectors prioritised by the AICCA project are those most vulnerable to CC, in terms of economic losses, including food, water and energy security of the population. Through a Regional Committee and the participation of key local organisations that will integrate the National Committees, the project seeks to illustrate an experience of multi-sectoral collaboration between multilateral, public, private and civil society organisations.
Adaptation to CC at Altitude (A@A) – SDC (2019-2023)	The programme Adaptation to Climate Change at Altitude, within the framework of A@A, is an SDC-funded initiative in four mountain areas of the world: Himalayas, Caucasus, East Africa and Andes. The Programme seeks to increase the resilience and adaptive capacity of mountain communities and ecosystems to CC by: improving knowledge of CC impacts and adaptation strategies; and, promoting knowledge transfer, strengthening science and policy platforms to inform decision-making in national, regional and global policy processes. One initiative of the programme at the global level is to feed a database on CC adaptation solutions in mountains, compiled through the WeADAPT platform. In the Andes, A@A is active in strengthening the IAM.
Andean Forests Programme (PBA) – CONDESAN, SDC (2014-2021)	The PBA is a regional initiative that aims to help the Andean people living in and around Andean forests to reduce their vulnerability to CC and to receive social, economic and environmental benefits from their conservation. To this end, information is generated and disseminated through applied research in Andean forests to identify, validate and share existing good practices, which will eventually be taken to a policy level. The programme, as part of SDC's Global Climate Change Programme, and combines expertise, practical relevance and the establishment of regional and international guidelines on the subject. It contributes to and builds on existing and successful experiences of stakeholders in the international forest and CC agendas. It is implemented by the CONDESAN-Helvetas Swiss Intercooperation Consortium.

Programme	Goals
Regional Initiative for Climate Change 'Resilient Andes' (ARIACC) – SDC, AVINA, IISD, IFAD (2020-2024)	ARIACC seeks to increase the resilience of the most vulnerable communities living in Andean mountain ecosystems to the effects of CC and natural hazards by increasing their food and water security through sustainable natural resource management. By promoting regional collaboration and capitalising on lessons learned from previous and relevant CC adaptation programmes in rural Andean areas, the regional initiative proposes to assist Andean countries in implementing policies and plans that respond to the needs of the most vulnerable communities in these regions. The ARIACC project is driven by SDC. It is implemented in Bolivia, Ecuador and Peru. It is facilitated by the Helvetas Swiss Intercooperation and Fundación AVINA, in partnership with the International Institute for Sustainable Development (IISD), and in strategic alliance with the International Fund for Agricultural Development (IFAD).
Project "Strengthening science-government links for climate policy development in Latin America". – UNESCO, AVINA (2018)	The Regional Network on Climate Change and Decision Making operates through a consortium that brings together universities, research and training institutions and recognised specialists from Latin America. It supports exchange and mutual learning, contributing to strengthen the integration of climate considerations into decision-making and management processes in the countries of the region. The initiative is driven by an institutional partnership between the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the AVINA Foundation. In this regard, the preliminary study carried out in 2010 by the partners concluded that the educational offer for training people in the areas of CC is still limited. The Regional Network on Climate Change and Decision-Making leads Latino Adapta, a project to support NDC implementation capacities in Argentina, Brazil, Chile, Costa Rica, Paraguay and Uruguay. Funded by the International Development Research Centre (IDRC) from Canada, this project aims to strengthen the interaction between academia and the governments of these countries for the implementation of NDCs. The overall objective of the project is to "strengthen the capacity of national governments in Latin America to make decisions and implement climate policies based on scientific evidence". It is structured around four components: assessment, policy-based research, science-policy links and regional exchange.
Support community for the National Adaptation Plans in Latin-America (PNACC) – UN Environment (2016-...)	The PNACC community of practice was created in 2016 with the objective of providing support to Latin American countries in the formulation and implementation of National Adaptation Plans of Action, within the framework of the National Adaptation Plan-Global Support Programme (NAP-GSP), jointly established by the United Nations Development Programme (UNDP) and UN Environment, with funding from the Global Environment Facility (GEF). The PNACC community of practice aims to contribute to the work of government officials involved in NAP processes, and to the work of specialists from national and international cooperation organisations, as well as to the work of people from the academic, private and civil sectors who provide support in the design and implementation of national and regional adaptation actions. The PNACC community of practice is implemented by the UN Environment regional office for Latin America and the Caribbean through the Regional Gateway for Technology Transfer and Climate Change Action in Latin America and the Caribbean (REGATTA), funded by the Spanish Agency of International Cooperation for Development (AECID).

4.2.7. Discussion on progress and challenges of CC adaptation policies at country level in the Andes

The development of several regional projects focused on the issue of CC adaptation in Andean mountain socioecosystems demonstrates the relevance and priority of the environmental agenda in the region for international and regional cooperation agencies and national governments (see summary in Box 2). Most of these projects include a cross-cutting approach to EbA and nature-based solutions. Beyond specific projects, regional integration platforms have also been formed and consolidated around CC management, such as the IAM, the Forum of Ministers of the Environment of Latin America and the Caribbean, and the Regional Network on Climate Change and Decision-Making.

Box 2. Examples of CC adaptation tools and platforms at the Andean level

- *Scientific Research Network on Climate Change (RICCC) – Pacific Alliance 2014.*
- *Andean Strategy for Disaster Risk Management for the period 2017-2030 (CAPRADE) – CAN 2017.*
- *Strategic Agenda on Climate Change Adaptation in the Andean Mountains – IAM 2018.*
- *Andean Environmental Charter – CAN 2020*
- *Andean Environmental Technology Platform Project – CAN 2020*
- *Proposal for a Research Agenda for the Integrated Monitoring and Analysis of Socio-environmental Indicators in the Andes – CONDESAN 2021*
- *XXII Forum of Ministers of Environment of Latin America and the Caribbean – CELAC 2021*

On the other hand, the declaration in 2020 of the Andean Environmental Charter reaffirms the CAN's potential as a regional cooperation forum for defining environmental indicators and CC mitigation and adaptation measures. This regional environmental agenda is linked to the CAN's extensive experience in promoting research and monitoring activities in the Tropical Andes, under the priority issues of CC, biodiversity and integrated management of water resources (Cuesta et al. 2012). In addition, since the 2000s the CAN has contributed to the implementation of several pioneering projects in the area of CC adaptation[26], such as the Adaptation to the Impact of Accelerated Glacier Retreat in the Tropical Andes Project (PRAA), the Project on Climate Change and the Environment in the Economic and Social Sector (ANDESCLIMA) and the consolidation of regional monitoring networks such as GLORIA-Andes (Maldonado et al. 2012, Llambí & Garcés 2020). There are other regional integration spaces that are less directly linked to the issue of CC adaptation (Organization of American States, OAS) or that may have suffered a recent loss of political relevance (Union of South American Nations, UNASUR).

However, although the countries of the region have made progress in incorporating environmental protection into decision-making processes, particularly in terms of environmental institutions and legislation, they still face difficulties in incorporating climate policies into relevant public policies. One of the main challenges of the climate agenda in this regard is to achieve articulation between climate policies and development, land-use and sectoral policies (Bárcena et al. 2020). In addition, progress needs to be made towards formalising platforms such as the IAM, which is still non-binding.

4.3. National level – Andean Countries

4.3.1. Argentina

4.3.1.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Argentina has made several advances in the development of inter-institutional mechanisms, sectoral policies and specific instruments on mountain socioecosystems in relation to CC adaptation (see Table 5).

Table 5. *Regulatory progress on CC adaptation policies in Argentina*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC update, 2020. *Law 27,520 on Minimum Budgets for Adaptation to and Mitigation of Global Climate Change, 2019.* *National Climate Change Adaptation and Mitigation Plan, 2019.* *Long-Term Strategy for 2050.*
Vertical arrangements (decentralisation, civil participation, monitoring)	National Cabinet on Climate Change: Focal Point Roundtables, Provincial Articulation Roundtables, Extended Roundtables. Federal Environment Council (COFEMA). National Climate Change Information System. Argentinean Network of Municipalities against Climate Change (RAMCC).
Horizontal arrangements (cross-sectoral articulation, mitigation/adaptation articulation, EbA)	National Sectoral Action Plans for Energy, Transport, Agriculture, Industry, Health, Infrastructure and Territory, and Forestry. Climate Change Committee for Agriculture, Livestock, Fisheries, Food and Forestry. *Laws 23,919 and 25,335: Regional Strategy for the Conservation and Sustainable Use of High Andean Wetlands.* *Proposed Wetlands Law.* *Law 26,639 on the Protection of Glaciers and the Periglacial Environment.* *National Law 27,118 on the Historical Reparation of Family Farming.* *Inclusive Rural Development Programme.* Committee for the Sustainable Development of the Argentinean Mountain Regions.

Regarding the institutional architecture on CC management, the country has considerably strengthened the articulation between the different competent bodies on the subject, through the creation of the National Climate Change Cabinet (GNCC) as an inter-ministerial institution recognised in several key documents: revised NDCs 2016; Law 27,520 on Minimum Budgets for Adaptation to and Mitigation of Global Climate Change, 2019; and the National Plan for Adaptation and Mitigation of Climate Change, 2019.

Two of the central sectors that stand out from the CC adaptation policies adopted in Argentina are mountain socioecosystems and the agricultural production model. In recent years, the country has developed or approved several instruments that recognise the role and priority of mountain socioecosystems in adaptation to CC in the country: *the Regional Strategy for the Conservation and Sustainable Use of High Andean Wetlands*; the National Wetlands Protection Programme for the period 2018-2022; *the Proposed Wetlands Law; Law 26,639 on the Protection of Glaciers and the Periglacial Environment;* and the Committee for the Sustainable Development of the Argentinean Mountain Regions. In addition, a specific adaptation measure on glacier and periglacial ecosystems is defined in the second

26 Medio Ambiente | | Temas | Portal de la Comunidad Andina

NDC 2020. Another advance is evident in the agricultural sector, with the adoption in 2015 of National *Law 27,118 on the Historical Reparation of Family Farming*, which takes an important step towards the recognition of the role of family and indigenous farming in the productive and sustainable development of the country.

On the other hand, the country still faces challenges regarding the approval or effective functioning of some tools linked to CC adaptation. For example, the Committee for the Sustainable Development of Mountain Regions has limited power in terms of stakeholder participation and binding decision-making at the national level. Another illustration is the tensions that arise in the debates for the adoption of the *Wetlands Law* which, although it represents an important advance in the conservation of high Andean ecosystems, also generates conflicts over the delimitation of permitted productive activities and the development of peasant and indigenous communities.

4.3.1.2. Main regulatory frameworks at national level

NDC update, 2020

Argentina has made commitments to the international community that have been ratified with the signing of the Paris Agreement through Law 27,270[27] and its enactment in September 2016. In the same year, it presented its first NDC[28], which includes the country's commitment to develop a National Climate Change Adaptation and Mitigation Plan (PNAyMCC) by 2019, which has subnational and sectoral chapters, serves to prioritise adaptation actions at the national level, and to generate a conceptual and institutional framework that allows for the design and implementation of local adaptation plans.

Through the NDC update in 2020, it is established that adaptive capacity will be increased, strengthening resilience and decreasing vulnerability in the different social, economic and environmental sectors. To achieve this, 35 cross-cutting and sectoral adaptation measures are proposed. These measures prioritise the following cross-cutting approaches: gender and diversity, EbA, community-based adaptation and comprehensive disaster risk management. Some of these measures include: (1) promoting the articulation of the NAP monitoring and evaluation system with the National Climate Change Information System established in Law 27,520, article 17; (2) establishing processes and designing tools for the mainstreaming of community-based adaptation in the PNAyMCC, response plans and policies and measures arising within the framework of the National Climate Change Cabinet (GNCC); (3) promoting a participatory process for intersectoral, inter-jurisdictional and stakeholder inclusion, both within the framework of the GNCC, the Advisory Council of Experts and specific mechanisms for the process of elaboration and implementation of the PNAyMCC.

Specific adaptation measures are also proposed in key sectors, such as: (1) agriculture and livestock: sustainable and resilient management of agroecosystems that contribute to achieving food security in the face of climate change impacts; and (2) *biodiversity and ecosystems:* (2.1) strengthen research applied to adaptive ecosystem management and biodiversity protection; (2.2) strengthen and expand the National System of Protected Areas in coordination with the provinces through the Federal System of Protected Areas; (2.3) manage the water assets with an integrated approach to ensure the availability, sustainable use and quality of the resource for the various human and natural uses in the face of the impacts of CC; and, (2.4) assess the alterations suffered by glacier and periglacial systems, in order to develop mechanisms for their protection.

The monitoring and updating of the second NDC is framed within the guidelines of the *Climate Change Law* with respect to the PNAyMCC, which will be the main instrument for the domestic implementation of mitigation and adaptation actions. The vehicle for the follow-up of the adaptation process will be the NAPyMCC through its own monitoring and evaluation system.

Law on Minimum Budgets for Adaptation to and Mitigation of Global Climate Change

In December 2019, *Law 27,520 on Minimum Budgets for Adaptation and Mitigation to Global Climate Change*[29] was published to ensure adequate CC mitigation and adaptation actions, instruments and strategies throughout the national territory. The objectives of the law are: (1) to establish the strategies, measures, policies and instruments related to the study of the impact, vulnerability and adaptation activities to CC that can guarantee human and ecosystem development; (2) to assist and promote the development of mitigation strategies and reduction of greenhouse gases (GHG); and, (3) to reduce human and natural systems' vulnerability to CC, protect them from its adverse effects and take advantage of its benefits. To achieve the established goals, the creation of the GNCC was made official, Decree 891/2016, which aims to articulate the different areas of government of the National Public Administration, the Federal Environment Council and different actors of civil society, the design of agreed public policies, with a strategic view to reduce GHG emissions and generate coordinated responses for the adaptation of vulnerable sectors to the impacts of CC. The Cabinet coordinates its work in thematic (energy, agriculture and forestry, waste, transport and industry) and cross-cutting (awareness raising and education, adaptation, financing) roundtables.

In addition, Article 25 mentions that "each jurisdiction must promote participatory processes among all stakeholders and interested actors that lead to the definition of the best adaptation and mitigation actions to CC". Law 27,520 establishes the creation of an External Advisory Council made up of researchers, trade unions, communities and indigenous peoples, representatives of environmental organisations, universities, academic and business entities, public and private research centres, and representatives of political parties with parliamentary representation, among others. Its main function is to guarantee citizen participation to assist and advise in the elaboration of CC public policies throughout the national territory and to prioritise the needs of the social groups most vulnerable to climate impacts.

Within the framework of the new law, the National Information System on Climate Change will be developed, with the aim of making available appropriate data for the elaboration of indicators to inform the monitoring and evaluation of the adaptation measures carried out and the quality of the actions undertaken.

27 https://www.argentina.gob.ar/ambiente/cambio-climatico/informe-pais

28 Republic of Argentina. 2016. *First Review of your Nationally Determined Contribution.*

29 https://www.argentina.gob.ar/ambiente/cambio-climatico/gabinete-nacional

National Climate Change Adaptation and Mitigation Plan (PNAyMCC)
In November 2019, the National Secretariat for the Environment and Sustainable Development concluded the preparation of the first *National Climate Change Adaptation and Mitigation Plan* (PNAyMCC)[30], which aims to advance in the fulfilment of the objectives assumed in the Paris Agreement, and the National Sectoral Action Plans for Energy, Transport, Agriculture, Industry, Health, Infrastructure and Territory and Forests. The PNAyMCC, which was made official by Resolution 447/2019[31], responds to the need to address the challenges of CC in a coordinated and efficient manner, being a public policy instrument that guides the medium- and long-term actions to be developed in the field. It also aims to integrate adaptation to CC into the country's development strategies, making it possible to reduce vulnerability and increase resilience to the adverse effects of CC[32]. The plan was developed by the National Bureau of Climate Change of the Secretariat for the Environment on the basis of the four-year work of the GNCC, coordinated by the Secretariat for Climate Change and Sustainable Development. The sections on mitigation and adaptation to CC summarise the work agreed with the ministries and secretariats in the framework of the aforementioned cabinet, the COFEMA, actors representing the academic sector, non-governmental organisations, chambers, companies, workers and participants in the extended roundtables.

The vision statement of the PNAyMCC mentions that concrete actions must be implemented to achieve the long-term benefits of adaptation, reducing vulnerability to the adverse effects of CC and improving the resilience of natural, social and productive systems. Four priority axes are identified at the national level: (1) research and development, (2) institutional strengthening, (3) reduction of vulnerabilities, and (4) raising awareness and education. Some central measures include the expansion of monitoring networks, the strengthening of early warning systems and climate services for health, food security, water, energy and disaster risk reduction, and the strengthening of initiatives that support land recovery and rehabilitation processes, including EbA.

In addition, under the PNAyMCC, cross-cutting measures are developed on institutional strengthening, capacity building and climate governance, awareness raising and education, SDGs, co-generation and transfer of information and knowledge, comprehensive disaster risk management, gender, EbA, community-based adaptation, resilient systems-based adaptation, and financing.

Long-Term Strategy for 2050
In the fifth block of the Extended Roundtable, the actions developed within the framework of the GNCC to elaborate the *Long-Term Strategy to 2050* were presented[33]. The long-term strategy should be built with a federal vision, with a gender perspective and in a participatory manner. The main elements that should be part of the long-term strategy include: science and technology, productive development, work and just transition, infrastructure, nature-based solutions, education, regulatory framework, energy sovereignty, financing, among others.

30 https://www.argentina.gob.ar/noticias/ambiente-elaboro-el-plan-nacional-de-adaptacion-y-mitigacion-al-cambio-climatico

31 http://argentinambiental.com/legislacion/nacional/resolucion-447-19-plan-nacional-de-adaptacion-y-mitigacion-al-cambio-climatico/

32 https://www.argentina.gob.ar/ambiente/cambio-climatico/plan-nacional

33 Extended Roundtable Report №7-2020

4.3.1.3. Vertical arrangements

The Ministry of Environment and Sustainable Development, as the law enforcement authority, has established four working instances[34] that make up the GNCC[35]: Ministerial Meetings, Focal Point Roundtables, Provincial Articulation Roundtables and Extended Roundtables.

The purpose of the Provincial Articulation Tables is to coordinate actions between the nation and the provinces, and to provide feedback on the work being carried out in terms of adaptation and mitigation in each jurisdiction. In this way, the Technical Administrative Coordinator, the Secretariat for Climate Change, Sustainable Development and Innovation, and COFEMA's Climate Change Commission jointly address the provincial CC response plans, which serve to strengthen the climate architecture at the subnational level.

The purpose of the Expanded Roundtables is to promote debate with all stakeholders (academia, workers, civil society, representatives of political parties, trade unions, municipalities, indigenous communities, private sector, among others) on how cross-cutting issues can permeate the design and implementation of the PNAyMCC. Activities at national and sub-national levels are reported at this forum. Inputs are also received that will later be shared as progress and results of the elaboration and implementation of the National Plan.

In addition, a mechanism for citizen and institutional participation[36] was designed by the Technical Administrative Coordination of the GNCC, which reports to the Secretariat for Climate Change, Sustainable Development and Innovation, with the aim of including the diverse suggestions, comments and visions of civil society in the country's climate policy. The mechanism is open to all civil society organisations, networks of organisations, federations, trade unions, universities and academics, thematic groups, and all youth organisations that wish to contribute to the design of the national climate policy coordinated through the Cabinet.

4.3.1.4. Horizontal arrangements

National Sectoral Action Plans for Energy, Transport, Agriculture, Industry, Health, Infrastructure and Territory, and Forestry
Sectoral action plans[37] are public policy instruments that bring together the set of actions planned by the government to promote sustainable development, reduce GHG emissions and adapt to the effects of climate change in different sectors. They make up the NAPCCM and enable compliance with international commitments in this area. They are elaborated within the framework of the GNCC, among the ministries that comprise it and in coordination with the academic sector, non-governmental organisations and the private sector.

34 https://www.argentina.gob.ar/ambiente/cambio-climatico/mesas-de-trabajo

35 https://www.pv-magazine-latam.com/2020/04/06/a-pesar-del-covid-19-comienza-en-argentina-el-trabajo-del-gabinete-nacional-nacional-de-cambio-climatico/

36 https://www.argentina.gob.ar/ambiente/cambio-climatico/participacion-ciudadana

37 https://www.argentina.gob.ar/ambiente/cambio-climatico/planes-de-accion

Climate Change Committee for Agriculture, Livestock, Fisheries, Food and Forestry

The Ministry of Agriculture, Livestock and Fisheries, through Resolution 576/14[38] and its amendment Resol-2018-191-APN-MA, creates the Climate Change Commission for Agriculture, Livestock, Fisheries, Food and Forestry with the aim of assisting, coordinating and proposing actions and instruments that address the causes and effects of CC in the sector. The Commission is made up of representatives from different areas of the Ministry of Agriculture, Livestock and Fisheries and its decentralised bodies. If required, other actors, both from different governmental areas and from the academic or private sector, may be invited to participate. In addition, the National Registry of Family Farming (ReNAF) functions as an observatory of the sector and participates in the strengthening of food security, through the data obtained from its historical reparation.

Protection of wetlands and glaciers

Laws 23,919 and 25,335[39] approve the Convention on Wetlands of International Importance (the RAMSAR Convention) whose objective is to promote the conservation of wetlands and waterfowl by creating nature reserves and taking appropriate measures for their custody. In the context of this convention, the Regional Strategy for the Conservation and Sustainable Use of High Andean Wetlands[40] was developed with the aim of promoting their conservation and sustainable use through the implementation of a long-term regional management process among the countries involved (Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Peru and Venezuela). In addition, the National Wetlands Protection Programme was approved for the period 2018-2022. On the other hand, the advance of open-pit mining in periglacial areas has generated concern and led to the enactment in 2010 of *Law 26,639 on the Protection of Glaciers and the Periglacial Environment*.

Law 27,118 on the Historical Reparation of Family Farming

Law 27,118[41], passed in 2015 declares family, peasant and indigenous agriculture to be of public interest for its contribution to food security and self-sufficiency, and for practising and promoting living and production systems that preserve biodiversity and sustainable processes of productive transformation. Within this framework, the law establishes the Family Farming Historical Reparation Regime, which is aimed at the family farmers and family farming enterprises that carry out farming activities in rural areas with the purpose to increase productivity, food security and self-sufficiency and to value and protect the essential subject of a productive system linked to the family's settlement in rural areas, on the basis of environmental, social and economic sustainability. With regard to production and marketing processes, the actions and programmes are aimed at increasing productivity and competitiveness, focusing on the conservation and improvement of soils and other natural resources, with sustainable methods, prioritising agro-ecological practices in order to preserve, recover and improve the conditions of productive land.

38 https://www.argentina.gob.ar/agricultura/cambio-climatico

39 https://www.argentina.gob.ar/ambiente/cambio-climatico/tercera-comunicacion

40 RAMSAR Convention and EHAA Contact Group. 2008. *Estrategia Regional para la Conservación y Uso Sostenible de Humedales Altoandinos. Gobiernos de Ecuador y Chile* [Regional Strategy for the Conservation and Sustainable Use of High Andean Wetlands. Governments of Ecuador and Chile]. Santiago: CONDESAN y TNC-Chile.

41 http://faolex.fao.org/docs/pdf/arg140755.pdf

Inclusive Rural Development Programme

The Inclusive Rural Development Programme seeks to promote the improvement of the social and productive conditions of poor rural families and increase their incomes, as a result of increased production, insertion into value chains and the creation of job opportunities. The programme is national in scope, with priority for the north-western provinces and progressive coverage of the rest of the country, with a six-year timeframe. It is financed by the national government through direct funds and loans from international organisations. In addition to its general strategy, there are three cross-cutting strategies: the Gender Strategy, the Strategy for Environmental Care and Adaptation to Climate Change, and the Strategy for Indigenous Peoples.

Committee for the Sustainable Development of Mountain Regions

The Committee for the Sustainable Development of the Argentinean Mountain Regions[42], established in 2005 and formalised in 2020 by Resolution 439/2020[43], is a policy coordination body that brings together public sector institutions involved in mountain issues. Its presidency and technical secretariat are held by the Ministry of Environment and Sustainable Development. The vice-presidency is held by the Ministry of Agriculture, Livestock and Fisheries. The international focal point of the committee is the General Bureau of Environmental Affairs (DIGMA) of the Ministry of Foreign Affairs, International Trade and Worship. Other state bodies make up an instance of articulation and discussion of strategies, in order to achieve a synergy that facilitates joint work.

Its main goals are to define sustainable development proposals for the mountainous regions of Argentina and to coordinate activities in order to become a forum for the coordination of strategies carried out by the various competent bodies, thus enhancing joint work. The work of the committee makes it possible to define different areas of the territory, making economic development needs compatible with the conservation of biodiversity and the well-being of the community. Its challenge is to promote the discussion of key issues in Andean and mountain territories, generating a space for exchange of analysis and reflection, both individually and as a group. The aim is to develop common criteria for the development of territorial knowledge through cartographic and technological tools, for the generation of capacities and understanding of the management systems used, in order to build an integrated and balanced country with a strong environmental identity and an organisation that favours economic competitiveness and social development.

4.3.2. Bolivia

4.3.2.1.Overview of policy progress and challenges in adaptation to CC

In the last five years, Bolivia has made important advances in the consolidation of an innovative normative framework on Living Well, Mother Earth Rights and CC, which has a strong component around water resources (see Table 6).

The issue of CC in Bolivia is closely linked to the national regulatory framework on the rights of Mother Earth and living well, which is materialised with the creation in 2012 of the Plurinational Authority of Mother Earth (APMT) as the competent institution on these issues, and the approval of *Law 071 on*

42 https://www.argentina.gob.ar/ambiente/ordenamiento-territorial/comite-montana

43 Resolución 439/2020 | Argentina.gob.ar

the Rights of Mother Earth and Framework Law 300 for Mother Earth and Comprehensive Development for Living Well. However, it is still necessary to consolidate a national institutional framework that is more focused on the issue of adaptation to CC, as Bolivia does not have updated and effective national policy instruments on CC, and the National Climate Change Programme and its implementation strategy have yet to be developed. In addition, mechanisms are needed for effective decentralisation of national regulations and training of local governments for their implementation in the territory.

Table 6. *Regulatory progress on CC adaptation policies in Bolivia*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC, 2015-2016 *Law 071 on the Rights of Mother Earth and Framework Law 300 on Mother Earth and Comprehensive Development for Living Well.* *Bicentennial Patriotic Agenda 2025* National Mechanism for Adaptation to Climate Change, 2007 *Law 777 on the State's Comprehensive Planning System* (SPIE)
Vertical arrangements (decentralisation, civil participation, monitoring)	Plurinational Mother Earth Authority (APMT) Directorate-General for Environment and Climate Change Vice-Ministry of Territorial and Environmental Planning *Territorial Comprehensive Development Plans* (PTDI)
Horizontal arrangements (cross-sectoral articulation, mitigation/ adaptation articulation, EbA)	Sector Programmes for Adaptation to CC in Water Resources, Health, Food Security and Self-Sufficiency, and Ecosystems National Forest and Climate Change Strategy National Watershed Plan 2013-2020 Mother Earth's Life Systems *Sectoral Comprehensive Development Plans (PSDI)*

On the other hand, the water resources planning sector stands out in the regulations on CC management in the country, through the National Watershed Plan 2013-2020, and the leading role of the Ministry of Environment and Water (MMAyA) in the formulation and implementation of CC policies in the country. In addition, water resources and forests are two sectors that are central to the issue of adaptation to CC in their planning and strategies, which tends to create a regulatory void for non-forest ecosystems in high mountains such as the puna.

4.3.2.2. Main regulatory frameworks at national level

NDC 2015-2016
Bolivia submits its first NDC linked to the UNFCCC multilateral process in 2015/2016[44]. Its contribution is consistent with its vision of comprehensive development, in accordance with the provisions of the Political Constitution of the State, *Law 071 on the Rights of Mother Earth and Framework Law 300 on Mother Earth and Comprehensive Development for Living Well*, and with the *Bicentennial Patriotic Agenda* 2025 and its 13 principles, as well as the long- and medium-term national plans as directives. For the operational implementation of living well in harmony and balance with Mother Earth, the Management of Mother Earth's Life Systems approach has been adopted, which allows for the implementation of a territorial action process based on the complementarity and interdependence of rights, as a proposal for the application of living well within the framework of intercultural public management.

The NDC mentions that the Bolivian state expects to achieve the following objectives and results in mitigation and adaptation to CC in the framework of comprehensive development by 2030, with respect to the 2010 baseline: (1) *water,* to comprehensively increase adaptive capacity and systematically reduce the country's water vulnerability; (2) *energy*, to increase electricity generation capacity through renewable energy for local and regional development; and, (3) *forests and agriculture*, to increase joint mitigation and adaptation capacity through joint management of forests in an integrated and sustainable manner.

An important command of the MMAyA is to "formulate the National Climate Change Policy; conduct, supervise and evaluate the functioning of the National Climate Change Programme, strengthen the National Mechanism for Adaptation to Climate Change, its National Implementation Strategy, and execute and evaluate actions to prevent, reduce and mitigate the impacts of CC and adaptation to it, as well as to formulate legislation and its regulations" (article 95-h). The MMAyA through the Plurinational Authority of Mother Earth and the United Nations Development Programme (UNDP) in Bolivia signed an agreement in the framework of the "Climate Pledge" [45] so that the country can review and adjust its NDCs under the Paris Agreement.

National Mechanism for Adaptation to Climate Change
Supreme Decree №1,696 of 2013 defines adaptation as a fundamental line of work of the National Climate Change Policy. Article 15 of this norm establishes that "the implementation of the Adaptation Mechanism for Living Well is carried out in the areas with the greatest vulnerability to the impacts of CC and natural disasters through intervention programmes"[46]

44 Ministry of Development Planning, Ministry of Environment and Water, Plurinational Mother Earth Authority, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). May 2020. *Análisis del estado de situación de la implementación de la Contribución Nacionalmente Determinada (NDC) de Bolivia y recomendaciones para su actualización* [Analysis of the status of implementation of Bolivia's Nationally Determined Contribution (NDC) and recommendations for updating it]. La Paz.

45 https://www.bo.undp.org/content/bolivia/es/home/presscenter/articles/2020/ministerio-de-ambiente-y-agua--apmt-y-pnud-firman-acuerdo-para-a.html

46 https://www.lexivox.org/norms/BO-DS-N1696.xhtml

In the Patriotic Agenda 2025's General Economic and Social Development Plan for Living Well (PDGES)[47] adopted in 2013, CC is linked to the issue of food self-sufficiency, technological innovation and the prevention of water scarcity in the country. To respond to the guidelines of the plan, and within the framework of the Political Constitution of the Plurinational State, the MMAyA is assigned the leading role in implementing policies related to CC adaptation, promoting the National Mechanism for Adaptation to Climate Change (MNACC). This mechanism prioritises sectors such as water resources, agriculture, ecosystems, health, human settlements and infrastructure, and climate risks. It also proposes cross-cutting actions related to research, education and the recovery of ancestral knowledge.

The strategic goals of the MNACC are: to reduce vulnerability to CC, to promote planned adaptation within the framework of the different sectoral programmes, and to reduce risks to CC impacts in the different sectors identified as vulnerable. These goals are in line with the PDGES policy, under the heading 'Environmental Resources'. The actions are aimed at responding to the urgent demand for scientific information with less uncertainty, providing consistent solutions and disseminating them among Bolivian society in order to generate adaptation actions. The implementation of the national mechanism will be led by the Vice-Ministry of Territorial and Environmental Planning, as an instrument of public policy. The programmes will be developed by the different sectors at the territorial and multi-sectoral level, integrating municipalities and rural communities in their actions, under the technical support of the National Climate Change Programme and departmental CC management entities.

4.3.2.3. Vertical arrangements

Law 777 on the State's Comprehensive Planning System (SPIE)
Law 777 introduces a comprehensive planning system for all State institutions, through an organised and articulated set of rules, processes, methodologies and procedures for long-, medium- and short-term planning. Long-term planning has a 25-year horizon. It is constituted by the PGDES, under the parameters of the 13 principles of the Patriotic Agenda. At the same time, the ministries draw up the PSDIs. The departments, municipalities and regions draw up the PTDIs. The indigenous and aboriginal peasant peoples carry out the Community Management Plans. At the institutional level, the Institutional Strategic Plans are drawn up. Similarly, state-owned companies draw up their plans. Finally, there are the Comprehensive Development Strategies for metropolitan regions and macro-regions.

4.3.2.4.Horizontal arrangements

National Forest and Climate Change Strategy
The strategy aims to "reduce the socio-economic and ecological vulnerability of forest users to climate change and of the Bolivian population as a whole, while developing actions to reduce extreme poverty by providing incentives for the comprehensive, community-based and sustainable management of forests, within the framework of the achievement of Living Well"[48], for which it proposes the development of six programmes: (1) reduction of threats to forests, (2) conservation and restoration of forests and degraded landscapes, (3) comprehensive community and sustainable management of livelihoods and forests, (4) education and institutional capacity building, (5) adaptation of legislation and institutional structure, and (6) monitoring and evaluation of the reduction of deforestation and comprehensive management of forests linked to CC.

