

Report to the Nations

Climate Governance of the Elements

August 2021

Towards an Integrated, anticipatory, socio-ecosystemic and evidence-based climate governance of water, air, fire and land.



air

water

fire

land



Center for Climate
and Resilience Research
www.CR2.cl

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Authors Coordinators:

Marco Billi
Pilar Moraga
Enrique Aliste
Antoine Maillet
Raúl O'Ryan
Rodolfo Sapiains
Roxana Bórquez

Authors Participants:

Paulina Aldunce
Gabriela Azócar
Gustavo Blanco
Noelia Carrasco
Mauricio Galleguillos
Dominique Hervé
Cecilia Ibarra
Cristián Ibarra
Laura Gallardo
Valentina Inostroza
Fabrice Lambert
Daniela Manuschevich
Francisco Martínez
Mauricio Osses
Nicolás Rivas
Maísa Rojas
Rodrigo Seguel
Sebastián Tolvet
Ana María Ugarte

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Catalina Aguirre
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Rodrigo Arriagada
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Daniela Cea
Luis Cordero
Camilo Cornejo
Sebastián Crespo
Daniela Escrig
Eugenia Gayó
Karen González
Mauro Gonzalez
Andrés Gutiérrez
Martín Jacques
Alejandro Miranda
Chloe Nicolas
Rafael Palacios
Guillermo Piñones
Pamela Poo
Andrea Rudnick
Sebastián Soza
Clara Tulasne
Anahí Urquiza
Mauricio Zambrano

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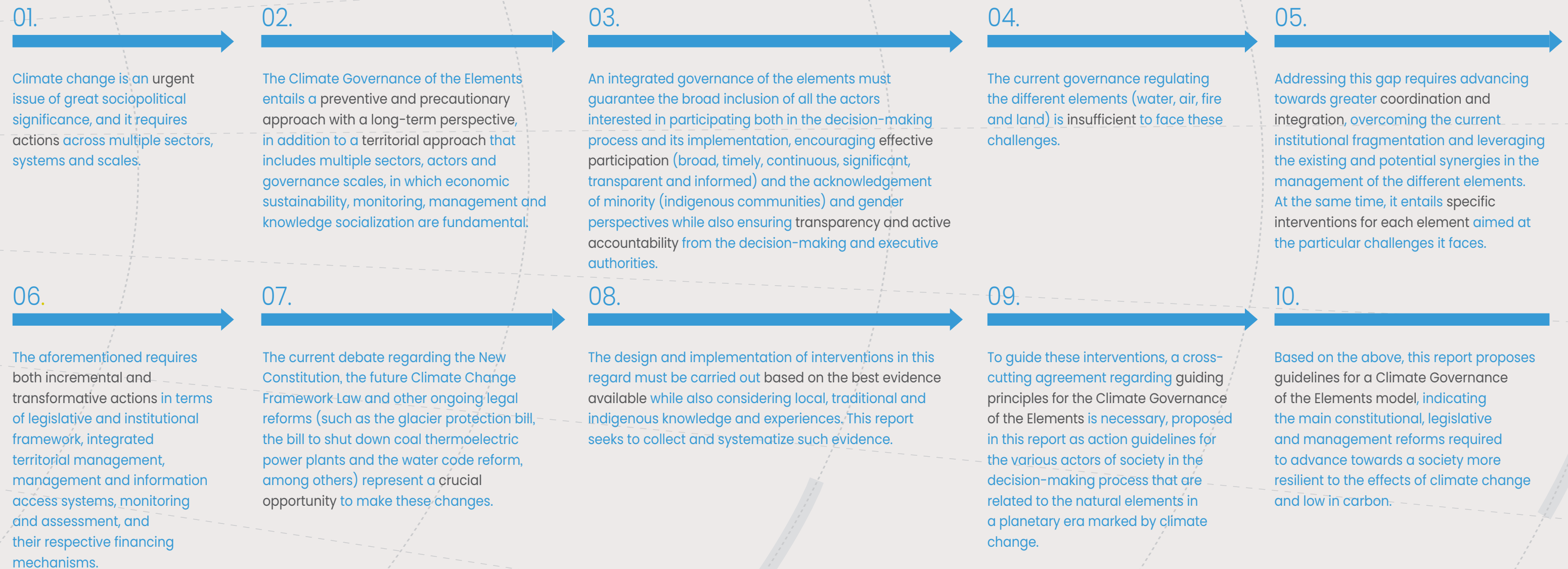
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PRESENTATION

This report offers a **conceptualization, diagnosis** and **recommendations** for an **integrated climate governance** of water, air, fire and land in Chile:





INTRODUCTION

“THE RAPING OF NATURE AND THE CIVILIZING OF MAN GO HAND IN HAND. BOTH ARE IN DEFIANCE OF THE ELEMENTS, THE ONE BY VENTURING INTO THEM AND OVERPOWERING THEIR CREATURES, THE OTHER BY SECURING AN ENCLAVE AGAINST THEM IN THE SHELTER OF THE CITY AND ITS LAWS” (H. Jonas, 1995[1979], p.26).

Humanity has become one of the greatest transformative forces of the planet, generating significant (and sometimes irreversible) changes in geophysical and ecological balances with potentially catastrophic and partly still unknown consequences (Foster *et al.*, 2017; Rockström *et al.*, 2009; Steffen *et al.*, 2007). Among all these alterations, **climate change** possesses predominant importance due to the magnitude and scale of its potential consequences, as well as the complexity and the controversies that have characterized the attempts to address it (Coninck *et al.*, 2018; IPCC, 2018). Contemplating this scenario entails a double dilemma. On one hand, it implies the need for urgent, coordinated and **transformative** actions on multiple scales and domains that address the drivers that cause climate change, as well as its significant and unequal effects on different territories and populations. On the other, it faces the insufficiency, biases and limitations shown by traditional governance models in dealing with these challenges.

Governance (the manner in which societies define objectives and priorities, make decisions, and implement and supervise actions of various nature to achieve these objectives and priorities) is a central dimension of the efforts aimed at mitigating and adapting to climate change (IPCC, 2018), and it is key for advancing towards more sustainable development pathways (United Nations, 2015). Particularly since the 1990s, a heterogeneous variety of approaches to environmental and climate governance has been proposed (Billi, Mascareño, *et al.*, 2020). Although several of these proposals promote horizontal, participatory and decentralized forms of governance, they tend to come from developed countries. Very few

approaches explicitly address the specific conditions and challenges of the **Global South**. Additionally, most of these proposals remain anchored to a multilateral logic that places solutions solely in the State and in the relationship among States. At the same time, they emphasize an anthropocentric logic that sees climate change and governance only from a human (and western) perspective, casting aside the impacts and role of **ecosystems** and other forms of non-human life, as well as the multiple alternative ways of understanding the relationship between humankind and nature (Sapiains *et al.*, 2020).

By focusing on the Climate Governance of the **Elements** (water, air, fire and land), we seek to overcome this anthropocentric vision that tends to see nature as a resource to be exploited or a force that needs to be controlled. In this context, we adopt a holistic understanding of the elements, perceiving them as “**social-ecological systems**”, i.e., systems composed of multiple entities, factors and processes, both natural and social, on multiple scales and with a high degree of self-organization (Holling, 2001). These systems generate a wide variety of **contributions** both to people and non-human entities. These contributions, in turn, may be positive (drinking water supply, energy, clean air, food, physical and mental health, recreational and spiritual experiences) and negative (extreme hydroclimatic events, fires and other social natural disasters). They can also have multiple assessments based on various sociocultural perspectives (Díaz *et al.*, 2018).

