LEDS
Technical Assistance Opportunity

Multi-Level Governance and Climate Actions

Institutional Mapping of Chile

ADAPT CHILE

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This report concentrates on an institutional mapping exercise that details a network of relevant actors in the context of the public policy framework and national level commitments regarding mitigation and adaptation to climate change. It specifically considers the role of national and subnational actors in the context of the nationally determined contributions (NDC) of Chile, the National Climate Change Action Plan 2017-2022 (PANCC, acronym in Spanish), and National Sectoral Plans on Climate Change[1], in which the Biodiversity and Infrastructure plans are analysed. By clearly identifying functions, jurisdictions and mandates of the national and subnational institutions related to the commitment areas established by the NDC (Mitigation, Adaptation, Construction and Strengthening of Capacities, Development, and Transfer of Technologies), the subnational context is assessed with regards to planning frameworks and public policies, institutions and key actors, and governance processes, to identify and analyse institutional incentives, opportunities, gaps, and constraints that may affect the planning and implementation of local climate actions.

This report will serve as a key contribution to facilitate a dialogue between national and subnational actors, and catalyse ongoing work among relevant actors, such as the Council of Ministers for Sustainability (CMS), the Inter-ministerial Technical Team on Climate Change (ETICC, acronym in Spanish), the Monitoring, Reporting and Verification Technical Team (ETMRV, acronym in Spanish), the Regional Climate Change Committees (CORECC, in Spanish), different ministries, the Chilean Agency for Sustainability and Climate Change, municipalities, among others. After having identified coordination gaps and other relevant challenges, recommendations are made to identify short-term actions that could be developed in the context of the technical assistance that LEDS provides to Chile, and within the action framework of the CORECCs during the current year.

1. Introduction

a. Scope and Objectives

The purpose of this report is to provide summary information regarding the current system of climate change governance in Chile for key actors, who make up the governance system at multiple levels. By doing so, the main actors and institutions from different sectors, both public and private, civil society, and academia will be mapped, identifying their main roles, mandates and influences in this system. In addition, decision-making nodes, processes and the dynamics of the interactions between actors, regarding institutionality, planning, and decision-making related to climate action in Chile will be characterised. This analysis will identify gaps, challenges and opportunities to substantially improve the efficiency and effectiveness of climate governance, in order to generate greater cohesion between the different scales of governance

[1] Agroforestry, biodiversity, fisheries and aquaculture, health, infrastructure, cities, energy, tourism, and water resources.

and between the various sectors, given that inter-sectoral and multi-level coordination is essential to face the numerous challenges that climate change presents.

The report seeks to provide valuable contributions to the work of the MLG Climate Action Team that is being formed by the Ministry of the Environment within the framework of the LEDS-GP Subnational Technical Assistance Group, specifically in the context of the formation and implementation of Regional Climate Change Committees (CORECC) in the country. The CORECCs represent a new type of subnational climate institution that has the potential to act as a key interlocutor to territorialize national public policies on climate change, while galvanizing the efforts of different territorial actors in a regional planning process, and facilitate local climate action.

While there is great potential for this new emerging institutionality in Chile, there are still many key elements missing in order for it to attain the resources and capabilities needed to fulfill its ambitious purpose. Some of these elements include the identification of actors that make up (consciously, or not) the climate governance system in Chile, the current and/or potential roles of these actors, and the gaps that exist in this system with respect to multi-level and inter-sectoral coordination. These gaps include areas related to information, technical capabilities, financing, policies, administration, faculties and/or objectives.

Based on the information collected and the gap analysis, the report concludes with some recommendations and suggestions regarding initial actions that could be taken by the different ministerial and inter-ministerial Technical Teams to enable them to work with the CORECCs and other relevant actors (multi-level), and respond to the challenges and gaps identified, specifically in the context of Technical Assistance. In addition, it is expected that the summarised information regarding climate governance in Chile and the analyses included in this report will serve to inform and support the work of the CORECCs in a direct manner, providing inputs that highlight the key role that this new institutionality has in the context of climate governance in the country. In this way, it is hoped that the work developed by CORECCs will be clearly framed within a national framework that closes the gaps and induces more efficient and effective coordination between scales and sectors.

b. Methodological Framework for the Analysis of Climate Governance

The methodology used to address the present analysis of the climate change governance system in Chile is the Governance Analytical Framework (GAF), developed by Marc Hufty[2]. Here governance is defined as, "processes of interaction and decision-making among actors involved in a collective problem, resulting in the creation, strengthening or reproduction of social norms and institutions." It is important to consider that this conceptualization is not relegated to vertical authority and regulatory power, as in the case of political systems. Rather, governance refers to vertical and horizontal processes, both formal and informal, without preference a priori. Therefore, multi-level governance refers to the synergistic interaction between institutions, levels of government, civil society and the private sector, which determine how

[2] Ver: Hufty M. 2011. Investigating policy processes: The Governance Analytical Framework (GAF). In: Wiesmann U, Hurni H, editors; with an international group of co-editors. Research for Sustainable Development: Foundations, Experiences, and Perspectives. Perspectives of the Swiss National Centre of Competence in Research (NCCR) North-South, University of Bern, Vol. 6. Bern, Switzerland: Geographica Bernensia, pp 403–424.

public policies and/or actions are defined and implemented. Such processes include both vertical and horizontal interactions and can take many forms and occur in different instances.

The GAF considers a methodological analysis that first contemplates the definition of a particular problem, in this case making decisions on climate change. It also considers the different types of social norms involved in decision-making processes, the interactions between actors and institutions, the formation of public policies, and the implementation of actions. For this reason, it is necessary to identify and categorise the different actors involved, as well as the 'nodal points', which refers to the physical spaces and instances of interaction in which problems, actors, and decision-making processes occur and converge. This makes it possible to analyse governance processes over time, which allows for the identification of gaps in governance systems and developing recommendations for potential ways to strengthen governance, in order to address a particular problem. Consequently, a governance analysis based on the GAF methodology, permits carrying out activities and submitting proposals that seek to fill the gaps identified, while working directly with actors, and across existing nodes.

For the gap analysis, the seven (7) potential governance gaps identified by the OECD governance gaps (Charbit, 2011: see section 3) are applied: i) Information Gap; ii) Capability gap; iii) Financing gap; iv) Political gap; v) Administrative gap; vi) Objective gap; and the vii) Gap of definition of responsibilities.

c. Summary of the Institutional Framework, Regulations and Climate Change Policies in Chile

Following Chile's signing of the United Nations Framework Convention on Climate Change (UNFCCC) and the ratification of the Kyoto Protocol, Chile began developing public policies and institutions at the national level. Below, we briefly describe the main milestones in this process from beginning to the current year:

Year	Milestones
1992	Signing of the UNFCCC, which was ratified by the National Congress in 1994. Decree No. 123 of the Ministry of Foreign Affairs is promulgated and implemented in 1995.
1994	**Law 19.300:** General Principles of the Environment
1996	**Decree No. 466:** Creation of the National Advisory Committee on Global Change (CNACG, in Spanish)
1998	**CONAMA Accord No. 90:** Approval of Strategic Guidelines on Climate Change
1999	**First National Communication to the UNFCCC**, INGEI base year 1994
2002	**Supreme Decree No. 349:** Ratification of the Kyoto Protocol, which came into effect in 2005.
2006	**National Climate Change Strategy**
2008	**CONAMA Accord No. 390:** National Climate Change Plan 2008-2012 by the Council of Ministers for Sustainability (CMS)
2009	The Inter-ministerial Committee on Climate Change held sessions with the CNACG, in response to international negotiations related to CC.
2010	**Law 20.417:** Creates the Ministry of the Environment (MMA, in Spanish), the Environmental Assessment Service, and the Superintendence of the Environment

	(which came into effect in June, 2012), the Council of Ministers for Sustainability (CMS), and the Office of Climate Change (OCC) from the MMA.
	Ratification of the Copenhagen Accord. Chile takes on voluntary commitments (NAMAs).
2011	**Second National Communication to the UNFCCC**, INGEI timeframe 1984-2006
	Mid-Term Evaluation of the Action Plan (EMT-PANCC, in Spanish), which aimed to measure the degree of implementation and results from the objectives that were set forth in the plan.
2012	The GHG Inventory Area of the DCC designs and implements the **National System of Greenhouse Gas Inventories of Chile (SNICHILE, in Spanish)**
2013	Approval of the **Adaptation to Climate Change Plan for the Agroforestry Sector**
	The Inter-ministerial Committee lasted until this year and was replaced with the Advisory Committee on Climate Change (CASCC, in Spanish), by exempt resolution of letter X, article 70, of Law 19,300.
2014	Approval of the **National Climate Change Action Plan (PANCC I, in Spanish)** by the CMS
	Approval of the **Adaptation to Climate Change for Biodiversity Plan** by the CMS
	Presentation of the **First Biennial Update Report** (INGEI time frame 1990-2010) to the United Nations at the **COP20** in Lima
	The OCC of the MMA becomes the Department of Climate Change (DCC)
	Drafting of the **Guidelines for a generic framework of MRV for NAMA** by the MMA, which were directed at monitoring, reporting and verifying the impacts of climate change mitigation, and other co-benefits of implementing actions
	Law 20.780 Article 8: Green taxes on stationary and mobile sources
2015	Presentation of the **National Tentative Contribution of Chile (INDC, in Spanish)** to the United Nations for the Paris Climate Agreement, with new commitments set for 2030, for COP21
	Approval of the **Adaptation to Climate Change Plan for the Fisheries and Aquaculture Sector**
2016	**Second Biennial Update Report** and **Third National Communication** before the **UNFCCC,** INGEI time frame 1990-2013
	Approval of the **Adaptation to Climate Change Plan for the Health Sector**
	Chile signs the Paris Agreement at the United Nations (New York)
	Chile presents its **Second Biennial Update Report on Climate Change** to the United Nations
2017	Approval of the **National Climate Change Action Plan 2017 - 2022 (PANCC II, in Spanish)** by the CMS
	The Department of Climate Change of the MMA, gains more institutional strength and becomes the **Office of Climate Change (OCC)**, which now becomes responsible for coordinating national public policies on climate change
	Approval of the **Climate Change Action Plan for Infrastructure Services**
	Creation of the **Agency for Sustainability and Climate Change**, as a CORFO committee
	Creation of the first **Regional Climate Change Committees (CORECCs)**
2018	Formation of the **Monitoring, Reporting, and Verification Technical Team of Chile**

	(ETMRV-CHILE, in Spanish)
	Approval of the **Climate Adaptation Plan for Cities** by the CMS

Source: Prepared by authors based on literature review

In terms of institutionality, the Council of Ministers for Sustainability (CMS) is the multisectoral body in charge of deliberating and approving public policies and general regulations related to environmental issues. However, it is the Ministry of the Environment (MMA), through the Office of Climate Change (OCC), that is responsible for proposing and coordinating policies, plans, and programs related to climate change.