Sector Programmes for Adaptation to CC in Water Resources, Health, Food Security and Self-Sufficiency, and Ecosystems
In its role as a regulatory body, the MMAyA, through the Vice-Ministry of Potable Water and Basic Sanitation, has included as an indispensable requirement for the presentation and design of potable water and sanitary sewerage projects the study of adaptation and mitigation measures for CC, risks and the environment. This ensures that this aspect is taken into account at the final design level of such projects.

National Watershed Plan 2013-2020
The Multi-Year Programme of the National Watershed Plan 2013-2020 aims to "promote Comprehensive Water Resources Management (GIRH) and Comprehensive Watershed Management (MIC) in Bolivia, under participatory and self-management modalities, from the perspectives of local cultures and systems of life, as a basis for sustainable human and environmental development, in a context of vulnerability to natural disasters and climate change". This programme comprises seven components: (1) promotion and development of Watershed Master Plans, (2) implementation of GIRH-IMC projects, (3) hydrological and CC risk management, (4) water quality management, (5) implementation of pedagogical watersheds, (6) knowledge and information management of water resources and watersheds, and (7) institutional development and capacity building for GIRH and MIC. The implementation of the PNC and its Multi-Year Programme is led by the Vice-Ministry of Water Resources and Irrigation, whose function is to promote, guide, facilitate, supervise and evaluate its execution at the level of the country's basins and micro-basins, by sub-national entities such as municipalities and governors' offices. Capacity building at the level of institutional operators and Basin Management Organisations (OGCs) is the key element for the sustainability of investment in watersheds.

4.3.3. Chile

4.3.3.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Chile has made significant progress in the development and consolidation of inter-institutional mechanisms, sectoral plans and specific instruments on mountain socioecosystems in relation to CC adaptation (see Table 7).

47 Bolivian Ministry of Autonomies. 2013. *Agenda Patriótica 2025: Plan de Desarrollo General Económico y Social para el Vivir Bien (PDGES)* [Patriotic Agenda 2025: General Economic and Social Development Plan for Living Well]. La Paz.

48 Plurinational State of Bolivia, Ministry of Environment and Water, National Climate Change Programme. 2010. *Estrategia Nacional de Bosque y Cambio Climático* [National Forest and Climate Change Strategy]. La Paz.

Table 7. *Regulatory progress on CC adaptation policies in Chile*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC, first update 2020 *National Action Plan on Climate Change,* 2017-2022 *National Climate Change Adaptation Plan* *Climate Change Framework Bill* (PLMCC) *Long-Term Climate Strategy*
Vertical arrangements (decentralisation, civil participation, monitoring)	Council of Ministers for Sustainability and Climate Change (CMSCC), Ministry of Foreign Affairs (MINREL) Inter-ministerial Technical Team on Climate Change (ETICC) Citizen Consultation Mechanism Regional Climate Change Committees (CORECC) Municipal Environmental Certification System (SCAM) Regional Advisory Councils Regional Action Plans
Horizontal arrangements (cross-sectoral articulation, mitigation/ adaptation articulation, EbA))	Sustainability and Climate Change Agency (ASCC) *Proposed National Policy on Sustainable Mountain Management and Action Plan to 2030* *National Strategy on Climate Change and Vegetation Resources* (ENCCRV) *Climate Change Adaptation Plans* by sector (forestry and agriculture, biodiversity, fisheries and aquaculture, health, CC infrastructure services, cities, energy, water resources, tourism). *Law 18,378 of the Ministry of Agriculture on Soil Conservation Districts.*

Chile has consolidated a national institutional framework articulated around CC management through different tools, and more specifically the National Climate Change Adaptation Plan as a reference document on the subject. In addition, some inter-institutional mechanisms have been created to facilitate CC management, such as the Council of Ministers for Sustainability and Climate Change (CMSCC), and the Inter-ministerial Technical Team on Climate Change (ETICC). However, these national tools have yet to be translated into action by identifying mechanisms for decentralisation and capacity building at regional and municipal level, which is foreseen for the coming years in the national plans and the NDCs.

With regard to sectoral CC planning, national policies focus in most cases on the forestry and agriculture sector, which is considered to be the sector with the highest priority due to the effects of CC and the opportunities for implementing CC adaptation projects in the territories. In addition, innovative local tools have been implemented to manage CC, such as the Soil Conservation District, managed by the Ministry of Agriculture. An important challenge is to promote greater intersectoral articulation between the environment and agriculture sectors.

An opportunity to resolve this tension lies in the ongoing process of building a national policy on mountains, which would encompass cross-cutting issues related to CC and adaptation.

4.3.3.2.Main regulatory frameworks at national level

NDC, first update 2020

A first update of Chile's NDC was made in 2020. Its central objectives include: (1) by 2021, the objective, scope, goals and the elements that will make up the adaptation component in Chile's Long Term Climate Strategy will have been defined, carrying out a participatory process in which various actors at different territorial scales will be incorporated; (2) the coordination of climate action on adaptation at the national scale will be strengthened through the National Adaptation Plan and adaptation plans for 11 prioritised sectors, incorporating the learning achieved in the implementation of the first plans; (3) by 2025, CC capacities and institutions will have been strengthened at the regional level and the implementation of adaptation and mitigation actions and the necessary means of implementation will have been initiated through regional CC action plans in 10 regions of the country, and by 2030 all 16 regions of the country will have such an instrument; (4) by 2026, the current monitoring and evaluation system will have been strengthened, through progress and impact indicators for all CC adaptation instruments, to assess progress and compliance with the established goals; (5) during the implementation period of this NDC, the inclusion of non-governmental actors in the planning and implementation of adaptation instruments will be strengthened; and, (6) the country's information and management mechanisms regarding the impacts of CC on water resources will be increased, in order to improve its resilience.

The NDC implementation strategy is articulated under the focal points described as follows. First, in 2020, Chile will develop the Capacity Development and Climate Empowerment Strategy and start its implementation during 2021, with the aim of strengthening sectoral, national and subnational capacities of individuals and organisations, both public and private, academia and civil society, to achieve the country's mitigation and adaptation goals. Second, Chile will present its Climate Change Technology Development and Transfer Strategy in 2020, and will start implementing it in order to foster and strengthen technology development and transfer by supporting and promoting the cultural, social, environmental and economic transformations needed to achieve sustainable, resilient and carbon neutral development by 2050. To this end, state agencies work in coordination with each other and with the different actors in society, generating multiple co-benefits for ecosystems, territories and production systems. Third, during 2020, the EFCC (Financial Strategy for Climate Change) will start its implementation and will be updated every five years, with the first review to take place in 2021, and in this way, the emissions neutrality goal contained in the Long-Term Climate Strategy will be considered.

With the aim of integrating adaptation and mitigation goals, priority work strands include commitments on the circular economy, land use, land-use change and forestry, and the ocean. In addition, it is intended to develop a monitoring and reporting system to track adaptation actions through the application of metrics that provide information on the progress of adaptation processes. In this way it is possible to evaluate the measures implemented through the NAP, *the National Climate Change Adaptation Plan* 2017-2022 and sectoral plans and determine whether they have been effective in reducing vulnerability or increasing the

adaptive capacity of the systems in question, report on progress in adaptation and vulnerability and risk reduction on a regular basis and disseminate the available information. This line of action will also consider reporting under the NDC framework. A national assessment system is still under construction until 2026, using vulnerability indicators and methodologies to determine the increased adaptive capacity of people, communities and systems that will be impacted by CC.

National Climate Change Adaptation Plan
In the *National Climate Change Adaptation Plan*, approved by the Council of Ministers for Sustainability (CMS) in December 2014, the need to strengthen the institutional framework on CC was proposed, outlining an operational structure for the implementation of the plan. The outline of the operational structure corresponds to a cross-sectoral approach, headed by the Council of Ministers for Sustainability and Climate Change (CMSCC), which is within the current regulatory and legal system. It requires at the central level (1) the creation of an Inter-ministerial Technical Team on Climate Change (ETICC); and, at the regional level (2) the creation of Regional Climate Change Committees (CORECC).

The *National Climate Change Adaptation Plan* is the instrument that articulates Chile's public policy on adaptation to CC, whose main task is to strengthen Chile's capacity to adapt to CC by deepening knowledge of its impacts and the country's vulnerability, and by generating planned actions to minimise the negative effects and take advantage of the positive effects, for its economic and social development and ensuring its sustainability.

Nine sectors or systems were prioritised for the elaboration of sectoral plans for adaptation to CC—forestry and agriculture, water resources, biodiversity, fisheries and aquaculture, health, energy, infrastructure, cities and tourism—given the relevance of the impacts on these sectors and the need for adaptation actions to ensure sustainable development in the country, avoiding losses in the economic, environmental and social spheres. The cross-cutting actions have been grouped into four main themes: (1) scientific research, (2) environmental communication and education, (3) institutional strengthening, and (4) reduction of risk of disasters (DRR).

During the implementation phase, all actions of the National Plan and Sectoral Plans must be subject to a monitoring and evaluation process, which allows for the estimation of the degree of progress of implementation and serves as a starting point to identify eventual modifications and updates. The monitoring and evaluation process, carried out by the ETICC, requires the definition of specific indicators to estimate the effectiveness and efficiency of the implementation of the respective cross-cutting and sectoral actions.

Climate Change Framework Bill (PLMCC)
In January 2020, the Climate Change Framework Bill (PLMCC)[49] started its process in the Senate, following a consultation in 2019[50]. The PLMCC establishes, among other things, a carbon neutrality target for the year 2050. On 25 August 2020, the Senate unanimously approved the idea of passing legislation. This marked the end of the general discussion stage of the PLMCC in the Senate's Environment and National Assets Committee, where it was deliberated in hearings in which the committee invited different actors from the social, academic, private, public and international spheres.

National Action Plan on Climate Change, 2017-2022
In the *National Action Plan on Climate Change* 2017-2022, it is mentioned how the Climate Change Office, at the beginning of 2017, became the Climate Change Division (DCC), maintaining its original responsibilities, but with greater weight within the organisational structure. The Ministry of Environment considers the competencies of other sectors, through the Council of Ministers for Sustainability, a public policy deliberation and general regulation body on environmental matters, composed of the Minister of the Environment—who chairs it—and his peers from Agriculture, Finance, Health, Economy, Development and Reconstruction, Energy, Public Works, Housing and Urban Planning, Transport and Telecommunications, Mining, and Social Development. In 2014, this Council agreed to begin the process of calling itself the Council of Ministers for Sustainability and Climate Change, which would also include the Ministry of Foreign Affairs (MINREL), due to its role in international negotiations.

In 2016, the Sustainability and Climate Change Agency was created, whose main role is to promote the inclusion of CC and sustainable development issues in the private sector through public-private agreements and the implementation of programmes and projects that contribute to the construction of a low-carbon economy and the fulfilment of Chile's commitments under the Paris Agreement.

Long-Term Climate Strategy (ECLP)
In the *Climate Change Framework Bill*, the country commits to develop, implement and monitor its Long-Term Climate Strategy (ECPL)[51], with the Ministry of Environment acting as the coordinator of this process. The ECPL is the instrument that defines the general long-term guidelines that the country will follow in a cross-cutting and integrated manner, considering a 30-year horizon, in order to face the challenges posed by CC, move towards a low GHG emissions development until reaching and maintaining GHG emissions neutrality, reduce vulnerability and increase resilience to the adverse effects of CC, and comply with the international commitments assumed by the State of Chile in this area. Among its most relevant contents are the adaptation indicators and targets as established in the bill, which must be met within ten years, as well as guidelines on adaptation to CC, and risk assessment, considering the vulnerability of each specific sector.

4.3.3.3. Vertical arrangements

The Council of Ministers for Sustainability acts as a focal point for the UNFCCC and all other international bodies related to the CC issue. Its action in this area is exercised through the Department of Environment and Ocean Affairs (DIMA), which exercises the role of technical focal point on the issue of CC, as established by the legal provisions in force, through the Climate Chan based in the Division of Air Quality and Climate Change, an inter-ministerial coordination body, corresponding to the ETICC and units belonging to the various ministries that have taken direct action.

49 http://leycambioclimatico.cl/leyccchile/

50 https://cambioclimatico.mma.gob.cl/proceso-de-consulta-publica-del-anteproyecto-de-ley-marco-de-cambio-climatico/

51 https://cambioclimatico.mma.gob.cl/estrategia-climatica-de-largo-plazo-2050/descripcion-del-instrumento/

A new component at regional level is incorporated, which is formed by the CORECCs. These committees are chaired by the Regional Governors and are made up of representatives of the Regional Government (GORE), the Regional Council (CORE), the Provincial Governors, the Climate Change Focal Point of the Regional Ministerial Secretariats (SEREMI) of the Ministry of the Environment, delegates from the SEREMI and public services of other ministries that are members of the ETICC and the Sustainability and Climate Change Agency, representatives of the municipalities and representatives of the Regional Advisory Council and other participatory bodies that each CORECC decides on.

The Regional Action Plans[52] are established as CC management instruments at the territorial level in the Climate Change Framework Bill currently being considered in Congress, specifically in the Senate's Environment and National Assets Committee. These plans were also committed to in the updated NDC that Chile submitted to the UNFCCC in 2020, and are consistent with the strategic lines of the *National Action Plan on Climate Change* 2017-2022.

The project *Strengthening and Expansion of the Chilean Network of Municipalities in the Face of Climate Change*[53] aimed to empower local governments and increase the adaptive capacity of communities, ecosystems and the economy towards CC. It was funded by the European Union and implemented by Adapt-Chile, with the support of the municipalities of Independencia and Peñalolén. For two years, the Municipal Climate Change Network (RedMuniCC) was strengthened, comprising 33 municipalities, representing more than 39% of the national population. Climate Change Academies were developed for training and the delivery of programming and communication tools. The commitment of the municipalities was formalised through the formulation of 20 local climate change plans in seven regions, which will make it possible to plan and guide municipal climate action based on the characteristics and needs of each territory. The most important platform to make their actions visible is the Mayors' Forum on Climate Change, where they meet annually to discuss the main needs and contributions of local governments to combat climate change and its impacts.

The function of the Citizen Consultation in the framework of the operational structure is to generate citizen participation during the process of the elaboration and implementation of CC plans and measures, with the aim of generating a high level of acceptance and support. The Citizen Consultation during the elaboration of the plans is organised by the Regional Focal Point for Climate Change of the Ministry of Environment in coordination with the Inter-ministerial Technical Team on Climate Change (ETICC) and the Regional Ministerial Secretariats (SEREMI) of the relevant ministries. Within the framework of this type of Citizen Consultation, the Preliminary Draft of the Sectoral Plan is presented and opinions and contributions are sought as inputs for the elaboration of the final version of the plan. The objective of the Regional Advisory Councils is to have a permanent participation of civil society organisations in the processes of implementation and monitoring of the components of the sectoral plans at the local level.

52 https://cambioclimatico.mma.gob.cl/avanza-la-elaboracion-de-los-primeros-4-planes-de-accion-regionales-de-cambio-climatico/

53 Leclerc G. & Morales Solís-Rosas M. 2019. *Adaptación al cambio climático y desarrollo local: una propuesta frente a la urgencia* [Policy Brief]. Latino Adapta.

4.3.3.4. Horizontal arrangements

National Mountain Committee
In 2014, the advisory committee called the National Mountain Committee was formalised (Decree №108 of 12 September 2014), chaired by the Ministry of Foreign Affairs, with the Ministry of Environment acting as technical secretariat. The objective is the elaboration of the National Policy for Sustainable Mountain Management and the Action Plan to 2030. It is currently undergoing a consultation process through the Strategic Environmental Assessment.

National Strategy on Climate Change and Vegetation Resources (ENCCRV)
The overall objective of the ENCCRV, which was approved in 2016, is to reduce the social, environmental and economic vulnerability generated by CC, desertification, land degradation and drought on vegetation resources and human communities that depend on them, in order to increase the resilience of ecosystems and contribute to mitigating CC by promoting the reduction and capture of GHG emissions in Chile[54]. The adaptation goal seeks to reduce vulnerability associated with the risk of land degradation through the management of vegetation resources, through the direct intervention of at least 264,000 ha between 2017 and 2025. The contribution to reducing vulnerability will be assessed in terms of indicators associated to biodiversity, provision of ecosystem services such as the supply and regulation of water flows and water quality, as well as soil productivity.

At the beginning of 2016, the implementation phase of the ENCCRV began with the execution of projects in the territory in order to test all the technical, financial and capacity building mechanisms planned, which was made possible with international funding donated to Chile. Four projects were completed in the territory on native forest restoration with emphasis on the provision of water resources, four firewood and CC projects aimed at promoting the sustainable use of firewood, and two projects in the area of preventive forestry to reduce the occurrence and spread of forest fires. Several projects focused on the forestry and livestock sector are in the process of being implemented, with the central objective of managing mechanisms for valuing the environmental services provided by native vegetation resources, including systems of payments for performance that respect benefit sharing and environmental and social safeguards.

Climate Change Adaptation Plan for the Forestry and Livestock Sector
The *Climate Change Adaptation Plan for the Forestry and Livestock Sector* was developed jointly by the Ministries of Agriculture and Environment and was launched publicly in October 2013. The plan's 21 CC adaptation measures focus on (1) water management; (2) research, information and training; (3) management of agricultural crops and forests; and, (4) risk management and insurance. In addition, it seeks to improve the competitiveness of agriculture; the promotion of research and innovation; the promotion of economic, social and environmental sustainability; transparency and access to markets; and, the modernisation of the Ministry of Agriculture and its services.

Climate Change Adaptation Plan for Biodiversity
The *Climate Change Adaptation Plan for Biodiversity* has been developed during 2011-2013 as a joint process of eight ministries, coordinated by the Ministry of Environment, and was approved in July 2014 by the Council of Ministers for Sustainability. The 50 measures of the plan correspond to four specific objectives: (1) biodiversity research

54 https://www.enccrv.cl/

and capacity building in management, information and environmental awareness, at national, regional and local levels; (2) promotion of sustainable productive practices for CC adaptation in biodiversity and the maintenance of ecosystem services; (3) consideration of biodiversity objectives in urban territorial planning instruments, in Regional Land Management Plans (PROT), or others, as a mechanism for CC adaptation; and, (4) strengthening of the National System of Protected Areas and implementation of CC adaptation measures at the ecosystem and species level, in terrestrial, marine, coastal, inland water and oceanic island environments, in rural, urban and peri-urban areas.

4.3.4. Colombia

4.3.4.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Colombia has enacted a large number of regulations and created new institutions on CC and adaptation, as well as specific instruments on paramo and high mountain socioecosystems (see Table 8).

National policy on CC and adaptation in Colombia is closely linked to development planning and high mountain ecosystems. Colombia is one of the only countries to have a specific law on paramo conservation and is in the process of building its *Strategy for the Integrated Monitoring of High Mountain Ecosystems* (EMA, see IDEAM et al. 2018). In addition, Colombia has made considerable progress compared to other countries in the construction of the monitoring and evaluation system for CC adaptation. On the other hand, one of the biggest challenges facing the government is the difficulty of adequately articulating the broad set of regulations at the central level. Furthermore, the implementation of these policies is often linked to international cooperation projects, which makes it difficult to ensure their continuity over time. In addition, the country has several thematic environmental information systems, belonging to the Colombian Environmental Information System (SIAC), which, although they constitute an advance for the generation of knowledge on CC, can also hinder access to and adequate use of this information, insofar as their effective integration constitutes a permanent challenge.

Table 8. *Avances normativos de las políticas de adaptación al CC en Colombia*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC, update 2020 *National Development Plan, 2018-2022* *Law 1,931 on Climate Change, 2018* *National Climate Change Adaptation Plan (PNACC)* *National Plan for Disaster Prevention and Response (PNPAD)* *Long-Term Strategy 2050*
Vertical arrangements (decentralisation, civil participation, monitoring)	National Climate Change Council National Climate Change System (SISCLIMA) National Climate Change Information System (SNICC) National Climate Change Adaptation Indicator System (SNIACC) *Comprehensive Territorial Climate Change Management Plans (PIGCCT)* Regional Territorial Climate Change Nodes (NRCC) CONPES 3700: *Institutional Strategy for the Articulation of Policies and Actions on Climate Change in Colombia*
Horizontal arrangements (cross-sectoral articulation, mitigation/adaptation articulation, EbA)	Intersectoral Commission on Climate Change (COMICC) *Comprehensive Sectoral Climate Change Management Plans* (PIGCCS) *Intersectoral Agendas on Climate Change* *National Strategy for Education, Training and Public Awareness on Climate Change* *Strategy for the Integrated Monitoring of High Mountain Ecosystems* (EMA) *Law 1,930 for the Comprehensive Management of Paramos* Ministerial Resolution №464 of 2017: *Strategic Public Policy Guidelines for Peasant, Family and Community Agriculture* (ACFC) *National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas (*PNR), 2015-2035 *National Policy for the Comprehensive Management of Biodiversity and its Ecosystem Services* *National Policy for the Comprehensive Management of Water Resources*

4.3.4.2. Main regulatory frameworks at national level

NDC update, 2020
The process of updating the NDC formally began in September 2019, with the approval of its roadmap at the *7th Session of the Intersectoral Commission on Climate Change* (CICC). From the sectoral approach, goals and measures have been identified to be included in the *Comprehensive Sectoral Climate Change Management Plans* (PIGCCS). From the territorial approach, there have also been working groups and territorial workshops with the Regional Territorial Climate Change Nodes (NRCC), where, based on the country's *Comprehensive Territorial Climate Change Management Plans* (PIGCCT), the most relevant territorial mitigation measures and goals are being identified for inclusion in the NDC as the country's international commitment.

For the period 2020-2030, the following adaptation goals have been identified: (1) a National Adaptation Indicator System to monitor and evaluate the implementation of adaptation measures, (2) the country's priority basins will have water resource management instruments with variability and CC considerations, and (3) six priority sectors of the economy—transport, energy, agriculture, housing, health, commerce, tourism and industry—will include CC considerations in their planning instruments and will be implementing innovative adaptation actions.

Law 1,931 on Climate Change
Law 1,931[55] of 2018 creates the National Council on Climate Change as a permanent advisory and consultative body of the CICC whose representation seeks to be multi-stakeholder, however, it does not include the participation of indigenous peoples, peasants and Afro-Colombians, who enjoy special treatment and are not represented in civil society organisations in all cases. It also creates the National Climate Change Information System (SNICC), which will contain transparent and consistent data and information over time for decision-making related to CC management.

National Climate Change Adaptation Plan (PNACC)
Since 2011, Colombia has had a PNACC, which aims to reduce the risk and socio-economic impacts associated with variability and CC. The plan is conceived to be developed in four phases: (1) conceptual and methodological, (2) support for the formulation of adaptation plans, (3) implementation of adaptation actions, and (4) monitoring and evaluation of implemented adaptation actions.

The main goals of the plan are to: (1) generate better knowledge about potential risks and current impacts, including their economic valuation; (2) take advantage of opportunities associated with climate change and variability; (3) incorporate climate risk management into sectoral and territorial development planning; and, (4) identify, prioritise, implement, evaluate and monitor adaptation measures to reduce the vulnerability and exposure of socio-economic systems to climate events. The aim is to move towards a new management model for sustainability that includes climate challenges. It is necessary to integrate Climate Change Management, Environmental Management and Risk Management in order to guarantee the sustainability of development in this country. In this sense, the *National Development Plan* (PND), local development plans, as well as the *Territorial Management Plan* (POT) and the *Watershed Organisation and Management Plans* (POMCA), among others, must integrate climate variables.

For the monitoring phase, the country received technical assistance from the Climate Technology Centre and Network (CTCN) between 2015-2016, with the aim of designing the National Climate Change Adaptation Indicator System (SNIACC), as part of the Colombian Environmental Information System (SIAC). In addition, an inter-institutional roundtable was created to support its conceptualisation. This input is considered the first effort that Colombia has made in the process of building a monitoring and evaluation system for adaptation. The process is led by the Climate Change Division of the Ministry of Environment and Sustainable Development (DCC-MADS). The SNIACC, in addition to being within the framework of the Climate Change Policy and Law, was incorporated by the National Government in the bases of the *National Development Plan "Pact for Colombia, Pact for Equity"* 2018-2022 established by Law 1,955 of 2019, under the understanding that it is essential to accompany the implementation of actions towards climate management with a respective evaluation.

At the same time, the country has a working body, led by the Ministry of Environment and Sustainable Development (MADS), formed from the need for projects, programmes and other initiatives to share experiences and collectively build the technical inputs of the National Adaptation Monitoring System, to be articulated with national priorities and needs as well as with the country's international commitments. The Adaptation Monitoring Board was created in 2017 and is made up of the same entities that are part of the Coordinating Committee of the PNACC plus various implementers of non-state adaptation projects and initiatives, which have been linked progressively.

Finally, the programme called Preparedness for National Adaptation to Climate Change, with support from the Green Climate Fund, is sponsored by the National Government and committed to the implementation of the PNACC and to strengthen the functioning of its coordinating committee, reinforcing its capacities to plan, prioritise, implement and monitor CC adaptation measures in the country.

4.3.4.3. Vertical arrangements

In accordance with the guidelines of CONPES 3700 (National Council for Economic and Social Policy) approved in 2011, the National Climate Change System (SISCLIMA, Decree №298 of the Ministry of Environment and Sustainable Development) will be made up of an Intersectoral Climate Change Commission (COMICC), which will have Guiding and Advisory Councils, a Financial Management Committee and four Permanent Councils that will be made up of Working Groups. The Working Groups of the Sectoral Committee will be in charge of formulating the Sectoral Adaptation Plans. For their part, the Working Groups of the Territorial Committee will provide support to the territories for the preparation of the Territorial Adaptation Plans through the Regional Territorial Climate Change Nodes (NRCC). CONPES 3700 proposed the Institutional Strategy for the Articulation of Policies and Actions on Climate Change in Colombia.

Likewise, the Sectoral Committee and the Territorial Committee, under the secretariat of the National Planning Department (DNP) and the Ministry of Environment and Sustainable Development respectively, will be responsible

55 https://sostenibilidad.semana.com/opinion/articulo/ley-de-cambio-climatico-una-oportunidad-para-colombia/42028

for presenting the projects identified by the sectors and territories in terms of adaptation to the Financial Management Committee to ensure their technical and financial viability. These instruments include the *Territorial Management Plan* (PND), the Departmental and Municipal Development Plans, the *Territorial Management Plan* (POT), the National Plan for Disaster Prevention and Attention (PNPAD) and other territorial, environmental and sectoral planning tools.

One of the great contributions to CC adaptation was the creation of the Institutional Strategy for the Articulation of Climate Change Policies and Actions in Colombia—the focus of CONPES 3700, which defined as its central goal "to facilitate and promote the formulation and implementation of CC policies, plans, programmes, incentives, projects and methodologies, achieving the inclusion of climate variables as determinants for the design and planning of development projects, through the configuration of an intersectoral articulation scheme. This scheme should permeate the current social and economic development model in a cross-cutting manner at all levels and in all institutions. In addition, it should permeate the highest levels of decision-making in each of the sectors and communities."

National Strategy for Education, Training and Public Awareness on Climate Change
This national strategy is the result of inter-sectoral and inter-institutional consultation work involving the UNFCCC Article 6 National Roundtable, composed of public and private entities, research institutes, civil society organisations and academia, among others. The objective of the strategy is to establish guidelines for the implementation of programmes and projects that promote access to information, public awareness, training, education, research and participation, in order to contribute to capacity building at local, regional and national levels on the issue of CC.

4.3.4.4. Horizontal arrangements

Intersectoral Commission on Climate Change (CICC)
The CICC approved its Action Plan[56] for the period 2019-2020, which covers the main initiatives in the area of CC. This plan was developed jointly with the technical committee of the CICC, which advises the commission, and responds to the international and institutional policy framework for CC management. The first component of the action plan corresponds to the *Intersectoral Climate Change Agendas*, which aim to contribute to the fulfilment of the short-term goals for mitigation, adaptation and risk management established in the *National Development Plan*. The updating of the NDC is complemented by the 2050 strategy, which is characterised by its long-term vision, and becomes an opportunity to project what would be the major transformations required by the country to move towards a decarbonisation of the economy by 2050. The inter-institutional work carried out by the CICC within the framework of the SISCLIMA focused the third component on the regulation of the *Climate Change Law*, as a basis for consolidating the short, medium and long-term strategic actions proposed in this action plan.

56 https://www.minambiente.gov.co/index.php/temas-cambio-climatico/4141-la-comision-intersectorial-de-cambio-climatico-aprueba-su-plan-de-accion-para-el-periodo-septiembre-2019-septiembre-2020

Ministerial Resolution №464 of 2017: Strategic Public Policy Guidelines for Peasant, Family and Community Agriculture (ACFC)
Between 2016 and 2018, the Green Growth Mission identified aspects to increase the productivity of agriculture in the country and the economic growth of the sector, incorporating elements of efficient and sustainable use of natural resources, climate-adapted growth and inclusive growth. In turn, the *Comprehensive Climate Change Management Plan for the Agriculture and Livestock Sector* allows for this articulation between portfolios.

In the same sector, the Ministry of Agriculture and Rural Development—in collaboration with the UNDP/FAO-led *Agriculture Integration Programme* of the *National Adaptation Plans* (NAP-Ag)—is making progress in building a national system on monitoring and evaluation for adaptation in the agricultural sector[57] in line with the national information strategy for CC management. The development of this system is led by the Institute of Hydrology and Climate Change. Both entities are advancing in the construction of a national system on monitoring and evaluation for adaptation in the agricultural sector in line with the national information strategy for CC management, whose development is led by the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM), as technical secretariat of the Technical and Scientific Information Committee of SISCLIMA.

Law 1,930 for the Comprehensive Management of Paramos
Colombia pays much attention to the paramo issue in national policy, including Law 1,930 for the Comprehensive Management of the Paramos, which sets out strict regulations for mining and other productive activities. In turn, paramos and high mountains ecosystems have been the subject of detailed attention from national environmental institutions such as the IAvH, IDEAM, and the Agustín Codazzi Geographic Institute (IGAP) on issues such as monitoring and sustainable management. The law includes the legal delimitation of the country's paramos, the need to identify high and low impact productive activities, and proposes to generate processes of productive reconversion and participatory monitoring of the delimited paramo complexes.

National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas (PNR), 2015-2035
The PNR[58] aims to guide and promote the ecological restoration, recovery and rehabilitation of troubled areas in Colombia within a broad framework of biodiversity conservation and adaptation to global changes. The implementation of the National Restoration Plan will be the responsibility of, among others, the Regional Environmental Commissions (CAR) and the environmental authorities of the large urban centres, who must include it in their regional environmental management plans and the action plans or instruments that replace them, seeking the participation of the communities in the search for benefits and economic stimuli from restoration.

57 Monitoreo y Evaluación para la adaptación al cambio climático del sector agropecuario | UNDP Climate Change Adaptation (adaptation-undp.org)

58 Ministry of Environment and Sustainable Development. 2015. *Plan Nacional de Restauración: Restauración Ecológica, Rehabilitación y Recuperación de Áreas Disturbadas* [National Restoration Plan. Ecological Restoration, Rehabilitation and Reclamation of Damaged Areas]. Bogota, Colombia.

Strategy for the Integrated Monitoring of High Mountain Ecosystems (EMA)
The Strategy for Comprehensive Monitoring of EMAs in Colombia[59] is being developed by IDEAM and IAvH in collaboration with CONDESAN[60], in the framework of the PBA and A@A (SDC). It constitutes an opportunity for the generation of an integrated monitoring system with an adaptive management approach that will make it possible to assess the impact of changes in the political-economic context and global change on biodiversity, ecosystem services and the living conditions of the population, providing inputs for territorial planning, adaptation to CC and ecological restoration (Llambí et al. 2019a, 2019b). It is framed within the adoption of Law 1,930 of 2018, which establishes the need to promote monitoring plans in the country's paramo complexes with the active participation of the local population and to generate information that supports the process of reconversion towards low-impact land-use strategies in the high mountains.

The general objectives proposed for the EMA are: (1) to assess the current status and trends of change of variables and indicators linked to the ecological integrity, biodiversity, functioning and ecosystem services of Colombia's high Andean ecosystems; (2) to relate these changes to the main agents driving the transformation processes operating at different spatio-temporal scales, including CC and demographic, socio-economic and land use dynamics; and, (3) to generate information to evaluate the effectiveness of the main environmental strategies and policies and territorial governance schemes, and to guide decision-making processes at different scales. In turn, the system should contemplate linkage and interoperability mechanisms with other international monitoring networks active in the region (GLORIA-Andes, GNOMO-The Global Network of Mountain Observatories, PBA) and with the Colombian Environmental Information System (SIAC).

4.3.5. Ecuador

4.3.5.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Ecuador has advanced towards the consolidation of the national regulatory framework on the environment, CC and adaptation through the approval of key instruments such as the *Organic Environmental Code* and the project on a *National Climate Change Adaptation Plan*, as well as the creation of an articulation mechanism such as the Inter-Institutional Committee on Climate Change (see Table 9).

Policy tools on CC in the country are mostly articulated around the issue of natural inheritance and water resources management, which guides the government's strategic lines on CC adaptation. This is evident in the project supported by EUROCLIMA+, and executed by the Ministry of Environment and Water of Ecuador for the preparation of the implementation plan for adaptation measures in the water resources sector contained in the NDC and in the National Climate Change Adaptation Plan of Ecuador[61].