Finally, we see the elements as **objects of governance** (particularly of **climate** governance), as the conservation, availability and accessibility of these contributions

BOX 1

Governance and transformation

In this report, **Climate Governance of the Elements** shall be understood as the system of processes and institutions that make decisions and plan, coordinate, fund, apply, evaluate and refine short, medium and long-term actions (policies, instruments, interventions, etc.) aimed at promoting the mitigation of climate change and the adaptation to its effects in an integrated manner and within each element. This governance coordinates multiple types of actors and institutions (public, private, scientific and civil society) at different levels (international, national, subnational and local). Likewise, it is composed of instruments directly involved in management, as well as coordination, planning and monitoring mechanisms that organize them and the definitions and principles that guide them.

On the other hand, **transformation** refers to a change in the fundamental attributes of natural and human systems that implies a deep and many times irreversible alteration in various ecological, economic, technological or social areas (for example, values, forms of inhabiting, infrastructure, energy use, practices and mechanisms of life reproduction, economic and cultural activities, etc.) (Aldunce *et al.*, 2021; Few *et al.*, 2017; IPCC, 2018; O'Brien, 2018)¹.

Finally, we speak of **transformative governance** as one which explicitly seeks to alter these fundamental attributes, generating profound changes in personal values, social structures, or individual and collective practices. With this, we refer to the governance's ability to transform itself to deal with the challenges associated with climate and environmental changes.

depend on decisions about the use, management and care of the elements. This is so within the context of the mitigation and adaptation challenges associated with climate change, as well as with respect to the institutions and regulations within which these decisions occur and are coordinated.

When we speak of **Climate Governance of the Elements** (CGE) in this report, we seek to promote an in-

novative and genuinely interdisciplinary approach to the problem, focusing on the territory and its socio-ecosystems as a central management axis. On one hand, CGE aims to accommodate the **multiple** forms and manifestations that governance may adopt in **different sectorial and territorial areas** (different problems, decisional and organizational structures, relationships among actors, etc.), as well as the **variety of perspectives** and proposals that exist in this regard,

¹ In this context, transformational adaptation (a process of profound changes and adaptation options of great magnitude) is necessary when the limit of incremental adaptation (a process that maintains the essence and integrity of a system, where the changes and adaptation options are of lesser magnitude) is surpassed, considering that the objectives and needs of actors and systems cannot be ensured against the risks of climate change.

including those from traditionally marginalized groups. On the other hand, it stresses the need for a greater **coordination and integration** of efforts surrounding climate challenges, fully recognizing the need to move towards a greater **balance** between human wellbeing and the conservation of nature.

The discussion about climate governance is incipient and continues to predominate in a sectorial logic that **fragments** responsibilities, resources and attributions in multiple decisional centers. In Chile in particular, disarticulated operational logics are evident, as diagnosed by the OECD in 2016 (OCDE, 2016). The processes for building the National Climate Change Action Plan (PANCC, Plan de Acción Nacional de Cambio Climático) and the Nationally Determined Contribution (NDC), as well as the debate regarding a future Climate Change Framework Law, show significant progress towards greater **coordination and cooperation** in governance. However, important challenges remain for achieving a truly integrated Climate Governance suitable for the climate and environmental challenges of the future (Arriagada *et al.*, 2018; Billi, *et al.*, 2020).

The purpose of this report is therefore to **advance in the conceptualization, diagnosis and public policy guidelines for an integrated and transformative climate governance of water, air, fire and land in Chile**. The aim is to present a state of the art of the existing evidence regarding the challenges posed by climate change for the governance of the elements, attempting to overcome the disciplinary fragmentation that has characterized scientific representations about the sociopolitical dimensions of the phenomenon un-

til now (Billi, Blanco y Urquiza, 2019). Based on this, we propose potential strategies in order to move towards development pathways that are sustainable and resilient to climate.

We hope this document provides relevant input for decision-making at different levels in terms of mitigation and adaptation to climate change within the public, private and community spheres, with a particular focus on the constitutional debate.

Chapter I presents the essential principles on which our CGE proposal is based. In **Chapter II**, we conduct a general assessment of the climate governance currently in place in Chile based on these principles, identifying aspects that could be improved. In **Chapter III**, we conduct a specific analysis of each element's Climate Governance in order to identify gaps and challenges specific to each one. **Chapter IV** synthesizes the cross-cutting findings and challenges emerged from this examination and proposes recommendations aimed at laying the foundations for a new governance of the elements model that establishes climate change as a central axis that defines the efforts in this matter. Finally, the **References** section offers a systematization of the literature reviewed for this report, and the **Glossary** defines the key concepts used in this document.

CHAP. I

PRINCIPLES OF THE CLIMATE GOVERNANCE OF THE ELEMENTS

TO ENSURE A GOOD GOVERNANCE OF CLIMATE AND THE ELEMENTS AND PROPERLY ADDRESS THE TRANSFORMATIVE CHALLENGES OF CLIMATE CHANGE, EFFORTS MUST BE DIRECTED TOWARDS JUST CLIMATE ACTION, ADOPTING FOR THIS PURPOSE AN ANTICIPATORY, TERRITORIAL SOCIO-ECOSYSTEMIC AND GOOD ADMINISTRATION APPROACH.

Climate change is an issue that is inherently **complex**, as it entails multiple heterogeneous and interdependent processes on several scales; **uncertain**, considering that the dynamics governing its causes and effects are not linear and partly still unknown; and **controversial** because it affects different groups unequally and its solutions involve a plurality of agents, perspectives and valuations (Gupta, 2016).

The **goal** advanced in the Paris Agreement (UNFCCC, 2015) and sustained by international scientific consensus requires keeping global warming within at least 2 °C, and ideally under 1.5 °C above pre-industrial levels (IPCC, 2018). If this were to be achieved, it would be possible to limit climate change and its consequences but not to eliminate it completely, so it is necessary to supplement this effort with **adaptation** mechanisms for assuming damages and losses. These mechanisms must deal with the fact that these **impacts** are distributed **unequally** and there is an important interrelation between climate vulnerability and poverty (Halle-gatte *et al.*, 2018), as well as with other forms of social marginalization.

Additionally, the decisions associated with the measures required for mitigating climate change and building resilience affect **multiple types of values** and imply ethically complex **dilemmas**. They are also marked by profound **power asymmetries** that may favor the interests of specific groups to the detriment of others (O'Brien, 2009). Moreover, they are influenced by complex **perceptions and beliefs** that vary according to context (Azócar *et al.*, 2021), which in many cases re-

present opposing ways of understanding the **relationship between human societies and nature** (Sapiains *et al.*, 2016).

Ultimately, addressing climate change entails **coordinating** multiple scales, levels and decisional centers while also recognizing the different **territorial contexts** in which it manifests and where the climate forcers reproduce (Billi, Delgado, *et al.*, 2020). For this reason, a **holistic** view of the problems, the solutions and the different actors involved is required that allows simultaneously covering **multiple risks and climate forcers** that interact and mutually reinforce on different scales, at different times and in different sectors (Simpson *et al.*, 2021).

Faced with this set of challenges, neither traditional **governance models** based on state bureaucracy nor those that rely on the self-regulation of the market or spontaneous network organization (Pahl-Wostl, 2015) have managed to offer effective answers so far. In fact, current efforts to **mitigate and adapt** to climate change in Chile and at a global level are far from what would be required to respond to the aforementioned challenges.