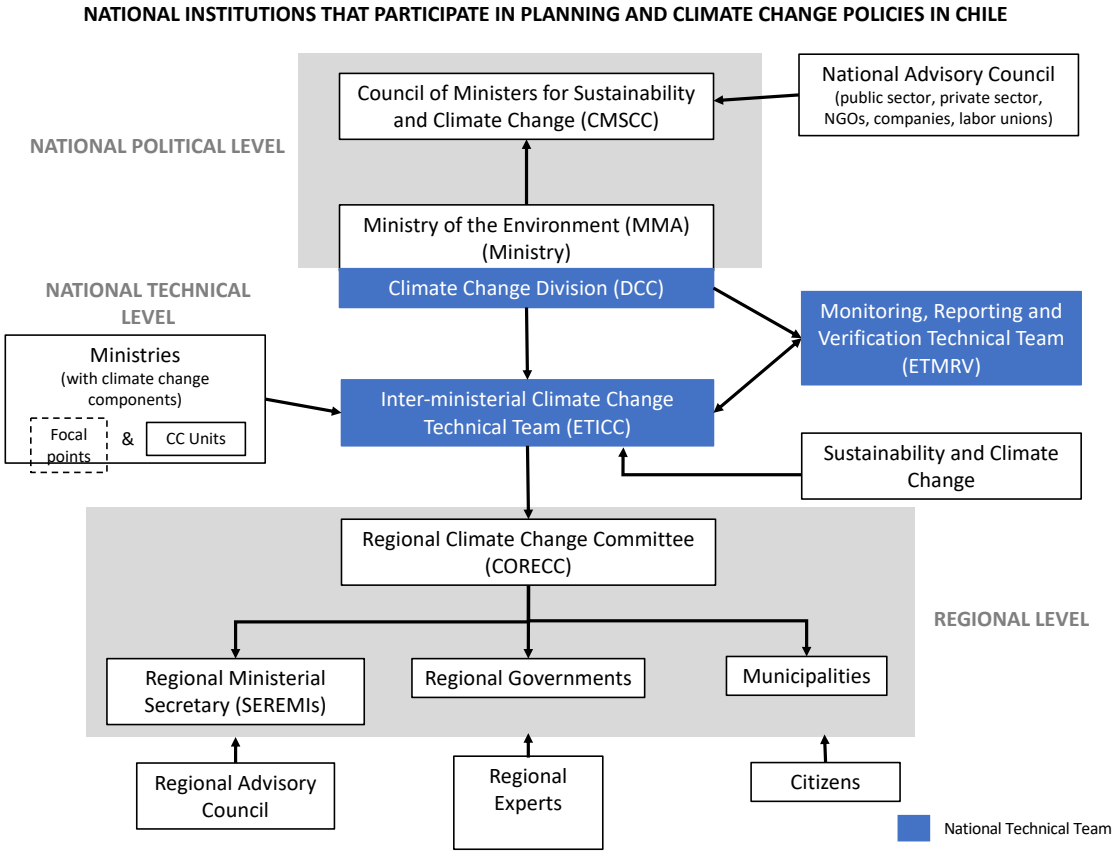
In the National Climate Change Adaptation Plan, the institutional structure is presented from the national (political and technical), to the local scale, incorporating the ETICC and the CORECCs. The main function of the ETICC is "to support the Ministry of the Environment (MMA), to participate and facilitate the preparation, implementation and monitoring of national policies and international agreements signed by the country, on climate change issues. The ETICC is characterised by its intersectoral and technical nature, and is made up of representatives of public institutions who are knowledgeable about climate change"[3]. In addition, the PANCC 2017-2022 considers it a key component of Chilean climate institutions in the preparation and implementation of actions in the four areas of the aforementioned plan: adaptation, mitigation, means of implementation and climate change management at the regional and community levels. CORECC, meanwhile, aims to "promote and facilitate low carbon and climate resilient regional development, through the development and implementation of climate change policies, plans, and actions, while integrating different sectors and management levels"[4].

The proposal of the institutional interaction that was presented at the Climate Change Forum of Mayors 2017 is shown below, with some variations from that of the PANCC II (Farías, 2017):

[3] The document has yet to be published: MMA and Adapt-Chile (2018). Proposal for the operation of the Regional Committees on Climate Change.

[4] Ibid.

Figure 1. Institutions that participate in the planning and policies of climate change in Chile



The most recent development is of the *Monitoring, Reporting and Verification Technical Team of Chile (ETMRV-Chile)* in January 2018, which constitutes a new node, or occasion for informal and permanent work to strengthen institutions, communications, the exchange of information, and agreements between the different actors involved in climate change (Retamal, 2018).

2. Climate governance processes in Chile: Actors, participation and inter-scalar dynamics

An analysis of climate governance requires the identification of the functions, jurisdictions and mandates of national and subnational institutions with respect to the reduction of greenhouse gas (GHG) emissions (mitigation), and climate resilience (adaptation). This includes the main actors, participation models, and structure of the inter-scalar dynamics that define the system and governance relations. It considers an evaluation of the "subnational" context with respect to planning frameworks and policies, political drivers, key institutions, actors and governance processes, including, limits and/or political, legal, and regulatory determinants. The evaluation of nodes will help to improve the understanding of political processes, and the evolution of climate governance and how subnational entities are linked to Chile's NDC.

a. Mapping of key actors at the national and subnational levels

Climate change is a phenomenon that affects several sectors simultaneously, including not only various local territories, but also social, environmental, economic, and other areas. All of this must be examined in order to construct the current framework of climate change governance, which, ideally, should point to integrated governance, in which all levels of government, the private sector, academia, and civil society work under a balanced territorial approach.

For this reason, the GAF methodology (Hufty, 2011), which focuses on actors, will be applied. This implies the following methodological steps:

- Define the nodal points of climate change;
- Identify the actors involved in each nodal point;
- Evaluate the influence of each actor's power (both state and non-state);
- Determine the interactions between actors;
- Describe the typology of regulations;
- Analyse the governance process (planning, implementation, and monitoring of a public policy, plan or action).

Nodal points: These are the meeting spaces of an institution that converge to address issues related to climate change, which involves actors from different sectors and scales, to develop and/or create processes or regulations to achieve the objectives proposed at the national level.

Actors/Stakeholders: Individuals or groups interested in certain areas and/or problems of a specific topic, in this case, climate change. They can be formal and informal, multi-scale and multisectoral actors.

Influence of the Actors: There are different tools to classify influence, for example, by different kinds of capital (economic, social, cultural), by the capacity to mobilize resources, or by strategy, either primary, or secondary. In this case, an effort will be made to classify the type of influence of the following kinds of actors:

- *State:* These are the organisations, institutions or people that are associated with the central government (e.g. Ministries, Regional Ministerial Secretariats – SEREMIs, Regional Governments, and other public services).
- *Non-state:* These are the organisations, institutions or people that are not associated with the central government (for example, the private sector, NGOs, academia and municipalities).

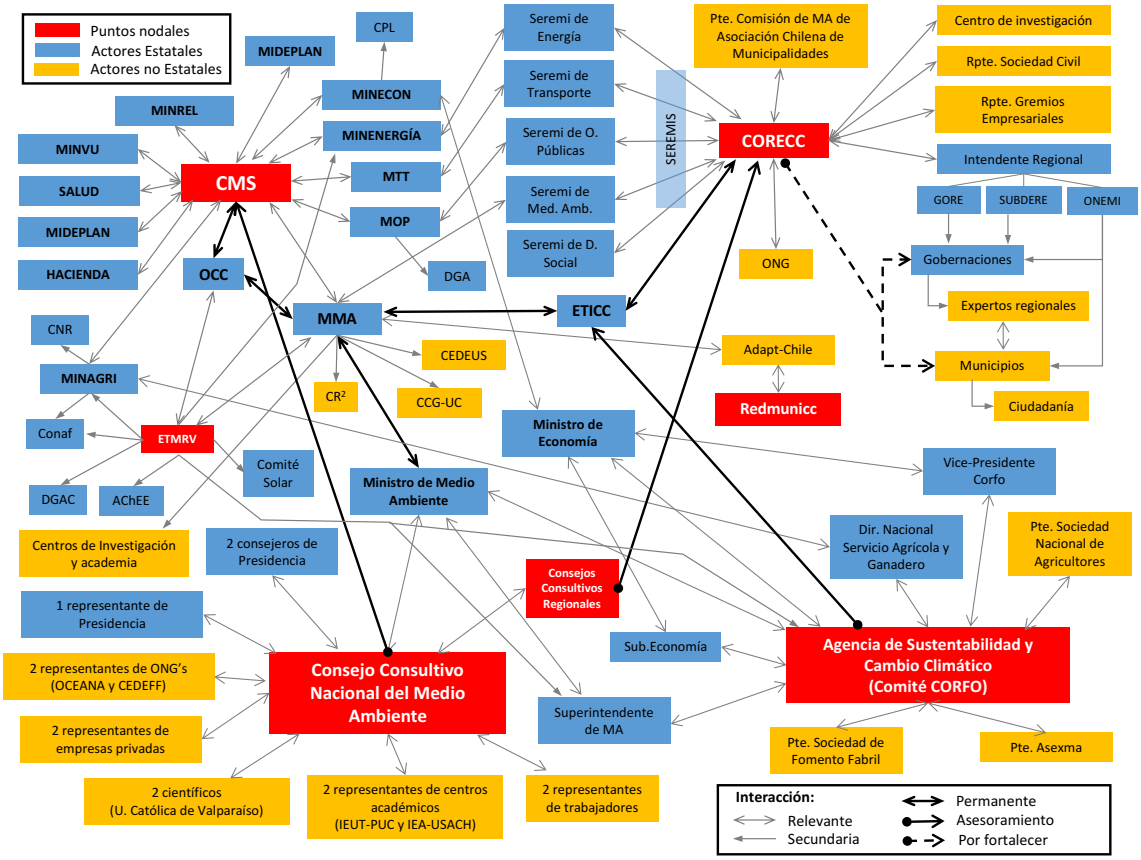
Interaction between actors: There are several kinds of interaction that correspond to different types of relationships between the actors involved.