Table 9. *Regulatory progress on CC adaptation policies in Ecuador*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC, 2019 *National Plan to Live Well, 2017-2021* *National Strategy on Climate Change* (ENCC 2012-2025) *Project for a National Plan on Adaptation to Climate Change* (PLANACC) *Organic Law on Citizen Participation* *Proposed Strategy for National Climate Finance* (EFIC)
Vertical arrangements (decentralisation, civil participation, monitoring)	Inter-Agency Committee on Climate Change (CICC) *Organic Environmental Code* (COA) *Organic Code of Territorial Organisation, Autonomy and Decentralisation* (COOTAD) Decentralised National System of Participatory Planning (SNDPP) *National Territorial Strategy* (ETN) Consortium of Provincial Governments of Ecuador (CONGOPE) *Regional Climate Change Strategies* (ERCC)
Horizontal arrangements (cross-sectoral articulation, mitigation/ adaptation articulation, EbA)	Sectoral Councils Sectoral Citizens' Councils *National Forest Restoration Plan,* 2019-2030

4.3.5.2. Main regulatory frameworks at national level

NDC, 2019
In the first months of 2019, the official technical and political validation process of the NDC document was carried out. The overall aim of the NDC[62]. for Ecuador is to implement policies, actions and efforts that promote the reduction of GHGs, and that increase resilience and decrease vulnerability to the adverse effects of CC in the sectors prioritised in the National Climate Change Strategy. The priority sectors for CC adaptation are: (1) human settlements, (2) water endowment, (3) natural assets, (4) productive and strategic sectors, (5) health, and (6) food security, agriculture, livestock, aquaculture and fisheries. Risk management and the prioritisation of target groups are cross-cutting approaches in all six sectors.

From an adaptation perspective, the specific objective of the NDC is to contribute, at national, sub-national and local levels, to global efforts to increase adaptive capacity, promote climate resilience and reduce risk to CC impacts, in a context

59 Institute of Hydrology, Meteorology and Environmental Studies, Biological Resources Research Institute Alexander von Humboldt and Consortium for the Development of the Andean Ecoregion. 2018. *Propuesta de Estrategia para monitoreo integrado de los ecosistemas de alta montaña de Colombia* [Proposal for a Comprehensive Monitoring Strategy for Colombia's High Mountain Ecosystems]. Bogota: IDEAM-IAvH-CONDESAN, p. 54, http://documentacion.ideam.gov.co/openbiblio/bvirtual/023886/Estrategia_EMA.pdf

60 http://www.bosquesandinos.org/arranca-la-fase-piloto-de-la-estrategia-de-monitoreo-integrado-de-los-ecosistemas-de-alta-montana-en-colombia/

61 EUROCLIMA+ es un programa financiado por la Unión Europea - Fortalecimiento de la gestión de adaptación al cambio climático en el sector de Patrimonio Hídrico en Ecuador (euroclimaplus.org)

62 Republic of Ecuador. March 2019. *Primera Contribución Determinada a nivel Nacional para el Acuerdo de París bajo la CMNUCC* [First Nationally Determined Contribution to the Paris Agreement under the UNFCCC]. Quito.

of equity, sustainable development and poverty eradication, respecting the principle of common but differentiated responsibilities, and in accordance with the country's capabilities.

An important milestone in the management of adaptation to CC in Ecuador is the explicit incorporation of the issue in the 2017 Organic Environmental Code (COA). Its objective is to guarantee the right of people to live in a healthy and ecologically balanced environment, as well as to protect the rights of nature recognised in Ecuador's Constitution. Its objectives include establishing effective, efficient and cross-sectoral measures to address the effects of CC through mitigation and adaptation actions. Through Executive Decree №752, in May 2019, the country published the COA regulation which, through Book 4 "Climate Change", facilitates the construction of technical regulations for the implementation of the NDC.

The inclusion of the climate dimension, including adaptation issues, has been a priority for the CC management agency since 2014. In this regard, a pilot process was launched in 2014 at the national level to provide technical instruments to the country's Decentralised Autonomous Governments (GAD) to incorporate the CC variable into their Territorial Development and Management Plans (PDOT) and for the preparation of CC plans. As of 2018, the initiative was introduced into the process carried out by the National Secretariat for Planning and Development (SENPLADES, currently the Technical Secretariat Planifica Ecuador), in its capacity as the governing body for land use planning, to update the guidelines for development and land use plans for provincial, cantonal and parish governments, and the creation of a toolkit, consisting of a set of inputs that allow the governments to apply the directives in the land use planning process.

National Strategy on Climate Change (ENCC 2012-2025)
The high-level political forum for the coordination and articulation of policies and measures/actions is represented by the Inter-Institutional Committee on Climate Change (CICC), created by Executive Decree №495. As part of its attributions, the CICC will approve the formation of intersectoral working groups, which will address specific elements of the strategy that contribute to the elaboration and implementation of the National Mitigation and Adaptation Plans with their respective programmes. These intersectoral working groups are additional to the Sectoral Councils. Their work is based on the intersectoral nature of CC management, without losing sight of their relationship with the work of the Sectoral Councils. They will also seek to define the formal space for the participation of civil society actors involved in the design and implementation of the strategy's national plans.

The Sub-Secretariat for Climate Change of the Ministry of Environment and Water (MAAE), in its role as Technical Secretariat of the Inter-Institutional Committee on Climate Change (CICC), will facilitate the implementation of the strategy. The *Implementation Mechanism of the National Climate Change Strategy* has three instruments: the *Plan for the Creation and Strengthening of Conditions, the National Adaptation Plan and the National Mitigation Plan*. The overall idea is to build and strengthen the capacity of social, economic and environmental systems to cope with the impacts of CC. The specific goals are to: (1) implement measures to ensure food security in the face of CC impacts; (2) initiate actions to ensure that the performance levels of the productive and strategic sectors, as well as the country's infrastructure, are not altered by the effects of CC; (3) implement prevention measures to protect human health with regard to CC effects; (4) manage the water endowment with a comprehensive and integrated approach by hydrographic unit, to ensure the availability, sustainable use and quality of the water resource for the various human and natural uses, given the impacts of CC; (5) conserve and sustainably manage the natural assets and its terrestrial and marine ecosystems, to contribute to their capacity to respond to the effects of CC; (6) take measures to guarantee access by priority groups to resources that contribute to strengthening their capacity to react to CC; (7) include comprehensive risk management for extreme events attributed to CC in public and private spheres and activities; and, (8) implement measures to increase the capacity of human settlements as a response to the adverse effects of CC.

The ENCC 2012-2025, through the Technology Development and Transfer Programme, contemplates the identification of technologies and/or ancestral practices that can facilitate the implementation of mitigation and adaptation measures.

Project for a National Plan on Adaptation to Climate Change (PLANACC)
The main goals of the PLANACC[63] are: (1) reduce vulnerability to CC impacts, through increasing adaptive capacity and building resilience in the prioritised sectors established in the *National Climate Change Strategy*; and, (2) facilitate the coherent integration of CC adaptation into development planning processes, policies and strategies in the six prioritised sectors for adaptation in Ecuador, as well as in new or existing programmes and projects that contribute to adaptation. The document has a national scope and plans to interact with the Decentralised Autonomous Governments (GAD) at three levels (parochial, cantonal and provincial), leading sectoral institutions and other key actors in the six sectors prioritised for adaptation in the country: natural resources, water assets, health, human settlements, productive and strategic sectors, and food security, agriculture, livestock, aquaculture and fisheries.

National Plan to Live Well "Toda una Vida" 2017-2021
The *National Development Plan* for the period 2017-2021 is organised into three programmatic lines and nine *National Development Goals*, based on environmental sustainability and territorial development. The first line, "Rights for all throughout life", establishes the protection of the most vulnerable people, asserts plurinationality and interculturality, proposes the eradication of poverty and of all types of discrimination and violence, and guarantees the rights of nature. Objective 3.3 mentions "encouraging good environmental practices that contribute to the reduction of pollution, conservation, mitigation and adaptation to the effects of climate change, and promoting them at the global level".

4.3.5.3. Vertical arrangements

Ecuador recognises, through its *Planning and Public Finance Organic Code* (COPFP), that in the design and implementation of public investment programmes and projects, the incorporation of ecosystem-friendly actions, CC mitigation and adaptation, and the management of vulnerabilities as well as natural and anthropogenic risks will be promoted.

The GADs, which represent the regional, provincial, cantonal and parochial levels of management, have delimited competencies, duties and levels of participation to fulfil in order to organise their management, largely determined in the *Organic Code of Territorial Organisation, Autonomy and Decentralisation* (COOTAD) of October 2010.

63 https://www.ec.undp.org/content/ecuador/es/home/presscenter/articles/2019/plan-nacional-de-adaptacion--una-respuesta-para-reducir-los-efec.html

The *Guidelines for Development Planning and Land Management of the Strategy for the Strengthening of the Decentralised National System of Participatory Planning* (SNDPP) establish that national planning is the exclusive competence of the Central Government and development planning and land management at regional, provincial, cantonal and parochial levels is the exclusive and obligatory competence of the GADs. The *National Territorial Strategy* (ETN) represents a constituent part of the *National Development Plan* (PND), whose determinations will have a binding character and will be mandatory for all institutions of the Decentralised National System of Participatory Planning (SNDPP).

With the Ministerial Agreement №137, general guidelines for the elaboration of CC plans, programmes and strategies in the GADs were issued in a technical document called *Explanatory Directive: How to Incorporate Climate Change in Local Planning*. The ministerial agreement encourages sub-national governments to submit *Climate Change Plans* (CCP) for approval by the Ministry of Environment and Water and to incorporate the climate variable into their *Territorial Development and Management Plans* (PDOT). The Consortium of Provincial Governments of Ecuador (CONGOPE) is a territorial coordinating body, which covers up to the provincial level, and a key factor in the process of building the NDCs. It is currently working to strengthen the capacities of provincial governments to generate their regional climate change strategies (ERCCs).

Civil society participation processes as part of public management are underpinned by the *Organic Law on Citizen Participation*, issued in April 2010 and updated in May 2011. This law mandates state entities to design and implement Sectoral Citizen Councils. These councils constitute the space for dialogue between civil society and the government for public management that harmonises the interests of different stakeholders.

4.3.5.4. Horizontal arrangements

Climate Change Sectoral Councils
The Executive Decree №726 (2011) establishes the characteristics of the so-called sectoral councils, instances of mandatory institutional convening aimed at the review, articulation, coordination, harmonisation and approval of ministerial and inter-ministerial policy within a sector and subject to the National Plan for Living Well. The following sectoral councils have been created in Ecuador: social development; strategic sectors; patrimony; economic policy; production, employment and competitiveness; security; politics; and, human talent and knowledge. The priority sectors for adaptation to climate change in Ecuador are: food security; agriculture, livestock, aquaculture and fisheries; productive and strategic sectors; health; water resources; natural heritage; priority groups; human settlements; and, risk management.

National Forest Restoration Plan, 2019-2030
On 22 July 2019, the Ministerial Agreement №065 of the Ministry of Environment and Water was published, which issued the *National Forest Restoration Plan 2019-2030*[64]. The execution of this plan will allow an investment of more than 30 million dollars, from international cooperation and the Central Government, for the implementation of restoration processes of 30,000 ha of degraded ecosystems nationwide, to benefit more than 17 million Ecuadorians thanks to the regulation of the water cycle for the provision of quality clean water and the improvement in the quality of agricultural soils. The implementation of the plan will strengthen local conservation programmes and projects for the restoration of the country's fragile ecosystems. More than 190,000 people linked to the restoration processes will benefit directly from the plan, as it will allow the promotion and development of bio-enterprise projects through the sustainable use of natural resources with a comprehensive, plural and participatory approach.

64 Ministro Marcelo Mata presentó el Plan Nacional de Restauración Forestal 2019-2030 – Ministerio del Ambiente y Agua

4.3.6. Peru

4.3.6.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Peru has consolidated the national regulatory framework on environmental management and CC, through the approval of several laws, as well as the development of specific CC adaptation measures and proposals in the country (see Table 10).

One of Peru's main advances in terms of CC management policies is the approval of the *Framework Law on Climate Change* in 2018, which consolidates the national institutional framework on CC by strengthening the powers of the Ministry of the Environment (MINAM) and subsequently creating the High-Level Commission on Climate Change (CANCC) in 2020. On the other hand, a challenge for CC adaptation policies in the country is to give more explicit visibility to mountain socioecosystems in the priority lines, beyond their sectoral focus on forests and water. In turn, this poses the challenge of making CC adaptation visible in other non-forest mountain ecosystems in the country, such as paramos, jalcas and punas.

Table 10. *Regulatory progress on CC adaptation policies in Peru*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC, update 2021-2030 *Law 30,754: Framework Law on Climate Change, 2018* (LMCC) *Law 28,611: General Law on the Environment* *Law 28,245: Framework Law on the National Environmental Management System* *National Strategy on Climate Change* (ENCC) *Project for a National Plan on Adaptation to Climate Change* *Long-Term Climate Strategy 2050*
Vertical arrangements (decentralisation, civil participation, monitoring)	*Climate Change Adaptation and Mitigation Action Plan 2010* (PAAMCC), Ministry of Environment (MINAM) *Organic Law on Regional Governments* *Regional Strategy on Climate Change* Regional Environmental Commissions (CARs), Regional Technical Groups on Climate Change (GTRCC) Municipal Environmental Commissions (CAMs) Peru's Indigenous Peoples' Platform for Climate Change (PPICC)
Horizontal arrangements (cross-sectoral articulation, mitigation/ adaptation articulation, EbA)	Multisectoral Commission – High-Level Commission on Climate Change (CANCC) Multisectoral Task Force *Law 30,215: Law on Mechanisms of Remuneration for Ecosystem Services (MERESE)* Technical Group on Mountains - General Office for Biological Diversity *Proposal for a National Policy on Glaciers and Mountain Ecosystems* (PNGYEM)

4.3.6.2. Main regulatory frameworks at national level

NDC update, 2021-2030

The updating of Peru's NDC[65] to the year 2030 was carried out through a participatory, multi-level and multi-stakeholder process with the aim of ensuring the formulation, updating and implementation of the country's national contributions. In the NDC, the Peruvian State commits to contribute to the global goal of adaptation through the reduction of damages, possible alterations and the resulting current and future losses generated by the hazards associated with CC on populations and their livelihoods; on watersheds, ecosystems and territories; and, on the country's infrastructure, goods and services. At the same time, it seeks to take advantage of the opportunities offered by CC for sustainable and climate-responsible development. Peru presented five priority sectors or systems for adaptation to CC: water, agriculture, fisheries, forests and health.

65 Government of Peru. December 2020. *Reporte de actualización período 2021-2030 de las Contribuciones Determinadas a Nivel Nacional del Peru* [Peru's Nationally Determined Contributions Update Report 2021-2030]. Lima.

Framework Law 30,754 on Climate Change (LMCC)

In parallel to the process of updating the NDC, the Peruvian State has strengthened the regulations and institutions that support the comprehensive management of CC in the country. In this regard, the enactment of *Framework Law 30,754 on Climate Change* (LMCC) in April 2018, and the approval of its regulations (*Supreme Decree Nº013-2019*, MINAM) in December 2019, were a turning point.

The LMCC[66] aims to establish the principles, approaches and general provisions for the participatory, transparent and comprehensive management of CC, in order to reduce the country's vulnerability, take advantage of the opportunities of low-carbon growth and comply with the international commitments assumed by the State before the UNFCCC. This law establishes clear directives and defines specific guidelines for government sectors, regional governments, local governments and non-state agents. The main elements included in the LMCC are: (1) articulation with the international context, (2) incorporation of CC in national development planning, (3) strengthening of the institutional framework, (4) increasing the competitiveness of investment and the national public budget, (5) support for science and technology, and (6) monitoring of NDCs.

The LMCC details the functions of the Ministry of the Environment (MINAM), the national authority on the matter, and also the functions of the sectoral, regional and local authorities, which will serve to reduce vulnerability to the impacts of climate change and GHG emissions. The regulation also establishes a multi-sectoral, multi-level and multi-stakeholder climate action, considering the inclusion of gender, intercultural and intergenerational approaches.

Likewise, Article 10 of the LMCC provides for the creation of the High-Level Commission on Climate Change (CANCC) as the body that proposes CC adaptation and mitigation measures and NDCs, within the framework of the Paris Agreement, and approves the update report that must be submitted to the UNFCCC Secretariat every five years. According to the Supreme Decree of its creation, the CANCC proposes and recommends, within the framework of Peru's *National Strategy on Climate Change*, actions to neutralise GHG emissions and adaptation to CC by 2050, as well as the progressive increase of the ambition of national contributions, considering the proposals and recommendations made by subnational governments, indigenous or native peoples, the private sector or any other non-state actor.

National Strategy on Climate Change (ENCC)

The *National Strategy on Climate Change* (ENCC) is prepared by MINAM, in coordination with the National Commission on Climate Change, and approved by supreme decree with the consent of the Council of Ministers. In 2021, Peru will begin the process of updating its ENCC with a 2050 horizon. In this regard, it has initiated the participatory generation of two important references in relation to GHG mitigation and adaptation to CC through the preparation—on the one hand—of the T*echnical Study for the Carbon Neutrality of Peru to 2050* and—on the other—the development of the *National Adaptation Plan*, with time horizons towards the years 2030 and 2050.

66 https://sinia.minam.gob.pe/novedades/gobierno-aprueba-reglamento-ley-marco-cambio-climatico ; https://sinia.minam.gob.pe/normas/decreto-supremo-que-aprueba-reglamento-ley-no-30754-ley-marco-cambio

Project for a National Plan on Adaptation to Climate Change
This national adaptation plan[67] is being developed through a participatory process and is based on five prioritised thematic adaptation sectors established by the government's Multisectoral Technical Group in 2018: agriculture, forestry, water, fisheries and aquaculture, and health. A first meeting, organised by MINAM on 23 April 2020, brought together representatives from 13 regional governments. The event was the first in a series of ten online meetings in which the Peruvian government aims to gather input from different sectors as the final stage of the elaboration of the country's *National Adaptation Plan*. In addition to regional governments, MINAM will meet with representatives from the private sector, academia, indigenous communities and civil society.

4.3.6.3. Vertical arrangements

The Climate Change Adaptation and Mitigation Action Plan[68] (PAAMCC) describes MINAM's proposal for programmes, projects and priority actions in the short and medium term in relation to CC, and constitutes the first approximation to the *Strategic Guidelines for Climate Change Adaptation and Mitigation* that are being formulated at the level of the National Climate Change Commission (CNCC), based on the national, sectoral, regional and local planning processes, and the consideration of CC impacts.

The ministries, regional governments and local governments are the competent authorities in terms of CC and, as such, promote, coordinate, articulate, implement, monitor and evaluate the comprehensive management of CC within their jurisdictions, and issue the corresponding regulations in the scope of their competences and functions. The CNCC, chaired by MINAM, is the permanent space through which the public sector and civil society monitor compliance with public policies on CC, as well as the international commitments assumed by the State before the UNFCCC. MINAM has the Vice-Ministry of Strategic Development of Natural Resources, which is the focal point for the UNFCCC, and the General Office of Climate Change, Desertification and Water Resources (DGCCDRH).

The Regional Environmental Commissions (CARs) are multi-sectoral environmental management bodies that work to reach consensus on regional environmental policy, promoting dialogue and agreement between the public and private sectors and civil society. Within the CARs, the formation of Regional Technical Groups is promoted and, from there, the formal recognition of the process to elaborate, implement, monitor and update regional strategies and action plans. The Municipal Environmental Commissions (CAMs) are the environmental management bodies created by the provincial and district municipalities that coordinate municipal environmental policy. They articulate their environmental policies with the CARs and MINAM.

Regional and local governments, within the framework of their competences and functions, granted by express law or through the decentralisation process, are responsible for incorporating CC mitigation and adaptation measures in their *Territorial Plan, Regional and Local Concerted Development Plan, Institutional Strategic Plan, Institutional Operational Plan, Budgetary Programmes* and investment instruments. In addition, the *Organic Law of Regional Governments*, approved in 2002, established the obligation to formulate *Regional Strategies on Climate Change* (ERCC). These identify the most vulnerable areas and sectors in each region, in order to take measures to reduce the negative impacts of CC, as well as those with the greatest GHG mitigation potential. All regional governments with ERCCs in the process of approval have CC working groups.

The private sector, civil society and indigenous or native peoples, within the framework of current regulations, recommend CC adaptation and mitigation actions, such as increasing and conserving carbon stocks and reducing GHG emissions, among others, in accordance with the provisions of this law and its regulations. The participation of non-state actors is governed in accordance with *Law 29,785 on Prior Consultation*.

The Ministry of Education and the regional and local governments, in coordination with MINAM, the Ministry of Culture and the Ministry of Women and Vulnerable Populations, implement the *National Environmental Education Policy* and the *National Environmental Education Plan*, considering the approaches of equality, interculturality, climate risk management, sustainable development in harmony with nature, intergenerational and vulnerable populations, adapted to the linguistic particularities of each locality.

Peru's Indigenous Peoples' Platform for Climate Change (PPICC)
In October 2020, MINAM, together with the Ministry of Culture and representatives of the seven organisations representing Peru's indigenous peoples—the Interethnic Association for the Development of the Peruvian Jungle, Peruvian Peasant Confederation, National Agrarian Confederation, Confederation of Amazonian Nationalities of Peru; National Federation of Peasant, Artisan, Indigenous, Native and Employed Women of Peru; National Organisation of Andean and Amazonian Women of Peru, and National Union of Aymara Communities—launched the intercultural dialogue platform to address the challenges posed by CC[69]. This space will serve to value, recognise and disseminate indigenous knowledge and practices that contribute to the integrated management of CC in the country. It also facilitates the fulfilment of one of the commitments made by MINAM in the process of Prior Consultation on the Regulation of the Framework Law on Climate Change (R.M №358-2019, MINAM), which determines the creation of the Sectoral Working Group for the development of the PPICC.

4.3.6.4. Horizontal arrangements

Multisectoral Commission – High-Level Commission on Climate Change (CANCC)
In its report, the Multisectoral Commission[70] spointed out the country's commitment to incorporate the environmental approach in its public policies based on concrete actions to achieve environmental performance with the highest standards. Within the framework of its fourth strategic line of action on Healthy Natural Heritage,

67 https://napglobalnetwork.org/2020/04/peru-hosts-a-series-of-virtual-meetings-as-the-final-stage-of-developing-its-nap-document/

68 Ministry of Environment. 2010. *Plan de Acción de Adaptación y Mitigación frente al Cambio Climático* [Climate Change Adaptation and Mitigation Action Plan]. Lima, Peru.

69 EUROCLIMA+ es un programa financiado por la Unión Europea - Lanzamiento de la Plataforma de los Pueblos Indígenas de Peru para enfrentar el Cambio Climático (euroclimaplus.org)

70 The High-level Commission on Climate Change. October 2012. *Ejes estratégicos de la gestión ambiental: Informe de la Comisión Multisectorial creada por Resolución Suprema №189-2012-pcm* [Strategic lines of environmental management: Report of the Multisectoral Commission created by Supreme Resolution №189-2012-pcm]. Lima, Peru.

the report establishes as an objective: "to incorporate the climate variable into development strategies, indicating as a priority to strengthen and develop the capacities of the State and society to respond to the challenges posed by climate change (adaptation and mitigation), in particular of the most vulnerable populations such as indigenous peoples and local populations".

Following an analysis of the country's vulnerabilities and adaptation priorities, the section on adaptation contributions for the different prioritised sectors and systems has been prepared based on the study of the national goals established by current national planning documents, like the *Bicentennial Plan, the National Disaster Risk Management Plan* (PLANAGERD), the *Environmental Action Plan* (PLANAA), and the 2014 *Environment Agenda*. Sectoral planning documents were also considered, like the *Risk Management Plan and Adaptation to Climate Change in the Agricultural Sector* (PLANGRACC-A12), *Budgetary Programmes, Comprehensive Plan for Mitigation and Adaptation to Climate Change Effects in the Public Health Sector,* among others. The establishment of these actions was the result of the work of the Multisectoral Working Group, made up of 13 State ministries and the National Centre for Strategic Planning (CEPLAN), for the implementation of the NDCs.

Law 30,215 on Mechanisms of Remuneration for Ecosystem Services (MERESE)
The Mechanisms of Remuneration for Ecosystem Services (MERESE) are instruments that make it possible to generate, channel and invest in actions aimed at the conservation, recovery and sustainable use of ecosystems, as a source of ecosystem services, through voluntary agreements between contributors and retributors[71]. With the approval of the *Legislative Decree №1.280 Law of Management and Provision of Sanitation Services* and its regulations, it is established that service providers can reserve in an intangible account a percentage of their income for the implementation of MERESE, as well as indicating that service providers can formulate, evaluate, execute and assume the costs of operation and maintenance of public investment projects aimed at actions for the conservation, recovery and sustainable use of the sources of ecosystem services. Three modalities are established for the execution of the resources that the service providers have been collecting from MERESE: through public investment projects, transfer to taxpayers, and agreements and/or contracts with specialised entities created by law to manage environmental funds.

Proposal for a National Policy on Glaciers and Mountain Ecosystems (PNGYEM)
In order to achieve sustainable management of glaciers and mountains, the National Institute for Research on Glaciers and Mountain Ecosystems (INAIGEM) is formulating the *Proposal for a National Policy on Glaciers and Mountain Ecosystems* (PNGYEM)[72]. INAIGEM is responsible for leading and coordinating with the different actors in the public sector, civil society, academia and the private sector, the joint drafting of the PNGYEM and the establishment of responsibilities for its implementation. In accordance with current regulations, three stages are contemplated for its elaboration: (1) *design*, which consists of defining the public problem, its current situation, its future situation, and its solution alternatives; (2) *formulation*, which consists of defining the priority objectives, guidelines, services and activities; and, (3) *approval*, following a favourable technical opinion from the National Strategic Planning Centre (CEPLAN), the PNGYEM is validated by INAIGEM's Board of Directors, which proposes it to MINAM for its corresponding approval, through a supreme decree, and subsequent publication in the Official Gazette *El Peruano* and the institutional websites of the participating entities.

71 MEcanismos de REtribución por Servicios Ecosistémicos – MERESE | Dirección General de Economía y Financiamiento Ambiental (minam.gob.pe)

72 Política Nacional de Glaciares y Ecosistemas de Montaña (PNGYEM) (inaigem.gob.pe)

4.3.7. Venezuela

4.3.7.1. Overview of policy progress and challenges in adaptation to CC

In the last five years, Venezuela has made progress in terms of climate policies, through the submission of its first NDC to the UNFCCC and the drafting of the Climate Change Bill, which sets out the guidelines for advancing the climate change adaptation agenda (see Table 11).

Table 11. *Regulatory progress on CC adaptation policies in Venezuela*

Multi-scale governance	CC adaptation policy tools
Regulatory frameworks at national level	NDC 2017 *Patriotic Plan Act, 2019-2025* *Draft Bill on Climate Change,* 2016 *Organic Law on the Environment,* 2006 *Environmental Criminal Law,* 2012
Vertical arrangements (decentralisation, civil participation, monitoring)	National Climate Change Office (currently under development)
Horizontal arrangements (cross-sectoral articulation, mitigation/ adaptation articulation, EbA)	*National Strategy for the Conservation of Biological Diversity* 2010-2020 (ENCDB) and its *National Action Plan* (PAN) Venezuelan Mountain Committee (COVEM)

However, the biggest challenge for the country is the approval of the *Law on Climate Change* in order to make way for the implementation of the proposed policy instruments such as the National Climate Change Office, the *National Climate Change Adaptation Plan* and the National Climate Change Registration and Reporting System.

4.3.7.2. Main regulatory frameworks at national level

NDC 2017
Venezuela presented its first NDC[73], in 2017, where it mentions that the Plan for Economic and Social Development of the Nation, approved as a National Law in 2013, establishes the priority of the fight against CC within the framework of a comprehensive, humanist and ecosocialist development oriented towards Good

73 Bolivarian Republic of Venezuela. July 2017. *Primera Contribución Nacionalmente Determinada de la República Bolivariana de Venezuela para la lucha contra el Cambio Climático y sus efectos* [First Nationally Determined Contribution of the Bolivarian Republic of Venezuela to Combat Climate Change and its Effects]. Caracas, Venezuela.

Living in harmony with Mother Earth. Within this framework, it plans measures and actions in the areas of electrical power, industry, housing, transport, health, popular organisation and participation, biological diversity, food security and sustainable agriculture, water conservation and management, sustainable forest management, research, monitoring and systematic observation, education and culture, waste management, land management, risk management, emergencies and disasters. In addition, the development of municipal and local adaptation plans for risk management scenarios that directly involve co-responsibility between the State and the People's Power is encouraged.

Patriotic Plan Act, 2019-2025
The fifth goal of the Patriotic Plan proposes ecosocialism as the socio-political foundation for the new productive model, i.e., as an alternative for the purpose of generating scenarios of social equity, collective social welfare, respect for the rights of nature and the individual and collective right to a healthy, safe and ecologically balanced environment, as stipulated in the *Constitution of the Bolivarian Republic of Venezuela* (Article 127). The *Patriotic Plan* develops five goals, the fifth of which is: "To contribute to the preservation of life on the planet and the survival of the human species, which expresses the guidelines and mandates related to the environmental issue and specifically to CC in the national goals".

In addition, a series of laws have been developed to address existing conditions of vulnerability, such as: *Law on Coastal Zones* (2001), *Law on Forests and Forestry Management* (2008), Law on Comprehensive Management of Socio-Natural and Technological Risks (2009) and *Law on Biodiversity Management* (2008); as well as different laws have been promoted and approved that in some way address the issue of the effects of CC: *Organic Law on the Environment* (2006), *Environmental Criminal Law* (2012), *Water Law* (2007), among others.

Draft Bill on Climate Change, 2016
With the *Law on Climate Change*, three main goals are pursued: (1) the regulation of measures to be adopted for the mitigation of GHG emissions and for adaptation to CC, in order to reduce the country's vulnerability to CC impacts; (2) the establishment of the governance model of public administration in relation to CC; and, (3) to guide the country's positioning in international cooperation efforts and in global forums where agreements are established to combat CC. The National Climate Change Authority is the Ministry of People's Power for Ecosocialism and Water. The National Climate Change Office is also created.

The law proposes the formulation of a *National Strategy on Climate Change* and a *National Plan on Adaptation and Mitigation Measures*. Within the framework of the *Patriotic Plan* and the *Bolivarian Economic Agenda,* the design of a national CC policy is required to support the construction of an ecosocialist, low-emission and climate-resilient production model, based on the principles of sustainable development and the strengthening of the post-oil economy. The creation of the National Climate Change Registration and Reporting System is proposed to systematise the required information, as well as to support and promote gas inventories and vulnerability studies, and additionally, CC adaptation and mitigation actions and measures. From the institutional point of view, one requirement is to advance in the articulation of actions at the different levels of national, state and municipal government, in conjunction with the People's Power. Although the law mentions that a *National Climate Change Adaptation* Plan must be approved within one year of the law's approval, it has not been approved so far.

4.3.7.3 Vertical arrangements

The Ministry of People's Power for Ecosocialism is the technical focal point before the UNFCCC, which promotes a line of action focused on implementing territorial management, taking into account the consequences of CC. The *Draft Bill on Climate Change* provides for the creation of the National Climate Change Office within the Ministry in charge of environmental management as a permanent space in which the public sector and civil society can monitor compliance with public policies on climate change.

4.3.7.4. Horizontal arrangements

Venezuela is preparing a decree for the creation of the Presidential Commission for Climate Change. The political commitment is that it will involve all ministries with competence in the matter, and its mission will be to advise on decision-making to reduce vulnerability to the effects of climate change.

National Strategy for the Conservation of Biological Diversity 2010-2020 (ENCDB) and its National Action Plan (PAN)
Since 2010, Venezuela has had the *National Strategy for the Conservation of Biological Diversity* 2010-2020 (ENCDB) and its *National Action Plan* (PAN), within the framework of Target 17 by 2015 of the Aichi Biodiversity Strategic Plan, as part of the Convention on Biological Diversity. The ENCDB and its NAP dictate the fundamental guidelines that will enable national articulation for the collective construction of an alternative model of life based on sustainability. These instruments represent the methodological, conceptual and political framework aligned with the country's project, for the independent exercise of conservation and sustainable use of biological diversity, thus reducing vulnerability to the multiple adverse effects of climate change. The Venezuelan Biodiversity Congress has been conceived as a space for the exchange of knowledge and experiences.

4.4. A comparative analysis of national CC adaptation policies

Generally speaking, there has been a remarkable acceleration over the last five years in the adoption of climate policies in the Andean countries within the framework of the UNFCCC objectives, compared to the previous situation (Maldonado et al. 2012, Schoolmeester et al. 2016). This is evidenced by the recent adoption of specific policy tools on CC adaptation through the approval and implementation of NDCs and their updates, as well as CC plans, strategies or laws (see Table 12). In these documents, the competencies of public institutions on CC are delimited and the power of an inter-institutional authority to manage the issue is consolidated. Another important advance is the design and approval of policies specifically focused on mountain socioecosystems and CC, as is the case in Argentina (Committee for the Sustainable Development of Mountain Regions), Chile (*Proposed National Policy for Sustainable Mountain Management and Action Plan to 2030*), Colombia (*Law 1,930 for the Comprehensive Management of the Paramos*) and Peru (P*roposed National Policy on Glaciers and Mountain Ecosystems*).