We consider that the first step in this direction is a clear and systematic identification of the **fundamental principles** on which climate governance must be based (Jaria-Manzano, 2019). These principles will help guide the decisions and preparation of instruments in this matter, as well as assess their adequacy for meeting the challenges associated with climate change.

As a **central purpose** of the CGE, this report suggests promoting a **just climate action** of the different elements. This means that the CGE must provide tools for adopting the best possible decisions in the **long term**, articulating:

- ▶ **Incremental actions**, that seek to gradually make progress without affecting the essential attributes of social-ecological systems in order to achieve mitigation and adaptation goals without ever going back (**principle of non-regression**) and progressively increasing ambition (**principle of progressivity**), as stopping means regressing;
- ▶ **Transformative actions**, that imply radical changes in the attributes of social-ecological systems, either expanding, reorganizing, redirecting or innovating in terms of beliefs, norms and values, institutional arrangements, production and consumption systems, relationships among actors, etc. (Aldunce *et al.*, 2021; Salgado y Aldunce, 2020).

At the same time, these actions must be **just**, which means that they must enable an **equitable allocation** of the mitigation and adaptation costs while also protecting the most vulnerable individuals and territories, preserving biological diversity and ecosystems, and safeguarding the interests of future generations. This also implies having inclusive and solidary **procedures** for attributing and enforcing climate responsibility and for collective participation in decision-making, its implementation and assessment (Hervé, 2015; Robinson y Shine, 2018).

Just climate action must be based on the following three guiding principles of governance² (Figure 1):

1. Anticipatory approach

In the current context of vulnerable countries like Chile, just climate action needs to be defined on the basis of an anticipatory approach, which implies taking measures that allow moving towards a low-carbon national economy (by 2050), reducing vulnerability and increasing the resilience of the population, ecosystems and territories. To this end, it is necessary to combine short, medium and **long-term** actions that consider future scenarios in the decisions adopted in the present in order to decrease or moderate the effects of climate change and increase resilience (**preventive principle**). This must operate even in the face of the scientific uncertainty (**precautionary principle**) that characterizes climate change pathways, as well as the manifestation of its risks and the effectiveness of potential strategies for addressing them (Workman *et al.*, 2020).

2. Territorial socio-ecosystemic approach

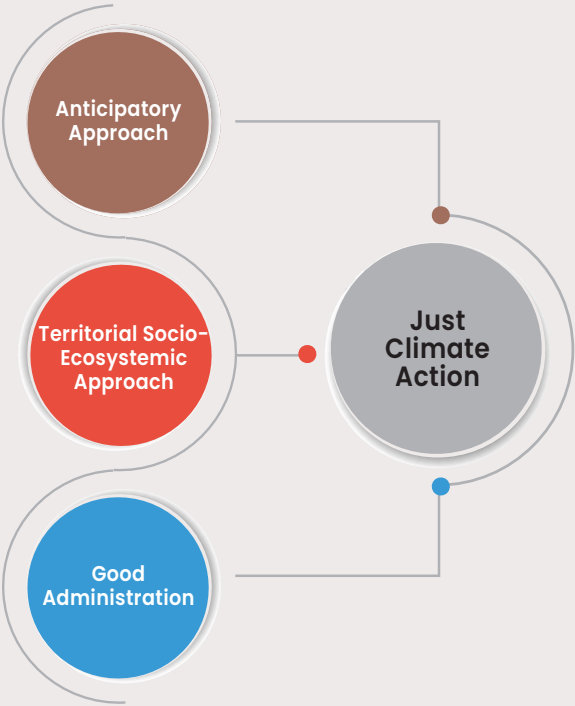
The CGE must always adopt a **territorial** approach to climate change, seeking to contribute mitigation, adaptation and training measures relevant to each territory's reality from a systemic perspective and recognizing the different social-ecological interrelations that constitute it. In turn, its **coordination** must be promoted with a focus on the multi-scale relationships among different **territories**. This means favoring territorial land use planning units that reflect the dynamics and limits of **social-ecological systems** (watersheds and airsheds, biodiversity macrozones, etc.), and transcending and coordinating the traditional administrative units.

² General guidelines and particular principles emerged from the review of national and international legislations, treaties and best practices. To learn more, see the Supplementary Materials to the report at www.cr2.cl/gobernanza-elementos/

3. Good administration

The effort to move towards just climate action robustly, legitimately and effectively must be based on the recognition of the obligation of **good administration** of climate and the elements; in other words, an administration that is at the same time rational, objective, transparent, coordinated, efficient and effective (Correa, 2019; Espinoza, 2020). Under this principle, the best scientific evidence available must be considered along with local, traditional and indigenous knowledge. This means prioritizing the demonstrably most **effective and efficient** strategies (considering their economic, environmental and social costs, and the indirect costs of inaction);

guaranteeing the broad inclusion of all the actors interested in both decision-making and its implementation; motivating **effective participation** and the recognition of minority perspectives (indigenous communities); and guaranteeing **transparency and active accountability** by the decision-making and executive authorities to all actors (public, private, civil society, individuals).



BOX 2

Just climate action and *fair share*

According to the recent scientific consensus, there is a quasi-linear relationship between accumulated carbon emissions since the beginning of the Industrial Revolution and the global average temperature increase. Therefore, reaching the objectives of the Paris Agreement means, on one hand, achieving carbon neutrality by 2050, and on the other, limiting the amount of carbon that may be emitted into the atmosphere until then. The aforementioned raises the question of how to determine a fair share of the “remaining carbon budget” (maximum emission allowed for a given temperature target) among the countries, recognizing their different capacities to adopt mitigation measures. At a national level, the same question regarding how to distribute the national carbon budget (committed by Chile in its NDC) among various sectors and territories arises. This allocation must consider the heterogeneity of efforts involving the mitigation of emissions in different regions of Chile, as well as the costs and co-benefits associated with them. Additionally, it must be carried out with the effective participation of the pertinent actors at a sectorial and territorial level.

Figure 1. Principles of the Climate Governance of the Elements.

CHAP.2

DIAGNOSIS AND CROSS-CUTTING RECOMMENDATIONS

TO ADVANCE TOWARDS THE GOALS AND PRINCIPLES PROPOSED BY THE CLIMATE GOVERNANCE OF THE ELEMENTS, COORDINATED ACTIONS ARE REQUIRED IN DIFFERENT AREAS AND LEVELS. IN THIS SENSE, IT IS NECESSARY TO OVERCOME THE CURRENT FRAGMENTATION AMONG SECTORS AND ELEMENTS, ALIGN THE MANAGEMENT OF HETEROGENOUS BIOPHYSICAL AND SOCIAL-ECOLOGICAL PROCESSES IN THE COUNTRY'S VARIOUS TERRITORIES, BRIDGE THE PLANNING, PREVENTION AND CONSERVATION, EQUITY, PARTICIPATION, AND INFORMATION ACCESS AND USE GAPS, AND CHANNEL THE TRANSFORMATIVE POTENTIAL OFFERED BY THE SOCIOPOLITICAL CONTINGENCY TOWARDS GREATER AMBITION IN CLIMATE ACTION AND JUSTICE.

Climate change **occurs** as a consequence of natural and anthropogenic processes related to the atmosphere's composition and/or the use of the land. These processes are associated with greenhouse gas emissions (compounds that retain part of the Earth's radiation, warming up the lower layers of the atmosphere) and other climate forcers and their precursors, many of which also have direct effects on human health and ecosystems. Together, **anthropic climate forcers** affect all components of the climate system, including vegetation and terrestrial and marine bodies of water (including masses of frozen water such as glaciers), reducing their capacity to regulate climate.