- *Relevant interaction:* the relationship between actors that are part of the same nodal point (for example, the CMS) or institution (for example, MOP and the SEREMI of Public Works).
- *Secondary interaction:* the relationship between actors that offer inputs, knowledge and vital information to an important state actor, such as a ministry (for example, academia to the MMA).

- *Permanent interaction:* relationships that provide an exchange of information (feedback, meetings, review of information, etc.), that are a part of the different climate change governance processes in Chile.
- *Interaction of consultation*: the advisory relationship between nodes, or node to actor, that are vital, such as the ETICC.
- *Interaction to be strengthened*: the relationship that needs to be strengthened through rules or regulations and/or training, to achieve the implementation of climate change measures and actions at the local level.

The majority of governance processes are carried out between actors at different levels (vertical interaction), for example, national-regional-local, or national-regional, lacking integration of a relationship with the local scale. Horizontal interactions, on the other hand, are those that occur within the same level (for example, local-local) (Young, 2002).

Figure 2. Climate Change Governance Actor Map in Chile



Note: Review the annexes of this document to see other actors involved in CC that are not incorporated in the illustration. Source: prepared by author.

Regulations: The interactions between actors and the collective decisions that lead to the development and formulation of regulations, which guide processes at different stages in a society. These rules can be modified through collective interactions, either to close gaps, strengthen institutions, advance objectives, etc. These modifications are determined in sessions or meetings within the nodal points (for example, the agreements signed by the CMS in its

regular sessions). The rules may be of a constitutive, regulatory, or of a private nature, and are regulated by an institution.

Table 1. Examples of types of regulations

Regulation	Example of Regulation	Agency
Law	Law 20.417	Ministry of the General Secretariat of the Presidency
Decree with Force of Law (D.F.L.)	D.F.L. No. 725	Ministry of Health
Decree Law (D.L.)	D.L. No. 2224	Ministry of Energy
Supreme Decree (D.S., in Spanish)	D.S. No. 255	Ministry of Transportation and Telecommunications
Decree	Decree No. 466	Ministry of Foreign Relations
Instructions	Accord No. 390	CONAMA
	Minutes of ordinary session	CMS

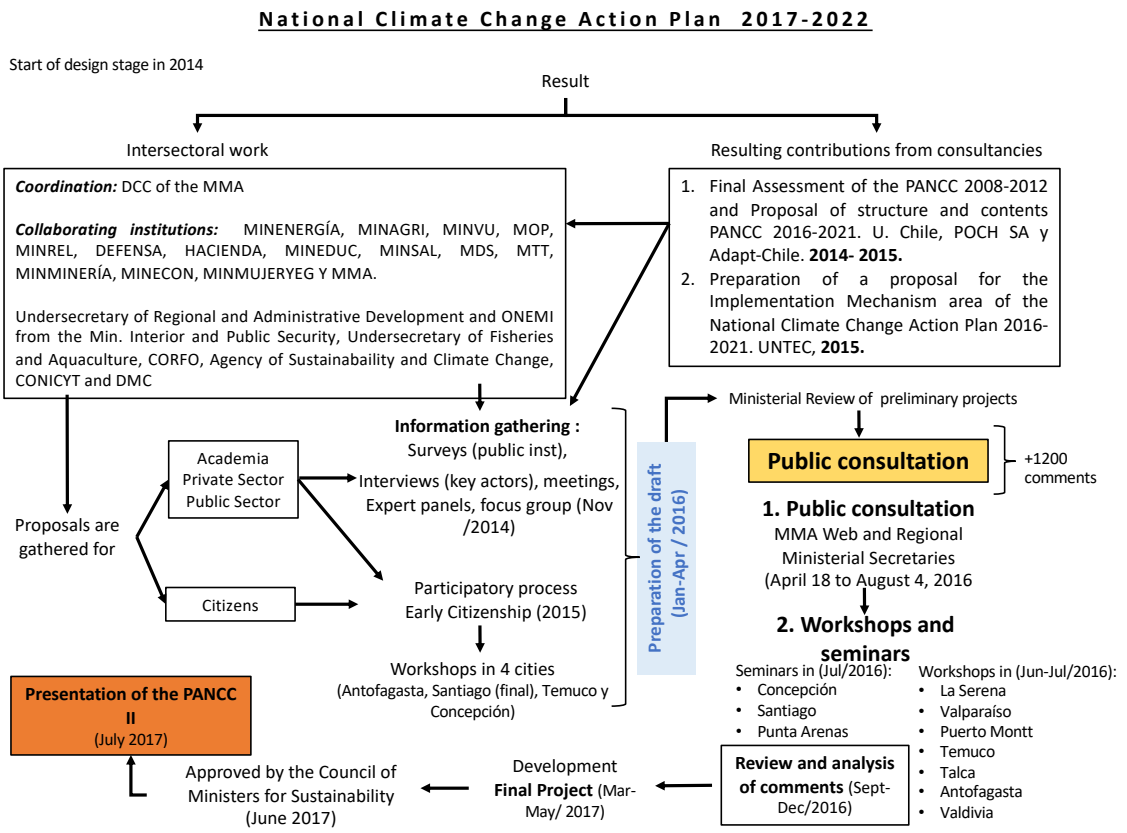
Source: Prepared by author based on CR2, 2014 (p. 33).

Governance processes: Within climate governance, interactions are developed between different actors, be they from the processes of formulating public policies, mechanisms and/or measures of actions; or in the different ways these actors participate (workshops, surveys, interviews, etc.) until they reach local implementation, which is the goal of all climate governance.

To improve the understanding of climate change policy formulation processes, only four mechanisms of national coverage will be analysed. These include the institutions, activities, the gathering of information, times, phases, and the synergic interactions between actors at different scales, which will help identify opportunities and constraints that influence the planning and development of national climate change plans, to achieve an integrated governance.

The first analysis (Figure 3) is of the PANCC II, which was the result of the evaluation of the implementation of PANCC I. From the design stage to the presentation of the plan, the process lasted almost 3 years. It is the only instrument that considered an early participatory process with citizens (2015), in addition to citizen consultation of the preliminary draft (2016). The gathering of information included the participation of actors from multiple levels and different sectors and was based on consulting inputs, through surveys, interviews, meetings, expert panels, focus groups and regional workshops. The plan was approved by the CMS in June 2017 and presented to the public in July of the same year.

Figure 2. Development process of the National Climate Change Action Plan 2017-2022

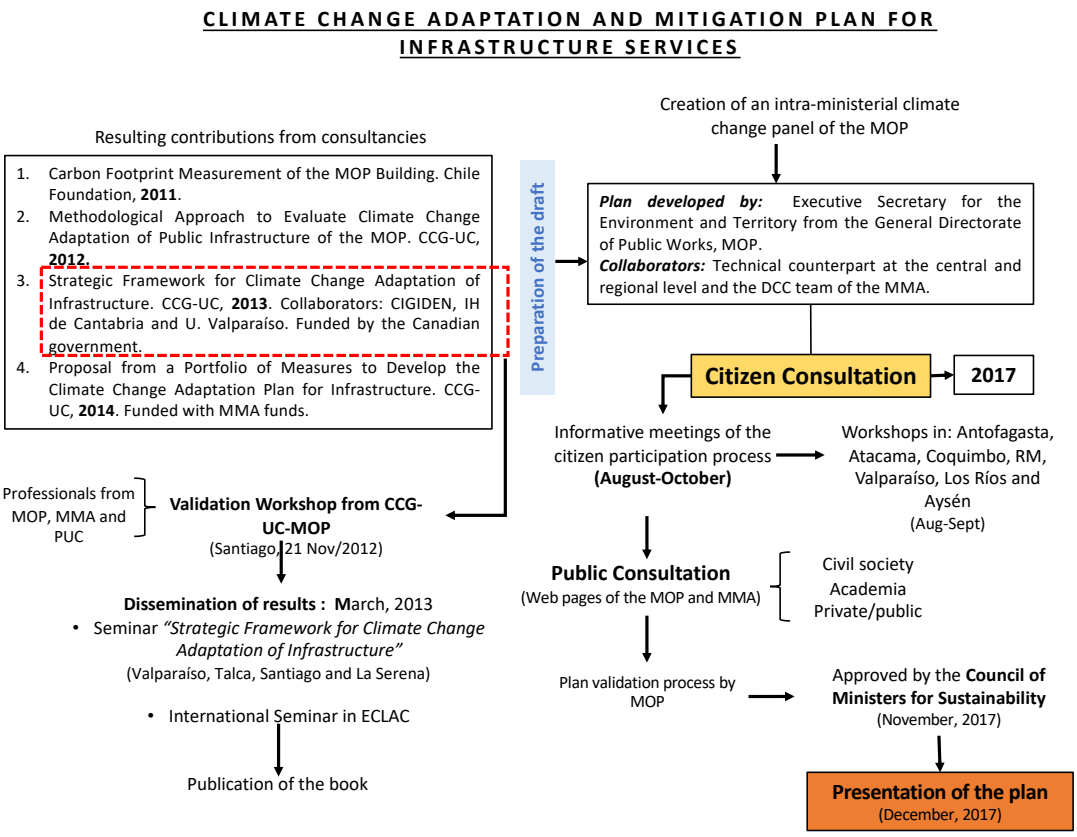


Source: Prepared by author based on a review of different sources

The second analysis (Figure 4) is from the Climate Change Adaptation and Mitigation Plan for Infrastructure Services (2017-2022), which began with the formulation of several consultancies that collected and analysed information (the first in 2011), and ended in 2017 with the approval and presentation of the plan, which was developed over 6 years. While reviewing different sources, it was not possible to identify if there had been an interruption in the development process since 2014 was the last consultation until 2017, which was the preliminary draft for the public consultation, or if this period was simply a stage with many modifications and technical revisions. There was no early participatory process with the community.