On the other hand, the Paris Agreement poses the challenge of moving from a stage of designing CC adaptation policies and plans to their real and effective implementation through the participation of various stakeholderss[74]. Perceptible and demonstrable results are expected, which require the creation of evaluation and monitoring systems for CC adaptation measures. Therefore, a major challenge remains the concrete implementation and monitoring of policy instruments at sub-national and local levels. For this, the use of mechanisms for social participation and co-creation of local and technical-scientific knowledge is essential to avoid reproducing power asymmetries and socio-environmental conflicts (Mills-Novoa et al. 2020).

Table 12. *Synthesis of progress, challenges and opportunities of CC adaptation policies in Andean countries*

Variable	Progress, challenges and opportunities
Inter-agency articulation	*Progress* All countries have defined the competencies of a national authority on CC management, which allows for strengthening the inter-institutional coordination of adaptation policies. All seven countries have adopted climate policies (plans, strategies and/or laws) at national level and have formulated their first NDC. In addition, four countries have submitted their updated NDCs in 2020 and have formulated long-term strategies to 2050, demonstrating ambitious CC targets (Argentina, Chile, Colombia, Peru). *Challenges and opportunities* Some countries are still in the process of approving their national plans, strategies or laws on adaptation to CC, due to competency, economic or political priority issues. The challenge is then to get these policies approved in order to advance in the concrete implementation of these policies and to have a real impact at the territorial level. One opportunity is to learn from the progress made by some countries in fulfilling international commitments to update NDCs and formulate long-term CC strategies.
Cross-sectoral articulation	*Progress* Most countries have formulated sectoral CC adaptation plans (Argentina, Bolivia, Chile, Colombia, Ecuador, Peru) and two countries have specific institutions for multi-sectoral articulation at the national level (Intersectoral Commission on Climate Change - COMICC, Colombia; High-Level Commission on Climate Change - CANCC, Peru). In addition, two countries have sectoral planning tools at sub-national level (Bolivia and Colombia). *Challenges and opportunities* A major challenge is the consolidation of multi-sectoral platforms at the national level and the concrete application of these instruments to solve the recurrent challenges of articulation between environment and agriculture in terms of CC adaptation. On the other hand, several national or sub-national CC policies have been built around an inclusive cross-cutting sector (e.g., water, forests or sustainable agriculture), which represents an opportunity for articulation).
Evaluation and monitoring	*Progress* Three countries have national mechanisms for evaluating and monitoring CC adaptation measures (Argentina, Chile, Colombia), through national systems of environmental indicators, monitoring tables or specific targets set out in their NDCs. Another advance is the construction process of the National Policy on Glaciers and Mountain Ecosystems in Peru. *Challenges and opportunities* On the one hand, a major challenge is that these mechanisms are still in the design stage, so concrete data are not yet available. On the other hand, there are opportunities for regional collaboration for discussion and exchange of experiences on long-term comprehensive monitoring of socio-environmental indicators and follow-up of CC adaptation measures that complement national efforts (e.g., Research Agenda and Platform for the Integrated Monitoring and Analysis of Socio-environmental Indicators in the Andes, CONDESAN; Proposal for an Andean Environmental Technology Platform, CAN Environmental Charter).

74 European Commission. 2019. A*vances en la Acción Climática de América Latina: Contribuciones Nacionalmente Determinadas al 2019* [Progress on Latin American Climate Action: Nationally Determined Contributions to 2019]. Brussels: EUROCLIMA+, Directorate-General for Development and Cooperation – EuropeAid, p. 171.

Variable	Progress, challenges and opportunities
Mountain and CC policies	*Progress* Four countries have adopted or are formulating specific national policies on mountain socioecosystems and CC, around high Andean wetlands and glacial and periglacial systems (Argentina), mountains (Chile and Peru) and paramos (Colombia). In addition, Colombia is working on the Strategy for the Integrated Monitoring of High Andean Ecosystems (EMA), and Venezuela launched the Venezuelan Mountain Committee (COVEM) in 2020. *Challenges and opportunities* A key challenge is to increase the visibility of the ecological, socio-productive and cultural diversity of mountain socioecosystems. This can be achieved for example through the strengthening of mountain focal points as spaces for collaboration at the national level. There is an opportunity for regional exchange of experiences and policies on mountain ecosystems and adaptation to CC due to the similar characteristics and challenges faced by the Andean countries. The IAM can play a key role in this context, but it may be necessary to evolve to more formal linking mechanisms.
Social participation and knowledge exchange	*Progress* All the countries mention social participation in their national climate policies as a guiding principle, through mechanisms for public consultation (Argentina, Chile), territorial planning (Bolivia) or subnational articulation roundtables (Colombia, Ecuador). An innovative experience is, for example, the creation of the Platform of Indigenous Peoples of Peru to address Climate Change (PPICC). *Challenges and opportunities* The biggest challenge is the effective implementation of platforms and mechanisms to link civil society with decision-making processes. Potential opportunities that promote this effective articulation of civil society include the Water Summits in Bolivia, Biosphere Reserves, Model Forests, among others. In addition, a key opportunity is to enhance co-production processes between techno-scientific and local knowledge on CC, both for the scaling up of local knowledge on CC and for local training on the use of technical and scientific tools.

Based on the literature review and policy framework presented above, as well as the survey conducted and interviews with key actors, three central issues were identified that reflect the progress and challenges of CC adaptation policies in the Andean region in the last five years: (1) the integration and visibility of mountain socioecosystems, (2) intersectoral coordination mechanisms, and (3) social participation processes and opportunities for institutionalisation of local knowledge.

4.4.1. Mountains as a cross-cutting issue for CC policies in the region

The main gaps, opportunities and priorities for the integration of mountain ecosystems into CC adaptation policies focus on: (1) the visibility of the ecological, socio-productive and cultural diversity of mountain socioecosystems, (2) the strengthening of mountain focal points at national level, (3) the exchange of experiences at regional and international level, (4) the monitoring and evaluation of policies, and (5) constraints in policy implementation.

A first key issue is a gap related to the ***limited visibility and priority given in some countries to mountain socioecosystems*** in national policies. For example, the priority lines of action for CC adaptation in Peru focus on forests, at the risk of not explicitly considering non-forest ecosystems characteristic of the country's mountain areas (paramos, punas, high Andean wetlands, glaciers) in the framework of adaptation strategies. Furthermore, the socio-ecological dimension of mountain socioecosystems must be considered beyond their biophysical dimension, in order to highlight the fundamental role of local communities and politics in the processes of adaptation to CC, including their ways of life and their understanding of Andean realities and dynamics.

As opportunities, there are several concrete experiences aimed at making visible the services and goods provided by mountain ecosystems in the region: mechanisms of retribution for ecosystem services (e.g., MERESE-IFAD Project in Peru on retribution for hydrological services); natural infrastructure for water storage from rainfall and glacier melt (e.g., The project on Natural Infrastructure for Water Supply in Peru); and the implementation of Early Warning Systems in watersheds vulnerable to CC[75] (e.g., Ecuador and Peru). Another key initiative is the *Regional Strategy for the Conservation and Sustainable Use of High Andean Wetlands* (RAMSAR) covering eight countries in the region. In addition, NDCs represent an opportunity to position the role of mountains in food security and water resource management. An illustration is the goal defined in Colombia's NDC 2020, which proposes the protection and delimitation of the 37 paramos, through participatory processes for boundary demarcation and the formulation and implementation of management plans for each demarcated paramo[76]. In this context, synergies can be generated by replicating and improving the experiences of countries that have made greater progress in policies that include actions in mountain ecosystems (as is the case of Argentina, Chile and Colombia, which have specific laws on mountain ecosystems at the national level).

75 Proyecto Infraestructura Natural para la Seguridad Hídrica – Proyecto Infraestructura Natural para la Seguridad Hídrica (forest-trends.org)

76 Ministry of Environment, Colombia. 2020. *NDC de Colombia Actualización 2020* [Colombia's NDC 2020 Update]. Bogota.

Several countries are the ***consolidating mountain focal points at national level*** by making progress in including the mountain agenda in the national agenda. For example, Chile is developing its proposed *National Policy for Sustainable Mountain Management* and *Action Plan to 2030*; and Peru, which has been consolidating research and management work through the National Institute for Research on Glaciers and Mountain Ecosystems (INAIGEM). This is also reflected in the progress of mountain working groups in several countries in the region, and of glacier monitoring networks (*National Glacier Strategy* 2009, Chile). In Argentina, there is the Committee for the Sustainable Development of Mountain Regions, which has the potential to become a more formal space for dialogue and policy that takes into account the representation of different sectors. In the case of Colombia, two official institutes members of the National Environmental System (SINA)—the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) and the Humboldt Institute (IAvH)—have mountain working groups and research agendas for integrated mountain monitoring (Llambí et al. 2019a, 2019b). In addition, mountain ecosystems are explicitly recognised in the country as strategic (*Law 1,930 on Paramos,* 2018) and there is ongoing debate about which anthropogenic activities should be excluded from these ecosystems and which productive activities are allowed, especially for small-scale producers (Sarmiento et al. 2017). Finally, there are projects that seek to strengthen CC adaptation plans in specific mountain ecosystems (Andean highlands, paramos, medium and high mountains, rainforests), such as the Regional Initiative for Climate Change 'Resilient Andes' (ARIACC), implemented by SDC for the period 2020-2027.

Box 3. *Challenges for the integration of mountains into CC adaptation policies in Ecuador*

Karina Salinas, National Director of Climate Change Adaptation at the Ministry of Environment and Water (MAAE) of Ecuador, noted that there is growing interest from the international community about the role of mountain and paramo ecosystems in CC adaptation, which offers new opportunities at the national level. Since 2008, the MAAE has been working with farmers in the paramos to encourage the transition of traditional production systems towards more environmentally friendly systems. Ecuador has positioned itself at the forefront of adaptation to CC, through advances in its national strategy, the organic environmental code, territorial development plans, as well as on the issue of CC and gender. He also explained the need to adopt a cross-cutting approach to the inclusion of EbA mechanisms in national policy. The updating of the NDC in Ecuador represents an opportunity to achieve the objective of mainstreaming and integrality, and to give priority and visibility to paramo ecosystems through a landscape approach.

Source: Roundtable in Climate Change Policies and Adaptation Strategies in the Andes: A Multisectoral View from the Mountains.

A third key point is the possibility of ***strengthening, systematising and replicating successful experiences and progress among the different countries in the region***. To this end, it is necessary to consolidate spaces for exchange and initiatives at the regional level on CC adaptation, for example, in relation to the processes of building NDCs at the national level, which is a key policy tool. At the regional level, mountain focal points at the national level need to be given a leading role so that they can promote a regional agenda in coordination with international frameworks (Maldonado et al. 2012). Also at the regional level, the CAN is gaining momentum recently with the declaration of the *Andean Environmental Charter* at the end of 2020, which clarifies a shared action plan for the future on issues related to CC. In addition, there are several regional initiatives that seek to strengthen research and knowledge production, such as the Scientific Research Network on Climate Change (RICCC) of the Pacific Alliance, the *Research Agenda for the Integrated Monitoring and Analysis of Socio-environmental Indicators in the Andes* (CONDESAN), and the *Andean Environmental Technology Platform Project* (CAN). Another opportunity in this context is to continue promoting greater articulation between official research and/or statistical agencies and institutes and monitoring and research networks working at the Andean continental level in mountain ecosystems, such as the GLORIA-Andes network, the Andean Forests Network and the Initiative for Hydrological Monitoring in Andean Ecosystems (Cuesta et al. 2017, 2019; Mathez-Stiefel et al. 2017, Correa et al. 2020, Malizia et al. 2020).

In addition, it is essential to seek mechanisms to link national policies with international regulatory frameworks, especially through initiatives that seek to produce global knowledge on adaptation to climate change, and the experiences of regional integration in mountains that are being developed in other geographical and political contexts. There are also initiatives at the international level that seek to respond to the knowledge gaps on adaptation, such as the partnership between the United Nations University and academia within the Nairobi Work Programme. (NWP).

A fourth key issue is ***policy monitoring and evaluation mechanisms***. In the surveys carried out, a number of challenges remain with regard to monitoring systems: their scarcity, their management by sectors and by projects, the lack of economic resources and training at the local level and of follow-up systems, the complexity of the Andean geography they face, and their difficulty in being formalised at the public policy level. Furthermore, it is difficult to evaluate progress in terms of adaptation to climate change due to the lack of publications, reports and monitoring and evaluation mechanisms in two key areas: (1) the programmatic analysis of actions (number of projects implemented, beneficiaries, work sites, etc.), and (2) the analysis of the impacts of adaptation measures on the vulnerability and adaptive capacity of populations. In turn, decision-makers and experts agree on the lack of information on the effectiveness of adaptation measures and the development of indicators to determine whether an action improves the adaptive capacity or if—on the contrary—it is a maladaptation (Peralvo & Bustamante 2015, Llambí & Garcés 2021).

To respond to these gaps, some countries in the region have included monitoring mechanisms in their national policies. This is the case of Chile, which included in its National Adaptation Plan, adopted in 2014, a system for reporting and monitoring the progress and impact of measures, and is currently working on a Capacity Building for Transparency Project, funded by the Global Environment Facility (GEF). Another example is Colombia, which is working on its *Strategy*

for the Integrated Monitoring of High Mountain Ecosystems[77] (IDEAM-IAvH-CONDESAN), and the ongoing process of building Colombia's National Climate Change Adaptation Indicator System[78] (SNIACC).

Finally, a fifth focal point refers to the ***limitations in policy implementation***, which is linked to the tensions between political-administrative boundaries and ecosystems, the limited resources at sub-national level for the implementation of CC adaptation strategies, the lack of more formal and binding spaces for dialogue at regional level, and the lack of clarity about who is responsible for the implementation of CC adaptation policies. However, some experiences in the Andean countries seek to counteract these gaps. One example is the creation of the Soil, Water and Forest Conservation Districts model in Chile within the framework of the GEF-Montaña project, but also the design of a Municipal Environmental Certification System (SCAM) and a sustainable neighbourhoods programme. In addition, the implementation by the Wetlands Foundation of the Binational Programme Conserving High Andean Wetlands in Argentina and Peru demonstrates the interest of public authorities in exchanging experiences and good practices between countries facing similar challenges in terms of adaptation to CC, transformation of production practices and conservation processes of fragile high mountain ecosystems.

4.4.2. Challenges for cross-sectoral articulation of CC adaptation

The main gaps, opportunities and priorities for cross-sectoral articulation of CC adaptation centre on the fragmentation of sectoral policies and the need for comprehensive planning processes at multiple scales.

Intersectoral articulation in adaptation policies is confronted with the ***fragmentation of CC adaptation tools across sectors***. There are dynamics of competition among sectors for scarce resources, which translates into the need to design financial mechanisms that contemplate an intersectoral dimension from the beginning of projects and programmes. Fragmentation within sectors is another challenge, and the need for science-policy articulation mechanisms was identified. One opportunity to respond to these gaps is the use of scientific knowledge generated by academia as a solid empirical basis to support policy tools (Llambí & Garcés 2020). In addition, the need for dialogue spaces at the sub-national level linked to specific territorial contexts was raised during the December 2020 roundtable, based on the successful experiences that already exist at the project level and that have the potential to be systematised and shared. The cross-cutting nature of the CC issue in sectoral policies (financial sector, infrastructure, agriculture, water management, etc.) should also be taken into account in order to reverse the recurrent conflict between the environment and agriculture.

77 Institute of Hydrology, Meteorology and Environmental Studies, Alexander von Humboldt Biological Resources Research Institute & Consortium for the Sustainable Development of the Andean Ecoregion. 2018. *Propuesta de Estrategia para monitoreo integrado de los ecosistemas de alta montaña de Colombia*. [Proposal for a Strategy for integrated monitoring of Colombia's high mountain ecosystems]. Bogotá: IDEAM-IAvH-CONDESAN, p. 54. http://documentacion.ideam.gov.co/openbiblio/bvirtual/023886/Estrategia_EMA.pdf

78 Bouroncle C., Rodríguez C. & Florián M. 2016. *Sistema Nacional de Indicadores de Adaptación al Cambio Climático (SIACC): definición del conjunto de indicadores* [National System of Indicators of Adaptation to Climate Change (SIACC): definition of the set of indicators]. PNACC.

Box 4. *Challenges for intersectoral articulation in Colombia*

> *María Teresa Becerra, an expert consultant on environmental and biodiversity issues, identified several challenges for intersectoral articulation around CC adaptation based on her experience in the Colombian case. She explained that access to knowledge about the impacts of climate change on production systems must be improved for everyone, from small-scale producers to national decision-makers. Furthermore, to remedy the lack of coordination between ministries, it is necessary to design policy instruments that facilitate intersectoral articulation at the territorial level and approaches to sustainable landscapes and integrated ecosystem management. Such approaches raise awareness of the interdependence of mountain ecosystems and productive systems (in the lowlands) and water sources (in the highlands) of watersheds. Another challenge is the formulation of more specific policies to implement market-based financial incentives and comprehensive technical assistance for farmers at the local level. The objective is to achieve the adaptation of small producers to the effects of CC on soils, so that they themselves can control their transformation processes and implement restoration and recovery actions for development. Finally, the monitoring and follow-up of CC adaptation policies needs to be articulated across the relevant scales.*

Source: Roundtable in Climate Change Policies and Adaptation Strategies in the Andes: A Multisectoral View from the Mountains, December 2020.

With regard to priorities, the need for more comprehensive planning processes and the generation of shared visions in specific territorial spaces was discussed during the roundtable. Emphasis was placed on the need for rural extension systems that have a comprehensive approach beyond the sectoral, working with productive areas that become tools for territorial management. There should also be a focus on intersectoral articulation in order to achieve joint management and adaptive management. There should be minimum common frames of reference between sectors, such as definitions and indicators, to facilitate communication and exchange. Finally, it was mentioned how the international level can also motivate intersectoral articulation at the national level. The surveys emphasised the need to define the order of priority of uses (conservation, agricultural frontier, food security, productivity), to consolidate the mechanisms for communication and delimitation of competences, and to improve the dissemination and transparency of information.

In response to these gaps, several countries have set up intersectoral CC commissions in recent years (Colombia, Peru, Ecuador, Chile). In addition, several programmes promote nature-based solutions that guarantee ecosystem services in agricultural production. Examples are the ProYungas Protected Productive Landscapes Programme in Argentina, the Green Growth Mission in Colombia, and the Socio-Bosque Programme in Ecuador. In the regional study of knowledge gaps on CC adaptation, it can be seen that for experts and decision-makers it is a priority to strengthen knowledge on ecosystem-based adaptation strategies, the development of sustainable productive reconversion alternatives and the establishment of resilient production systems (Llambí & Garcés 2021). Likewise, a cross-cutting issue is the integration of multiple institutions, sectors and scales to manage adaptation to climate change.

4.4.3. Opportunities and challenges for social participation and the institutionalisation of local knowledge

The main gaps, opportunities and priorities for social participation and institutionalisation of local knowledge in CC adaptation policies focus on: (1) the need for effective participation, (2) the process of knowledge co-production, and (3) the articulation across scales.

Firstly, the survey identified the need to go beyond donor-driven participation to ***implement comprehensive participatory processes based on local needs***. It was suggested that participatory processes are often imposed from above and do not emerge from processes built at the community level. This limits their possibility of success in the long term.

Box 5. *Social participation processes in Cochabamba, Bolivia*

Tito Villarroel, Project Coordinator at AGRECOL Andes Foundation, Bolivia, shared his thoughts on social participation and the institutionalisation of local knowledge in adaptation policies. He talked about his experience with the initiative of the Municipal Law for the Protection of Water Recharge Areas in the municipality of Totora, Cochabamba province, Bolivia. According to Villaroel, the process of participatory construction of the law through municipal summits has been key. This law has the potential to become a long-term sustainable national policy. For the construction of the law, producers in the highlands have been included in the reflection process to understand their perception of water scarcity. Furthermore, considering this resource as a common good, it is important to take into account the local knowledge of water caretakers on climate prediction, and to raise awareness of the contribution of upland areas to urban centres. However, if local initiatives do not become municipal policy or national development strategy, they will not be sustainable. Therefore, a process of advocacy and evidence generation is needed to achieve sustainability.

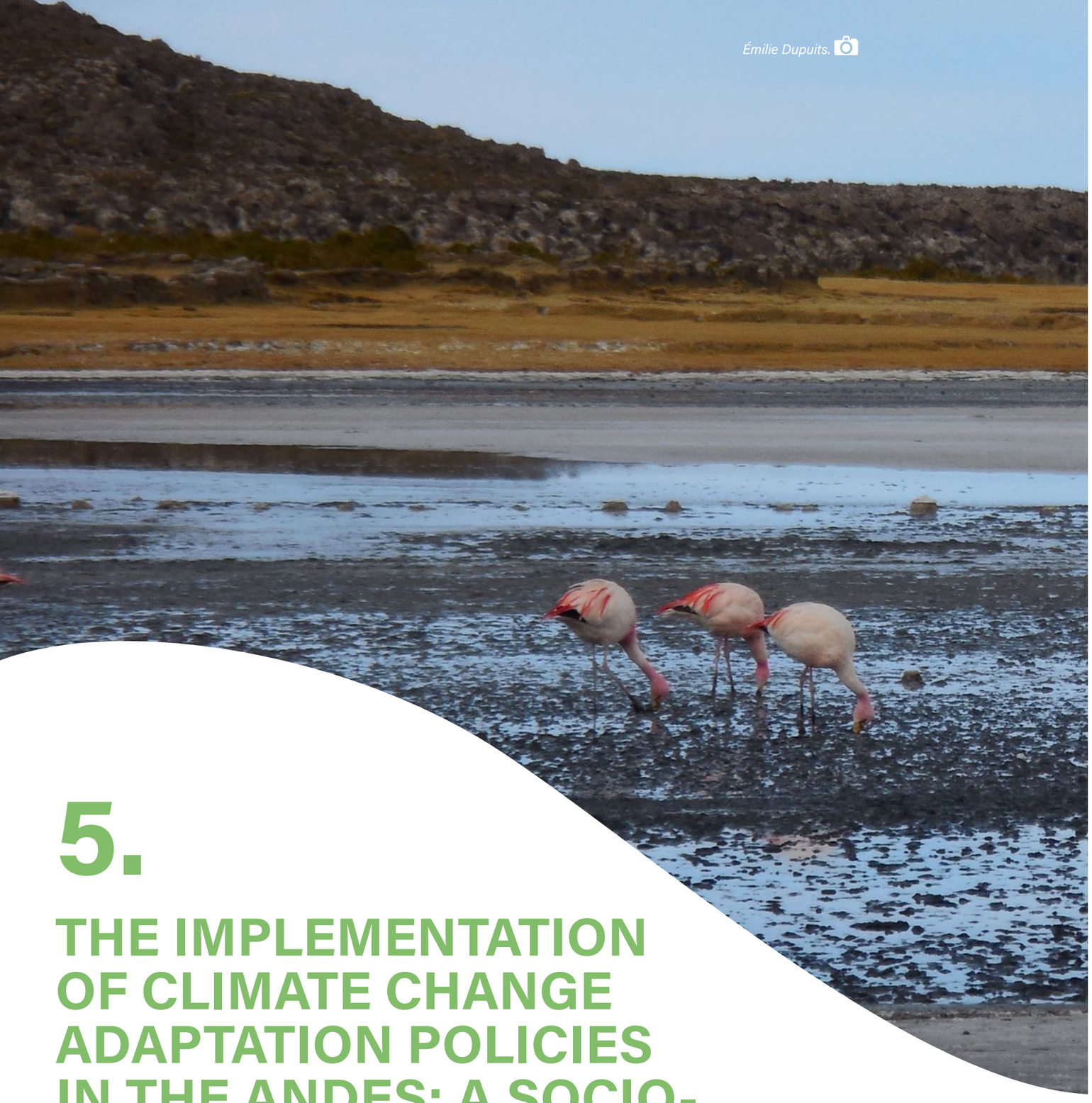
Source: Roundtable in Climate Change Policies and Adaptation Strategies in the Andes: A Multisectoral View from the Mountains, December 2020.

The main opportunity and priority that emerged during the discussion is to promote more dialogue and the co-production of knowledge. To this end, it is necessary to carry out a process of validation and research into both local and technical-scientific knowledge in order to understand how it can effectively contribute to the processes of adaptation to climate change. A key point is the need to continue producing scientific knowledge in a dialogue with local knowledge in order to support public policy-making processes at regional, national and sub-national levels. Key actors to achieve this challenge include regional integration spaces, national and territorial public authorities, mountain and CC focus groups, scientific and academic bodies, and civil society organisations.

Another important challenge emphasised during the discussion was the issue of ***articulation across scales***. Local knowledge often remains local and not all of it is suitable for scaling up because it is context-specific. One difficulty for local experiences to be taken advantage of is the limited monitoring and evaluation processes of the solutions and adaptation strategies implemented and the need to generate more publications that systematise these experiences and allow them to be disseminated (see, e.g., Arce Rojas 2011, Lara & Vides-Almonacid 2014, Herrador-Valencia & Paredes 2016, Mathez-Stiefel 2016, Bustamante et al. 2019).

On the contrary, national policies are often constructed without a participatory process that takes into account this local complexity, which generates a contradiction when implementing national policy in the field. A priority for national policies to be better articulated with local experiences and knowledge is to create directives and ensure constant monitoring through participatory processes of interest (e.g., the *Handbook on Good Municipal Practices for Biodiversity Management* in Chile and the *General Guidelines for the Elaboration of Climate Change Plans, Programmes and Strategies in Decentralised Autonomous Governments*, Ecuador). Finally, it is necessary to define who has the competency to influence knowledge on CC, among decision-makers and local stakeholders, which is linked to the need to strengthen capacities and resources at the relevant scales.

In addition, the need to adapt and disseminate scientific knowledge in order to improve its applicability at the level of local policies and practices was raised at the end of the discussion. The role of academia and scientific research in the construction of policies that take into account local realities was emphasised, the local level being the most appropriate for megadiverse countries characterised by a high variety of ecosystems and geographical and human environments. An experience that illustrates this is the *Applied Research Project for Adaptation to Climate Change* (PIA-ACC) and its research line on "Andean Climate Conception", implemented by the Universidad Mayor de San Simón, in Cochabamba, Bolivia. The aim of this project was to systematise the traditional tools used to measure climate in Andean communities in order to influence the construction of national climate policies. Furthermore, these local experiences have the potential for replication at the national and eco-regional levels. This is evident, for example, in the national institutionalisation of the Living Systems in the *Framework Law of Mother Earth and Comprehensive Development for Living Well*, adopted by the Bolivian government in 2012, which recognises the value of the socio-ecological and cultural approach to environmental management. Another illustration of this potential for replication of local initiatives into national policies is the recognition of the role of ancestral practices for adaptation in *Ecuador's National Climate Change Strategy* (ENCC), 2012-2025.



5.

THE IMPLEMENTATION OF CLIMATE CHANGE ADAPTATION POLICIES IN THE ANDES: A SOCIO-POLITICAL ANALYSIS

In this section, a socio-political analysis of seven case studies is presented to assess the progress, challenges and opportunities for the implementation of CC adaptation policies at the local level in Andean mountain socioecosystems. The objective of this section is to better understand to what extent NDCs, as well as the CC plans, strategies and laws formulated at the national level, do or do not translate into real changes and improvements in the adaptive capacity of the productive systems of local communities in the Andes.

5.1. CASE STUDY 1: Conservation of High Andean Wetlands, Argentina

Table 13. *Synthesis of the main findings of the case of Argentina's Laguna de los Pozuelos*

National policies applied in local contexts	*Inter-agency articulation* Several national policy instruments linked to CC adaptation in the sectors of ecosystem conservation (Laws 23,919 and 25,335: R*egional Strategy for the Conservation and Sustainable Use of High Andean Wetlands*, RAMSAR) and agricultural development (*National Law 27,118 on Historical Reparation of Family Farming*) have a positive impact on the territory for community development and sustainable production alternatives in high Andean wetland protection areas. The key actors in the territory are the Secretariat of Family Agriculture (province of Jujuy), the National Institute of Agricultural Technology (INTA), the Wetlands Foundation, local communities and indigenous peoples, and mining companies. *Implementation gaps* While there are formal spaces for collaboration on mountain and CC issues at the national level, such as the Committee for the Sustainable Development of Mountain Regions, these spaces need more outreach and could benefit from binding mechanisms of operation.
Territorial resistance	The proposed *Law on Wetland*s, currently being debated in Congress, generates tensions among different stakeholders (communities, mining companies, public authorities) especially around the delimitation of productive activities that will be allowed in conservation areas. There are also tensions between the local and national levels, for example with INTA, which adopts a techno-productive approach with less emphasis on the central social dimension in community projects of productive transition.

National impact and opportunities for replication	The social participation model implemented in the Laguna de los Pozuelos Biosphere Reserve area can be seen as an opportunity for national and regional replication, as well as the process of empowering provincial public authorities in the formulation of sustainable livestock grazing management and wetland restoration plans, in collaboration with the communities. Another opportunity is to advocate for a national policy on the restoration of high Andean ecosystems, which is currently lacking.

5.1.1. Context

High Andean wetlands are a key component in ensuring the region's resilience to CC and deliver economic benefits to local communities by providing ecologically and economically important grazing areas for llamas and alpacas, and plant fibre as food and fuel for subsistence. Wetlands are areas where water is the main factor controlling the ecological functioning of the area, so they can be characterised as "hydroecosystems" (Izquierdo et al. 2016). Especially in arid areas such as the puna, these systems are of great importance for biodiversity and local populations that depend on the ecosystem services, such as water regulation and accumulation that they provide. They represent an invaluable cultural heritage for many rural communities and indigenous peoples.

Despite their great value, high Andean wetlands are threatened mainly by pollution resulting from mining activity and overgrazing, which results in the degradation of grasslands, meadows and swamps[79]. In addition, the Andean region is experiencing new environmental changes due to the redistribution of human settlements into urban centres, mining and tourism expansion, and the recovery of wild animals (Izquierdo et al. 2018). These changes are occurring in the context of increased drought due to CC affecting the economy (Grau et al. 2018).

In 2017, the Wetlands Foundation has initiated the first phase of a project to contribute to the conservation of high Andean wetlands[80]. This project is implemented in collaboration with the Andean Ecosystems Association (ECOAN), Environment and Natural Resources Foundation (FARN) and YUCHAN Foundation, with financial support from DOB Ecology. The aim of the project is to restore the health of these ecosystems to safeguard their unique biodiversity and safeguard the livelihoods of the communities that depend on them so that they can continue to regulate water and carbon for the benefit of society. The work sites are the Laguna de los Pozuelos National Monument and RAMSAR site in the province of Jujuy (Argentina) and the Lake Junín National Reserve and RAMSAR site, located in the departments of Junín and Pasco (Peru). The first phase of the project was developed between 2017 and early 2019. Together with the communities of the two sites, pilot experiences were carried out to develop better livestock grazing practices, extraction of champa, management actions and restoration of meadows and wetlands[81]. In the new phase, the experience is being extended to five sites: Junín National Reserve and Carampoma-Marcapomacocha in Peru, Laguna de los Pozuelos Biosphere Reserve, Salinas Grandes-Laguna de Guayatayoc, and Lagunas Altoandinas and Puneñas of Catamarca, Argentina[82].

A key stakeholder for the implementation of conservation measures for the ecosystem services of upstream wetlands is the local communities and indigenous peoples[83]. The aim is to integrate conservation with social development, through the delimitation of grazing areas for livestock (sheep and llamas) for the benefit of the community to limit overgrazing[84], and carbon storage practices in high altitude wetlands. In some natural ecosystems, water management techniques are used to conserve biodiversity and habitats. For example, in the Cordillera region, the Kolla-Quechua Community of Lagunillas del Farallón is carrying out an active management project in meadows and marshes to increase the productivity of llama herds.

The key public actors in the areas of intervention of the Wetlands Foundation are the Secretariat of the Environment and the Secretariat of Family Agriculture at the national level, the National Institute of Agricultural Technology (INTA) and the Cooperative for the Development of Pozuelos (CODEPO). Other key actors are the lithium mining companies in Salinas Grandes, Jujuy province. At this site, social conflict between mining companies and indigenous peoples led to the departure of the companies due to a failure to obtain mining permits[85]. Lithium mining has an irreversible impact on wetlands. Water is extracted from the bottom of the wetlands, creating a water imbalance, and the wetland is salinized or dries out. The Wetlands Foundation does not take a direct stance on mining, but seeks to promote land-use planning strategies that do not exclude mining from RAMSAR sites, promote the use of alternative technologies and reduce environmental liabilities.

The Laguna de los Pozuelos Natural Monument and Biosphere Reserve (Map 1) was created in 1980 by Provincial Decree-Law 3749/80, and National Decree 453/94. The Laguna de los Pozuelos Biosphere Reserve, declared in 1990 by UNESCO, covers an area of 350,000 ha and is located in the northwest of the province of Jujuy. It is a saline lagoon, with a surface area of 16,224 ha. It is located in an area of extreme aridity where only species adapted to such conditions survive, such as the two species of Andean flamingos. It is one of the most important sites for waterfowl and shorebirds in the Andean region. The Biosphere Reserve is inhabited by some 10,000 people, whose main activity is raising domestic livestock (llamas and sheep) and where overgrazing is resulting in the degradation of the meadows.