Climate change **manifests itself** as a variation in medium, maximum and minimum values, and in the variability of temperatures, precipitations, humidity, wind, insolation or atmospheric pressure. These alterations may negatively impact ecosystems, productive activities and human wellbeing, in addition to increasing the frequency, duration or intensity of extreme hydro-climatic events such as droughts, heat waves, floods, fires and tidal swells, among others. **In Chile, its main effects** can be observed in water resources, forestry and agricultural activities, human health, and also in damages to housing, land and infrastructure. Important consequences for biodiversity, mining, hydropower

generation, fishing, aquaculture and tourism are also projected, as well as an increase in plagues, potential psychological consequences, political instability and social conflicts.

The causes and effects of climate change are dependent on the complex interaction among multiple factors, both biophysical and social, which are distributed and organized -in a heterogeneous and asymmetrical manner- in different territories and act on multiple scales. Therefore, mitigation and adaptation efforts require coordinated, integrated and systemic actions that explicitly consider the socio-ecosystemic and management interactions among various elements, so that productive activities and/or urbanization processes do not contribute to worsening the current situation of the planet's global temperature increase (**Figure 2a**). However, the current governance is fragmented into multiple agencies, regulations and territorial land use planning instruments that are disarticulated from each other. It also displays an excessive centralization of resources and a low consideration of territorial interdependencies, generating artificial separations among processes and components associated with the management of the different elements, and a lack of coordination in management (**Figure 2b**).

The following results are derived from an exhaustive and careful analysis of the existing literature, combined with the expert opinion of (CR)2 researchers pertinent to each topic. For more information, see the supplementary materials to the report at <https://www.cr2.cl/gobernanza-elementos/>

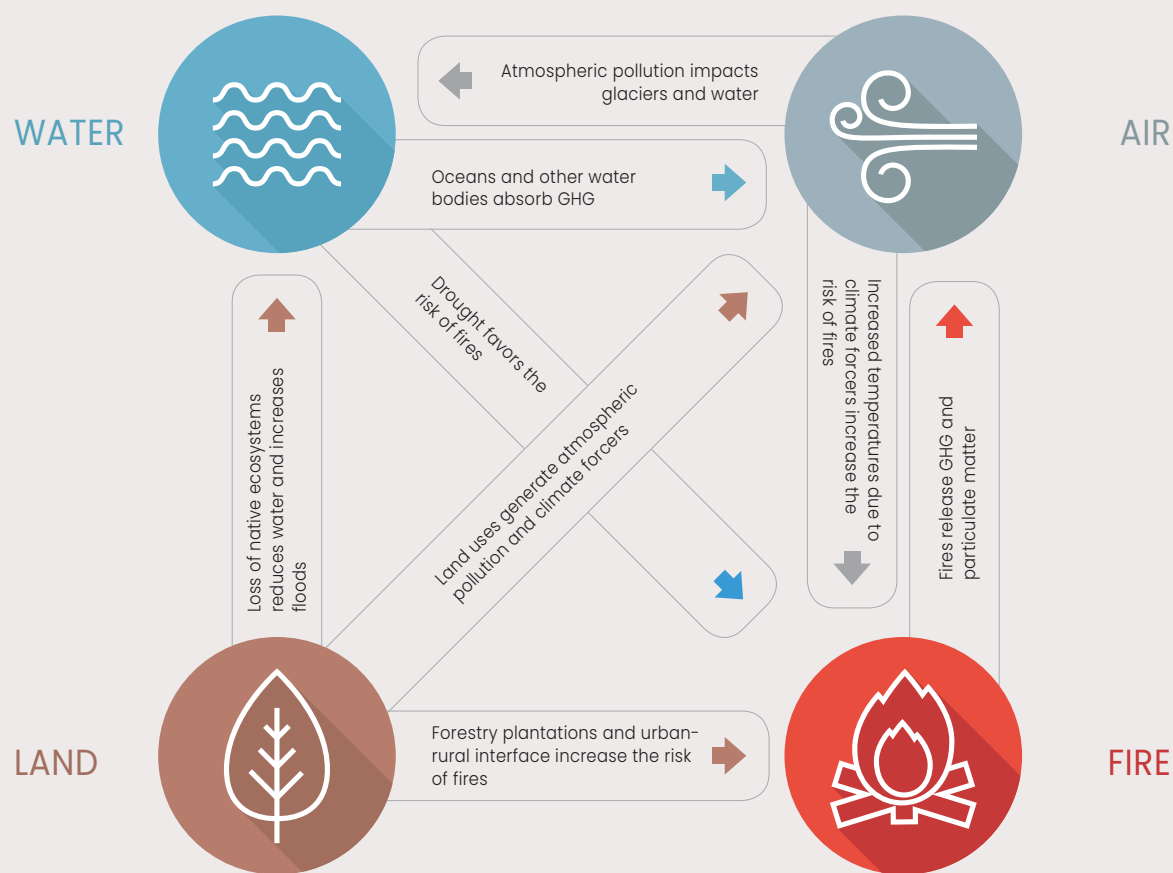
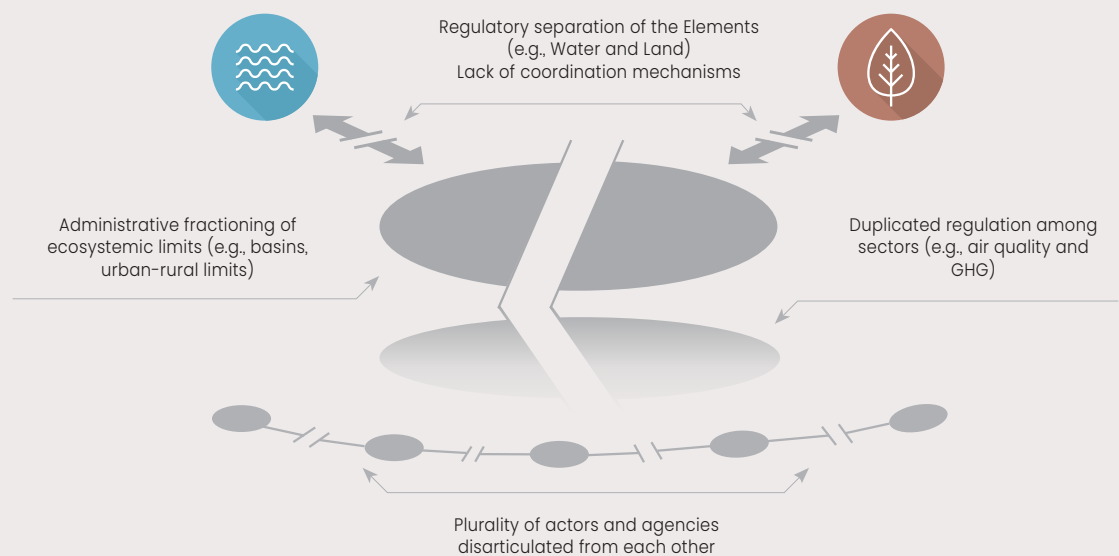


Figure 2a (above): Examples of interactions among elements (social-ecological systems). **Figure 2b (below):** Example of governance fragmentation that breaks systems, does not account for its interactions, etc.