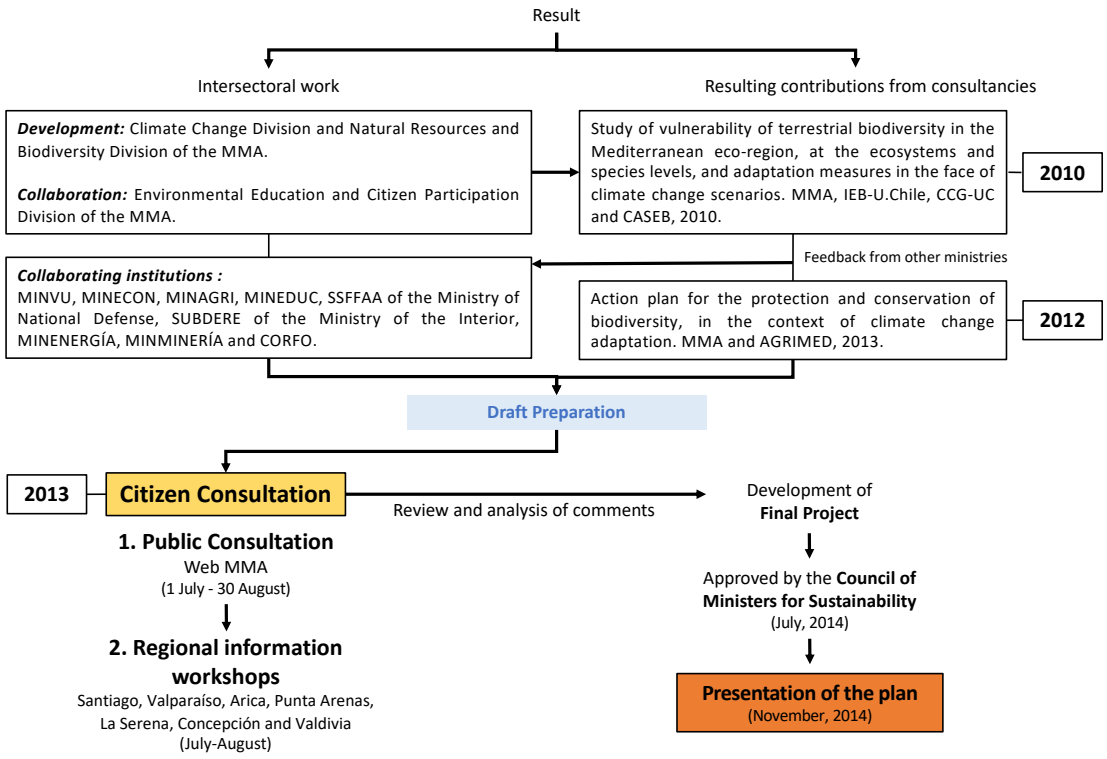
The third analysis (Figure 5) is from the Climate Change Adaptation Plan for Biodiversity, that started with the first consultation in 2010 and ended with its approval by the CMS in 2014. The plan was developed over a 4 year period and did not include an early participatory process with the community.

Figure 3. The Climate Change Action Plan for Infrastructure Services development process



Source: Prepared by author based on a review of different sources

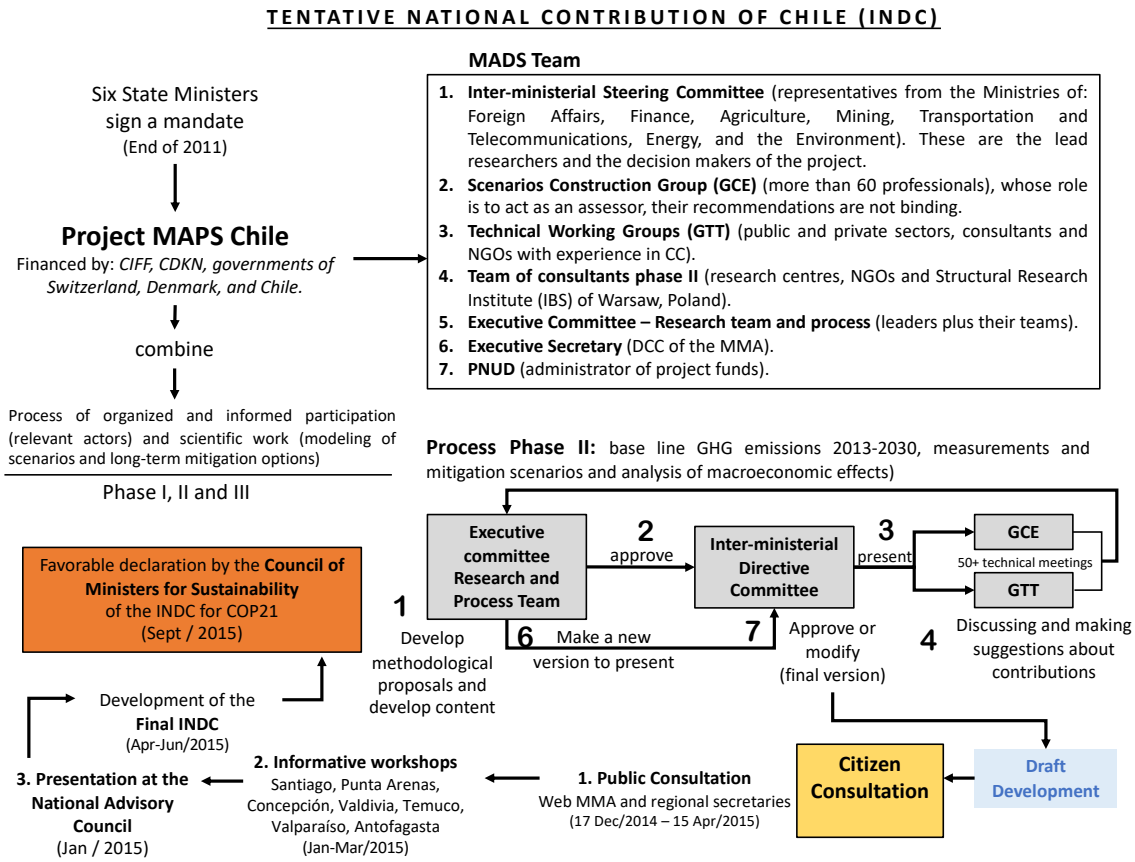
Figure 4. The Climate Change Adaptation Plan for Biodiversity development process



Source: Prepared by author based on a review of different sources

The fourth and final analysis (Figure 6) is from the INDC for the Paris Agreement. To develop this project, which is both national and international in nature and in its commitments, funding was provided by the Children Investment Fund Foundation (CIFF), the Climate and Development Alliance (CDKN), and the governments of Switzerland, Denmark, and Chile. The INDC was based on the *MAPS Project Chile*, which was the result of the work of more than 50 experts from the country's main universities, research centers, and institutes dedicated to the topic of climate change mitigation. The MAPS Project Chile combined an organised and informed participation process with relevant actors, in addition to scientific work to develop scenario modeling, and long-term mitigation options. From its inception to its presentation at the National Advisory Council, and favorable response from the CMS, the project lasted a period of almost 4 years. However, it is worth noting that the MAPS project turned out to be fortuitous in the context of the development of the NDC, as it provided a very important contribution (results of phase 2) that reflected Chile's commitments to reduce its GHG emissions by the year 2030.

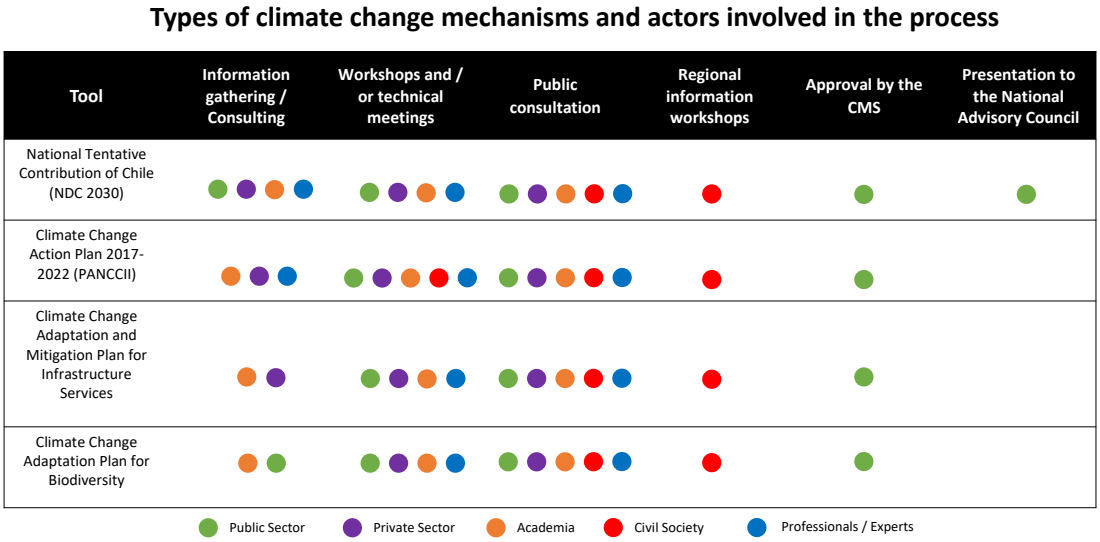
Figure 5. The National Tentative Contribution of Chile (INDC) development process



Source: Prepared by author based on a review of different sources

Lastly, Figure 7 shows the 4 instruments, as well as the involvement of different actors throughout the development process.