79 Hegoburu C., Andelman M. & Blanco D. *Proyecto Conservando los Humedales Altoandinos. Para la gente y la naturaleza* [Conserving High Andean Wetlands Project. For People and Nature]. BA: Wetlands International, ECOAN,

80 https://www.humedales.org.ar/campa%C3%B1a/conservando-los-humedales-altoandinos-en-argentina-y-per%C3%BA

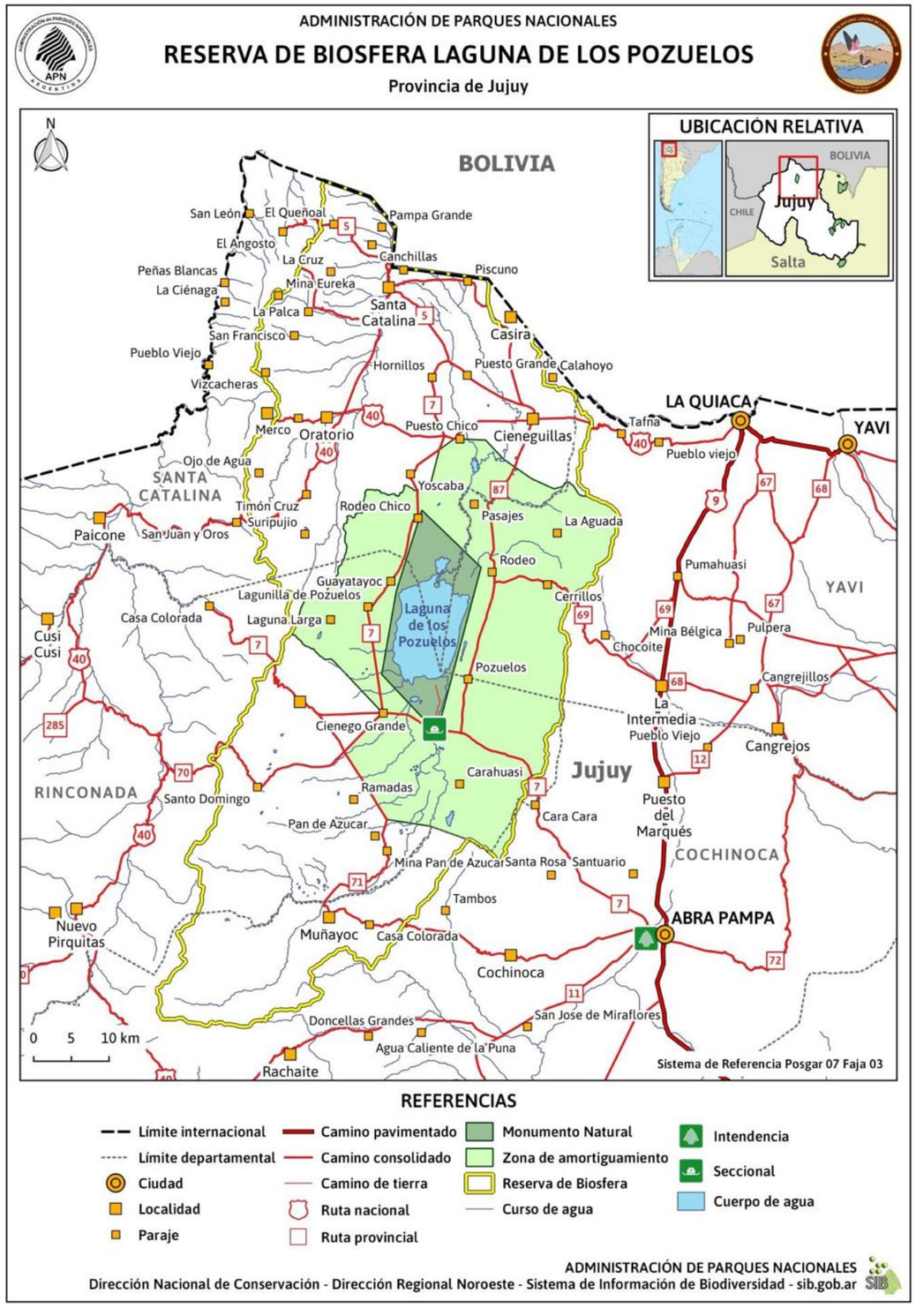
81 https://lac.wetlands.org/noticia/iniciamos-la-segunda-fase-del-programa-conservando-los-humedales-altoandinos-en-argentina-y-peru/

82 https://lac.wetlands.org/caso/conservando-los-humedales-altoandinos/

83 Interview with Nidia Amaya, Wetlands Foundation - Argentina, 22 January 2021, Zoom.

84 https://www.elsol.com.ar/una-decada-de-trabajo-en-conjunto-para-recuperar-los-humedales-de-guanacache

85 Interview with Baigun, Wetlands Foundation - Argentina, 7 October 2020, Zoom.



Map 1: *Laguna de los Pozuelos Natural Monument and Biosphere Reserve, Jujuy, Argentina. (Source: Wetlands International)*

5.1.2. Knowledge co-production at territorial level

▪ **Participatory processes**

The Laguna de los Pozuelos Natural Monument and Biosphere Reserve (MNLP) has a *Management Plan for 2019-2024*. The plan identifies as the vision of the MNLP: "National Parks, the Original Communities of the Kolla People and producers of the Laguna de los Pozuelos Basin, with other institutions, manage the territory conserving the natural and cultural, tangible and intangible values, through planned, ethical and sustainable use, favouring ancestral and community practices with the incorporation of new technologies, in a horizontal relationship between man, nature and the cosmos for a life in harmony, guaranteeing participation and equity"[86].

The plan was built in close liaison with local and indigenous communities, provincial and national governments, the Secretariat of Family Agriculture and the Secretariat of Natural Resources. According to the coordinator of the Wetlands Foundation's "Conserving the High Andean Wetlands" programme, there is a cooperative relationship and dialogue with the authorities[87]. The Biosphere Reserve Plan was drawn up in accordance with the needs and demands of the local populations, through work in local assemblies[88]. Five participatory workshops were held with local communities and institutions. Prior to the last workshop, the synthesis of the plan and the prioritised lines of work were presented to the communities of Pozuelos, Rodeo y Pasajes, Ciénaga Grande and Lagunillas de Pozuelos. However, the process faced the difficulty of socialising the document during the pandemic, so the plan was only validated with the institutions.


Laguna de los Pozuelos Wetlands *Ron Knight.*

86 *Natural Monument Laguna de los Pozuelos. Management Plan 2019-2024.*

87 Interview with Román Baigun, Wetlands Foundation – Argentina, 07 October 2020, Zoom

88 Interview with Amaya, Wetlands Foundation – Argentina, 22 January 2021, Zoom

According to the programme's social affairs manager, the northern communities are highly organised[89]. The eight communities that are located around the lagoon make decisions during their monthly assemblies, and are led by a president of the neighbourhood union and a president of the native community. Within the framework of the project, the communities set up the meetings and visits to the farms to understand the problems they had, as well as to be able to present their perceptions in relation to the variation in rainfall and the reality of water scarcity and drought caused by the CC, the reduction of pastures that affects livestock production and the peasant economy. All decisions in the territory are made through the community assemblies, conservation projects alone cannot be made and there has to be a dialogue with the communities individually. In the past, the communities tried to create a departmental council to group together, but it failed due to internal conflicts[90]. Therefore, there is no formal space for linking all the stakeholders in the area, but the starting point is to consolidate the connection with the communities through territorial presence.

▪ **Transition of productive practices and restoration activities**

Within the framework of the programme, a *Sustainable Livestock Grazing Management Plan* was developed to reduce the environmental degradation of the wetlands around Laguna de los Pozuelos. It seeks to implement programmes to convert from sheep to llama herding and to seek benefits for the herders, which represents an important transition. This plan articulates technical expertise with the traditional knowledge of the communities, promoting the participation of local people in order to meet their production needs. This has involved jointly defining management strategies and determining how livestock stocking rates are applied in the fields. The plan covers the entire Laguna de los Pozuelos wetland, where it is working with producer families in the communities of Lagunilla de Pozuelos and Ciénaga Grande, involving over 1,000 ha of grazing areas in total. A recent study supports the implementation of the management plan in the area by demonstrating that increasing vicuña grazing in puna areas does not necessarily affect their productivity and resilience to CC, when there is adequate ecosystem management by the communities (Navarro et al. 2020). The most important thing is to be able to restore links between neighbours in order to think communally.

89 Idem.

90 Interview with Claudia Martínez Oviedo, Secretariat for Family Farming, 03 March 2021, Zoom.

Sheep and llama breeding, Laguna de los Pozuelos *Kimon Berlin.*

In addition, a *Vegas Management and Restoration Plan* was drawn up with the aim of improving the storage and maintenance of rainfall water in the wetland systems to achieve greater soil wetting and, thus, an increase in pasture productivity, helping to counteract the wide oscillations between dry and wet periods that lead to the intensification of the effects of overgrazing. These actions are being carried out in the Lagunilla de los Pozuelos and Ciénaga Grande communities. The 110 families that make up these communities benefit from the works carried out on the watercourses, on the coast of Lagunilla de los Pozuelos and in the fertile plains of the Chico river. Management actions are based on the construction of small walls for sediment control and wetland irrigation. Annual monitoring of the works is being carried out, verifying the functioning and taking measurements of water height and accumulated sediment.

The key point is that there is joint work between the technicians and the villagers, with the aim of associating scientific studies with ancestral wisdom through the formation of a network of work in the field. Therefore, agreements are established with the communities so that they can define their priorities and that the solutions are locally based. The Wetlands Foundation is present in the long term to leave a methodology and management plans in place for communities and governments. According to the programme's social affairs manager, despite the pandemic, there is adequate ownership of the project in the territory, communities are requesting training to replicate, they are aware of the problems and are asking for more information on the water situation.

5.1.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies CC

▪ **Inter-institutional articulation**
The aim of the Wetlands Foundation and the actors in the area is to scale up the experience through knowledge platforms. The way forward is to link up and show restoration options in addition to conservation. The aim is to reach a regional scale through a state policy on the subject of restoration. In addition, one objective is to use the experience of binational cooperation between Argentina and Peru in the conservation of high Andean wetlands to work with Chile and Bolivia in the future. In this sense, the Wetlands Foundation participated in 2020 in the launch of the Wetland Restoration Working Group of the 20x20 Initiative[91]. The 20x20 Initiative is an effort promoted as part of the Bonn Commitment and facilitated by the World Resources Institute (WRI), as an effort by countries to restore 20,000 ha by 2020. It was created in 2014 as a platform to generate commitments from governments, private actors and NGOs to restore wetlands and other ecosystems, and to work towards sustainable development and poverty reduction.

▪ **Cross-sectoral articulation conservation, family farming and mining**
One of the challenges identified in the reserve's *Management Plan* is the multi-sectoral articulation between wetland conservation, agricultural and livestock production activities, and mining in relation to CC adaptation policies, wetland conservation and the agro-productive sector. In Argentina, two sectoral action plans are particularly noteworthy: the *National Action Plan for Industry and Climate Change (Mining)* and the Climate Change Commission for Agriculture, Livestock, Fisheries, Food and Forestry. There is a collaborative relationship between the Secretariat of Family Agriculture of the province of Jujuy, the University of Jujuy, with the support of the Ministry of Environment of the province, INTA, and the Secretariat of Indigenous Peoples and Education.

The Secretariat of Family Agriculture of the province of Jujuy supports the productive activities of livestock farmers in the Pozuelos basin through micro-credits and technical assistance from a social perspective[92]. Monitoring is done every year through a socio-productive diagnosis, rather than through formal centralised standards. In addition, the Wetlands Foundation evaluates quantitative impacts and generates other types of data. However, according to the head of the Undersecretariat for Family Farming and Territorial Development, there are tensions with state entities at the national level, in particular INTA, which have a more productive vision, leaving aside the social aspect. They seek to invest in cheaper and more profitable technologies, but which are difficult for older populations to use. In addition, the Provincial Secretariat reports a lack of personnel and resources to attend to all the needs, which have been increasing in the context of the pandemic.

On the mining issue, there are agreements signed between the mines and the communities of Pozuelos. For example, at the Pan de Azúcar mine, a water quality study was carried out, and at the Chinchilla mine, training programmes were carried out for young people from the communities so that they have the capacity to interpret the reports and participate in monitoring and consultation strategies. We work together with the FARM Foundation, which places more emphasis on the issue of mining.

91 Lanzamiento del Grupo de Trabajo de Humedales de la Iniciativa 20x20 - Wetlands International Latinoamérica y el Caribe

92 Interview with Claudia Martínez Oviedo, Secretariat for Family Farming, 03 March 2021, Zoom.

The proposed *Wetlands Law* is still being debated in Congress[93]. It aims to define minimum requirements for the conservation, protection and wise use of wetlands. There are some points of conflict that have to do with the definition of wetlands, wetland categorisation, territorial reordering, and which activities are allowed and which are not. While there is controversy over which jurisdiction should survey wetlands (national, provincial or jointly) or how wetlands are categorised with respect to their preservation or use, the biggest controversy is over criminal penalties, as well as economic sanctions. According to the social affairs manager of the Wetlands Foundation, the idea is to protect without prohibiting or creating strict conservation areas. However, one of the risks is that, with the approval of the law, wetlands will become natural parks and producers will not be able to make any kind of intervention.

5.2. CASE STUDY 2: Community-Based Adaptation Strategies, Bolivia

Table 14. *Synthesis of the main findings of Bolivia's Cochabamba case study*

National policies applied in local contexts	*Inter-agency articulation* Bolivia has consolidated a national regulatory system with innovative instruments for planning, development and adaptation to CC (*Territorial Integrated Development Plans*, Life Systems). *Implementation gaps* On the other hand, there are limits to the decentralisation process and a lack of training for technicians in the municipalities so that they can concretely implement the national development planning instruments and, for example, formulate their own municipal laws. Another limitation is the political instability caused by changes of government, which has a negative impact on the continuity of CC adaptation projects in the territories.
Territorial resistance	There are tensions among the different types of knowledge on CC at the territorial level, leading to a process of devaluation of local knowledge by municipalities and a barrier to scaling up this traditional knowledge on climate towards national public policies. On the other hand, tensions may arise due to the lack of training for local actors in the use and exploitation of technical-scientific tools for climate information and governance.
National impact and opportunities for replication	The proposal for a *Municipal Law on the Protection of Water Recharge Areas* in Totora aims to carry out an advocacy exercise towards departmental and national policy, in order to consolidate the regulatory framework for adaptation to CC and conservation of water sources in community areas. This experience has the potential to be replicated in other Andean countries facing similar problems (e.g., Ecuador, Peru, Venezuela).

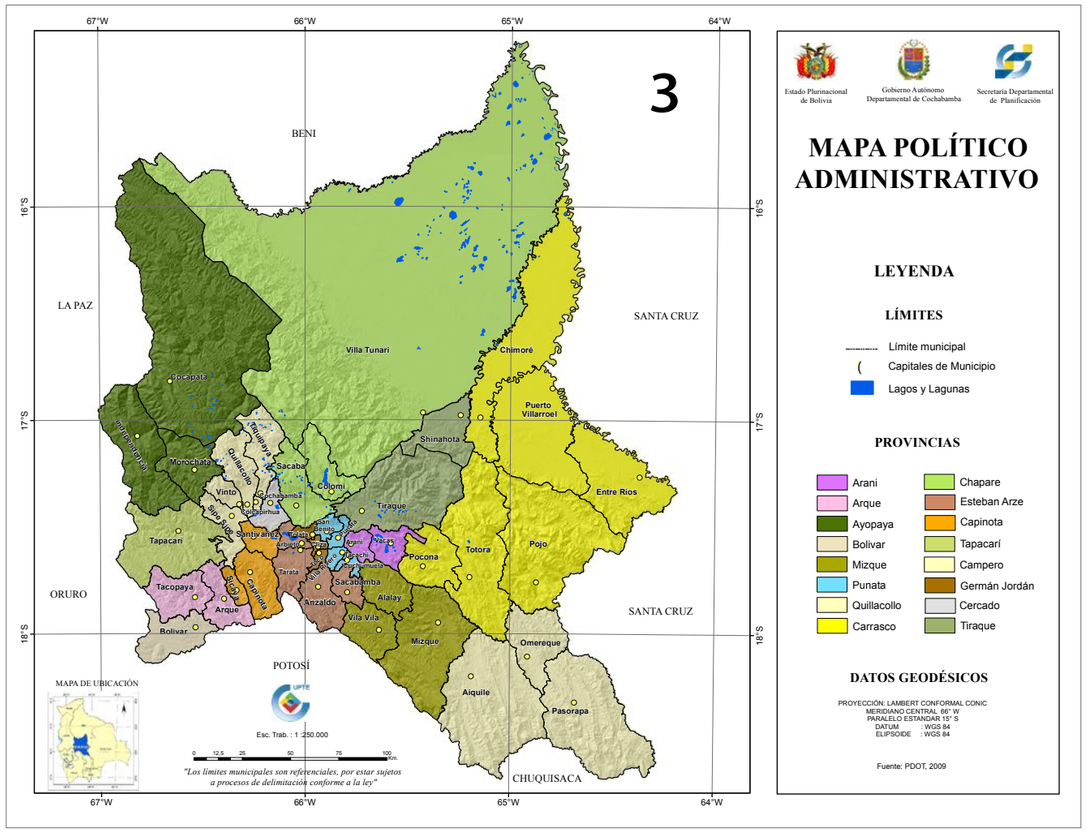
93 https://www.infobae.com/campo/2020/09/27/ley-de-humedales-de-que-se-trata-y-que-piensan-el-campo-y-los-ambientalistas/

5.2.1. Context

Consistently with national mandates and policies, the country seeks the valorisation and recovery of ancestral knowledge as a central component of CC adaptation actions. In this sense, the *Biocultural and Climate Change Project*[94] is being implemented by the Plurinational Authority of Mother Earth (APMT) with funding by SDC. The programme's main focus is water, which is fundamental in the Central Andes, as well as a food self-sufficiency and agrobiodiversity. It is being developed in the upper valley of Cochabamba to protect water sources and water recharge areas, through the co-creation and revaluation of ancestral knowledge. The project benefits indigenous and peasant families from 300 communities in 27 municipalities in the Andean and sub-Andean areas of the country and proposes a fusion between the sustainable management of biodiversity and the revaluation of ancestral knowledge in order to develop endogenous biocultural models.

Agricultural activity in the municipality of Totora, department of Cochabamba, is an alternative livelihood for the entire population. However, in the last decade there have been reports of significant losses in agricultural production due to the effects of CC and the absence or poor application of policies, plans, programmes and productive projects in favour of food security for families and communities[95]. The municipality of Totora is home to three basins—Totora river, Ivirizu river and Mizque river—which in turn make up 13 sub-basins. Due to its territorial composition, it has two ecological levels: yungas and valleys, with marked differences in water availability. One of the major problems facing the area is the limited availability of water, problems of delimitation of property rights and the lack of water sources protection.

For more than three years, around 600 families in the valley and headwaters areas of the Totora Life System have been working within the framework of the project to strengthen their capacity to respond to adverse climate change phenomena by implementing ecological, socio-cultural, economic and political-institutional buffering actions. The *Totora Territorial Integrated Development Plan* (PTDI) 2016-2020, considered one of the pioneers in the country, has been prepared, approved and implemented. This made it possible to incorporate proposals that respond to the needs of the population in aspects of water management and food security. It has achieved the commitment and joint work of the families of producers with their agrarian unions and economic entrepreneurship, and with the Autonomous Municipal Government of Totora, to promote the sustainable management of common goods such as water, soil, forest and animals, as an example of integrated territorial management. The economic counterpart of the Autonomous Municipal Government of Totora has been involved in the execution of the project for the strengthening of the Risk Management Unit.



Map 2: *Department of Cochabamba, Bolivia.*
(Source: Autonomous Government of Cochabamba)

5.2.2. Knowledge co-production at territorial level

▪ **PTDI, Life Systems and Totora's Law for the Protection of Water Recharge Areas**
According to *Law 777 on the State's Comprehensive Planning System* (SPIE), the municipal PTDI must contemplate the management of life systems, and include risk management that allows for resilience and adaptation to CC (Marca Cáceres & Lipa Challapa 2020). In its PTDI 2016-2020, the municipality of Totora proposes a vision of sustainable development to achieve Living Well as follows: "Totora's system of life is in balance, it has a sustainable productive, agro-ecological, tourist system, with food security and self-sufficiency, which maintains its healthy environmental functions in coexistence, harmony and respect for the rights of Mother Earth; where all and all its inhabitants have full access to quality intercultural education and health, to basic services, with social, gender and generational equity, to achieve living well or Sumaj Kawsay"[96].

94 https://prorural.org.bo/index.php/proyectos/template/pages

95 https://www.agrecolandes.org/biocultura/

96 *PTDI Totora 2016-2020*, p. 223.

Cochabamba, Bolivia *Wanderley Ferreira.*

The AGRECOL Andes Foundation supports the proposed Municipal Law for the Protection of Water Recharge Areas in the municipality of Totora[97]. One of the future goals of the project in terms of knowledge generation is to influence the departmental level of Cochabamba and the national level. To prepare the process of enactment of the municipal law, the First Water Summit was held in the municipality of Totora on 25 April 2018[98], at the call of the Municipal Government. It was attended by representatives of peasant and neighbourhood organisations, the Local Council for Agricultural Productive Development (CLODEPA), technical, legislative and executive staff of the municipal government, the Agroecology University Centre (AGRUCO) of the Universidad Mayor de San Simón, the parish of Totora and development institutions working in the municipality. The objective was to reflect on the need for strategic and integral actions to improve the supply of water for irrigation and human consumption. Delegates from the communities that form part of the four life systems of the municipality of Totora participated: Yungas, Alturas, Valles and Centro Poblado. According to a technician from the foundation, the summit opened a dialogue between the communities and their authorities and built a bridge between science and politic[99]. In 2021, the process of building the second PTDI of the municipality of Totora will begin, for which the foundation seeks to advocate in the municipalities so that the life systems are adequately included.

97 https://www.agrecolandes.org/solidagro/2019/07/24/rumbo-a-una-ley-municipal-para-proteger-las-zonas-de-recarga-de-agua-en-totora/

98 AGRECOL Andes. Febrero 2019. *Boletín Temático Nº3*, http://www.agrecolandes.org/wp-content/uploads/2019/02/Bolet%C3%ADn-3.-Propuestas-para-Recarga-Hi%CC%81drica.pdf

99 Interview with Tito Villarroel, Fundación AGRECOL Andes, 27 November 2020, Zoom.

▪ Ethno-climatology, bio-indicators and local monitoring

Another initiative with an impact in the area is the project on Applied Research for Adaptation to Climate Change and project "Concepción Andina del Clima" (PIA-ACC, UMSS.49) of the Universidad Mayor de San Simón in Cochabamba. An analysis of local knowledge and narratives on climate risks was carried out, involving young people from the municipality of Tiraque, in the province of Cochabamba. A training process on risks was carried out for young people to pass on knowledge to elders[100]. The aim was to collect ritual practices throughout the agricultural cycle with an anthropological approach, and to monitor climatic cycles in the community. A group of climate observers with specific training was created. The monitoring of climatic cycles through trained people, and not through technological instruments, allows the recording of other data linked to pachagramas[101] and local knowledge.

Participatory research in Cochabamba *Wanderley Ferreira.*

100 Interview with Rocio Bustamante, Centro Agua, Cochabamba – Bolivia, 05 November 2020, Zoom.

101 Pachagramas are ancestral agro-climatic recording and risk management tools used by Andean communities in Bolivia.

The theoretical proposal to materialise these goals is based on studies on CC and the adaptation strategies of Andean communities, which focus mainly on the collection, systematisation and analysis of climate indicators (Bustamante et al. 2019). It was analysed how the conformation of *ritual landscapes* generates a visual language of the territory in Andean communities, as a space-time continuum, or *pacha*. The various religious festivals of the year coincide with important moments of agricultural work (land ploughing, harvesting), which in turn is being impacted by climatic variation.

The researcher in charge comments that it has been difficult to maintain the follow-up of the project after its closure[102]. The idea was to link the project with the Ministry of Development Planning (MPD), but it was difficult in the political context of the change of authorities in 2020. There was a follow-up of three years of observation of practices and there is a need to be in the field continuously. However, with the change of government, there is a lack of institutional continuity and the establishment of working relationships and collaboration at the municipal level is complicated. The priority is to work on mechanisms to collect information and invest in monitoring systems for research projects at the municipal level. The problem is that sometimes there is only one technician in the municipality to assist 150 communities, so work ends up being done at a very macro level.

5.2.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies CC

In the second phase of the project (2015-2019) [103], the Biocultural project has supported the MPD in the design of the *National Economic and Social Development Plan*, with regard to the CC approach and, specifically, in the application of the notion of Living Systems, which is at the heart of the *Territorial Plans for Integrated Development* (PTDI). The aim is that the 27 municipalities where the Biocultural project works could become 27 laboratories to refine the methodologies, procedures and training of public servants and community leaders for the implementation of this integral way of managing the territory from a CC perspective.

Law 071 on the Rights of Mother Earth and Framework Law 300 on Mother Earth and Comprehensive Development for Living Well constitute a consolidated legal framework with a complex planning system. However, a researcher from the Catholic University of Cochabamba comments that, in his opinion, the Plurinational Authority of Mother Earth (APMT) was created without giving it sufficient power[104]. The APTM wanted to carry out a training process on the new legal framework for planning and development, but did not have time to socialise it with the municipalities due to the change of government. Political changes require the systematisation of regulatory processes beyond specific projects to ensure their continuity and operability. Furthermore, the same researcher points out that despite the decentralisation process defined in the legal framework, which allows municipalities to enact laws on this scale, the municipalities lack the capacity to execute them, especially to concretely implement the Life Systems.

102 Interview with Rocio Bustamante, idem.

103 https://journals.openedition.org/poldev/2502

104 Idem.

5.3. CASE STUDY 3: Protecting Mountain Biological Corridors, Chile

Table 15. *Synthesis of the main findings of the Chilean Metropolitan Region case study*

National policies applied in local contexts	*Inter-agency articulation* One of the major advances is the implementation of the Soil Conservation District model (Law 18,378 of the Ministry of Agriculture) in several municipalities of the country. The empowerment of the municipalities through the training activities developed within the GEF-Montaña project (*Handbook of Good Practices, Conservation Districts*) has allowed a good appropriation of the policies at the municipal level and an adaptation of these policies to local needs. *Implementation gaps* Sub-national coordination spaces on CC adaptation (e.g., Regional Climate Change Committees, CORECC) are not sufficiently articulated with local needs and realities, and are therefore underutilised by local stakeholders.
Territorial resistance	The process of raising the awareness of local communities for a transition to a regenerative livestock model is a slow one, facing some local resistance to the adoption of conservation practices.
National impact and opportunities for replication	Capacity building in the municipalities, through the figure of the Conservation Districts, represents an opportunity to influence the national process of intersectoral coordination between the Ministries of Environment and Agriculture, and between the objectives of environmental conservation and productive development.

5.3.1. Context

Chile has one of the most unique habitats in terms of flora and fauna in the world, known as the Mediterranean ecosystem[105]. These areas, when mountainous, provide multiple benefits such as water provision, air purification, soil formation, pollination, and sustenance of biodiversity. However, there is a growing degradation of biodiversity, soils and water in the mountain territories of Central Chile, despite increasing efforts by public and private institutions to reverse the deterioration in the last ten years.

In some municipalities there are no land-use regulations and only a few municipalities take actions to demand biodiversity-friendly practices in their wilderness and buffer zones. In addition, local environmental management strengthening mechanisms, such as the Municipal Environmental Certification System (SCAM), do not include demands for the management and conservation of biodiversity and ecosystem services.

105 https://gefmontana.mma.gob.cl/proyecto-gef-montana/

The project *Protecting Biodiversity and Multiple Ecosystem Services in Mountain Biological Corridors of the Mediterranean Ecosystem of Chile*[106]briefly called GEF-Mountain—seeks to contribute to the development of public-private initiatives that enable the conservation of biodiversity and protect or enhance the benefits provided by the mountains of the Metropolitan Region of Santiago and part of the Valparaíso region, by strengthening municipal capacities, monitoring their ecosystems on a permanent basis and incorporating good productive practices in the territory. It is a region with biodiversity hotspots that has the largest population in the country, heavily pressured, in a context of intense drought, heat waves and mega fire[107].

The project covers 36 municipalities and benefits 30 municipalities in the Metropolitan Region and six in the Valparaíso Region. It is an initiative of the Ministry of the Environment, which intends to conduct it in alliance with key stakeholders in order to achieve the goals of this initiative. Some of the actors are the Association of Rural Municipalities, the Cordillera Park Association, the Metropolitan Regional Government, the Undersecretariat of Regional and Administrative Development (SUBDERE), the Agricultural and Livestock Service, the National Forestry Corporation (CONAF), the Clean Production Council, the Institute for Agricultural Development (INDAP), the Office of Agricultural Studies and Policies (ODEPA), the Regional Ministerial Secretariats (SEREMI), municipalities, and universities, among other important partners, in addition to some private companies.

One of the components that the project seeks to strengthen is local environmental management, which is considered to be strategic. This component proposes the sustainable development of the territory, which involves the strengthening of municipal environmental units, incorporating traditional environmental issues, the management and conservation of biodiversity, water and soil. This will improve environmental governance in the 36 municipalities in the project area that have wild territories. The study, called *Floristic and Vegetational Survey in the GEF Mountain Biological Corridors Project Area*[108] identified 660 species of flora and 180 plant formations through a sampling that focused on natural mountain areas, covering 506 plots in nine provinces of the Metropolitan and Valparaíso Regions. The information gathered by the study is part of the Biodiversity and Ecosystem Services Information and Monitoring System (SIMBIO) of the Metropolitan Region, which seeks to convey the values of biodiversity and its ecosystem services in the territory and thus guide the management of local governments. In addition, work is being carried out on the installation of the first long-term monitoring site of the GLORIA-Andes Network in the region[109] (Clarillo River Reserve).


Project SIMBIO GEF-Montaña.

The other two components of the project seek to minimise the negative impact that some production activities have on biodiversity. To this end, good practices in tourism, agriculture, livestock and forestry activities will be promoted. In addition, incentive instruments will be improved and integrated on a landscape scale, declaring for the first time in Chile the figure of "Soil, Water and Forest Conservation District". The first pilot district was implemented in a territory of 500,000 ha in the municipality of San José de Maipo, an area of high Andean mountains and glaciers. In this municipality there are livestock farming communities with a long-standing tradition, with which the aim is to implement adaptation and protection techniques for the territory, which is affected by CC, drought and overexploitation of livestock.

5.3.2. Knowledge co-production at territorial level

- **Livestock community participation and capacity building**

Within the GEF-Mountain project, the municipality of San José de Maipo works with small landowners and rural communities dedicated to high mountain livestock farming. The Livestock Pilot Plan was developed with the Las Tórtolas Community, for which a diagnosis of the territory was made to gather information, achieve more sustainable management and carry out regenerative livestock production with groups of farmers. There is also support from INDAP's forestry programme for small vulnerable livestock farmers, and several pilot workshops were held in an comprehensive manner, involving networks of professionals.

106 http://gefmontana.cl/resumen-del-proyecto/

107 Interview with Jaime Rovira, Ministry of Environment – Chile, 06 October 2020, Zoom.

108 https://www.latercera.com/que-pasa/noticia/sorprendente-catastro-mas-del-70-de-las-flores-que-habitan-las-montanas-de-santiago-y-valparaiso-son-especies-nativas/PAXH3KS2K5B33OSXZRXF6EYMK4/

109 Chile en la red mundial GLORIA: Por primera vez las cimas de monitoreo serán administradas por un organismo público: GEF Montaña (mma.gob.cl)

Livestock farming in the Metropolitan Region of Chile GEF-Montaña.

However, the head of the forestry and livestock development programme of the municipality of San José de Maipo says that the project with the community of Las Tórtolas is still in the pilot phase, and there is still a lack of training and education to raise awareness in the communities about the soil situation, livestock management and the need for conservation projects[110]. According to existing regulations, cattle ranchers have to approve a management plan to regularise their land possession. Although most of the communities define themselves as sustainable, there is still work to be done to move towards a regenerative livestock model, especially with older people.

▪ Eco-Local Plan and the Conservation Districts

After two years of work with municipalities in the Metropolitan and Valparaiso regions, together with public services in both regions and three faculties of the University of Chile, the GEF-Mountain Project contributed to the implementation of the *Eco-Local Plan*[111], which helps to integrate the ecological dimension into the territorial planning of municipalities. This is an environmental management tool that will allow municipalities, private associations, non-governmental organisations and civil society organisations to orient their work and focus their management efforts to protect biodiversity and ecosystem services in the natural area of their communities. Ecological planning at the local scale provides technical information for decision-making at the municipal level, for example through the creation of ecological trails to raise community awareness or the definition of wetland cadastres.