Other relevant gaps are:

- i. A tendency to concentrate the efforts of the various actors involved in the Climate Governance of the Elements on the adoption of **reactive measures** that are applied once the effects of climate change occur and seek to resolve the specific situation in the short term. Such approach differs from the long-term vision and consideration of future climate scenarios in decision-making required by the CGE, especially in case of scientific uncertainty. On the other hand, it is necessary to plan and act today in order to prepare whatever is needed in the face of deeper changes in the long term.
- ii. An **increasingly unequal distribution** of both the burdens caused by the impacts of climate change and the access to services provided by the elements, which affects the most vulnerable communities in environmental, social and economic terms. This is evident in terms of land and water as well as fires and air quality, particularly in “sacrifice zones” and those affected by firewood pollution.
- iii. **The ineffectiveness of participatory mechanisms**, often delayed, of limited scope, and merely informative or consultative. There is also a **disregard for local and indigenous knowledge and perspectives** due to a limited recognition and active legitimization of their cosmovision, the power imbalance among these groups compared to large economic corporations, and the growing conflicts and mistrust towards public and private institutions.
- iv. **Deficiencies in the availability, quality or accessibility of data** about hydroclimatic and ecosystemic

conditions, information about property rights and information required for monitoring and assessing management. This is coupled with the **low use of existing data** and the lack of guidance for policy design.

At the same time, the current scenario presents significant **opportunities**: on one hand, as will be illustrated in the following chapters, each element has numerous instruments and institutions that could be strengthened and supplemented in order to gradually advance towards more ambitious mitigation and adaptation goals based on their cooperation and coordination. Similarly, public and private actors have relevant sources of information, capabilities and initiatives that could be coordinated and organized in order to improve their effectiveness, leverage this synergy and generate new knowledge as part of joint work that focuses on protecting the public interests of society with a clear definition of roles. On the other hand, the growing sensibility towards environmental and climate issues, the numerous proposals and advances regarding a more integrated governance at a basin level, the discussion of a Climate Change Draft Framework Law and the debate about a new constitution open up a significant space for generating profound transformations that may allow expanding, reorganizing, redirecting and innovating on the existing institutional arrangements and management systems with a focus on the challenges of climate change.

Making progress in this aspect requires actions at **multiple levels** that are both incremental (focused on improving or complementing existing instruments) and transformative (focused on expanding, reorganizing, redirecting or innovating on such instruments). These

BOX 3

International best practices in integrated territory management

According to the international literature, achieving an integrated Climate Governance of the Elements entails an adaptive co-management that focuses on three dimensions: a) ecosystemic management practices; b) the ability of different actors to plan, fund, interact, cooperate and manage these practices and ecosystems; and c) the ability to collaboratively generate information and knowledge, monitor, learn and innovate to act adaptively. Its key aspects are: (i) institutional and management comprehensiveness; (ii) a territorial approach that includes multiple sectors, actors (based on leadership and common vision) and governance scales; and (iii) economic, monitoring, management and knowledge socialization sustainability. The aforementioned requires adding and complementing actions, leveraging existing instruments and bodies with transformative changes.

actions must operate, on one hand, **across all elements** in order to advance towards a more integrated, holistic and polycentric governance of climate change and social-environmental relationships that allows leveraging synergies and avoiding the dangers associated with a lack of coordination; and on the other, **specifically for each element**, seeking to respond to the particular challenges identified in them.

These actions must also consider **all governance levels**, including at least:

- ▶ **Laws and institutions** that make just climate action a central axis of public action and establish agencies, regulations, procedures and resources dedicated to safeguarding the articulated coordination of the current governance in each element and its linking to the effort associated with the mitigation of and adaptation to climate change. These laws and institutions must adopt a long-term, anticipatory, territorial and socio-ecosystemic prospective vision;
- ▶ **Processes and instruments for the territorial management of the elements** that seek to regulate, structure and plan its procedure at various levels and scales, with a comprehensive perspective of the entire ecological cycle of the elements, as well as the particularities of each territory. These processes and instruments must also facilitate the coordination of different actors (public, private, social and academic) with an effective participation (broad, timely, continuous, significant, transparent and informed) that recognizes the plurality of their forms of knowledge;

- **Information, assessment and monitoring systems** that allow for a transparent accountability of decisions, as well as an ex ante and ex post assessment of the effectiveness of the instruments and initiatives. It is crucial that they address, in an integrated manner, the complex interactions between clima-

te change and the various social-ecological processes of each element (and between elements), which don't necessarily respond to administrative limits but to ecosystemic ones that require a more integrated understanding of the territory.



CHAP.3

GOVERNANCE CLIMATE BY ELEMENT

Climate
governance of **water:**
an integrated
perspective of the water
cycle that incorporates
its ecological and social
values

20



Climate
governance of **air:**
more integrated and
prospective

24

Climate
governance of **fire:**
**integrate risk and
prevention**

28

Climate governance
of **land a strategic and
socio-ecosystemic
perspective**

32



Climate governance of **water:** **an integrated perspective** **of the water cycle that** **incorporates its ecological** **and social values**

THE GOVERNANCE OF WATER IS HIGHLY FRAGMENTED AND LACKS AN ANTICIPATORY AND SOCIO-ECOSYSTEMIC APPROACH, WHICH RESULTS IN THE LACK OF A COMPREHENSIVE MANAGEMENT OF THE WATER CYCLE IN ITS DIFFERENT FORMS: FRESHWATER (WATERCOURSES, GROUNDWATER, LAKES AND WETLANDS), SOLID (SNOW AND GLACIERS) AND SALTWATER (OCEAN). THIS HAS GENERATED DIFFICULTIES FOR MEETING HUMAN AND ECOLOGICAL NEEDS, CONSIDERING PRESENT AND FUTURE GENERATIONS. MAKING PROGRESS IN WATER GOVERNANCE IN THE CONTEXT OF CLIMATE CHANGE ENTAILS RECOGNIZING THE PUBLIC AND ECOLOGICAL VALUE OF WATER IN ORDER TO ADVANCE TOWARDS A SOCIO-ECOSYSTEMIC APPROACH TO ITS USE AND CONSUMPTION, CONSIDERING FUTURE CLIMATE SCENARIOS, WATER SECURITY, THE IMPROVEMENT OF ITS AVAILABILITY, INFORMATION ACCESS AND PARTICIPATION.



Water is an indispensable element for all life, including domestic human needs (consumption, food preparation, sanitation and hygiene), the wellbeing and conservation of ecosystems and non-human life forms, and the development of productive, community and recreational activities. Nonetheless, it is scarce and unevenly distributed across the territory due to natural conditions as well as inadequate and/or disarticulated management or organization systems that do not consider the climate variable. This tends to generate conflicts among different human uses (for example, among domestic, agricultural and industrial purposes), as well as among human activities and the conservation of ecosystems and water bodies (such as rivers, glaciers and oceans). These tensions are amplified as a result of climate change -which affects the composition and level of rivers, aquifers, glaciers and oceans- and the frequency and intensity of extreme hydroclimatic events, which increases both droughts and floods. In this context, the climate governance of water is necessary both to balance its various uses and to manage and protect it.

In terms of inland waters, the Political Constitution of the Republic, the Water Code and the Civil Code provide the legal framework that governs this element. Although the last one stipulates that it is a national asset for public use, the Constitution (especially Article 19, N°24, final paragraph) sets forth “the rights of private individuals over water”, while the Water Code regulates its acquisition, enjoyment, use and disposition, establishing Water Utilization Rights (DAAs, Derechos de Aprovechamiento de Aguas) that are granted through a system of concessions that are free, perpetual, independent from ownership of land and regardless of their intended use. Oversight Committees watch over the proper extraction of water by each holder according to their DAA, while the assignment and transfer of these rights are left to the free market. The State limits its

function to the assignment of new water titles or their recognition, the provision of infrastructure, and the coordination, monitoring and delivery of information about the resource through the Water Authority (DGA, Dirección General de Aguas) that reports to the Ministry of Public Works (MOP, Ministerio de Obras Públicas).