Figure 6. Types of climate change mechanisms and actors involved in the process

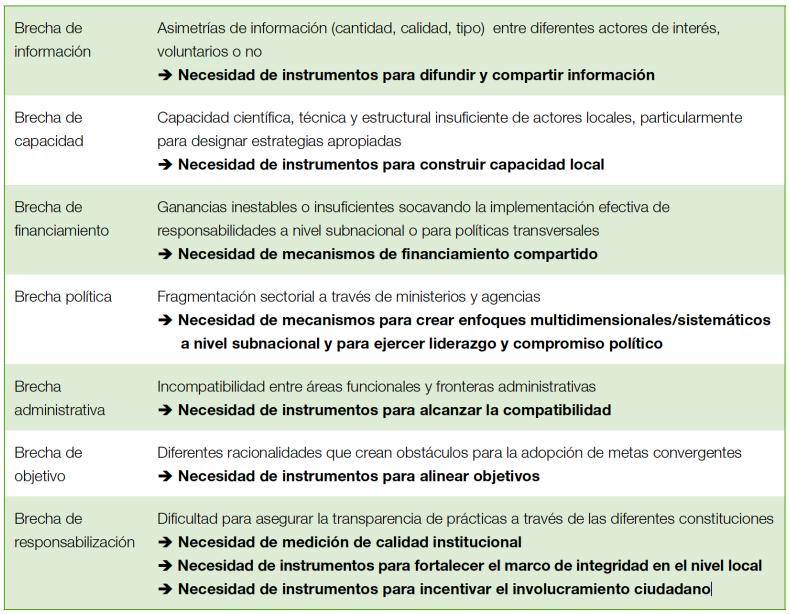


Source: Prepared by author based on GIZ, MMA, MINENERGÍA and Carbon Price Chile

3. Gap Analysis

This section deals with the identification and analysis of institutional incentives, opportunities and constraints that can influence the planning and implementation of local climate actions. The focus will be on the diagnostic tool "*Mind the Gaps*" developed by the OECD (Charbit, 2011), which uses seven (7) potential dimensions of coordination and/or capacity gaps related to the challenges of multi-level governance, to identify and diagnose the obstacles associated with climate change governance in Chile.

Figure 7. The OECD diagnostic tool to identify coordination and capacity challenges



Brecha de información	Asimetrías de información (cantidad, calidad, tipo) entre diferentes actores de interés, voluntarios o no ➔ **Necesidad de instrumentos para difundir y compartir información**
Brecha de capacidad	Capacidad científica, técnica y estructural insuficiente de actores locales, particularmente para designar estrategias apropiadas ➔ **Necesidad de instrumentos para construir capacidad local**
Brecha de financiamiento	Ganancias inestables o insuficientes socavando la implementación efectiva de responsabilidades a nivel subnacional o para políticas transversales ➔ **Necesidad de mecanismos de financiamiento compartido**
Brecha política	Fragmentación sectorial a través de ministerios y agencias ➔ **Necesidad de mecanismos para crear enfoques multidimensionales/sistemáticos a nivel subnacional y para ejercer liderazgo y compromiso político**
Brecha administrativa	Incompatibilidad entre áreas funcionales y fronteras administrativas ➔ **Necesidad de instrumentos para alcanzar la compatibilidad**
Brecha de objetivo	Diferentes racionalidades que crean obstáculos para la adopción de metas convergentes ➔ **Necesidad de instrumentos para alinear objetivos**
Brecha de responsabilización	Dificultad para asegurar la transparencia de prácticas a través de las diferentes constituciones ➔ **Necesidad de medición de calidad institucional** ➔ **Necesidad de instrumentos para fortalecer el marco de integridad en el nivel local** ➔ **Necesidad de instrumentos para incentivar el involucramiento ciudadano**

According to the previous methodology, the main gaps are:

Type of gap	Gap
Information Gap	The need to develop information management systems (MRV systems for emissions, mitigation actions, climate financing, databases, monitoring systems, GIS, etc.), especially in regions. Adjustable indicators and/or methodologies to monitor the implementation of measures in multi-level plans (annual, biannual), especially multisectoral climate change plans.
	The need to create a technological platform that contains all the information related to climate change (PANCC II).
	The need to develop a framework for emissions registries, to avoid double counting.
	The need to keep the community informed about objectives and monitoring of local-provincial plans and measures.
Capability gap	The need to strengthen capacities at the institutional level, as well as public policies and legal frameworks. In this strengthening process, it is crucial to incorporate citizen participation.
	The need to strengthen sectors with the greatest vulnerability to the impacts of climate change, especially regarding technology transfers.
	The need to hire qualified personnel at the subnational level, since there is a high turnover of personnel due to a lack of hiring resources and low salaries at the local level.

Financing Gap	The need for a National Climate Change Financial Strategy and a Climate Change Roadmap (PANCC II).
	The need for a financial institution at the national level (with permanent funds, and specific budgets detailed in a portfolio of projects (short and medium term) that are aligned with the national objectives and goals, proposed alongside those at the sub-national level).
	The need to plan financing at multiple levels, assessing needs, defining priorities, and identifying investment barriers (coordination mechanisms) (PNUD, 2012).
	The need to implement project development systems to access financing.
	The need to strengthen financial compliance, since it is the key to ensuring effective and transformative actions, either from the implementation and execution of activities; the local offer of expertise and skills; or the project coordination system (PNUD, 2012).
	The need for effective public investment at all levels of government.
Political Gap	The need for a law that strengthens the institutional framework and processes of climate governance in Chile, especially those focused on the sub-national scale, from CORECCs to local implementation, as well as the mandatory incorporation of climate change into territorial planning instruments.
	The need for governance that follows common principles with a high level of coordination to achieve multisectoral actions (MMA and MINVU, 2018).
	The need for representatives with political will and/or leadership on issues related to climate action.
Administrative Gap	The need to create an office or director responsible for climate change within the governorships and municipalities, who would have constant interaction with all remaining areas, and whose function would be to identify, implement and monitor local measures and actions, according to a portfolio of projects, and regional goals.
Objective gap	The need to create measurable objectives at the local-provincial level (proposed at different time scales), as well as at different scales and levels. These objectives must be aligned and approved by the CORECCs.
	The need to assess the effectiveness of all the different action plans (for example, sectoral climate change plans).
Definition of Responsibilites Gap	The need to clearly define the role and responsibilities of each actor. There are many functions that overlap each other.

	The need to expand social participation in different decision-making processes to ensure early and effective participation, and not left (as happens in most cases) in the space of public consultation.

Source: Prepared by author.

4. Recommendations

Based on the gap analysis, the following is a series of recommended next steps that can be taken to respond to the identified gaps and challenges, while also suggesting concrete actions that could be addressed in the context of technical assistance for capacity building, provided by LEDS.

Information:

1. Design **regional programs for the development of territorial information regarding climate change risks and vulnerabilities**, with special emphasis on regions that do not have large universities or research centers. First approach methodologies capable of providing basic information that allow regional and local authorities to develop plans and structure strategic work based on climate challenges, are required.

2. Implement a **public technological platform** that contains information related to all types of risk, as well as climate change vulnerability variables, both at the regional and communal level[5]. Such a platform could host existing information (for example, the Geospatial Data Infrastructure portal - IDE Chile), as well as inputs from regional programs to produce territorial information. It would be of upmost interest to generate experiences for the integration of existing information to support decision-making, sub-national planning processes, and the development of local climate projects.

3. Develop an **MRV platform** with a strong infrastructure that includes data and innovative information technology resources, and permits the maintenance and exchange of data in a collaborative, safe, congruent and traceable manner between the public and private sectors, and research centers (Retamal, 2018). This requires the state to agree on a methodology to measure territorial emissions, one which is consistent with existing programs such as Huella Chile and the National Inventory System (SNI, in Spanish).

4. Develop a **system of subnational indicators** to: i) monitor progress in the implementation of measures considered in Local Climate Change Plans (PLCC, in Spanish) and Local Energy Strategies (EEL, in Spanish) that some communities have (as these are voluntary); ii) evaluate the impact of implemented climate change actions, in terms of their ability to increase resilience, reduce vulnerability and risks, and reduce greenhouse gas emissions.

5. In addition, since there is a lack of information or knowledge, it means there is a lack of **adequate knowledge transfer**, either by the people or organisations that facilitate the communication of information (climate change knowledge brokers), especially ensuring that local decision-makers and educated users are informed in terms of climate change knowledge. In some cases, this is not due to a lack of political will, it is simply that they do not understand the subject, or do not have the time to read extensive reports that tend to use highly technical language. These users need greater availability and access to reliable data, information adapted to their needs, systematised climate information,

[5] See, for example, the National Atlas of Risks of Mexico - http://www.atlasnacionalderiesgos.gob.mx/

sectoral contextualization, feedback with local information, and access to raw data, etc. (Bauer & Smith, 2015).

Capabilities:

1. Strengthen capabilities and/or create permanent skills, especially those of public officials at the sub-national level, according to the strategic sector's priorities (for example, management of information systems software, updating of databases, general knowledge about specific topics and statistics, technology transfer, national goals related to climate change, monitoring, reporting and verification systems, etc.). This requires the integration of a permanent training program at the SUBDERE, which would permit all municipalities to develop skills, according to their specific needs.

2. The **development and transfer of technology and innovation** is key to reaching different sectors, especially the most vulnerable, to help implement mitigation measures and adaptation to climate change. To achieve this, it is essential to have different sub-national agents from various sectors that have the capacity to identify potential technologies, that could be suitably applied in response to territorial problems. These agents should also participate in international networks, and be able to produce trial experiences to demonstrate the effectiveness of solutions, adapt them to local realities, generate potential business models, and determine their replicability and scalability.

3. Develop **educational programs and social campaigns** to raise awareness among local populations (together with the public, the private sector, and civil society - rural, urban, vulnerable, or not) about climate change, its implications, and the existing adaptation and mitigation opportunities.

Financing:

1. A **National Financial Strategy** and Climate Change Roadmap should be developed and implemented.

2. Create a **non-traditional financial institution (a green investment bank)**, capable of coordinating public resources, private investors, international resources and others, that can be oriented to carrying out projects that are an "investment in low carbon infrastructure and climate change resilient (LCR), which will be necessary in order to achieve the NDC" (NRDC, 2017, p.1) in Chile (for example, the Green Investment Bank[6] [7] from the United Kingdom; the Clean Energy Finance Corporation (CEFC)[8], in Australia; the Green Bank from New York[9] and Connecticut in the United States, GreenTech from Malaysia and the Green Financing Organization of Japan). This entity must be related

[6] This institution was created by "the Enterprise and Regulatory Reform Order 2013", a legal tool of the British Government and approved by the Parliament. It was formed as a public body to achieve the objectives of the Climate Change Law and the Energy Law.