110 Interview with Paulina Cerda, San José de Maipo, 26 January 2021, Zoom.

111 http://gefmontana.cl/proyecto-gef-montana-presenta-resultados-de-la-planificacion-ecologica-a-escala-local/

Región Metropolitana de Chile GEF-Montaña.

Eco-local plans were implemented in 36 municipalities (including San José de Maipo). Previously, such plans were made at regional level through the Ministry of Environment in central Chile. Maps of areas of vulnerability to CC were made in order to make proposals for restoration instruments and capacity building for municipalities. According to the GEF-Mountain coordinator, the Eco-Local Plan tool was very well received during the socialisation of the results towards the municipalities[112].

In addition, around 500,000 ha in the community of San José de Maipo were declared an Integrated Conservation District for Soil, Water and Forests[113]. This figure aims to prevent soil erosion and the recovery of eroded land to ensure that ecosystem services and forests are protected. To join these districts, the condition of the soils has to be demonstrated. By declaring a district by the Ministry of Agriculture, a number of Ministry of Agriculture funds are prioritised and enhance the implementation of management plans on lands that voluntarily join the district.

In the municipality of San José de Maipo, workshops were held for the construction of the Conservation District Master Plan and the proposed creation of a Municipal Nature Reserve (RENAMU), which is articulated with the approval of a *Municipal Environmental Ordinance*[114]. *The Master Plan*[115] seeks to ensure that livestock, apiculture, tourism and agricultural activities continue to be developed in a sustainable and responsible manner with natural resources and biodiversity. It involves a zoning map of the district with a maximum number of animals allowed. It was defined that 36% of the community of San José de Maipo has moderate,

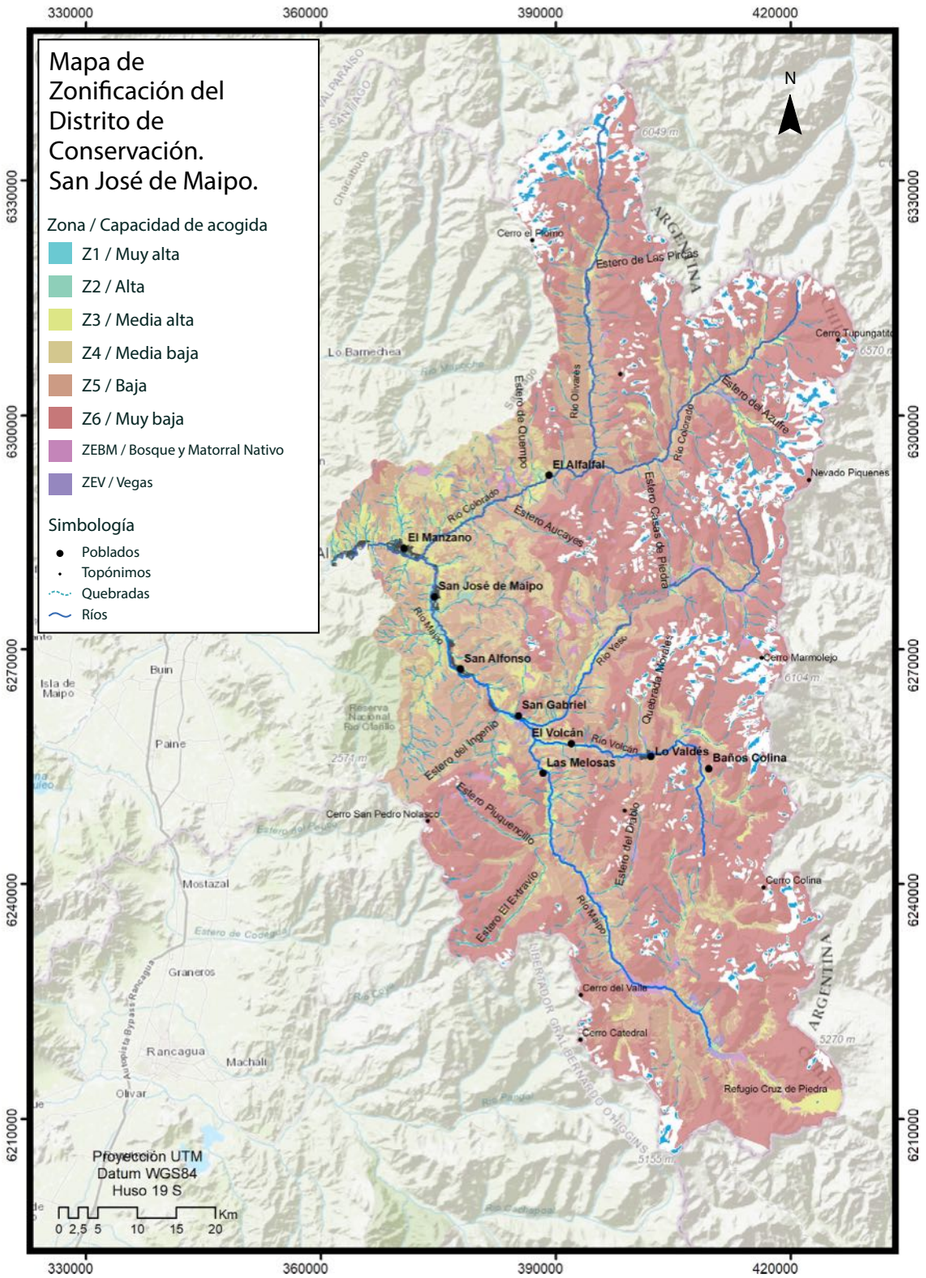
112 Interview with Jaime Rovira, Ministry of Environment – Chile, 06 October 2020, Zoom.

113 https://gefmontana.cl/componente-3/

114 https://gefmontana.mma.gob.cl/proyecto-gef-montana-realiza-primera-reunion-anual-de-la-mesa-de-gobernanza-de-municipios-socios/

115 Agriculture's SEREMIs of the Metropolitan Region. 2018. *Guía del Distrito de Conservación de Suelos, Bosques y Aguas, San José de Maipo* [Guide to the Soil, Forest and Water Conservation District, San José de Maipo]. Santiago, Chile.

severe or very severe erosion and 60% of the remaining area corresponds to glaciers and high peaks. However, according to an environmental manager of the municipality, the *Conservation District Master Plan* is still in theory and has not been put into practice[116].



Map 3: *Zoning of the San José de Maipo Conservation District, Chile. (Source: GEF Montaña)*

116 Interview with Paulina Cerda, San José de Maipo, 26 January 2021, Zoom.

5.3.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies CC

▪ Inter-institutional articulation at regional and municipal level

The GEF-Mountain project is related to other planning exercises carried out by the Ministry of Environment throughout the territory. The first exercise to define Regional Action Plans was carried out seven years ago. Regional CC adaptation plans are being developed throughout the country as sub-national planning exercises. The person in charge of GEF-Mountain comments that, at the beginning, decision-makers were not committed to the plans, and it was necessary to change the inertia of public policy and invest money in issues that were not being invested in. Now CC is increasingly permeating the discourse of decision-makers as a way out of the economic crisis in a sustainable way. However, according to the same interviewee[117], regional action plans need to be more adequately integrated because they are often not known by the municipalities and are not adapted to the scale of what they need. The same happens between the national strategy and the regional plans, which seem to be out of sync.

Within the GEF-Mountain project, a central theme is the strengthening of municipalities to push public policy from the bottom up, according to their local needs. Through the project, courses were offered to municipal government officials to help them learn about their natural landscape and to conserve and reduce vulnerability to the effects of CC. A diploma for environmental professionals was also created. Municipalities can propose projects related to wetland conservation, payment for environmental services, mitigation, flood control, stream restoration and wildlife coexistence. With the aim of facilitating the work of municipal officials in decision-making and strengthening local environmental management in the protection and sustainable use of biodiversity and natural resources, the handbook titled Good Municipal Practices for Biodiversity Management[118]. was created. The document compiles various experiences in environmental management for the protection of biodiversity at the local level in 18 municipalities of the Valparaíso and Metropolitan regions, which are part of the GEF-Mountain Project.

▪ Inter-sectoral coordination

The Ministries of Environment and Agriculture seek to work together through different initiatives. The Ministry of Agriculture, as part of its commitment to forestry and livestock farming and its harmony with the environment, has detected the need to promote productive initiatives that allow the conservation of biodiversity and its ecosystem services. One of the concrete actions for the development of this goal has been the promotion of good productive practices in agricultural, livestock and forestry activities, complemented by sustainable rural tourism. This is how the figure of Soil, Water and Forest Conservation District[119] was developed. However, the Ministry of Agriculture still does not regulate the decree that creates the conservation districts because the law, enacted in the 1980s, has never been implemented. Furthermore, according to the GEF-Mountain project manager, there is still a certain lack of inter-sectoral coordination because the Ministry of

117 Interview with Jaime Rovira, Ministry of Environment – Chile, 06 October 2020, Zoom.

118 https://gefmontana.mma.gob.cl/municipios-se-unen-para-compartir-en-un-manual-sus-experiencias-de-gestion-municipal-para-conservar-la-biodiversidad-local/

119 *Ministry of Agriculture's Law 18,378*, 1984.

Environment does not work on the issue of productive activities and does not take it as a permanent programme[120]. The objective is to better link the work on production activities with biodiversity, conservation and adaptation to CC.

5.4. CASE STUDY 4: Monitoring and Restoration of Paramos in Los Nevados National Park, Colombia

Table 16. *Synthesis of the main findings of Colombia's Nevados National Park case study*

National policies applied in local contexts	*Inter-agency articulation* The experience of the *Strategy for the Integrated Monitoring in High Mountain Ecosystems* (EMA) is an example of an ongoing process for multi-scale articulation between different stakeholders, including national authorities, mainly IDEAM and IAvH, a regional organisation such as CONDESAN and the participation of researchers, authorities and civil society organisations at national and local level. *Implementation gaps* There are some institutional gaps in the implementation of the *National Restoration Plan*, which tends to focus on technical dimensions, with less emphasis on the social dimension and the involvement of the local population in the implementation of restoration projects.
Territorial resistance	There are tensions between national regulations and peasant communities regarding the process of delimiting strict conservation zones and possible productive uses in paramo areas, within the framework of *Law 1,930 on Paramos.*
National impact and opportunities for replication	EMA is an opportunity to integrate different types of knowledge about paramo ecosystems, through dialogue between science and policy and the participatory construction of information and monitoring. It is key to be able to move forward in consolidating the experience in the pilot area of the Claro river basin in order to replicate the strategy at the national level, and at the regional level of the Andes.

5.4.1. Context

Colombia's high Andean forest and paramo ecosystems are subject to multiple changes in terms of land use and the restructuring of socio-environmental dynamics linked to post-conflict processes and the legal delimitation of paramos. In turn, high mountain territories are considered to be among the most exposed and vulnerable to the effects of CC (Sarmiento et al. 2017, Llambí et al. 2019).

Declared an area of natural interest in 1974, Los Nevados Park covers an area of 58,300 ha and has altitudes ranging from 2,600 to 5,321 m above sea level. In addition to having three of the six remaining glaciers in Colombia—the Nevado del Ruiz, the Nevado de Santa Isabel and the Nevado del Tolima—the park is the most important water reserve in the coffee-growing region, supplying water to 38 municipalities and providing water to more than 3,000,000 inhabitants. The most representative ecosystem of the park is the paramo, made up of grasslands, peat bogs, bushes, marshes and ponds, occupying 80% of the Protected Area. The paramo located within the park has lost part of its territory to livestock farming and other land-use changes such as mining (Ruiz-Carrascal et al. 2008). In one sector of this protected area, the restoration of 258 ha is being implemented as part of the nearly 7,000 ha of critically degraded land that have been identified[121].

In August 2020, the 58,300 ha of Los Nevados Park were declared by the Superior Court of the Judicial District of Ibagué as a special subject of rights for its protection, recovery and conservation with a comprehensive approach[122]. One of the related actions will be the preparation of a *Joint Plan for the Recovery, Management, Maintenance and Conservation of Los Nevados National and Natural Park*.

Between 2015 and 2018, the *Paramos Biodiversity and Water Resources in the Northern Andes* project was implemented, with funding from the European Union and the execution by IAvH, WCS Colombia and Parques Nacionales de Colombia[123]. The aim was to contribute to the maintenance of the water regulation capacity and biodiversity of the paramo ecosystem in key targeted areas of the Northern Andes in Colombia, Ecuador and Peru[124]. As part of the project, paramo restoration focused on 258 ha that are connected to the Otún lagoon and benefit several other water bodies. In addition, 9,000 plants were introduced, including frailejones, shrubs and grasses.

On the other hand, the Claro river basin, located in the municipality of Villamaría, Caldas, has been selected as a pilot area for the implementation of the *Strategy for the Integrated Monitoring in High Mountain Ecosystems (EMA)*[125]in Colombia, developed by IDEAM and IAvH in collaboration with CONDESAN. The proposed task consists of generating a synthesis of the status and trends of the socioecosystems in the area, which include the glacier (Nevado Santa Isabel), the paramo (Los Nevados complex) and the high Andean forest. It also contemplates the construction of a proposal for a comprehensive monitoring protocol for high mountain socioecosystems at the landscape or micro-basin scale. The selection of

120 Interview with Jaime Rovira, Ministry of Environment – Chile, 06 October 2020, Zoom.

121 Colombia: así recuperan una zona de páramo degradada por ganadería en el Parque Los Nevados | FOTOS (mongabay.com)

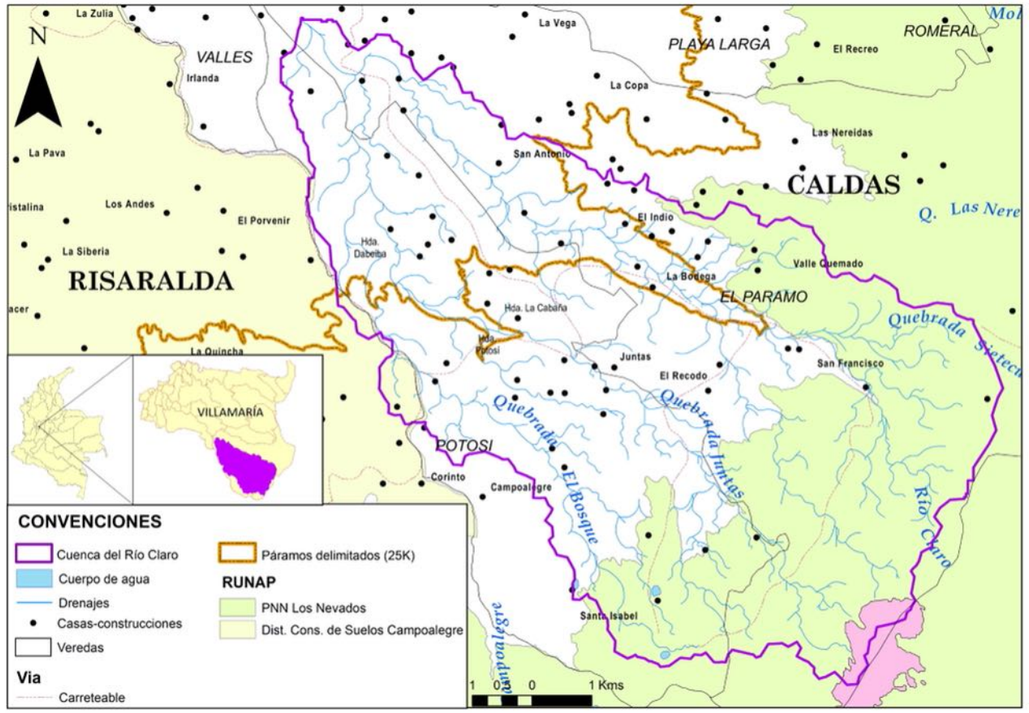
122 https://www.lapatria.com/medioambiente/declaran-al-parque-nacional-natural-los-nevados-sujeto-de-derechos-463064

123 https://sostenibilidad.semana.com/actualidad/articulo/como-recuperaron-258-hectareas-de-paramo-en-el-parque-de-los-nevados/54666

124 https://www.iucn.org/es/regiones/am%C3%A9rica-del-sur/nuestros-proyectos/proyectos-en-ejecuci%C3%B3n/p%C3%A1ramos-biodiversidad-y-recursos-h%C3%ADdricos-en-los-andes-del-norte

125 http://www.bosquesandinos.org/arranca-la-fase-piloto-de-la-estrategia-de-monitoreo-integrado-de-los-ecosistemas-de-alta-montana-en-colombia/

the Claro river basin as a pilot site is due to the extensive experience accumulated in long-term research and monitoring in this basin, where initiatives for the monitoring of climate dynamics, glaciers, hydrology, carbon, biomass, biodiversity, land use and livelihoods of the local population coincide.



Map 4: *Rio Claro Basin, Colombia. (Source: IAvH)*

5.4.2. Knowledge co-production at territorial level

▪ Production of and access to information

Thirty years ago, the environmental authority declared the Claro river basin a protected area and removed the population from the area. There are few people living in the paramo today, and those who are there do not own the land, but work under a system of landowners who temporarily allow floating communities to stay and then move to Tolima. According to an IAvH researcher, this dynamic makes it difficult to implement a governance process, which must take into account social inequality[126]. In the context of the EMA pilot project, IAvH carried out a mapping of stakeholders to define with them the questions, local interests and indicators that could be relevant for management, in order to promote greater ownership of the integrated monitoring process.


Sierra Nevada of Santa Marta *Frank Kehren.*

There has been long-term research work in Los Nevados Park closely linked to the issue of CC and the study of glaciers since 1988. With the support of the Research Institute for Development (IRD) and the Andean Community (CAN), the first glacier monitoring station in the country was installed. The biggest challenge of the integrated monitoring process is to put the information at the service of participatory management of the area that goes beyond the scientific community, in order to establish a dialogue with all the stakeholders so that they can take advantage of the information and solve the unequal access to information that generates conflicts.

▪ Sustainable production activities

There are two areas in the basin: (1) the protected area with absolute restriction of uses where only ecotourism, preservation activities and research are allowed, and (2) the complementary conservation strategy with ecosystem care criteria in the paramo area. There was a controversy in 2010 because they sought to limit productive activities in the paramo without considering the people, which generated a conflict[127].

126 Interview with Camilo Rodríguez, IAvH, 01 February 2021, Zoom.

127 Idem.

Claro River Basin *Andrew Neild.*

In 2018, with the approval of Law 1,930 on the Comprehensive Management of Paramos, sustainable uses permitted for production with conservation criteria were defined. The challenge is to achieve productive reconversion in paramos without impoverishing vulnerable families who depend on ecosystem services. In addition, regulations on the paramos have generated much debate due to prohibitions, which is why Congress is debating the creation of mediation mechanisms and the relaxation of certain prohibitions for high-impact farmers. On the other hand, the definition of traditional inhabitants within the framework of the law has helped to resolve certain tensions in the communities. The objective of these regulations is to reach agreements with the inhabitants in order to not only raise awareness of the importance of the paramo, but also to establish limits so that the restoration zones of the Claro river basin are respected.

▪ **Participatory processes**
Tolima's civil society filed a legal action to make the environmental authority more aware of the management of the park against mining in the south. It appealed to the constitutional court that declared the park as a subject of rights. This implies an institutional arrangement with the Ministry of Environment and Sustainable Development (MADS) to take responsibility for the park and to agree on a management plan for the park. The MADS was supported in the previous process of linking actors through the Regional System of Protected Areas (SIRAP) of the Eje Cafetero. A joint commission was set up as a micro version of SIRAP.

5.4.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies CC

▪ **Inter-agency coordination**
An IAvH researcher explains that, because they are considered strategic ecosystems in the country (Law 1,930 on Paramos) and national pride, there is a large amount of regulation on the conservation and management of paramos[128]. However, there is still an implementation gap and a challenge to generate greater local ownership. Therefore, the IAvH seeks to influence national public policy without creating new policies due to the high number of existing regulations in the country.

In the country, 800,000 ha are in the process of restoration through large investments. However, according to an IAvH researcher, there is a lack of knowledge on how to restore paramos beyond traditional or technical approaches, which do not allow restoration to be maintained over time due to a lack of continuous work with the population[129]. The IAvH seeks to support the implementation of the *National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas* (PNR) through, for example, restoration and monitoring protocols with the local population, community nurseries, and smaller-scale rehabilitation projects.

The Strategy for Integrated Monitoring of High Mountain Ecosystems in Colombia (EMA) was born on the one hand from the initiative of several research institutes on monitoring activities in ecosystems and biodiversity, which resulted in the publication of the first version of the strategy with the support of CONDESAN in 2018. On the other hand, article 29 of Law 1,930 on Paramos obliges the MADS to monitor biodiversity and ecosystem services and implement management and community and productive strengthening actions. According to an IAvH researcher, this is a response by the Colombian state to the problems of paramo delimitation that generated conflicts with local communities[130].

The idea is that the regional autonomous corporations, park authorities and other key actors will be involved as the pilot integrated monitoring strategy is consolidated and methodological guidelines are defined. The aim is also to involve the communities in order to achieve a dialogue between institutions and communities. Municipalities and departments have an important role to play in the monitoring processes through their land-use plans. They are included in Law 1,930, although their role is not clearly defined.

▪ **Inter-sectoral coordination**
According to an IAvH researcher, there is a need for intersectoral articulation solutions between the MADS and the Ministry of Agriculture[131] that can be sustained beyond specific international cooperation programmes. The agricultural system tends to be focused on productivity, without providing small producers with access to differential programmes. In contrast, the adoption of Ministerial Resolution 464 in 2017 is an opportunity to invest in agroecological practices and define a public policy for Peasant, Family and Community Agriculture (ACFC).

128 Interview with Marcela Galvis, IAvH Colombia, 07 October 2020, Zoom.

129 Interview with Marcela Galvis, IAvH – Colombia, 07 October 2020, Zoom.

130 Interview with Camilo Rodríguez, IAvH – Colombia, 01 February 2021, Zoom.

131 Interview with Marcela Galvis, IAvH – Colombia, 07 October 2020, Zoom.

5.5. CASE STUDY 5a: Sustainable Rural Development at the Commonwealth of the Andean Chocó, Ecuador

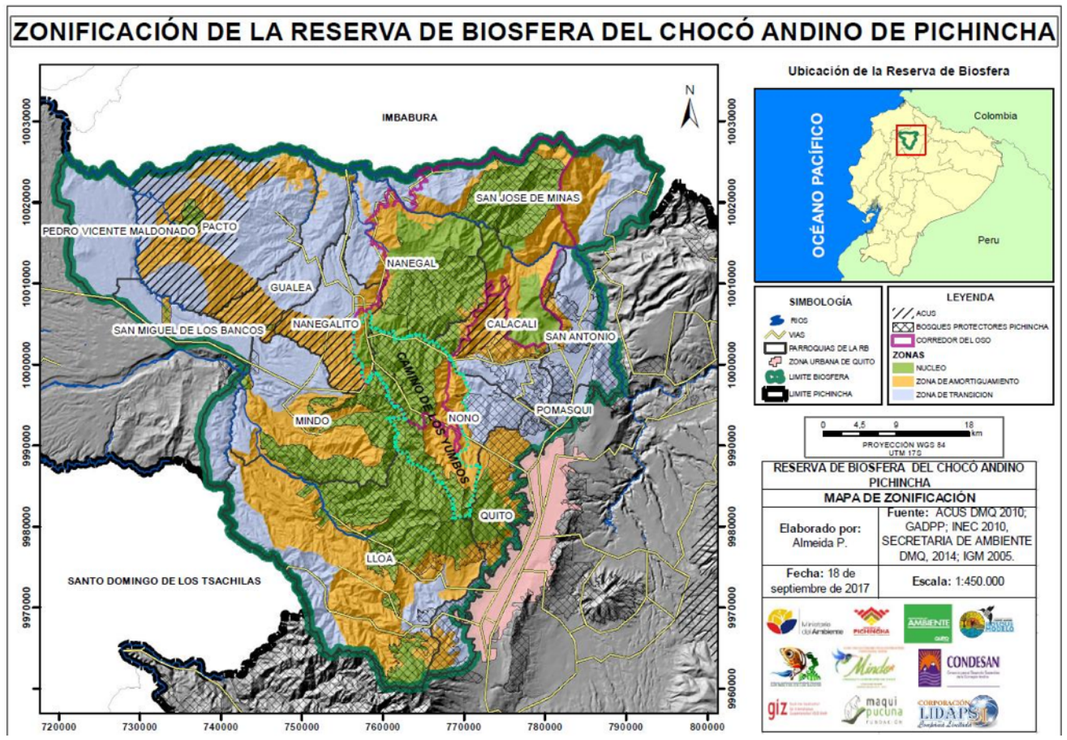
Table 17. *Synthesis of the main findings of Ecuador's Andean Chocó case study*

National policies applied in local contexts	*Inter-agency articulation* The declaration of the Andean Chocó Biosphere Reserve constitutes a space for articulation and collaboration, through the governance platform to be created, between diverse actors and scales, in order to be able to apply national regulations, especially the *National Restoration Plan*, in the local context. *Implementation gaps* Some political spaces encouraged by external actors, such as the Commonwealth of the Andean Chocó (MCA), face limitations in terms of continuity due to political changes over time. In addition, the Biosphere Reserve's governance mechanism has yet to be consolidated as a space for inter-institutional and multi-scale articulation between national and local policy.
Territorial resistance	Extractive activities such as mining continue to develop in the area, threatening the sustainability and social cohesion of community-based sustainable development initiatives proposed by the local communities.
National impact and opportunities for replication	Several local policy instruments have been developed in the Andean Chocó that have potential for national impact and replication to achieve compatibility between conservation, restoration and productive activities in CC-sensitive areas. These instruments include the municipal ordinance declaring the Andean Chocó as a sustainable rural territory, the land-use plans and the network of school forests. These instruments have emerged from the dynamism of the local social and community fabric. The potential of these instruments should be taken into account in national CC policies, in particular the *National Adaptation Plan*.

5.5.1. Context

The north-western area of the Metropolitan District of Quito (DMQ) is located on the Pacific slope of the western Andes mountain range, between 500 and 4,700 m above sea level, in the transition between the Tumbes-Chocó-Magdalena and Tropical Andes bio-regions, both considered biodiversity hotspots with a high degree of threat (Torres & Peralvo 2019). The main threat to biodiversity in the area is habitat degradation and fragmentation caused by agricultural activities. The major challenge is to achieve compatibility between production, conservation and restoration objectives in an area sensitive to environmental change. In addition, legal and illegal mining is one of the most recent direct social and environmental pressures in the area.

Approximately 26% (32,000 ha) of the DMQ's Andean Chocó territory is under agricultural land use. The prevalent land use corresponds to pastures for livestock activity, which occupy 63% of the area under use (19,500 ha) in the Andean Chocó Commonwealth (MCA). Tourism in the Andean Chocó of the DMQ has the potential to contribute to the dynamisation of the local economy, through the enhancement of the natural and cultural heritage of the territory. However, it can also provoke the emergence of new hotspots, pressures and growing threats. A substantial portion of the DMQ's Andean Chocó corresponds to the territory of the parishes of Nono, Calacalí, Nanegal, Nanegalito, Gualea and Pacto, whose parish governments make up the MCA, created on 10 August 2014 with the objective of "consolidating the North-West of the DMQ as a biodiverse, productive and sustainable territory"[132].



Map 5: *Map 5. Pichincha Andean Chocó Biosphere Reserve Zoning, Ecuador. (Source: Secretariat of the Environment)*

Between 2009 and 2019, the municipality of the Metropolitan District of Quito (MDMQ) created four Conservation and Sustainable Use Areas (ACUS). The ACUS constitute a land management strategy that seeks to conserve the last remaining forests of the DMQ, maintain ecosystem services, promote sustainable land management practices and strengthen environmental awareness and education. In addition, the municipality's Secretariat of Environment (SAMDMQ) created in 2013 the Andean Bear Ecological Corridor (CEOA) as a mechanism to protect the habitat of this emblematic species of fauna considered vulnerable by the IUCN, and other species of fauna and flora associated with the Andean forest.

132 Official Register No 659.

In June 2011, the Mashpi-Guaycuyacu-Sahuangal ACUS was created, and in April 2012 the Water and Archaeological System Pachijal ACUS. Both have the aim of conserving forests, promoting sustainable production practices and developing environmental education and awareness processes. The Mashpi and Pachijal ACUSs are promoted through the Management Committee of the North-Western ACUSs, which gathers on a monthly basis with farmers, community leaders and representatives of producers' associations to discuss, agree on actions and seek opportunities to advance towards the objectives of their creation. Under a similar legal scheme, the Yunguilla ACUS was created in 2013, managed by the Yunguilla Corporation, an organisation that brings together all members of the community, with a consolidated governance process that began more than 20 years ago.

On 9 March 2016, the Andean Chocó Commonwealth (MCA) territory was declared a Model Forest of the Ecuadorian Andean Chocó (Ecuador's first model forest), for demonstrating in its practices principles of partnership and participation, landscape approach, effective environmental governance, commitment to sustainability and capacity building, and networking.

On 1 September 2016, the *Metropolitan Ordinance №137* was enacted, which establishes the parishes of the MCA as an area of ecological, cultural and sustainable productive development importance, and creates the Inter-Institutional Roundtable as a coordination mechanism between the MCA and the various municipal entities. The Inter-institutional Roundtable, led by SAMDMQ, must coordinate actions adapted to the local context and oriented towards the objectives defined in the aforementioned legal instrument.

On 25 July 2018, the UNESCO Man and the Biosphere (MAB) Programme signed the *Declaration of the Biosphere Reserve of the Andean Chocó of Pichincha*[133]. CAs a follow-up, in 2019, different authorities of the territory signed the *Agreement in Favour of the Conservation and Good Living of the Pichincha Andean Chocó Biosphere Reserve*. This agreement seeks to consolidate the inter-institutional position against metal mining, safeguard its natural heritage and jointly build a conservation and good living plan for the sustainable management of the territory.

5.5.2. Knowledge co-production at territorial level

- **Participatory processes**

According to a CONDESAN consultant, there is a successful experience in the northwest of Pichincha due to the convergence of priorities[134]. The fact that the political-administrative area coincides with the landscape provides many opportunities. In addition, there is a strong dynamism of local actors and the social fabric, with the support of some NGOs such as CONDESAN that give continuity to the processes. From the formulation of parish PDOTs and the construction of the territorial plan of the commonwealth, the declaration of the Andean Chocó Model Forest and the Biosphere Reserve was achieved. In addition, the territorial plan was considered in the municipality's land use plan and *Ordinance №137*, which made it possible to define a management model for the rurality of the North-West. The objective is to change the focus on state or private area models to create a new reference on sustainable uses that is adapted to each context. The instruments of municipal ordinance, commonwealth and model forest network have the potential to be replicated at a higher level.

CAndean rainforest landscapes *Emilie Dupuits.*

The Inter-Institutional Roundtable has ordered the elaboration of the *Special Plan for the Use and Occupation of the Land of the Commonwealth of the Andean Chocó*. As part of the preparation of the Special Plan for the MCA, micro-watersheds have been identified that contain water sources for human consumption, which are located at the heads of important basins. Through a specific agreement with the SAMDMQ[135], CONDESAN, through the PBA, committed to support the process of formulating the *Special Plan* for the MCA in three specific areas: (1) macro-zoning to incorporate natural heritage management objectives, (2) generation and validation of information on socio-environmental dynamics in territory to strengthen the management model, and (3) articulation of MCA governance platforms for the formulation of the management model.

The commonwealth is made up of the six presidents of the parish Decentralised Autonomous Governments (GADs), and the current president is from the GAD of Nanegalito. The MCA has a Board of Directors that meets monthly to discuss and make decisions in order to act in a coordinated manner and face regional challenges, with an emphasis on the environment. In the search for sustainability of the socio-environmental governance process and in order to prepare for a

133 http://www.bosquesandinos.org/el-Chocó-andino-celebra-su-primer-ano-como-reserva-de-biosfera/

134 Interview with Macarena Bustamante, CONDESAN, 15 December 2020, Zoom.

135 https://condesan.org/2018/08/06/plan-especial-la-mancomunidad-del-Chocó-andino-se-construye-desde-parroquia/

generational change, the MCA supported the creation of the MCA Youth Network and the MCA School Forest Network, which seek to strengthen local identity through communication and environmental education. Made up of young people from the six parishes that make up the MCA, the MCA Youth Leaders Network was created in 2016. However, the commonwealth structure has its life cycles, as do the conservation area management committees, leading to some instability in political processes. The previous leadership was more empowered in the process through the founding of the commonwealth, the environmental commitment, and the construction of the *Municipal Ordinance №137* of the DMQ that declares the northwest as a sustainable territory. With this ordinance, projects have to be developed in accordance with the local needs of the rural area. Before, the territory was seen and managed as part of the urban area.

▪ **Sustainable land use and production transition**
In the Andean Chocó, it is common not to use fertilisers, but this does not mean that there is no environmental impact, land degradation and pressure on forests[136]. It is an area that has no vocation for livestock farming, but it is done out of economic necessity. A change was made eight years ago through a large investment to reduce the agricultural frontier, improve the management of natural resources and make a transition to sustainable livestock farming with rational grazing, conservation of water sources and reforestation of native plants in water recharge areas. The goal of the School Forest Network is to be able to show livestock farmers in the area what works and to use the farm as a learning site.