In urban areas, water for human consumption (90% of the population) is provided by drinking water companies that also deal with wastewater and rainwater. In rural areas, it is provided by community associations of Rural Drinking Water (APR, Agua Potable Rural), which do not cover all territories, while the maintenance of the water infrastructure and other management interventions are left to local user organizations, inexistent in many watersheds. In the coastal area, the entity in charge of controlling, overseeing and surveilling the entire coast of the territorial sea and granting the particular or shared use of the water is the Ministry of National Defense. Nonetheless, other public and private actors also participate in its administration.

In effect, there is a vast and complex framework of actors that deal with water. For example, only in inland water, 43 public agencies have some degree of involvement in the element’s management. These actors are also disarticulated from each other and generate a fragmented and uncoordinated governance, which makes an integrated management of the water cycle even more difficult and leads to severed river administration systems or to disregarding the contribution of freshwater to the ocean balance, for example. On the other hand, despite the fact that numerous legislative attempts have sought to establish a special protection system for glaciers, there is no specific regulation in this regard to date. At present, only the Environmental Impact Assessment System (SEIA, Sistema de Evaluación de Impacto Ambiental) defines, case by case, the conditions for executing activities or projects that may im-

BOX 4

The human right to drinking water

In 2021, the Supreme Court recognized the human right to access drinking water in the national jurisprudence. A first ruling forced the Municipality of Nogales to “*adopt all necessary measures to ensure (...) a supply of water for human use and consumption of no less than 100 liters a day per person*”. It also established the responsibilities of the Undersecretariat of the Interior. Another ruling for the municipalities of Petorca, Cabildo and La Ligua determined that “*every person, due to their dignity as such, has the human right to access drinking water (...) which possesses in correlation the duty of the State to guarantee this access*”. Although these are advances in the recognition of the right to water, they only operate in terms of availability, not quality.

pact ice masses, which are simultaneously threatened by human activities (especially mining), the increased temperatures and the decrease in precipitations.

Even though there is a unit dedicated to Glaciology and Snow within the DGA, there are information gaps in terms of inventories and the characterization of the country's glaciers, a deficiency that also affects other water sources, for instance, peat bogs. Additionally, the observational records of hydrometeorological and groundwater data are insufficient, causing uncertainty about the water balance of the watersheds in the national territory, while the DAA registration and transaction system has major shortcomings that limit its control, inspection and diagnosis of the water availability of watercourses in a climate change context. The same weaknesses are identified in an accentuated manner regarding the water quality. On the other hand, the system for assigning and executing DAAs does not consider the dynamic and complex nature of hydro-ecological processes, which generates an over-granting of them with respect to the availability of watercourses. DAAs are also not subject to specific uses, and there are no mechanisms for prioritizing or recognizing the human right to water in the legislation (notwithstanding substantial advances in the recent jurisprudence of the Supreme Court, **as described by Box 4**).

The limited planning, regulation and supervision, the strong emphasis on the ownership of the right over

the common good, the absence of a regulation that mandates integration and the lack of consideration of the ecological cycle of water in its various forms (freshwater, saltwater and solid) limit comprehensive and long-term planning, which results in the heightened vulnerability of communities and ecosystems to future climate scenarios. In turn, they intensify conflicts, leading to a growing judicialization of controversies motivated by the lack of trust in a system where decisions are usually made by authorities and private holders without considering local particularities, users who do not hold DAAs, communities and other stakeholders.

A clear example of the lack of adaptation of water governance to a changing climate is the institutional response to the current water crisis, which is focused on reactive and extraordinary measures such as shortage decrees (in force for a maximum period of 6 months) and water delivery through tanker trucks (active in an ongoing basis in 13 of the country's 15 regions). This visibly contrasts with a megadrought situation that has been going on for over 10 years and which is expected to become a recurring phenomenon in the future due to climate change.

Water is and will continue to be a critical resource subjected to stress and with high degrees of conflict, especially considering the impacts of climate change. A speedy transformation of the governance of water is required that favors an integrated management of its



entire cycle and the recognition of its ecological and social values. To this end, we must move towards a socio-ecosystemic approach to its use and consumption that considers future climate scenarios, guarantees

water security, equity and justice, improves availability and access to information, and involves all actors of the territory in decisions and management.

Climate governance of water diagnosis

Principle	Gaps	Opportunities
Just Climate Action	Limited planning, regulation and supervision, and little consideration of climate change in management. The legal order doesn't recognize the human right to water. Lack of prioritization of DAAs regarding conflict among water uses, and concentration of their ownership.	Growing legal recognition of the human right to water. Relevance of water management in the constitutional process. Increasing evidence about the relationship between water security and climate change.
Anticipatory Approach	Assignment of DAAs leads to overexploitation of watersheds and aquifers across the territory. Reactive approach in responding to droughts and emergencies.	Legislative initiatives for the protection of glaciers and ecosystems linked to water.
Territorial Socio-Ecosystemic Approach	Governance doesn't contemplate the dynamic nature of hydrology, the complexity of eco-hydrological processes or the particularity of each territory.	Strategic plans for water resources in watersheds set forth in the Climate Change Framework Draft Law (PLMCC, Proyecto de Ley Marco de Cambio Climático) and promised in the NDC, whose content must be considered in the Climate Change Regional Action Plans (PARCC, Planes de Acción Regionales de Cambio Climático) and in the Territorial Planning Instruments (IPT, Instrumentos de Planificación Territorial). Organizations of rural users and local experiences of territorial water management.
Good Administration	Public and private management is uncoordinated. Insufficient, incomplete and outdated data. Limited participation in decisions, especially by users and other interested actors who do not hold DAAs.	Potential synergies between Climate Change Observatories and MOP data.

Figure 3. Diagnosis for the water element.



Climate governance of **air:** more integrated and prospective

DESPITE HAVING ENVIRONMENTAL AND CLIMATE MANAGEMENT INSTRUMENTS, THE CURRENT GOVERNANCE OF AIR IS MOSTLY REACTIVE, FRAGMENTED, OF RESTRICTED AMBITION, WITH LIMITED CITIZEN PARTICIPATION AND A MONITORING CAPACITY RESTRICTED TO STANDARDIZED PARAMETERS IN URBAN AND INDUSTRIAL AREAS, WITHOUT PROPER FOLLOW-UP AND EX POST ASSESSMENT. ADVANCING TOWARDS A GREATER INTEGRATION OF AIR QUALITY MANAGEMENT AND THE MITIGATION OF CLIMATE FORCERS WOULD ALLOW PROPOSING TRANSFORMATIVE LONG-TERM GOALS THAT ARE EFFICIENT AND EFFECTIVE, LEVERAGING SYNERGIES BETWEEN BOTH DIMENSIONS.



The climate governance of air is related to the management and regulation of climate forcers (emissions produced by human activities that cause changes in the atmospheric composition), including those that remain in the atmosphere for a long time (mainly CO₂, N₂O, y CH₄), as well as those with a shorter duration and their precursors: for example, fine particulate matter (PM_{2.5}), including black carbon, nitrates, sulfates etc., and others like O₃, sulfur dioxide and nitrogen oxides. The latter are known as short-lived climate forcers (SLCFs), several of which directly affect the health of people and ecosystems and are frequently the focus of social-environmental conflicts.