[7] www.greeninvestmentgroup.com

[8] www.cefc.com.au

[9] www.greenbank.ny.gov

directly with subnational entities (at the regional or communal level). At the international level, green investment banks (BIV, in Spanish) have been recognised as "financial driving forces that are specialised at addressing market barriers that restrict the expansion of clean energy" (NRDC, 2017, p.6) and climate change. For example, "*Nacional Financiera (Nafin) played an important role in achieving 105% growth in clean energy in Mexico in 2015, with one of the largest land-based wind energy portfolios in the world with an estimated $2.2 billion USD for 1.6GW*" (Frankfurt School, UNEP Center and BNEF 2016, cited in Holmes et al., 2016).

3. Create a **financial tool** that is backed by the National Financial Strategy, to help close investment gaps, build trust, and interest between public and private sectors.

4. The need for **project formulation systems** is essential to ensure universal access to climate financing and to attract larger volumes of investment. To achieve this, an implementation entity and national banking institutions are required (i.e., green banks) (PUND, 2012).

5. At the national level, there should be **greater autonomy and contribution in terms of climate change financing within the national budget**. Since Chile is already a member of the OECD, this means it will start to receive less international funding, which could affect the fulfillment of international commitments it has undertaken, due to a lack of economic resources.

6. I**mproving transparency and accountability mechanisms** of climate change financing is needed.

7. Promote the use of **regional funds** (FNDR, FRIL, FIC, etc.) for projects that are related to integrated risk management of climate change and adaptation.

8. **Encourage the private sector** to take on innovative financial agreements to diversify funding sources and strengthen capacities, especially at the subnational level. This initiative would be another way to help close infrastructure financing gaps in the face of climate change.

Politics:

1. Integrate **climate change factors in territorial planning tools**, primarily in Communal Regulatory Plans (PRC, in Spanish), but also in regional planning tools, such as Regional Development Strategies (ERD, in Spanish), which would justify including climate change projects in the regional fund summaries.

2. Formulation and implementation of a **Climate Change Law**, which would establish an institutional and legal framework of binding nature, leading Chile towards a low carbon and climate resilient development, prioritising sustainability, water and climate security. This law must consider the subnational perspective as a central component.

3. Strengthen and increase the development of **public-private partnerships** to encourage innovative and suitable solutions for local circumstances. Doing so would join capacities

and experiences in a horizontal manner, starting from a common task with private sector actors, and under defined financial and/or fiscal incentives. The public sector must have the motivation to form these alliances, and explore the possibility of generating associative entities (similar to municipal associations) capable of raising resources and executing projects.

4. The process to **update Chile's NDCs must be institutionalised**, including the participation of both the ETICC and the ETMRV, and broadening participation to other sectors and key experts, such as academia, civil society, the private sector, and sub-national public entities, should also be considered. By doing so, the consensus regarding Chile's commitments and objectives would contemplate a wide spectrum of opinions and visions, thus enjoying transversal legitimacy, and also serving as an example for other countries in the region, and the world.

5. The current **Carbon Tax** should increase its value if the goals of the NDC are to be achieved. The current value is symbolic and would not produce the desired impact in reductions (according to researchers from the Faculty of Economics at the University of Chile, and analysts at Carbontax). In addition, designing a compensation system for territories negatively affected by emissions is recommended, so as to increase their resilience and capacity to adapt to climate change, and to generate low carbon development paths.

Administrative:

1. As shown in the analysis carried out in this report, the development processes of some national plans in Chile lasted between 3 and 6 years, which in some cases is too long. Therefore, improving the **efficiency of the time it takes to develop plans and projects** is recommended, not only at the national, but also at different scales, since this would allow for a faster completion of adaptation and/or mitigation activities, which is considered an urgent matter, as Chile is a highly vulnerable country.

2. Develop **integration and coordination mechanisms at the subnational level** (between the CORECC, the governorships, and municipalities).

3. Increase the **auditing, monitoring and the local follow-up** of different activities, which must be supported by the Climate Change Law.

Objectives:

1. One of the main challenges to climate change adaptation is that there is no **methodology to transcend knowledge and outcomes from the CORECCs to the local scale**. Designing a rescaling from the regional scale to the communal and inter-communal territories is recommended, in order to have a comprehensive and inter-scalar governance system.

2. Define a **method to differentiate between different regions in regards to the procedures and priorities** of their respective CORECCs. While some regions require a full undertaking in terms of information gathering and plan development, others require an

emphasis on local execution with targeted actions in specific places, according to their vulnerability and exposure to climate change, as well as their capacity to decrease greenhouse gases. For this reason, such a procedure should avoid the duplication of actors, efforts and tasks between the different established committees, since in many cases there is no process, nor existing conditions to share information and results between different committees.

3. Climate change should not be left only up to the Office of Climate Change and/or the CORECCs, as these entities are meant to be the main driving forces to mobilize actions. However, they must work closely **with the provinces and communes**. There should be training programs for subnational authorities, encouraging authorities to become involved and empowered on the subject, and also facilitating access to resources for the implementation of activities related to climate change.

Definition of responsibilities:

1. **Coordination and integration of local actions and measures** (municipal and civil society) with the CORECCs, with the aim of streamlining efforts and allowing eventual territorial integration of initiatives.

2. Strengthen **local participation** in territorial decision-making, in terms of disaster and climate change risks, in order to avoid the centralisation of processes.

3. **Encourage the use of tools** such as Cool Farm Tool (CFT), which has worked very well in Europe and helps to incorporate better agricultural practices and management decisions on carbon sequestration and reduction of greenhouse gas emissions. It has been considered the best tool to calculate this type of emission for public use[10].

[10] https://coolfarmtool.org/coolfarmtool/

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ANNEX

Annex 1. Acronyms

CMNUCC	Convención Marco de las Naciones Unidas sobre el Cambio Climático (United Nations Framework Convention on Climate Change, UNFCC)
CMS	Consejo de Ministros para la Sustentabilidad (Council of Ministers for Sustainability)
CNR	Comisión Nacional de Riego (National Irrigation Commission)
CONAF	Corporación Nacional Forestal (National Forestry Corporation)
CONAMA	Comisión Nacional del Medio Ambiente (National Commission of the Environment)
COP	Conference of Parties (Conferencia de las Partes)
CORECC	Comité Regional de Cambio Climático (Regional Climate Change Committee)
CORFO	Corporación de Fomento a la Producción (Corporation for the Promotion of Production)
CPL	Consejo Nacional de Producción Limpia
DCC	División de Cambio Climático (Climate Change Division)
DGA	Dirección General de Aguas (General Water Directorate)
EMT-PANCC	Evaluación de Medio Término del Plan de Acción Nacional de Cambio Climático 2008-2012 (Mid-Term Evaluation of the National Action Plan on Climate Change)
ETICC	Equipo Técnico Interministerial de Cambio Climático (Inter-ministerial Climate Change Technical Team)
ETMRV	Equipo Técnico de Monitoreo, Reporte y Verificación (Monitoring, Reporting and Verification Technical Team)
GEI	Gases de efecto invernadero (Greenhouse Gases, GHG)
INDC	Intended Nationally Determined Contribution (Contribuciones Nacionales Tentativas)
MAPS	Mitigation Action Plans and Scenarios
MDS	Ministerio de Desarrollo Social (Ministry of Social Development)
MINAGRI	Ministerio de Agricultura (Ministry of Agriculture)
MINEDUC	Ministerio de Educación (Ministry of Education)
MINENERGIA	Ministerio de Energía (Ministry of Energy)
MINREL	Ministerio de Relaciones Exteriores (Ministry of Foreign Relations)
MINSAL	Ministerio de Salud (Ministry of Health)
MINVU	Ministerio de Vivienda y Urbanismo (Ministry of Housing and Urbanism)
MMA	Ministerio del Medio Ambiente (Ministry of the Environment)
MOP	Ministerio de Obras Públicas (Ministry of Public Works)
MTT	Ministerio de Transportes y Telecomunicaciones (Ministry of Transportation and Telecommunications)
NAMA	Nationally Appropiated Mitigation Actions (Acciones de Mitigación Nacionalmente Apropiadas)
OCDE	Organización para la Cooperación y el Desarrollo Económico (Organisation for Economic Cooperation and Development, OECD)
ONEMI	Oficina Nacional de Emergencias (National Office of Emergencies)
PANCC-I	Plan de Acción Nacional de Cambio Climático 2008-2012 (National Climate Change Action Plan 2008-2012)
PANCC-II	Plan de Acción Nacional de Cambio Climático 2017-2022

(National Climate Change Action Plan 2008-2012)

SEREMI Secretaría Regional Ministerial (Regional Ministerial Secretary)

SUBDERE Subsecretaría de Desarrollo Regional y Administrativo (Undersecretary of Regional and Administrative Development)

Annex 2. List of public Actors

Actor	Institution in which it is framed	Sector	Description
Association of Municipalities of Chile		Public (Non- state)	Training, preparation of studies, program development.
Vehicular Control and Certification Centre 3CV	Ministry of Transportation and Telecommunications	Public	Use of gas in motorized vehicles, standardisation of vehicles and motorcycles, certification of heavy vehicles and the incorporation of new technologies applied to transport.
Natural Resources Information Center (CIREN, in Spanish)	Ministry of Agriculture	Public	Technological institute that produces and manages information and knowledge about the country's natural and productive resources.
National Irrigation Commission (CNR, in Spanish)	Ministry of Agriculture	Public	Public policies and programs related to irrigation in the country.
Council of Ministers for Sustainability and Climate Change	Ministry of the Environment	Public	Public policy and planning for sustainability and natural resources (chaired by the MMA).
National Council for Urban Development	Ministry of Housing and Urbanism	Public	Public policies for urban development.
National Council for Clean Production (CPL, in Spanish)	Ministry of the Economy - CORFO	Public - private	Agency that articulates to the public and private world the will, confidence and the cooperation that promotes the modernisation and the competitiveness of productive sectors by means of fostering clean production.
National Forestry Corporation (CONAF, in Spanish)	Ministry of Agriculture	Public	In charge of the promotion and sustainability of the Chilean forestry sector and biodiversity protection.
DGA	Ministry of Public Works	Public	Promotes the management and administration of water resources within a framework of sustainability, public interest and efficient allocation.
Office of Energy, Science and Technology and Innovation (DECITY)	Ministry of Foreign Affairs	Public	DECYTI seeks to support the formulation and management of the international aspects of energy policies, innovation, research and development in science and technology.