Ecotourism activities in the Andean Chocó *Emilie Dupuits.*

136 Interview with Carolina Davalos, Fundación Futuro, 20 January 2021, Zoom.

The Secretariat of Environment of the municipality of the Metropolitan District of Quito (SAMDMQ) seeks to promote sustainable production activities and train livestock farmers through the exchange of experiences. As part of a project with CONDESAN on sustainable land management, farm plans were drawn up with a diagnosis and future projection. Fundación Futuro also has a work line on sustainable livelihoods and education for territorial development. In 2021, marketing activities for agro-ecological products, community gardens and women's groups will be implemented. The marketing issue is coordinated with the members of the commonwealth according to their interests. Since 2014, work has been carried out on several initiatives aimed at promoting sustainable land management practices on MCA farms, with emphasis on the ACUS and CEOA in a collaborative effort among SAMDMQ, CONDESAN, the MCA and the parish governments of the Andean Chocó. Local actors have promoted integration through productive restoration, with occasional support from public institutions (Ariza-Montobbio & Cuvi 2020).

5.5.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies

▪ **Biosphere Reserve governance**
According to a member of Fundación Futuro, the level of involvement of local actors in the *Biosphere Management Plan* has decreased in recent months. The idea is that the activities carried out in the area should be aligned with the territorial development policy embodied in these instruments and with the vision of the commonwealth as a sustainable territory. However, the tools are not widely used by stakeholders and remain on paper. The biosphere management committee, led by the provincial government, has not met recently and there is a lack of official communication.

The Biosphere Reserve of the Andean Chocó of Pichincha will offer the possibility of forming a governance platform that incorporates a broader base of local governmental and non-governmental actors and new levels of government: GAD of Pichincha and the Ministry of Environment and Water (MAAE). The need to advance in the articulation of the Municipal GADs, the MAAE and the Provincial Government is evident, especially relevant in the framework of the conformation of the Management Committee of the Andean Chocó Biosphere Reserve of Pichincha.

▪ **National restoration and conservation programmes**
At the national level, there are economic incentive programmes such as the *National Forest Restoration Plan and the Native Forest Conservation Programme*, which are part of the Socio-Bosque Programme[137]. Socio-Bosque consists of the voluntary conservation of ecosystems by individual or community landowners in exchange for monetary incentives. The Socio-Bosque programme has been implemented throughout the country in a variety of ecosystems, including paramos and Andean forests (1,000,000 ha), and with the participation of various stakeholders (large farms, peasants, local and indigenous communities from the coast, highlands and the Amazon). Socio-Bosque started with the main objective of poverty reduction and evolved to CC adaptation and mitigation goals at country level. However, the programme has developed in isolation from other sectors and tools at the national level (e.g., livestock production). Furthermore, the implementation of this programme has not tackled the underlying causes of

137 https://www.ambiente.gob.ec/mae-difunde-plan-nacional-de-restauracion-forestal-en-santo-domingo-de-los-tsachilas/

deforestation, nor is accurate data available on this problem[138]. Some stakeholders mention, for example, the contradiction that extractive activities are taking place in areas where there are agreements.

5.6. CASE STUDY 5b: Kayambi Community Water Protection Area, Ecuador

138 https://www.eltelegrafo.com.ec/noticias/sociedad/6/programasociobosque-zonasverdes-yasuni

TablE 18. *Synthesis of the main findings of Ecuador's Kayambi Territory case study*

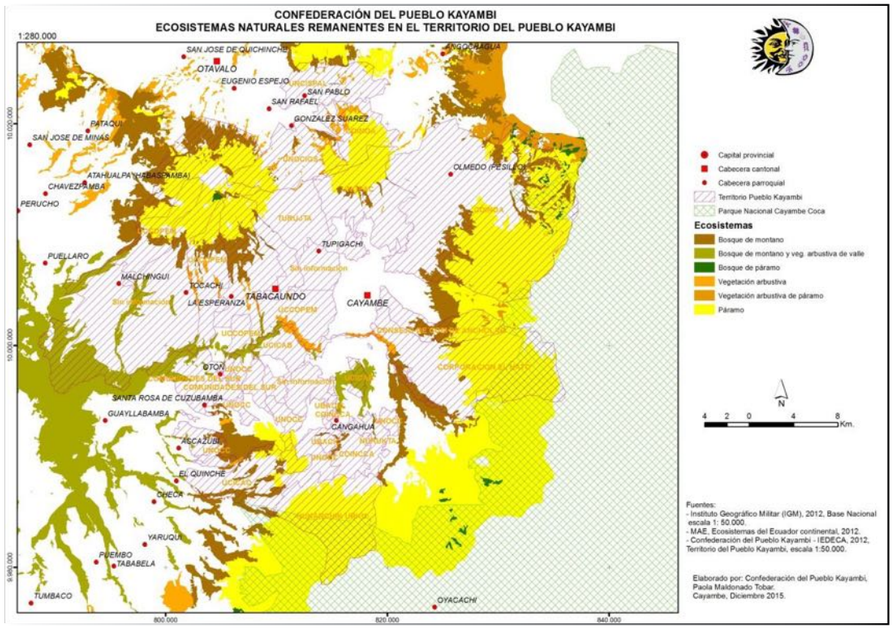
National policies applied in local contexts	*Inter-agency articulation* National regulations on water resources (*Law on Water* and its reform) translate into concrete advances at the territorial level for community water management and the declaration of Water Protection Areas (APH) in paramos cared for by the communities. *Implementation gaps* However, the process of validation of the APHs by the Ministry of Environment and Water (MAAE) at the national level could go against the initial principles defended by the indigenous jurisdiction, limiting local acceptance and the concrete application of the regulations.
Territorial resistance	There are several tensions at the territorial level about the situation of scarcity and contamination of water resources by production activities, which translates into a complex negotiation process between the different actors involved in the proposal for a plurinational water fund initiated by the Confederation of the Kayambi People. There are also barriers in the process of co-production of information on water resources in the area between the municipality—which calls for greater technical-scientific relevance of water studies, and the communities—which assert their historical knowledge.
Incidencia nacional y oportunidades de réplica	*The Reform of the Law on Water*—which is currently pending in the National Assembly—is an opportunity to improve the process of declaring APHs in accordance with community and indigenous principles, and thus reduce tensions between stakeholders.

5.6.1. Context

In Ecuador, the former National Water Secretariat (SENAGUA), now integrated into the Ministry of Environment and Water (MAAE), has been supporting the creation of water protection areas (APHs) throughout the country to curb the mining frontier and water pollution from agricultural and extractive activities. Article 78 of the *Organic Law on the Use and Exploitation of Water Resources* (LORHUAA) establishes that "water protection areas are territories where there are watersheds declared to be of public interest for their maintenance, conservation and protection, which supply human consumption or guarantee food security. They will form part of the National System of Protected Areas (SNAP)"[139]. Several APHs have already been recognised in the country since 2018, for example, in the indigenous community of San Isidro, Cotopaxi province, or the Ponce-Paluguillo HPA in Pichincha province, which is managed by the Water Conservation Fund (FONAG)[140].

In July 2020, the Biodiversity and Natural Resources Commission of the National Assembly conducted an exercise aimed at reforming the LORHUAA[141]. Among several elements of the reform is a proposal for a second debate, which broadens the application of indigenous jurisdiction in specific tools for management, conservation and service provision. The reform raises the possibility for peoples and nationalities to establish PAHs from their jurisdiction. The proposal guarantees the implementation of community law tools and generates complementary mechanisms to protect water resources in territories under indigenous jurisdiction.

In December 2018, the first *Kayambi Community Water Protection Area* (APH) was declared from the indigenous jurisdiction, which has a total area of 9,701.93 ha and benefits four communities, three development committees and, indirectly, all the inhabitants of the Cayambe canton[142]. This protected area is made up of paramo zones and borders the protected areas of the Cayambe-Coca National Park, making it a connectivity corridor and buffer zone.



Map 6: *Natural ecosystems in the Kayambi territory, Ecuador. (Source: Kayambi People's Confederation)*

139 https://www.iagua.es/blogs/helder-solis-carrion/areas-proteccion-hidrica-politica-clave-garantia-derechos

140 https://www.ambiente.gob.ec/ponce-paluguillo-es-declarada-la-primer-area-de-proteccion-hidrica-del-ecuador-y-de-la-region/

141 https://camaren.org/camino-a-una-reforma-a-la-ley-de-recursos-hidricos-usos-y-aprovechamiento-del-agua/

142 https://www.agua.gob.ec/se-declara-la-primer-area-de-proteccion-hidrica-comunitaria-del-pais/

Through the declaration of the Kayambi territory as a Community APH, the aim is to protect water resources for the supply, use and consumption of water, both in rural and urban areas, by ensuring the availability of quality water. This is an area of high water importance, in which at least 19 springs and six rivers (and their headwaters) have been identified, which supply water for human consumption and irrigation to the community organisations of Hato, Huacho, Monjas Bajo, Asociación Monjas Bajo, Monjas Alto, Pesillo, Cariacu, La Chimba, Puliza, Santo Domingo 1 and 2, Paquiestancia and Ñukanchikurku.

On the other hand, the APH is located in an area of high pressure on water resources due to the presence of flower production for agribusiness and agricultural activities, which threaten the conservation of paramo ecosystems and water recharge sources. Furthermore, out of the 110,000 inhabitants of the canton Cayambe, only 60% have access to drinking water. There is no access in the rural areas, which is why it is necessary to upgrade water sources and build water treatment plants. In Cayambe, the $8,000,000 Huayco Machay[143] project is being developed to draw water from the sources of the Cayambe volcano. The drinking water company has also been created and rates have been revised.

Between 2016 and 2019, the Paramo II Project was implemented in the area by the Heifer Foundation Ecuador and the Institute for Ecology and Development of Andean Communities (IEDECA), with funding from Johanniter and the German Development Cooperation. The project aimed to expand activities for sustainable resource management, climate protection, adaptation to CC and improvement of the living conditions of the population in Ecuador and Colombia[144]. It also sought to train the population directly affected by CC to develop concepts and strategies based on their experiences. It was developed with the participation of 49 communities of the Kayambi and Karanki peoples in the provinces of Pichincha, Imbabura, and in 15 indigenous and peasant communities of Cotopaxi in Ecuador.

5.6.2. Knowledge co-production at territorial level

▪ **Social participation (socio-organisational vision of territory and water)**
IEDECA, with the support of Hiefer, participated in the elaboration of seven Sustainable Paramo Management Plans, which were built with the participation of more than 30 communities and which contemplate conservation measures in more than 32,500 ha. For organisational strengthening, 1,445 leaders of seven organisations from ten communities learned about and discussed aspects related to CC mitigation and adaptation, sustainable management of natural resources and integrated territorial management. Six local vigilance committees were formed to reduce burns, fires and deterioration of water sources. According to a member of IEDECA, the paramo management plans are strategies for the defence of specific territories and serve as regulations of use to demand community ownership[145].

Cayambe-Coca National Park *Emilie Dupuits.*

Local organisations and authorities worked on guidelines for the territorial declaration of a Water Reserve for the Kayambi people, and on the proposal for Reciprocity for community management of water and paramos, now called the Plurinational Water Fund (Fondo Plurinacional del Agua). It consists of a water conservation fund that seeks to reduce water inequalities and injustices between the guardians of water and the urban centres and industries (floriculture) in the area. The water fund, which is a proposal of the indigenous organisations of the Confederation of the Kayambi people, is now in the process of construction.
The technical round table on the Plurinational Water Fund is made up of the Confederation of the Kayambi people, GADIP Cayambe, IEDECA, and the Kawsay Foundation. NGOs such as IEDECA and Fundación Kawsay have been in the area for many years with information on water potential. The process is in a stage of action planning and technical inspection of the local paramo boundaries.

According to the leaders of the Kayambi Confederation, the water fund should not be considered from the perspective of environmental services, but from one of human reciprocity. They promote a socio-organisational vision of the territory that goes beyond water recharge zones, paramos and watersheds. It does not mean a payment for the care of water but a payment to generate capacities in the community for the protection of water and research on the retention capacity of the paramos, mitigation of environmental damage, restoration and recovery of wetlands and lake areas to retain water in the summer season. Experiences are being gathered at the national and international level, such as the case of the Tungurahua water fund, which has good community participation, through the purchase of communal lands in paramo areas and indigenous rulings to declare communal areas where there are water sources. Also, the experience of Nicaragua where the Misquitos have a conservation fund, and in Azuay the dialogue with local authorities.

143 https://municipiocayambe.gob.ec/huayco-machay-un-sueno-en-marcha/

144 https://www.johanniter.de/johanniter-unfall-hilfe/auslandshilfe/laender/nuestros-proyectos/

145 https://www.johanniter.de/johanniter-unfall-hilfe/auslandshilfe/laender/nuestros-proyectos/

▪ Co-management between communities and the municipality (economic-legal-environmental vision)
The idea is to first define a consolidated proposal from the Kayambi Confederation so that external actors can then enter the negotiating table. The water fund mechanism establishes co-responsibility between communities, municipalities and private companies. In this sense, the proposed mechanism goes beyond the community level and requires a capacity for dialogue with other actors in order to concretely implement the water fund. In addition, the Kayambi APH was drawn up over a very large territory covering a variety of potentially conflicting activities.

The next step is to concretely implement conservation in the territory, not only through public funds, but also by involving private actors. The aim is to involve private companies and industries in the canton, for example, the Nestlé factory, which has been allocated a significant amount of water for 40 years. We have already approached them to propose that this be part of their social and environmental responsibility, and they have shown interest. They also want to involve the flower companies, not only in the canton but also in Pedro Moncayo, and the Coca-Cola company at the national level. However, according to a technician from IEDECA, there are tensions due to the perception in the communities that the floriculture companies want to use the water fund to secure the water flow to benefit their private interests[146]. Now, the management model for the fund is in a complex negotiation stage between this diversity of stakeholders and interests regarding water.

▪ Production of information
For the municipality of Cayambe, there is a lack of technical documentation to justify the creation of the fund and a systematisation of the areas to be conserved. In addition, potential contributors to the fund need to know the projects and areas to be financed. Feasibility studies are being carried out with cartographic information and a hydrological model to identify areas with the greatest amount of water with the help of the Cayambe water company, in order to define conservation and monitoring projects. The Kayambi Confederation has played the role of mediator between the communities and the municipality to carry out studies and collect information in the field. However, although IEDECA has carried out paramo management plans, they have not been translated into budgets or concrete projects, and a complete analysis of how the fund should function and operate is still lacking.

146 Interview with Luis Chicaiza, IEDECA, 05 February 2021, Zoom.


La Chimba River for Tabacundo irrigation project *Cecilia Puertas.*

In 2020, a Municipal Ordinance №04-CMC-2020 on the Land Use and Management Plan of the Cayambe Canton[147]. was approved. It was socialised through community leaders, water boards, parish boards and GADs. The delimitation of the agricultural frontier is a complex social issue[148] and the way in which it was defined in a communal or historical manner is being verified in the field. According to the Law on Land, agricultural production should not take place above 2,700 or 3,700 m above sea level, depending on the area. However, for example, in Cangahua, there is an agricultural frontier situation above 3,900 m above sea level in an area of high water recharge. Therefore, the communities must demonstrate with evidence that they are not in conflict with legal regulations.

5.6.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies

▪ Inter-institutional articulation with SENAGUA
The APH proposal defined by the Kayambi Confederation was polished by the former National Water Secretariat (SENAGUA) because it included areas that should not be included while considering only high paramo areas. As a result, tensions arose with community leaders who demanded that it be declared from the Kayambi

147 https://municipiocayambe.gob.ec/images/ley_transparencia/Ordenanzas/2020/ord_4PUGS.pdf

148 Interview with Gloria Jiménez, GADIP, 08 February 2021, Zoom.

people[149]. There is fear of being restricted in the productive activities that can be carried out within the APH because there are restrictions on water uses when entering the legal framework. The Confederation asked SENAGUA not to include the APH in the SNAP and to repeal the declaration process. These tensions are part of the historical relationship of mistrust that exists between communities and the state in the country. Furthermore, the communities have a different cosmovision of why to protect the paramo, which is different from the declaration by SENAGUA as an administrative act based on regulations (source, human consumption, food self-sufficiency). The central dimensions are the care of the paramos for the reproduction of life, ecosystem services including plant and animal life, and the integrity of the communities as part of the territory.

5.7. CASE STUDY 6: Compensation for Hydrological Ecosystem Services, Peru

Table 19. *Síntesis de los principales hallazgos del caso de Nor Yauyos-Cochas.*

National policies applied in local contexts	*Inter-agency articulation* The implementation of the mechanism of retribution for hydrological services in the Nor Yauyos-Cochas landscape reserve is an example of multi-scale and multi-stakeholder collaboration around the issue of adaptation to CC and protection of water recharge sources. This occurs through articulation spaces such as the Good Governance Platform that links the National System of Protected Areas (SERNANP), regional and local governments, and rural communities. *Implementation gaps* It is still a challenge to improve the inter-sectoral articulation between the objectives of water source protection, agricultural activities and hydroelectricity production in the area. Another challenge is to ensure the continuity of the Nor Yauyos-Cochas Commonwealth as a space for articulation between the different actors, and especially to consolidate the participation of local and regional governments.
Territorial resistance	There are *some* tensions at the territorial level due to the presence of hydroelectric dams in the area that generate socio-environmental impacts for the peasant communities. Furthermore, in the context of the upcoming closure of the MERESE-IFAD project, a major challenge at the local level is to ensure the sustainability of economic aid and technical support so that communities can continue to conserve and implement sustainable production practices.
National impact and opportunities for replication	The Mechanism of Remuneration for Hydrological Services (MERESE) is recognised in national regulations, offering opportunities for replication at national level in priority watersheds for water provision and in terms of CC impacts.

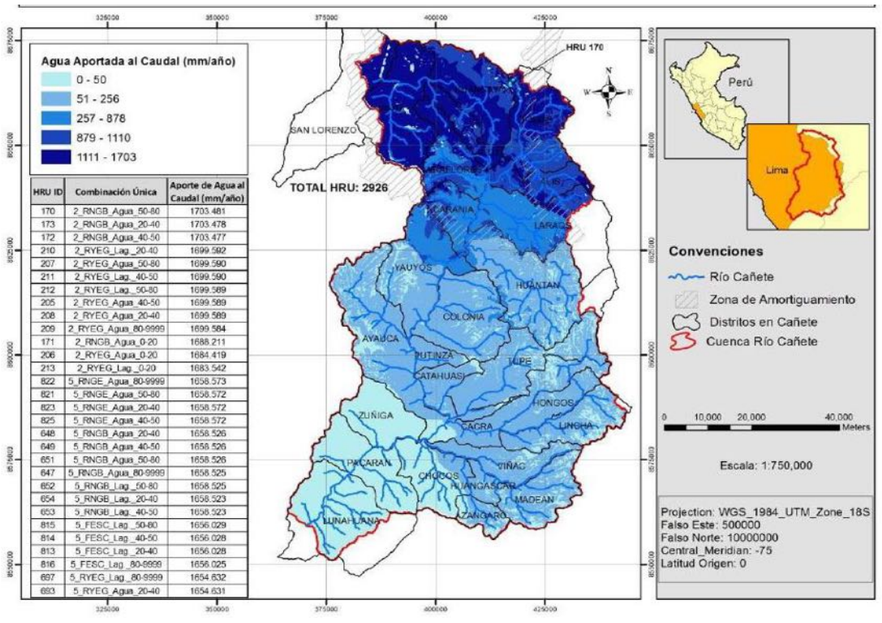
149 Interview with Helder Solís, Protos Ecuador, 19 January 2021, Zoom.

5.7.1. Context

The Nor Yauyos-Cochas Landscape Reserve (RPNYC) was created on 1 May 2001, by Supreme Decree Nº033-2001-AG[150]. The RPNYC is located in the upper and middle basin of the Cañete river and in the basin of the Cochas Pachacayo in the highlands of the departments of Lima and Junín. It covers an area of 221,268.48 ha.

A total of 4,655.4 ha of forests, pastures and wetlands were recovered within the reserve, thanks to the joint work between the Ministry of the Environment (MINAM), the National Service of Natural Protected Areas (SERNANP) and the communities that inhabit this territory. The upper basin groups 13 peasant communities that are mainly dedicated to agriculture, livestock and fish farming. In the rural district of Miraflores, the population has recovered pre-Inca structures to improve pasture irrigation and thus efficiently feed the livestock, which represents their main source of income[151]. There are 80 families who are dedicated to livestock farming and who, through planting and harvesting water, have managed to cope with the drought caused by the CC.

The Cañete river basin is located on the central coast of Peru, has a total area of 601,734 km² and an extension of 235 km from its source in the Ticllacocha lagoon, located in the rural community of Tanta, to its mouth at the Pacific Ocean. Nearly 80% of the basin's area is located above 2,500 m above sea level. The basin is located in the Lima region, extending through the provinces of Yauyos, Cañete, and Huarochirí.



Map 7: *Estimated water generation in the Cañete River Basin, Peru (Source: EMAPA Cañete)*

150 https://www.sernanp.gob.pe/nor-yauyos-cochas

151 https://convoca.pe/agenda-propia/miraflores-la-comunidad-rural-de-lima-que-utiliza-diques-ancestrales-para-conservar

It is the first landscape reserve in the country, where 16 peasant communities live inside and in the buffer zone[152]. The category of landscape reserve, according to the IUCN, seeks the articulation between man and nature, and has a landscape shaped by man through pre-Inca terraced systems, crops, ancestral customs and a set of canals. The predominant activities are agricultural and livestock production based on ecosystem management.

In the territory of the upper basin of the Cañete River there is also mining activity and a reservoir for the operation of El Platanal S.A. Electric Company (CELEPSA), which is located in the lower basin. Mining activity dates back to the 1980s and is concentrated in two peasant communities. This activity has generated various conflicts between the communities and the companies (Tristán Febres 2020). For its part, the construction of CELEPSA's Paucarcocha reservoir involved a series of negotiations with the Tanta peasant community. This water infrastructure transformed part of the community's territory, occupying the natural pasture areas where livestock farming is the main activity. CELEPSA is currently part of the Nor Yauyos-Cochas Landscape Reserve's Board of Trustees, which is an initiative that involves private companies aimed at generating and financing actions for conservation, environmental management and sustainable development.

On the other hand, the lower basin concentrates the greatest amount of population and demand for water resources. The entity in charge of drinking water supply is the Cañete Municipal Drinking Water and Sewage Company (EMAPA), which supplies 12 districts. In this part of the territory, the main economic activity is intensive agriculture, very different from the one developed in the upper basin, which is small-scale agriculture for self-consumption. In the lower basin, agricultural production in the Cañete valley is mainly market-oriented, where there is an important growth in export crops.

Currently, the MERESE-IFAD project *Conservation and Sustainable Use of High Andean Ecosystems in Peru through Payment for Environmental Services for the Alleviation of Rural Poverty and Social Inclusion*[153] through the design and implementation of *Mechanisms for the Remuneration of Ecosystem Services*[154](MERESE), is being developed in the basin. This project is implemented by the International Fund for Agricultural Development (IFAD) and administered by the Peruvian Fund for the Promotion of Protected Natural Areas (PROFONANPE). It involves the protection of 23,866 ha of high Andean ecosystems and landscapes, as well as the formation of two trust funds whose profitability will cover the expenses related to the monitoring and evaluation of the project for the benefit of more than 2,165 families in both basins. The main objective is to preserve the high Andean ecosystems through the conservation and recovery of wetlands and wetlands, high Andean pastures and relict forests, in an area of 14,000 ha. These actions are part of the initiative promoted by MINAM for the recovery of the high Andean ecosystems of the Cañete river basin through the financing of subprojects for the conservation and sustainable use of ecosystem services such as water in the basin.

152 Interview with Abdias Villoslada Taipe, SERNANP, 25 January 2021, Zoom.

153 https://www.gob.pe/institucion/minam/noticias/23798-recuperan-mas-de-cuatro-mil-hectareas-de-bosques-altoandinos-en-la-reserva-paisajistica-nor-yauyos-cochas

154 https://www.sernanp.gob.pe/noticias-leer-mas/-/publicaciones/c/proyecto-de-mecanismos-de-pago-por-servicios-ecosistemicos-297090

5.7.2. Knowledge co-production at territorial level

▪ **Participatory process**

Following a participatory process with communities in the regions of Lima and Junín, SERNANP approved the *2016-2020 Master Plan*[155] for the Nor Yauyos-Cochas Landscape Reserve (RPNYC). With a 20-year vision and strategic objectives to be achieved in the next five years, the RPNYC *Master Plan*, approved by Presidential Resolution №207-2016-SERNANP, highlights the environmental, social and economic value of the protected area. The vision for 2036 of the *Master Plan states*: "The RPNYC reinforces the shared management model between the state and civil society through the strengthening of the stakeholders of the management committee and organised associations. the peasant communities and all civil society organizations that use the natural, cultural and landscape resources become responsible partners in conservation. The RPNYC is a pioneer in the incorporation of approaches and information systems for adaptation to climate change, which contribute to increasing the resilience of the local population and their ecosystems."

Similarly, the fundamental role of this protected natural area in the adaptation and mitigation of CC is highlighted, emphasising the importance of the management and contribution of the reserve's ecosystemic water service to the basins of the Cañete, Mantaro (sub-basins of the Cochas-Pachacayo, Canipaco, Cunas and Huari rivers), Rímac and Mala rivers. The conservation and development of the most important productive activities such as livestock, agriculture, fish farming and tourism in an orderly manner without altering the ecosystemic and cultural balance, as well as the recovery of agro-biodiversity and Andean crops such as native potatoes, mashua, oca, corn and beans in agro-ecosystem areas (terraces and terraces), are other important points included in the Master Plan. It also seeks to make the reserve an important ecotourism destination with diversified products and quality services.

In order to update the *Master Plan*, SERNANP, through the head of the RPNYC, in coordination with the Protected Area Management Committee, the Nor Yauyos-Cochas Municipal Community, with the support of the ANP Board of Trustees, and the EbA Mountain Project, promoted the active participation of authorities, public and private institutions and local communities, through workshops and meetings that allowed for the compilation of contributions from each of them. The authorities of the regional governments of Junín and Lima played a key role in the process of updating the *Master Plan.*

The MERESE-IFAD project is incorporated into the governance structures of the communities so that the subprojects financed are appropriated by the community and it is the community itself that finally decides which areas to preserve and how to do so. In this perspective, SERNANP plays a fundamental role with the communities that form part of the RPNYC through territorial management processes based on a sustainable resource use approach. The management structure of the RPNYC itself involves the communities through representation in the RPNYC Management Committee.

155 http://rpnycperu.blogspot.com/2016/08/nuevo-plan-maestreo-de-rp-nor-yauyos.html

Work with peasant communities within the MERESE-IFAD project in the Cañete river basin *Michell Leon/MERESE.*

IInitially, the MERESE-IFAD project approached local governments through the *Glaciers Project*[156] (SDC), which was being managed in the area and which had a similar focus on intervention in high Andean ecosystems and participatory processes. *The Glaciers Project* promoted the creation of the Nor Yauyos-Cocha Commonwealth of Municipalities. However, in the Commonwealth, the board of directors is renewed every year, which does not allow the work to be sustained and to see concrete results. The coordinator of the MERESE-IFAD project pointed out that the integration of local governments in the project activities could become a weak point, as they did not achieve a greater articulation beyond their involvement in some subprojects. The elections of new municipal authorities and the exit of the *Glaciers Project* fragmented the relationship between MERESE-IFAD and local governments. In this context, the project's aim was to maintain the articulation it had been building with the communities, hand in hand with SERNANP.

- **Economic alternatives for communities**

The objective of the project is to implement a Mechanism for the Payment of Ecosystem Services[157]. MERESE). It involves direct funding to communities and associations in the highlands to support awareness-raising and training activities, work with communities for the conservation and recovery of 1,800 ha of forests, swamps and wetlands through 19 sub-projects with 17 community groups.
A sign of the centrality of local communities in the MERESE-IFAD project was the commitment to invest in conservation and sustainable use of ecosystems projects designed and implemented by community groups. According to the project coordinator, in a first approach with the communities, the most important thing was to understand how people see their territory, how they use it, what problems they identify and what alternative solutions they consider appropriate to solve those problems[158]. Thus, a qualitative study was carried out on the conservation and development priorities in the communities prioritised by MINAM in the framework of the MERESE design for the Cañete river basin.

Communities understand the need to conserve in order to improve productive development, so a transition towards the sustainable use of pastures is necessary. Water is perceived to have diminished in the marshes. In the case of forests, their ecosystemic role is less clear, but their relationship with tourism is valued. The communities formulate their proposals to identify the areas to be conserved and the type of techniques to be adopted, and make commitments to conserve the forests for five years. *A Pilot Intervention Plan* is being worked on in the Miraflores Peasant Community. This community was chosen because of the previous work carried out with the Mountain Institute—EbA Mountain Project[159]the extension of hectares, the conservation process being maintained, the capacity and monitoring equipment installed. The pilot plan identified natural infrastructure activities for the construction of fences, infiltration channels, ancestral dams, organisational strengthening and environmental education in the community.

Agricultural activities in the Cañete river basin *Michell Leon/MERESE.*

156 Proyecto Glaciares +

157 Idem

158 Interview with Jerónimo Chiarella, MINAM, 21 January 2021, Zoom.

159 Adaptación basada en Ecosistemas (EbA) Montaña | El PNUD en Peru (undp.org)

Four contests were opened between 2017 and 2021, involving all 13 municipalities: ten in the reserve area, two in the buffer zone and one outside[160]. This was a participatory process of interest and not imposed. The contests have been disseminated in each district and in peasant communities, community associations and producers' associations. The requirements were that they were listed with the Unified Registry of Taxpayers (RUC), had their own bank account for the management of funds and land tenure. They must have obtained the endorsement of the reserve in order not to go against the objectives of the *Master Plan* to recover 3,000 ha of pastureland. Between the four contests, 924 peasant families benefited and were able to implement actions to conserve 7,415 ha and restore 6,491 ha of wetlands, pastures and native forests.

Communities have committed to give continuity to the conservation projects through the delimitation of the area to be conserved so that cattle cannot enter, and the intangible zone has been recognised in community assemblies. Continuity is also ensured by the presence of the SERNANP technical team that monitors the area. Communities see the benefit of preserving because of the direct financial retribution they receive. However, some economic needs arose during implementation, so it was decided to finance production activities in three communities to compensate for the loss of resources due to conservation. If the communities are not given alternatives, they will put pressure on natural resources again. These are complementary projects focused on territorial management, improvement of canals for productive management, trout farms and reforestation to promote tourism.

5.7.3. Inter-institutional and cross-sectoral articulation of CC adaptation policies

▪ **Inter-institutional articulation: Good Governance Platform**

MINAM has a promotional role in financial incentives through the *Law on Mechanisms of Remuneration for Ecosystem Services*[161] (MERESE), which provides a legal framework for managing public funds, and where the Good Governance Platform (PBG) of the Cañete river basin is recognised as a necessary element in the design of MERESE. According to the regulations of the MERESE Law[162], the PBG is a space for dialogue and coordination in which public and private actors linked to MERESE participate in order to monitor compliance with the agreements and supervise transparency in remuneration, under the financing strategy that the parties have established. The platform involves several actors: GORE Lima, MINAM, SERNANP, Mountain Institute, CARE, Reserve Management. Through *Regional Ordinance 004-2018-CR-GRL*[163], GORE Lima recognises the formal and institutionalised character of the PBG at government level. However, there is a low participation of GORE Lima through the Secretariat of Natural Resources that supports the PBG, and they do not have specific projects for the conservation of ecosystems.

160 Interview with Leonardo Montes Cáceres, MINAM, 20 January 2021, Zoom.

161 Law 30,215: *Law on Mechanisms of Remuneration for Ecosystem Services*, https://cdn.www.gob.pe/uploads/document/file/385601/Ley_N__30210520191013-25586-11h7han.pdf

162 *Supreme Decree Nº009-2016-MINAM.*

163 *Regional Ordinance Nº004-2018-CR-GRL*, disponible en http://www.minam.gob.pe/economia-y-financiamiento-ambiental/wp-content/uploads/sites/128/2019/08/Ordenanza-Regional-N%C2%B0-004-2018-CR-GRL.pdf

The Technical Secretariat of the PBG ensured the participation of high Andean communities by financing their travel to meetings and workshops. However, this measure is not sustainable given that it depends on the resources of the MERESE-IFAD Project that is about to end. In addition, the participatory process has declined with the change of leadership in recent years. The institutions are located in Lima or in Cañete, where the face-to-face meetings are held, making it difficult to have constant participation of the communities.

▪ **Cross-sectoral articulation**

The housing and sanitation sector has a leading role through the National Superintendence of Sanitation Services (SUNASS) as the sectoral framework to support. Articles 9 and 11 of the Directive №039-2019-SUNASS-CD state that the design of the MERESE water supply must contain an Intervention Plan, comprising one or more actions or projects prioritised in the Rapid Hydrological Diagnosis (DHR) prepared by the sanitation service providers (EPS). The *Law on Management and Provision of Sanitation Services* (Legislative Decree 1,280) and its regulations establish that the EPSs can set aside a percentage of their income in an intangible account for the implementation of the MERESE. It is also indicated that the service providers can formulate, evaluate, execute and assume the costs of operation and maintenance of public investment projects aimed at actions for the conservation, recovery and sustainable use of the sources of ecosystem services. Within this regulatory framework, 41 of the 50 existing EPSs at the national level have already approved their new rate structure, which includes charges for MERESE.