The ultimate responsibility in terms of governance of air falls on the Ministry of the Environment. Within the Ministry, however, management is divided into two units: an air quality unit and another focused on the mitigation of climate forcers, mainly greenhouse gases (GHG). The first focuses on the protection of human health (and in a very marginal way so far, of ecosystems), which it does by generating quality and emission standards, decontamination plans and reports from the Environmental Impact Assessment System for larger projects. The Superintendence of the Environment oversees and penalizes non-compliance with the emission standards and decontamination plans, and legal actions before Environmental Courts proceed against its decisions. The second unit's main instrument is the Nationally Determined Contribution (NDC), which defines a carbon budget compatible with achieving carbon neutrality by 2050. Sectorial Mitigation Plans prepared with the pertinent ministries define specific measures and actions to achieve this goal. The future Long-Term Climate Strategy (ECLP, Estrategia Climática de Largo Plazo) currently being drafted as part of the Climate Change Framework

Draft Law (PLMCC, Proyecto de Ley Marco de Cambio Climático) will coordinate both instruments (NDC and Sectorial Plans), establishing a distribution of the national budget in sectorial goals. The linking of sectorial and territorial strategies falls on the Regional Climate Change Committees (CORECC, Comités Regionales de Cambio Climático), which must develop regional climate change action plans; so far, four regions have done this as part of pilot projects (Atacama, O'Higgins, Los Ríos and Los Lagos).

This fragmentation of the climate governance of air (between air quality and climate forcers) is evidenced, for example, in keeping various emission inventories that are not aligned, as well as in the dissociation among each sector's priorities, resources and instruments. Similarly, this disconnectedness is present in territorial terms, as the environmental management instruments consider administrative definitions that do not respond to the underlying biophysical dynamics. There is limited involvement and coordination among local actors in the environmental decisions adopted in this area: although the Ministry of the Environment holds regional consultations, these are often formal rather than substantive mechanisms, with little impact and inclusivity, and with participation mechanisms that are often restricted to public consultation processes.

Although it is true that the environmental management instruments related to air quality (standards and plans) are an expression of the preventive principle, their implementation has several weaknesses from an anticipatory perspective, which should prevail in decision-making in this area. Thus, actions and restrictions from the authority implemented in response to exceeding the standards lack long-term planning.

They focus on technological changes of incremental nature, and mainly on primary pollutants. Generating these standards may take over ten years or even several decades in the case of plans established for urban and industrial areas, without necessarily performing a comprehensive assessment of their efficiency and effectiveness. Finally, a limited capacity of the air quality monitoring and emissions control systems is observed, as well as in the ex post assessment of plans and standards limited to verifying the implementation of measures without assessing their effective impact, in addition to a heterogeneous follow-up capacity by regional and local authorities.

All in all, air quality management is limited: although pollution due to particulate matter in Santiago and sulfur dioxide at mining centers has been significantly reduced in the past, these improvements have exhausted their potential. Therefore, substantial changes are required in terms of technologies and citizen behaviors, with a focus on equity. The development of a climate governance of air that incorporates both short-lived and long-lived climate forcers offers an opportunity to promote a prospective strategy that prioritizes transformative policies that imply co-benefits in terms of air quality.

BOX 5**Recent advances
in coordination**

Recently, some progress has been observed in the integration of climate mitigation and air quality management by incorporating black carbon (a climate forcer part of fine particulate matter) into NDCs. On the other hand, the Climate Change Framework Draft Law (PLMCC), currently under discussion at the National Congress, seeks to improve coordination by establishing a list of ministries responsible for issuing sectorial plans, as well as a Long-term Climate Strategy in charge of strategically planning mitigation and subdividing the national GHG and black carbon budget into percentages associated with each sectorial ministry's responsibility.





Climate governance of air diagnosis

Principle	Gaps	Opportunities
Just Climate Action	Incrementalist management practice in air quality, insufficient to achieve the transformations required to prevent damages to the health of people and ecosystems. Unequal distribution of environmental burdens and benefits, which results in conflicts and the existence of sacrifice zones. Lack of effective participation.	Potential synergies and co-benefits among the transformations required to mitigate climate change, improve air quality and further reduce inequalities. Possible coordinating role of the Ministry of the Environment.
Anticipatory Approach	Reactive measures that are triggered when standards are surpassed, focused on diminishing critical episodes without long-term planning.	NDC and ECLP establish ambitious goals for reducing climate forcers, including black carbon. Incorporation of the climate change criterion into the Strategic Environmental Assessment (EAE, Evaluación Ambiental Estratégica) and the SEIA.
Territorial Socio-Ecosystemic Approach	Centralization of decisions and weak participation of the regions and the population in the drafting of plans and standards.	Potential role of CORECCs and regional climate change action plans in linking sectorial and territorial strategies.
Good Administration	Regions are heterogeneous in their capacities. The ex post assessment only verifies administrative compliance. The ex ante assessment based on cost-benefit is not enough.	Opportunity to integrate and strengthen existing emission inventories and monitoring and assessment instruments.

Figure 4. Diagnosis for the air element.



Climate governance of **fire:** **integrate risk and prevention**

THE CLIMATE GOVERNANCE OF FIRE IS CURRENTLY CHARACTERIZED BY AN EMINENTLY REACTIVE APPROACH, WITH LITTLE PLANNING AND PREVENTION, DEPENDENCE ON RESOURCES AND PRIVATE INITIATIVES, AND INEQUALITY, WHICH MEANS THAT URBAN-RURAL INTERFACE AREAS AND TERRITORIES WHERE FORESTRY INDUSTRIES DO NOT OPERATE ARE PARTICULARLY HELPLESS. ALTHOUGH RECENT IMPROVEMENTS IN FIRE RESPONSE CAPABILITIES ARE APPRECIATED, THERE IS A NEED TO EXPAND AND REINFORCE PREVENTIVE ACTIONS, IMPLEMENT COORDINATION PROTOCOLS AMONG THE PARTICIPATING ACTORS, STRENGTHEN THE CAPABILITIES AND RESOURCES OF MUNICIPALITIES AND LOCAL COMMUNITIES, AND GENERATE PROCEDURES FOR ACCESSING AND INTEGRATING SCIENTIFIC EVIDENCE.



Fire is an element whose controlled management benefits society with the production of power for domestic and industrial use. The lack of control in its use can cause social-environmental disasters such as forest fires, which increase CO₂ emissions, affect the health and quality of life of people, and deteriorate ecosystems. Climate change impacts such as the decrease in precipitations and increased temperatures, along with the megadrought currently affecting three quarters of the national territories, provide favorable conditions for an increased frequency, intensity and magnitude of these disasters.

Decrees from the Interior and Agriculture Ministries regulate the use of fire, fire prevention and firefighting. These functions are performed by the National Forestry Corporation (CONAF, Corporación Nacional Forestal). In 2019, CONAF updated the “guidelines for the technical requirements applicable to the Forest Fire Protection Program” contained in the management plans, imposing a series of new obligations on plantation owners. Forest fires are considered a specific risk variable in the National Civil Protection Plan only since 2020, and response actions, operational phases and coordination mechanisms for its management at a national, regional and sectorial level have been established.