Office of Environment and Ocean Affairs	Ministry of Foreign Affairs	Public	Responsible for coordinating Chile's position in international forums where issues under their command are discussed, which includes climate change issues.
Chilean Meteorological Office (DMC, in Spanish)	General Directorate of Civil Aviation	Public	This is the agency responsible for meteorological tasks in the country, whose purpose is to meet the information and weather forecasting needs of all national activities.
Air Quality Division	Ministry of the Environment	Public	Environmental quality standards, emission standards and prevention and/or decontamination plans (emission control).
Climate Change Division (DCC, in Spanish)	Ministry of the Environment	Public	Responsible for "proposing policies and formulating plans, programs and action plans on climate change", according to article 70.h. of the Law on Environmental Requirements 19.300.
Logistical Development Division	Ministry of Transportation and Telecommunications	Public	Responsible for maritime port development, expansion of services or strengthening of railway infrastructure, cargo transportation by truck, among others.
Urban Development Division	Ministry of Housing and Urbanism	Public	National policies that guide urban and territorial development, including climate change.
Regional Public Transport Division	Ministry of Transportation and Telecommunications	Public	Planning and supervision of public transport systems.
Sustainable Development Division	Ministry of Energy	Public	Energy policy compatible with environmental care.
Energy Efficiency Division	Ministry of Energy	Public	Efficiency in energy consumption.
Renewable Energy Division	Ministry of Energy	Public	Renewable energy sources.
División Prospectiva y Política Energética	Ministry of Energy	Public	Future energy development prospects.
Division of Natural Resources and Biodiversity	Ministry of the Environment	Public	Biodiversity conservation, in addition to actions for the protection, conservation, sustainable use and management of natural resources.
DOH	Ministry of Public Works	Public	Provides hydraulic infrastructure services that allow the optimal use of water and the protection of territories and people.
Inter-ministerial Climate Change Technical Team	Ministry of the Environment	Public	Cross-cutting and inter-ministerial climate change management (coordinated by the Climate Change Division of the MMA). Its function is to facilitate the implementation of climate change plans and policies, to coordinate the proposed cross-ministerial and inter-ministerial activities, and to monitor these activities.
Provincial Governorships	Ministry of the Interior and Public Security	Public	Entity responsible for provincial public safety, which includes taking the necessary measures to prevent and face emergency situations or catastrophes.

GORE	Ministry of the Interior and Public Security	Public	Responsible for ensuring the harmonious and equitable development of territories, both in economic, social and cultural development aspects, inspired by principles of equity, efficiency and effectiveness in the allocation and use of public resources and in the provision of services; in the effective participation of the regional community and in the preservation and improvement of the environment (Art. 14 LOCGAR).
Agricultural Development Institute (INDAP, in Spanish)	Ministry of Agriculture	Public	Develops and manages financing programs, consultancies and training, aimed at small producers, farmers and their families, among which are initiatives aimed at the sustainable use of water.
Forestry Institute (INFOR, in Spanish)	Ministry of Agriculture	Public	Generates and transfers knowledge to the forestry sector, which is oriented towards sustainable development and innovation.
Ministry and SEREMI of each region	Ministry of Housing and Urbanism	Public	Urban development, by means of public planning and investment.
Ministry and SEREMI of each region	Ministry of the Environment	Public	Design and application of policies, plans and programs in environmental matters, as well as in the protection and conservation of biological diversity and renewable natural resources and water, promoting sustainable development, the integrity of environmental policy, and its regulatory regulation.
Ministry and SEREMI of each region	Ministry of Energy	Public	Prepares and coordinates, in a transparent and participatory manner, the different plans, policies and regulations for the development of the country's energy sector, and thus ensuring that all Chileans can access energy safely and at reasonable prices.
Ministry and SEREMI of each region	Ministry of Social Development	Public	Responsible for the review of studies, projects and public investment programs. Since 2017, evaluations must consider risk management, within a climate change framework.
Municipalities		Public	Entity responsible for territorial administration within its jurisdiction (communes). This task includes a large variety of action areas, among which, for the purposes of this study, include the concern for the provision of potable water to citizens, territorial planning (PRC), domestic solid waste management, the preservation of the natural environment, among others.
Office of Waste and Environmental Risk	Ministry of the Environment	Public	Policies, education, coordination of services, and generation of information related to waste.

ONEMI	Ministry of the Interior and Public Security	Public	Coordination of the Early Warning and Emergency System, and Civil Protection System, as well as attention and support in situations arising from emergencies from the multiple risk variables present throughout the country.
Santiago Metropolitan Park	Ministry of Housing and Urbanism	Public	Administration, care and conservation of intercommunal parks in the Metropolitan Region.
Transportation Inspection Program	Ministry of Transportation and Telecommunications	Public	Control of vehicle emissions, operation of technical review inspection stations, among others.
Secretary of Transportation planning (SECTRA)	Ministry of Transportation and Telecommunications	Public	Development plans for urban transportation systems, social assessments of investment initiatives in infrastructure, management of transportation systems, and the development of methodologies and models for transport analysis.
Agricultural and Livestock Service	Ministry of Agriculture	Public	In charge of supporting the development of agriculture, forests and livestock, through the protection and improvement of animal and plant health.
National Solid Waste Unit	Undersecretary of Regional and Administrative Development (SUBDERE) - Ministry of the Interior and Public Security	Public	Contribute to sustainable territorial development at the local, community and regional levels, through the implementation of integral solid waste management systems.

Annex 3. List of private, civil society and international actors

Actor	Sector	Description
350 org	NGO	350 uses campaigns, grassroots organisation, and massive public actions to oppose new coal, oil, and gas projects, it withdraws funds from companies that are contributing to global warming, and builds 100% clean and free energy solutions that serve everyone. It is part of the "Citizen Panel on CC".
Ecological Action Chile (Acción Ecológica Chile)	NGO	Environmental movement of volunteers in favor of the harmony between the earth and human beings. Mentioned in Midterm Report of the PANCC 2008-2012.
Acción por la Tierra / Earthaction Santiago	NGO	Promotion of governance, informed and responsible citizen participation in environmental and development issues, to reduce the impacts of climate change to ecologically sustainable levels. Linked to the Latin American Climate Action Network.
Adapt-Chile	NGO	NGO that works and promotes local responses to climate change. We believe in the changes that arise from collective action and in the capacity of current systems to adapt to the challenges and opportunities presented by climate change.
German Technical Cooperation Agency (GIZ)	International Financing	International cooperation of effective services for sustainable development.
Chilean Association of Non-Governmental Organizations – ACCION	Association	This Association brings together 55 institutions interested in promoting the exercise of full citizenship and the recognition and unrestricted respect for human, economic, social and cultural rights. ACCIÓN was born as a space that summons, strengthens, and identifies its members: it shelters their proposals and ideas, promotes the development and protection of their common activities and facilitates spaces for reflection and debate. It is part of the "Citizen Panel on CC".
Avaaz	International NGO	Avaaz is a global community of online mobilisation that integrates political action promoted by citizens within the decision-making processes. For example, it calls for a global march on climate change.
Centre for Conservation Law (Centro de Derecho de Conservación)		The Center for Conservation Law is a research, legislative, and regulatory support organization in the field of biodiversity conservation in Chile and other South American countries. The Center was founded with the conviction that correct understanding and implementation of legal strategies can make a difference in the way projects are inserted in the social context, as well as in relation to their true, long-term sustainability.
Centro Regional del Agua para Zonas Áridas y Semiáridas de América Latina y el Caribe (CAZALAC)	Category II Centre	This centre has within its Operational Plan the intention to carry out a series of projects destined to increase and provide better tools and knowledge to support the management of water resources in the Region. It has support from the International Hydrological Program (IHP) of UNESCO and the Government of Flanders.
Committee for the Defense of Wildlife (CODEFF, in Spanish)	NGO	It has an extensive background in safeguarding Chile's environmental heritage through environmental education, citizen participation, research and management of protected areas. It is part of the "Citizen Panel on CC".

Dunas de Ritoque	NGO	They work in the area of Quintero, Puchuncaví to prevent environmental degradation. Through technical and systematic assistance, they work with the communities of the area who deal with the various consequences of living in an area that suffers from serious pollution problems, such as Bahía Quintero, Ventanas. They are part of the "Citizen Panel on CC".
Avina Foundation	International NGO	Contributes to specific and relevant changes for a largely sustainable development in Latin America.
Casa de la Paz Foundation	Foundation	They work on informed participation, community relationships, and having an impact on public policies. Working on topics ranging from global peace in the 1980s towards socio-environmental sustainability at the moment, its main action areas are sustainable local management, education for sustainable development, and multisectoral participation and dialogue. It is part of the "Citizen Panel on CC".
DECIDE Foundation	Foundation	A group of young people, professionals and university students, linked to different disciplines and interested in the different territorial conflicts that occur throughout the country. It has a Center for studies on urban and territorial conflicts. It is part of the "Citizen Panel on CC".
Terram Foundation	NGO	Their work aims to build reflection, critical capacity and contribute to the development of public policies that stimulate the renewal of political, social and economic thinking in the country. One of the main areas of action is citizen empowerment, in order to support and stimulate participation and actions aimed at promoting sustainable development. It is part of the "Citizen Panel on CC".
Greenpeace Chile	International NGO	An international environmental organization based in Chile. It seeks to generate awareness, inform and inspire citizens to participate in the search for solutions to environmental problems. It is part of the "Citizen Panel on CC".
Institute of Political Ecology (Instituto de Ecología Política)	NGO	Their work includes education in sustainability, research, the strengthening of civil society, education campaigns, reporting, legal actions in defense of the environment and people, the creation of strategic alliances, and development of public policies that can guarantee the right to live in a healthy environment. It is part of the "Citizen Panel on CC".
Citizen Observatory (Observatorio Ciudadano)	NGO	It was created in September 2004, in the city of Temuco, Chile, as an Observatory on the Rights of Indigenous Peoples, by a group of citizens from different parts of the country, from diverse professions and ethnic origins. It is part of the "Citizen Panel on CC".
NGO Entorno	NGO	Contributes to the human development of Chilean society, especially to people in vulnerable situations.
NGO FIMA	NGO	FIMA has been working on providing a significant contribution to policy, legislation and access to environmental justice in Chile. They work in the areas of litigation, training and legal empowerment, research and publications. It is part of the "Citizen Panel on CC".
POCH Ambiental	Private	Engineering and consulting on environmental issues, used as a source of information in the PANCC 2008-2012.
Sustainable Chile Program (Programa Chile Sustentable, in Spanish)	NGO	Aims to contribute to the development of a citizen proposal for the social, political and economic transformation of Chile, and towards a criteria for sustainable development. Mentioned in PANCC Midterm Report 2008-2012.