The first MERESE was signed in 2018 between EMAPA Cañete and SERNANP, which started charging fees in 2019. The *Pilot Plan of Interventions* was designed to implement activities and bring in stakeholders from the lower part as contributors to raise awareness about conservation and reforestation, and improve water flow[164]. Water recharge points to be supported by EMAPA were identified, based on a water study carried out in several communities, and actions to compensate the headwaters of the basin. A budget of 2.2 million PEN[165] was approved for the period 2019-2024, within the framework of the Budgetary Programme №057 called *Conservation of Biological Diversity and Sustainable Use of Natural Resources*.

However, in view of the Covid-19 pandemic situation, the Peruvian government approved *Emergency Decree №036-20202*, which stipulated that the EPSs should suspend payments related to the MERESE reserves, disaster risk management and adaptation to the CC, and authorised the financing of the companies' operation and maintenance costs with funds from the aforementioned reserves. At this juncture, EMAPA Cañete decided to set aside 128,281 PEN to implement the *Pilot Intervention Plan*.

In Peru, the institutional framework for water resources management is expressed in the Basin Water Resources Councils (CRHC) managed by the National Water Authority of the Ministry of Agriculture and Irrigation (MINAGRI). The Mala-Omas-

164 Mountain Institute. 17 December 2020. *Piloto de Intervenciones de EMAPA Cañete para viabilizar los recursos recaudados en el marco del MERESE* [Pilot Interventions for EMAPA Cañete to make viable the resources collected under MERESE]. Lima.

165 Peruvian soles.

Cañete CRHC has been tried to be promoted and formalised for several years, but the process has not been completed. It is hoped that the Cañete PBG will join this larger articulation space as a working group, given that the purpose of the CRHCs is to plan, coordinate and coordinate towards the sustainable use of water resources through the construction of a management plan for the basin.

Within the MERESE-IFAD project, the aim is to strengthen the intersectoral approach by trying to involve the irrigation user boards, which are linked to MINAGRI. An approach was made with the irrigation board of Cañete to see the type of agreement and conservation actions in the area. Finally, it is being sought to involve hydroelectric plants in the financing mechanism, such as the CELEPSA hydroelectric plant, but there is no regulatory figure to include them in the MERESE rate.

6.

DISCUSSION: RESULTS OF THE CASE STUDY ANALYSIS

A comparative analysis of the seven case studies is presented in the following pages, focusing on the two key concepts of knowledge co-production and multi-scale governance, and their related variables: social participation, production alternatives, production of and access to information, inter-institutional and inter-sectoral articulation (see summary in Table 20). These five dimensions appeared to be the most significant throughout the study at the territorial scale, in terms of the creation of spaces for collaboration, the resolution of conflicts between sectors and stakeholders' interests, and the articulation across scales and types of knowledge. This comparative analysis illustrates, on the one hand, the institutional challenges and local perceptions regarding the implementation of CC adaptation policies in the territories and, on the other hand, the potential for replication of local initiatives at the national and regional levels.

Table 20. *Synthesis of the results of the socio-political analysis of the seven case studies*

Variable	Case studies
Inter-institutional articulation	*Progress* The most relevant and effective CC policy tools at the local level are those that have a specific thematic dimension or design elements that allow them to adapt to variation in local contexts. The following are examples that include one of these qualities: 1) Water resources: *Law on Mechanisms of Remuneration for Ecosystem Services, Peru; Organic Law on the Use and Exploitation of Water Resources,* Ecuador. 2) Wetlands and paramos protection: *Law 1,930 for the Comprehensive Management of Paramos,* Colombia; *Proposed Wetlands Law,* Argentina. 3) Environmental restoration: *National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas,* Colombia. *Challenges and opportunities* In most cases, initiatives taken at the local level are not explicitly linked to CC strategies or policies at the national level, revealing the limits of the "climatisation" process (Dupuits 2020). This suggests the need to link local tools more explicitly to national CC adaptation policies by recognising that everything related to socioecosystem management contributes to adaptation. Some strategies for more effective articulation include the design of directives for the integration of subnational and local instruments on socioecosystem management into national CC policies (e.g., municipal ordinances, land-use plans, etc.) and the generation of spaces for training and joint work between national and local authorities (e.g., territorial multi-thematic roundtables). Governance spaces or instruments have been created around CC adaptation at sub-national level, which should be enhanced in national policies. (e.g., *Regional Action Plans on Climate Change, Chile; Handbook of Good Municipal Practices for Biodiversity Management*, Chile; Good Governance Platform (PBG) of the Cañete Basin, Peru; Commonwealth of the Andean Chocó, Ecuador).

Variable	Case studies
Inter-sectoral articulation	*Progress* Policy instruments have been created at the sub-national level or through pilot programmes, which have the potential to improve inter-sectoral articulation around CC, especially between the environment and agriculture sectors, which face recurrent tensions. (e.g., Soil, Water and Forest Conservation Districts, Chile; *Strategy for the Integrated Monitoring of High Mountain Ecosystems,* Colombia; *Pilot Interventions Plan* of the Cañete Municipal Drinking Water and Sewage Company, Peru). *Challenges and opportunities* An opportunity for replication and learning is linked to the implementation or proposal of instruments focused on specific sectors such as wetland protection, family and peasant agriculture, and forest restoration, which include the issue of CC adaptation in a cross-cutting manner and promote cross-sectoral mechanisms (e.g., Proposed Wetlands Law, Argentina; Ministerial Resolution №464, Colombia; *National Forest Restoration Plan and Native Forest Conservation Programme,* Ecuador).
Social participation	*Progress* Three types of mechanisms for social participation at the territorial level are highlighted, which should be strengthened in national CC policies: 1) Management plans and committees for natural protected areas, landscape reserves and biosphere reserves (Laguna de los Pozuelos Natural Monument and Biosphere Reserve's Management Plan, Argentina; Municipal Environmental Ordinance, San José de Maipo, Chile; Management Committee of the Andean Chocó Biosphere Reserve, Ecuador; Nor Yauyos-Cochas Landscape Reserve Master Plan, Peru). 2) Master plans, municipal laws, commonwealth and sub-national level ordinances (Draft for the Municipal Law on the Protection of Water Recharge Areas, Totora, Cochabamba, Bolivia; Conservation District Master Plan, San José de Maipo, Chile). 3) Civil society meetings and networks (Water Summit, Cochabamba, Bolivia; School Forest Network of the Commonwealth of the Andean Chocó, Ecuador). *Challenges and opportunities* In terms of challenges, planning and policy implementation horizons do not coincide with local-level processes (e.g., agro-ecological transitions, restoration of ecosystem functions). In addition, a focus on urban-rural linkages in the Andes could facilitate incentive mechanisms for conservation, restoration and sustainable production through access to improved market conditions, payment for ecosystem services, among others. There are efforts of articulation between local spaces for social participation and the national level, which can be replicated through their involvement and decision-making mechanisms (e.g., Platform for Good Governance of the Cañete River Basin, Peru; proposal for the creation of a governance platform for the Andean Chocó Biosphere Reserve, Ecuador).

Variable	Case studies
Production and adaptation alternatives	*Progress* The implementation of sustainable and adaptive productive alternatives for agricultural and livestock production is a central point in most CC adaptation plans and programmes at the local level. It highlights the key role of municipalities in partnership with local communities for the implementation of these productive and adaptive CC alternatives: · Sustainable Livestock Grazing Management Plan and Meadows Management and Restoration Plan, Laguna de los Pozuelos, Argentina · Livestock Pilot Plan at Las Tórtolas Community, Municipio de San José de Maipo, Chile · Conservation and Sustainable Use Areas (ACUS), Ecuador · *Metropolitan Ordinance №137*: Special Plan for the Use and Occupation of the Land of the Commonwealth of the Andean Chocó, Ecuador · *Municipal Ordinance №04-CMC-2020*: Land Use and Management Plan of the Cayambe Canton, Ecuador · Pilot Plan for Interventions in the Peasant Community of Miraflores, Peru *Challenges and opportunities* There is an important challenge of sustainability in the implementation of these productive alternatives, which must be guaranteed with the consolidation of governance spaces from the state, such as the figure of the commonwealth. Another challenge is to recognise the links between the context in which production measures are implemented and their influence on adaptation to CC, and to understand the effect of land use change on ecosystem services.
Production of and access to information	*Progress* The co-production of technical-scientific and local knowledge is key to the management and monitoring of adaptation to CC (Lara & Vides-Almonacid 2014, Mathez-Stiefel 2016). On the one hand, there are attempts to scale up ancestral climate knowledge (e.g., bio-indicators and pachagramas, Cochabamba, Bolivia) into national public policy. On the other hand, municipalities can ask local actors to make better use of technical-scientific knowledge to validate their community demands (e.g., Proposal for a Plurinational Water Fund, Cayambe, Ecuador). *Challenges and opportunities* The main challenge is the difficulty of some local actors in producing information on CC according to the technical and scientific parameters required by public entities, which marginalises them from decision-making processes at the (sub) national level. One opportunity to resolve this limitation is to strengthen alliances between academia and local communities to validate relevant ancestral knowledge on CC, and to train these stakeholders in the use of technical-scientific tools for climate measurement and management.

6.1. Multiscale governance and institutional gaps

This first issue illustrates the progress and challenges of implementing CC adaptation policies, or related sectoral policies, at the local level. The case studies analysed reveal opportunities and challenges in relation to the scale of CC adaptation policy design and implementation. A first challenge identified relates to the tensions that can arise between initiatives or spaces at the regional level and their fit with local realities and needs (Dupuits & Cronkleton 2020). This is evident, for example, in the proposal led by CONDESAN to design an integrated monitoring platform for Andean socioecosystems at the regional level, which aims to systematise socio-environmental indicators that are dispersed. However, it faces challenges of articulation with existing monitoring systems and socio-environmental indicators at the national level and the particularities of each local context[166].

Another important result concerns the difficulty in translating the CC adaptation plans, strategies and laws adopted at the national level into the territories. Many of the spaces designed in national policies require concrete implementation or appropriation by subnational or local stakeholders. On the contrary, the case studies show that at the local level, the most relevant and effective policy tools are those that have a sectoral dimension or a local or sub-national character. In most cases, the most commonly used policy tools include water resources issues (Law on Mechanisms for the Remuneration of Ecosystem Services, Peru; Organic Law on the Use and Exploitation of Water Resources, Ecuador), protection of mountain ecosystems (*Law 1,930 on the Comprehensive Management of Paramos, Colombia; Proposed Law on Wetlands, Argentina), and environmental restoration (National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas,* Colombia).

Therefore, in many cases, initiatives taken at the local level are not explicitly linked to countries' CC strategies or policies. However, CC appears as a cross-cutting issue in the programmes and initiatives implemented in the field, demonstrating the relevance of CC as an integrating theme of sectoral policies through key approaches such as EbA, gender, citizen participation and monitoring, among others. These observations echo the literature that questions the recent dynamics of "climatization" (Aykut et al. 2017, Dupuits 2020), which translates into the creation of new negotiation spaces and the multiplication of policies focused purely on the issue of CC. These processes tend to overshadow sector- or scale-specific agendas and interests, and the impact of other processes such as land-use change which, in many cases, are having very large and more direct impacts on mountain socioecosystems (Mathez-Stiefel et al. 2017).

On the other hand, when implementing national normative tools at the local scale, tensions can arise between political-administrative delimitations and ecosystem approaches. This tension is illustrated in the case of the Living Systems in Bolivia and the Conservation District in Chile, which promote EbA approaches that clash with the political-organisational delimitations managed by municipal authorities, complicating the work of implementing national regulations.

166 Hacia una agenda de investigación para el monitoreo integrado de los socioecosistemas andinos - Condesan

Another major challenge of multi-scale governance is the monitoring of CC adaptation programmes, which often tend to be tied to time-limited international cooperation projects. Several actors mention the difficulty of institutionalising programmes at local, regional or national government level to ensure their sustainability, despite good ownership of practices by local communities and efforts to build capacity in municipalities. These efforts are evident, for example, in the cases of San José de Maipo in Chile and Laguna de los Pozuelos in Argentina, where several training workshops have been implemented for municipal technicians to manage the new policy instruments or the CC adaptation techniques implemented.

Finally, a major challenge relates to intersectoral articulation in CC adaptation programmes and policies, especially between the environment and agriculture sectors, which tend to be disconnected or conflicting in many of the case studies. In response to this problem, policies have emerged that seek to better articulate the objectives of conservation or environmental restoration and productive development. This is illustrated by the adoption of laws or resolutions that support peasant family farming and sustainable rural development, such as in Colombia (*Ministerial Resolution №464, Strategic Public Policy Guidelines for Peasant, Family and Community Farming*) and Argentina (Law 27,118 on the Historical Reparation of Family Farming). Another example is the MERESE-IFAD Project in Peru, which seeks strategies to involve irrigation boards linked to the Ministry of Agriculture in the mechanisms of retribution for hydrological services promoted by the Ministry of the Environment. In addition, the national instruments or commissions for intersectoral articulation on CC that have recently been created in several countries in the region (e.g., Intersectoral Commission on Climate Change, Colombia; Multisectoral Commission, Peru) have potential, although their implementation at the subnational level should be strengthened. A related challenge involves the implementation of sustainable land management actions at the local level, which face problems of political instability, misalignment with land use realities at the territorial level, funding levels, and disarticulation between biodiversity and water resources (Wiegant et al. 2020).

6.2. Co-production of knowledge, local perception and resistance

This second issue illustrates the opportunities for advocacy and replication at national and regional level of CC adaptation initiatives that arise in the territories. Through this axis, we sought to analyse local perceptions, appropriations or resistance to the CC adaptation policies that are being implemented, as well as the initiatives or experiments that have emerged from the territories, and the processes of co-production of knowledge and policies with public authorities at different levels. The aim was to study both the synergies and opportunities as well as the possible tensions that the implementation of these policies can generate between different actors (civil society organisations, local and indigenous communities, urban centres, local authorities, etc.).

On the one hand, in most of the cases studied, there are formal mechanisms for social participation that ensure the effective articulation of civil society actors with the State's decision-making and governance processes in the field of natural protected areas and international cooperation's CC adaptation programmes. Three types of social

participation mechanisms can be highlighted: (1) management plans and committees for natural protected areas, landscape reserves and biosphere reserves; (2) master plans, municipal laws, associations of several municipalities and ordinances at the subnational level; and (3) civil society meetings and networks. In this sense, national CC adaptation policies have a positive impact on territories by fostering the creation of formal spaces for social participation and negotiation among the various actors. Many of these spaces are supported by national policies related to CC or development planning more broadly. This is the case of the participatory construction process of the proposed *Municipal Law on Water Recharge Zones in Totora, Bolivia, which derives from Law 777 State's Integral Planning System* (SPIE) and the guidelines for the elaboration of T*erritorial Plans for Integral Development* (PTDI) and Life Systems.

Another salient point that emerges from the analysis is the preference for local or sub-national spaces of governance, participation and collaboration, as opposed to spaces provided at the national level that tend to conflict with more local demands and needs. This is illustrated by the proposal to create a Municipal Nature Reserve (RENAMU) in the municipality of San José de Maipo in Chile, in the framework of the approval of the Conservation District Master Plan and the *Municipal Environmental Ordinance.*

On the other hand, the identification of sustainable agricultural and livestock production alternatives for local communities is a central point in most of the CC adaptation plans and programmes that are being implemented at the local level. These activities are prioritised through the design and implementation of pilot management plans, interventions, land use, and sustainable livestock practices that allow for the orientation of productive transition processes at the local scale. In these experiences, municipalities play a key role, sometimes organised through commonwealths, in alliance with local communities. The central government can also play an important role, especially through the ministries of agriculture, family farming or the management of protected areas and natural resources. In the case of Ecuador, there are two examples of municipal ordinances that seek to promote an alternative model of sustainable rurality in the Andean Chocó (*Ordinance №137*), and land use planning in the Cayambe canton (*Ordinance №04-CMC-2020*).

Although these local instruments have the potential to be replicated and systematised at the national level, they need to be more explicitly taken into account in CC adaptation plans and strategies formulated at the national level, which tend to remain at a very macro level. Some strategies to achieve this include the design of directives for the implementation of CC and adaptation policies in sub-national and local instruments, and the generation of spaces for training and joint work between national and local authorities. In addition, there is a need to clarify how these sustainable agricultural or livestock alternatives do or do not explicitly respond to climate hazards or CC-related vulnerabilities faced by production systems and livelihoods.

In addition, there are several challenges for the articulation between environmental conservation, adaptation to CC and transition of agricultural and livestock production activities. The greatest challenge has to do with the sustainability over time of the conservation and restoration practices implemented by local communities through international cooperation or governmental programmes. For example, in the case of the Nor Yauyos-Cochas commonwealths in Peru and the Andean Chocó in Ecuador, there is a need for greater consolidation of this political figure that has been promoted through international cooperation projects. Furthermore, in the case of Chile and the implementation of the GEF-Montaña project in the municipality of San José de Maipo, the slow work of raising awareness in the livestock farming communities through workshops and training to achieve effective change has been highlighted. In addition, there is a risk of loss of interest and commitment on the part of the communities in the face of economic instability to ensure environmental conservation and the substitution of unsustainable and non-resilient production practices in the face of CC. This is evident, for example, in the Nor Yauyos-Cochas reserve, where the MERESE-IFAD project is about to be concluded and the problem of ensuring economic assistance and technical support from SERNANP to the livestock-raising communities that have begun their productive transition arises.

Regarding the production of and access to information, one of the biggest challenges relates to the need to better connect science and decision-making, and to support the development of participatory research and community science (Jasanoff 2004, Bäckstrand 2004). Furthermore, it is worth noting the problem of the lack of monitoring and evaluation of the impacts of CC adaptation programmes, related to the lack of publications systematising these experiences. An illustration of progress in this direction is the ongoing construction of the high mountain monitoring strategy in Colombia, which aims at the appropriation of scientific knowledge by civil society and political actors. Another example is Bolivia, where several academic research projects (Universidad San Simón de Cochabamba) encourage processes of institutionalisation of ancestral knowledge of climate measurement in the Andes, focusing on the relationship between climate and cultural and ritual practices. In addition, a key challenge of these projects is to support the combination of local knowledge with more technical-scientific systems promoted at the national level, in order to respond to the complexity of monitoring processes on CC impacts.

Finally, conflicts can arise when scaling up community proposals to the national level (Roth et al. 2015, Boelens et al. 2019). This is evident, for example, in the officialisation of the Kayambi Community Water Protection Area by the former SENAGUA in Ecuador, which resulted in the transformation of community demands according to the requirements of the regulations (reduction of the protected area, imposition of restrictions on permitted uses). The process of institutionalisation led to a loss of confidence on the part of the Kayambi leaders and the near abandonment of the proposal. Furthermore, this case shows the limitations in the recognition of local knowledge at the national level. Thus, although IEDECA has contributed to the production of knowledge on water resources in the Kayambi territory, it lacks legitimacy on the part of governmental actors who demand greater technical-scientific support. This demonstrates the importance of co-production processes between technical-scientific and local knowledge (Budds & Zwarteveen 2020, Miller & Wyborn 2020), to resolve the tensions between conflicting perceptions of water between the socio-cultural vision of indigenous communities and the political-legal vision promoted by governmental bodies.

Therefore, national CC adaptation policies represent an opportunity to provide tools and mechanisms so that technical-scientific knowledge can be better used by local actors, and articulated with their own knowledge. Some national CC adaptation policies already include this recognition of the cultural view of natural resources held by communities and the valuing of their knowledge to analyse CC impacts and changes in their adaptive capacity. For example, Peru created in late 2020 the Platform of Indigenous Peoples of Peru to address Climate Change (PPICC), as an innovative space to facilitate the co-production of knowledge on CC between the state and indigenous peoples.

Emilie Dupuits.

7.

CONCLUSIONS AND RECOMMENDATIONS

One of the main objectives of this study was to identify gaps, opportunities and priorities to guide the work of decision-makers and the political advocacy of those implementing projects and strategies to promote sustainability and adaptation to CC in mountain areas in the coming years. The central question posed in this study was to understand the institutional challenges and local perceptions regarding the implementation of CC adaptation policies in Andean countries. Based on the results of the normative and socio-political analysis, some key recommendations related to the different actors are then proposed.

The first point addresses *decision-makers involved in CC adaptation policies at regional, national and sub-national levels*, especially in the sectors of environment, agriculture, water resources, biodiversity, among others. One of the main recommendations concerns the possibility of more effectively articulating national CC adaptation policies (strategies, plans, laws, NDCs) with local realities and needs. The study revealed that in some cases there is a significant gap between the instruments and spaces designed in national policies and their concrete implementation or use at the local level by municipalities and civil society organisations. There is often an excessive creation of instruments or spaces related to CC management, described as a "climatisation" process, which do not take into account or are disconnected from the tools and spaces that are already being used at the local level. On the other hand, at the sub-national level, policies focused on a particular sector tend to be used more frequently without losing sight of the cross-cutting nature of CC (payment for hydrological services, land use and territorial planning, peasant family farming, among others). Therefore, it is key to incorporate CC as a cross-cutting issue in sectoral policies at different scales, for example, through the design of directives or guidelines for sub-national governments. Conversely, there are efforts to incorporate locally relevant sectoral issues into national CC plans (e.g., guidelines to address forestry and agroforestry in National Adaptation Plans)[167].

The second point is *addressed to experts and international cooperation agencies, which are leading a large number of national, binational*, regional or global projects related to CC adaptation and the conservation of mountain socioecosystems in the Andes. One of the main findings of the study emphasises the challenges linked to the sustainability of these programmes and projects as they reach closure and exit the areas of intervention. To address this problem, several examples show the efforts made to train the municipalities involved, the creation of collaborative spaces that can be sustained over time (commonwealth, management committee, technical roundtable, good governance platform, among others) and the processes of appropriation by the beneficiaries, which in most cases are peasant, indigenous and/or livestock farming communities. However, governments have to follow up on these political spaces, so that they do not decay over time and continue to fulfil their function. Another successful strategy to ensure the sustainability of CC adaptation projects in the territories are initiatives to strengthen participatory socio-environmental monitoring processes.

The third point addresses *civil society organisations that collaborate, participate and contribute to co-produce policies and knowledge in relation to CC adaptation practices in the territories.* One of the critical points identified throughout the study is the need to generate effective mechanisms for social participation,

167 Meybeck A., Gitz V., Wolf J. & Wong T. 2021. *Cómo abordar la silvicultura y la agroforestería en los Planes Nacionales de Adaptación: directrices complementarias* [Addressing forestry and agroforestry in National Adaptation Plans: complementary guidelines]. Roma / Bogota. FAO-FTA, https://doi.org/10.4060/cb1203es

institutionalisation of relevant local knowledge, and co-creation between local and scientific knowledge. The study revealed the barriers that community-based organisations often face when scaling up their local and historical knowledge, in terms of legitimacy, conflicting visions of territory and natural resources, and articulation with technical-scientific knowledge. Although initiatives have emerged from academia to strengthen ancestral knowledge related to climate measurement or the conservation of water sources, there is still a need to consolidate effective dialogue between this diverse knowledge in order to legitimise the scientific validity of local knowledge and, in turn, promote the effective use of available technical-scientific knowledge by local actors.

Based on the above discussion, we present below a series of priority lines of action to guide the advocacy work of project implementers and strategies to promote sustainability and adaptation to CC in mountain areas:

1) A first priority is to develop and strengthen spaces, processes and mechanisms for the participatory and territorial construction of national CC adaptation policies that capitalise on the regulatory tools most used by local actors (e.g., municipal ordinances and laws; land-use plans; community or municipal conservation areas), and the most relevant sectoral policies (e.g., guidelines for addressing forestry and agroforestry in National Adaptation Plans, FAO). These tools facilitate the inclusion of the specificities of mountain socioecosystems as a cross-cutting issue in CC adaptation policies in the region, by providing effective spaces for collaboration in the field and by better responding to the CC impacts faced by these ecosystems. In addition, it is key to systematise sub-national tools and spaces that adopt a cross-sectoral and ecosystem approach to inform and influence national public policies, as well as their effective implementation (e.g., municipal ordinances, land-use plans, territorial zoning with integrated landscape approaches, biodiversity, socio-cultural dynamics, CC, land use, hydrology, among others). For this first point, the key actors that can help develop these processes are local and sub-national governments, as well as representatives of civil society.

2) A second priority is to design strategies for monitoring, evaluation and follow-up of the tools, spaces and practices developed within international cooperation projects or programmes, in relation to the transition towards sustainable rural development and environmental conservation or restoration practices adopted by local communities. For this second point, regional spaces such as the IAM have a particularly important role to play as a bridge between international actors and agreements, and the continuity of public policies at national and sub-national levels. One possible way to respond to this priority is through the construction of a platform of indicators and socio-political monitoring of CC adaptation measures, beyond the socio-environmental monitoring of CC, biodiversity and ecosystem services, which would make it possible to follow up and evaluate the development programmes that have been implemented.

3) A third priority is linked to the construction of *mechanisms and spaces for co-production between technical-scientific knowledge and local and ancestral knowledge on CC adaptation*, which has a long history in the Andean region. For this last point, academia has a leading role in conducting research that can link the most relevant local and ancestral knowledge with national public policies and, in turn, evaluate the environmental sustainability and adaptive value of traditional management practices and strategies in CC scenarios (e.g., design of Participatory Action Research methodologies). In addition, the use of international and regional initiatives or funds focused on CC management research, and the implementation of international cooperation or governmental programmes aimed at supporting the institutionalisation of ancestral CC measurement or adaptation practices, and the analysis of their impacts in CC scenarios and their value in the context of the resilience and vulnerability of livelihoods and productive strategies (e.g., the Nairobi Work Programme of the United Nations University, the International Research and Training Programme on Sustainable Management of Mountain Areas led by the Mountain Partnership Secretariat of the Food and Agriculture Organization of the United Nations, FAO). On the other hand, tools need to be promoted so that local actors can make better use of technical-scientific knowledge in land management and generate processes of co-production and innovation by integrating diverse knowledge.

8.

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9.

ANNEXES

ANNEX 1 – Survey of decision-makers and experts in the Andean region

This survey is part of the regional study Current Status of Climate Change Policies and Adaptation Strategies in the Andes: A multi-sectoral view from the mountains, led by the Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN). Within the framework of the Andean Forests Programme (PBA), Adaptation at Altitude (A@A), and the Andes Adaptation to the Impact of Climate Change on Water Resources Project (AICCA), this study aims to achieve a synergic work that allows joining efforts and resources to make viable a synthesis of regional scope, which allows updating the state of the art of the regulatory framework and climate change policies in the Andean countries, with a multisectoral view and from the mountain socioecosystems and with emphasis on plans and strategies for adaptation to climate change. It will take approximately 10-15 minutes to fill out the survey. Please complete the survey by 11 November 2020. The results of the survey will be shared during a virtual workshop tentatively scheduled for December 2020, for which you will receive an invitation. If you have any questions about the survey, please contact Émilie Dupuits: dupuits.emilie@gmail.com

10. Which climate change adaptation projects/programmes have you worked on over the last five years? (mention the two most important ones)

11. In your opinion, what are the major challenges related to climate change impacts and vulnerability in mountain ecosystems in your country? (Select the three most important ones)

12. In your opinion, what are the opportunities/priorities in the design, implementation and impact of climate change adaptation policies in mountain ecosystems in your country? (Select the three most important ones)

13. What is the current status of monitoring mechanisms for climate change adaptation policies in your country? Please explain.

14. How is the mountain agenda integrated into climate change adaptation policies in your country?

15. In your opinion, what are the pending challenges or institutional gaps in relation to climate change adaptation policies in mountain ecosystems in your country? (Select the three most important ones)

16. With which sectors do you cooperate most frequently within the climate change adaptation projects/programmes you manage? (Select the three most important ones)

17. What are the opportunities or challenges of intersectoral coordination between environment and agriculture in relation to climate change adaptation policies in your country? Explain.

18. How has the Covid-19 pandemic affected, or does it affect, climate change adaptation policies in your country? In the Andean region?

19. How have the social protests that started in 2019 in the region affected climate change adaptation policies in your country?

20. Has there been local resistance to the climate change adaptation projects you are working on or have worked on?

21. What strategies have been used to respond to these resistances and generate new opportunities and synergies between actors and/or scales of action?

22. Which actors do you most frequently work with in the climate change adaptation programmes/projects you design and/or implement?

23. Would you say that your working relationship with these actors has been collaborative, neutral or conflictual? Please explain.

24. In your experience, which level(s) is/are the most relevant for implementing climate change adaptation policies?

25. In your experience, which level faces the greatest challenges or difficulties in implementing climate change adaptation policies?

26. If you could identify three emblematic case studies (opportunities for collaboration, progress, level of conflict) in relation to climate change adaptation in your country, what would they be? Why did you choose these three case studies?

ANNEX 2 – List of survey respondents

Last name, name	Institution and position	Country	e-mail
PinzónJohana	DNP, Coordinadora de Adaptación al Cambio Climático	Colombia	jpinzon@dnp.gov.co
Fuentealba Durand Beatriz	INAIGEM	Peru	bfuentealba@inaigem.gob.pe
Norden Natalia	IAvH	Colombia	nnorden@humboldt.org.co
Altavista Manrique	Ministry of Foreign Affairs, Governance Focal Point	Argentina	atv@mrecic.gov.ar
Galvis Marcela	IAvH, Paramo Project Coordinator	Colombia	mgalvis@humboldt.org.co
Sierra Marcelo Sebastián	MAAE, Protected Areas Specialist	Ecuador	marcelo.sierra@ambiente.gob.ec
Baigun Román	Wetlands Foundation, Conserving High Andean Wetlands for People and Nature Programme	Argentina	rbaigun@humedales.org.ar
Nuñez Jara Jorge	MAAE, PLANACC Coordinator	Ecuador	orge.nunez@ambiente.gob.ec
Brown Alejandro	Proyungas	Argentina	abrown@proyungas.org.ar
de Bievre Bert	FONAG	Ecuador	bert.debievre@fonag.org.ec
Villarroel Tito	AGRECOL Andes, Cochabamba	Bolivia	tito.villarroel@agrecolandes.org
Leucci Cristina	INAIGEM, Mountain Technical Focal Point	Peru	cleucci@inaigem.gob.pe
Rovira Soto Jaime	Ministry of Environment, Focal Point for Mountains	Chile	JRovira.rm@mma.gob.cl

Arenas Aspilcueta Marco Antonio	SERNANP	Peru	marenas@sernanp.gob.pe
Grau Ricardo	IER U Tucumán	Argentina	chilograu@gmail.com
Román Francisco	CONDESAN-Peru, INSH Project	Peru	francisco.roman@condesan.org
Salinas Heredia Karina Patricia	MAAE, Head of Adaptation to CC	Ecuador	karina.salinas@ambiente.gob.ec
Bustamante Rocío	Centro Agua, Cochabamba	Bolivia	rocio.bustamante.centroagua@gmail.com

ANNEX 3 – List of participants in the semi-structured interviews

Last name, name	Institution and position	Country	e-mail
Grau Ricardo	IER U Tucumán	Argentina	chilograu@gmail.com
Baigun Román	Coordinator of the Conserving the High Andean Wetlands Programme, Wetlands Foundation.	Argentina	rbaigun@humedales.org.ar
Amaya Nidia	Social Affairs Coordinator, Wetlands Foundation	Argentina	nidiagon1@gmail.com
Bustamante Rocío	Centro Agua, Cochabamba	Bolivia	rocio.bustamante.centroagua@gmail.com
Villarroel Tito	AGRECOL Andes	Bolivia	tito.villarroel@agrecolandes.org
Ferreira Wanderley Julio	Cochabamba Catholic University	Bolivia	wferreira@ucb.edu.bo
Rovira Jaime	Ministry of Environment, GEF-Mountain Project Coordinator	Chile	JRovira.rm@mma.gob.cl
Cerda Paulina	Municipality of San José de Maipo, Head of the Forestry and Livestock Development Programme.	Chile	pcerda@sanjosedemaipo.cl
Galvis Marcela	IAvH	Colombia	mgalvis@humboldt.org.co
Rodríguez Camilo	IAvH	Colombia	crodriguez@humboldt.org.co
Davalos Carolina	Fundación Futuro; former Secretary of the Environment Municipality of Quito SAMDMQ	Ecuador	carolinadavalost@gmail.com
Bustamante Macarena	CONDESAN Consultant; ECOAN Project	Ecuador	macarena.bustamante@gmail.com
Jiménez Gloria	Environment Director, GADIP Cayambe	Ecuador	gloria.jimenez@gadipmc.gob.ec
Solís Helder	Protos Ecuador; SENAGUA former subSecretary	Ecuador	helder.solis@protos-ec.ong
Cisneros Mauricio	IEDECA	Ecuador	

Chicaiza Luis	IEDECA	Ecuador	
Beltrán Bolívar	GADIP Cayambe	Ecuador	
Román Francisco	CONDESAN, INSH Project	Peru	francisco.roman@condesan.org
Villoslada Taipe Abdías	Head of the Nor Yauyos-Cochas Landscape Reserve, SERNANP	Peru	avilloslada@sernanp.gob.pe
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