Consulting Society Sustainable Systems	Private	Development of applied research for environment, energy and innovation projects. Mentioned in PANCC Midterm Report 2008-2012.
SustentaRSE	Private	A consulting company founded in 2006, based in Santiago, Chile, that specialises in developing and providing integral solutions for Socio-environmental Sustainability and Corporate Social Responsibility (CSR). It is part of the "Citizen Panel on CC".

** Minutes from the fourth meeting of the technical committee Action Plan-National Climate Change Strategy. Tuesday, March 27, 2007. Source: U. Chile, POCH and Adapt-Chile (2015). Proposal of structure and contents for the PANCC 2016-202. Phase II. Annexed S-I. 4.*

Annex 4. List of academic actors

Actor	Related institution (s)	Sector	Region	Description
Centre for Agriculture and the Environment (AGRIMED)	Faculty of Agronomy Sciences at the University of Chile	Academia	RM	The centre provides specialised support services in the agricultural and environmental area, such as project evaluation, agro-meteorological information systems and cartographic digitisation, among others.
Centre for Global Change (CCG-UC)	Pontificia Universidad Católica de Chile (Pontifical Catholic University of Chile)	Academia	RM	The CCG-UC arises from the alliance between five faculties: Agronomy and Forestry Engineering, Biological Sciences, Engineering, Economic and Administrative Sciences and History, Geography and Political Science, concentrating its efforts in developing basic and applied research on the biophysical and human dimensions of global change.
Center for Climate Science and Resilience (CR2)	University of Chile	Academia	RM	A Fondap centre of excellence sponsored by the University of Chile and in partnership with the Universidad Austral and Universidad de Concepción. Its objective is to study climate science in Chile in an interdisciplinary way to improve understanding, and search for ways to enhance resilience.
Centre of Environmental Sciences EULA	University of Concepción	Academia	Biobío	A product of international cooperation, made up of a multi and interdisciplinary academic unit, oriented to Research, Continuous Training, Technical Assistance and Extension in environmental issues. Activities are developed across three Research Units: aquatic systems, environmental engineering and territorial planning, and urban systems.
Centro de Desarrollo Urbano Sustentable (CEDEUS) (Centre for Sustainable Urban Development)	Pontificia Universidad Católica de Chile (Pontifical Catholic University of Chile)	Academia	RM	A research centre made up by three institutions: the Pontificia Universidad Católica de Chile (UC) as a sponsoring institution; the University of Concepción (UdeC) as an Associated Institution; and the Center for Sustainable Urban Development (CSUD) of the University of Columbia, in the United States, as an international collaborator. Its main objective is to understand the urban dynamics, the instruments and the decision-making processes that allow the development of equitable and sustained improvements in the quality of life of people.
Centre for Energy	University of Chile	Academia	RM	The Centre for Energy from the Faculty of Physical and Mathematical Sciences of the University of Chile, was founded in 2009 as an academic initiative. Its mission is to create and lead R&D solutions in energy of an interdisciplinary, collaborative, innovative and inclusive nature, to ensure sustainable development.

Centre for Energy and Sustainable Development (CEDS)	Universidad Diego Portales (UDP)	Academia	RM	The main objective of the CEDS is to strengthen its presence in the field of public policy and academia by participating in research projects, as well as public sector studies that are relevant in defining public policies on energy and sustainability. At the same time, the CEDS promotes dissemination and debate activities based on the knowledge accumulated in the development of its research and projects, as well as debates relevant to the areas of energy and sustainability.
Centre for Environmental Studies (CEAM)	Universidad Austral de Chile	Academia	Los Ríos	The centre is focused on environmental problems that require the integration of their approach to the social and exact sciences, where an inter- and transdisciplinary approach is needed. Mentioned in the minutes of the fourth CT meeting 2007*.
Centre for Advanced Studies in Arid Zones (CEAZA)	Universidad de La Serena (ULS), Universidad Católica del Norte (UCN) e Instituto de Investigaciones Agropecuarias (INIA-Intihuasi)	Academia	Coquimbo	A Regional Center for Scientific and Technological Research from the Coquimbo Region. It is financed by CONICYT and the Regional Government of Coquimbo (GORE Coquimbo).
Centre for Scientific Studies (CECs)		Research	Los Ríos	Development, promotion and dissemination of scientific research. Mentioned in the minutes of the Fourth CT meeting 2007*. The CECs is a beneficiary of the CONICYT Basal Financing Program.
Centre of Natural Resources Studies (Oterra)	Universidad Mayor	Academia	RM	A centre that relies on the Forest Engineering School of the U. Mayor. Since 1998 it has been dedicated to the development of projects related to the management, and applied research of the environment, and natural resources, with emphasis on the country's forests.
Centre of Studies in Right of Natural Resources (CEDRENA)	Facultad de Ciencias Jurídicas de la Universidad Católica del Norte	Academia	Antofagasta	Research, teaching, extension and consultancy focused on diverse subjects in the legal discipline connected to the use, protection and exploitation of natural resources.
Centre for Management and Strengthening for the Clean Development Mechanism (CGF-MDL)	Pontificia Universidad Católica de Valparaíso	Academia	Valparaíso	This center is generating a diagnosis for the CDM market and the voluntary market in Chile, to clearly identify the sectors with the greatest potential and the barriers that each of them faces. In addition, it produces market conditions through an approach and dissemination plan and a generic business model, by sector that allows them to overcome previously identified barriers, mainly to SMEs.

Centre for Innovation in Energy (CIEN)	Universidad Adolfo Ibáñez	Academia	RM	Belonging to the Faculty of Engineering and Sciences, it is an academic cooperation agreement with the international company Eosol New Energy, with the aim of developing research projects in the renewable energy field and forming high-level human resources in energy development issues.
Center for Vulnerability and Territorial Informality Research (CINVIT)	Universidad de Valparaíso	Academia	Valparaíso	The aim of the centre is to reinforce and show the theoretical knowledge derived from the different investigations carried out by its members. In addition, it aims to document and analyze the geometries of power to generate prospective and proactive dialogues in the field of territorial planning, generating scientific knowledge to create alternative dialogical territorial planning models that allow gathering multiple logics and knowledge to take action in territories.
Centre for Research and Innovation for Climate Change (CiiCC)	Universidad Santo Tomás	Academia	RM	Performs basic and applied research aimed at understanding the effects of climate change on coastal ecosystems, with emphasis on opportunities for scientific and technological innovation offered by natural capital, for the adaptation and mitigation of its impacts.
Centre for Research on Biodiversity and Sustainable Environments (CIBAS)	Universidad Católica de la Santísima Concepción (UCSC)	Academia	Biobío	The objective is to create synergy between Science and Engineering researchers, which will power research within the UCSC and will contribute to the strengthening of one of the priority areas defined by the University: Sustainable Coastal Development.
Research Centre for Integrated Disaster Risk Management (CIGIDEN)	Pontificia Universidad Católica de Chile, Universidad Nacional Andrés Bello, Universidad Técnica Federico Santa María y Universidad Católica del Norte	Academia	RM	This is an association of four universities, which was founded in response to the call made by the FONDAP program of CONICYT. The main objective is to contribute to increasing the levels of resilience and help mitigate the consequences caused by natural disasters.
Centre for Technological Research of Desert Water (CEITSAZA)	Universidad Católica del Norte	Academia	Antofagasta	Development of competencies and development of innovative technological solutions for the sustainable and efficient management of water resources.
Centre for Research and Development of Water Resources (CIDERH)		Academia	Tarapacá	Regional research centre. Production and dissemination of knowledge about water resources in arid zones.

Center for Research and Management of Natural Resources (CIGREN)	Universidad de Valparaíso	Academia	Valparaíso	The objectives of the center are: to consolidate a dynamic nucleus of researchers with an increasing capacity to address current and future problems derived from the expansion of the hydrobiological species farming industry, and creating a multidisciplinary academic-technical culture that contributes to Regional and National development by producing knowledge and technologies applied to the conservation of natural resources for sustainable use.
Marine Observation Centre for Risk Studies of the Coastal Environment	Universidad de Valparaíso	Academia	Valparaíso	The purpose of this centre is the observation, quantification and simulation of marine environment phenomena associated with risks to inhabitants, infrastructure and coastal ecosystems, which is gained by observational activities that consist in maintaining and strengthening the current coastal observation system using fixed stations and boat exploration.
CEQUA Regional Centre	Universidad de Magallanes, Instituto de Fomento Pesquero (Fisheries Development Institute)	Academia	Magallanes y Antártica Chilena	CEQUA is the first regional center for scientific and technological research, created in 2002, under the initiative of the Regional Program of CONICYT in collaboration with regional governments to strengthen the process of scientific decentralisation in Chile. Its goal is to contribute to the generation of knowledge relevant to the ecosystems and natural resources of the southernmost region of Chile, which promotes the community's sense of belonging to the territory.
Alexander von Humboldt Institute of Natural Sciences	Universidad de Antofagasta	Academia	Antofagasta	An academic unit that relies on the Faculty of Marine Sciences and Biological Resources of the University, whose preferential role is scientific research, directly related to the field of marine sciences.
Institute of Ecology and Biodiversity (IEB)	Universidad de Chile	Academia	RM	Its main objective is to carry out pioneering scientific research in biodiversity sciences and contribute to the sustainable development of the country.
City and Territory Laboratory	Universidad Diego Portales	Academia	RM	The laboratory was founded from the need to articulate and generate academic and professional capacities for the development of dissemination, reflection, and urban debate initiatives; of design and implementation of urban and territorial projects and plans; of collaboration for the study and innovation in public policies of city and territory, as well as to systematise the academic production in these areas of knowledge, opening itself at the same time, to professional and academic collaboration with other public and private institutions.

Disaster and Risk Reduction Program (CITRID)	Universidad de Chile	Academia	RM	The program promotes teaching, training, coordination, integration, promotion, development and dissemination of knowledge, know-how, and practices for the reduction of socio-natural risks, in order to effectively meet the requirements of the State, government and society.