The National Emergency Office (ONEMI, Oficina Nacional de Emergencia) coordinates regional, provincial and municipal Emergency Operation Committees (COEs, Comités de Operaciones de Emergencia), along with collaborating technical bodies in which the main participants are the Chilean police (Carabineros), the investigations police, the fire department, health services and municipalities.

The relevant resources for fighting fires include trained technical staff, aircrafts, machinery and tools for building firewalls, recording and projecting systems, various water sources and others. From these, a relevant portion is provided by forestry companies that coordinate with public bodies, especially in emergency situations.

BOX 6

Voluntary governance mechanisms of forestry companies

The governance practices designed and implemented by forestry companies have favored the coordination of various actors, including local communities, around fire prevention. Even though these types of initiatives are very important, they are carried out in a non-institutional, deregulated space that limits the scope of this governance to geographical areas where forestry companies have assets. In these territories, the climate governance of fire is subject to private guidelines and interests without necessarily considering the citizens, state institutions and the scientific community. A governance platform where these actors are under common conditions is required in order to minimize power asymmetries.

Although the causes of forest fires vary depending on each territory's economic and sociocultural characteristics, 97% of them originate from intentional, accidental or negligent actions. The indictment of institutions and individuals is affected by the difficulties to demonstrate their liability and constitute the crime of arson, which hinders deterrence through the effective application of penalties and sanctions. Additionally, there are no landscape recovery policies that charge those who engage in risks or bad practices that favor these types of events.

The risk of fires increases with the existence of abandoned lots, expansive industrial activities (e.g., agricultural and forestry), and deregulated urban and rural expansion. The aforementioned increases the population's exposure, especially of those who reside in areas adjoining abandoned lots, shrublands and forestry plantations. Over 60% of forest fires are initiated in these areas, called "urban-rural interfaces". Starting in 2019, CONAF's Forestry Management Plans have incorporated regulations for interface areas related with the prevention of fires, whose results are not yet observable. The rapid advancement of the impacts of climate change requires updating municipal zoning plans (PRCs, planes reguladores comunales), inter-municipal zoning plans (PRIs, planes reguladores intercomunales), metropolitan zoning plans (PRMs, planes reguladores metropolitanos) and/or indicative instruments such as Regional Territorial Land Use Plans (PROTs, Planes Regionales de Ordenamiento Territorial) in order to include these types of risks in the definition of the territory's uses.

The climate governance of fire is deployed in a context characterized by geographical differences, social inequalities and power asymmetries among the social

actors and stakeholders involved. Although progress has been made in fire response capabilities (which is reflected by an increase in the state budget destined to this task), the effectiveness of these measures is often conditioned by the presence of forestry industries that invest to protect their lots, leaving areas of the country where they are not present in clear disadvantage. Likewise, it is necessary to have complete, robust and accessible data and evidence related to fires, integrating accurate projections regarding increments in frequency and magnitude expected due to climate change.

All of this results in a vulnerable system installed on an enormous state effort that protects the forestry sector, which in some territories is in strong conflict with the local communities. The State acts in a mainly reactive and fragmented way, therefore lacking the anticipatory, comprehensive, socio-ecosystemic, transparent and evidence-based approach needed to face the challenges required by just climate action in terms of fires.

Advancing towards a climate governance of fire implies addressing the gaps identified here, strengthening and generating new institutional spaces that engage the communities and the scientific sphere in the decision-making processes, incorporate the notion of risk in territorial planning and allocate resources to the development of effective and contextualized prevention strategies. Additionally, it is necessary to recognize and meet the needs of territories that currently do not have sufficient resources for managing forest fires.



Climate governance of fire diagnosis

Principle	Gaps	Opportunities
Just Climate Action	Insufficient instruments, shortfall in the participation of the community and scientific agents, conflict of interest in the coordination of public and private actors. Power and resource asymmetries among the actors involved. Definition of urban-rural interface areas does not incorporate local needs and characteristics, especially those associated with poverty.	Chilean commitment to fire prevention and native forest restoration in the NDC. Acquired experiences and trust among actors involved. Advances in the regulatory framework that regulates forest fire management.
Anticipatory Approach	The focus on the emergency implies abundant resources for firefighting and limited ones for prevention. Less room is given to risk identification and management.	Higher budget for firefighting and early response, acknowledgment of a longer duration of the fire season and its monitoring, and increased regularity in the coordination of local institutions..
Territorial Socio-Ecosystemic Approach	Community actors are excluded from fire management. Coordination among actors is seasonal and not part of long-term territorial processes.	Space for incorporating local risks into Regional Territorial Land Use Plans (PROTs) with participation from the scientific community and the civil societyl.
Good Administration	Dispersion of initiatives among public and private actors. Weak institutionalism of CONAF (limited powers), as it is not a public service.	Technical agents with a high level of preparation, anticipation and management. Trust among local actors. Bill to create the National Forestry Service (SERNAFOR).

Figure 5. Diagnosis for the fire element.



Climate governance of **land**: a strategic and socio-ecosystemic perspective

THE GOVERNANCE OF LAND IN CHILE IS CHARACTERIZED BY THE LACK OF A STRATEGIC AND PREVENTIVE VISION, THE PREDOMINANCE OF PRODUCTIVE USES OF THE LAND OVER COLLECTIVE AND CONSERVATION PURPOSES, AND LITTLE CONSIDERATION OF THE TERRITORIAL SOCIO-ECOSYSTEMIC SPECIFICITIES AND DYNAMICS. TO ADVANCE TOWARDS A JUST CLIMATE ACTION OF LAND, WE NEED TO OVERCOME THE CURRENT FRAGMENTATION (AMONG URBAN AND RURAL LAND, SECTORS AND TERRITORIES), IMPROVE THE AVAILABILITY OF SCIENTIFIC EVIDENCE AND ITS USE IN DECISION-MAKING, AND TRANSPARENCY AND PARTICIPATION IN THESE DECISIONS.



For the purposes of this report, land (also known as soil) refers to the edaphic substrate, the ecosystems supported by it and the various services they provide.

The changes in the uses of land generated by agricultural and livestock production, the decrease in native vegetation coverage or its transformation into forestry plantations, and urbanization are the main causes of the disappearance or degradation of ecosystems and biodiversity, especially in southern Chile. To date, 25.5% of the native land between the regions of Maule and Magallanes has been irreversibly lost due to its transformation by human activity. This results in an increase in climate forcers and a higher susceptibility to fires, droughts, landslides and desertification.

The governance of land implies planning, regulating and structuring its uses, as well as forms of subdivision and appropriation in order to promote human wellbeing and ecosystem health. This governance is currently divided into urban and rural land, competencies of the Ministry of Housing and Urbanism and the Ministry of Agriculture, respectively. Urban use is arranged, from a regulatory perspective, particularly by municipal (PRC), inter-municipal (PRI) and metropolitan (PRM) Zoning Plans. On the other hand, the management of rural land is focused on limiting its potential urbanization, establishing natural resources protection areas (by CONAF) and heritage-cultural protection areas, and promoting productive activities. For the third option, indicative instruments such as Regional Territorial Land Use Plans (PROTs), Regional Development Strategies (ERD, Estrategias Regionales de Desarrollo) and Municipal Development Plans (PLADECO, Planes de Desarrollo Comunal) are in place. Large and medium owners play a key role in the various changes in land use, including its con-

servation. Judicial courts settle disputes among private individuals, while environmental courts and the Environmental Assessment Service limit their action only to specific forms of environmental infringement.

This governance gives precedence to private ownership and use of resources, favoring productive purposes (livestock farming, agriculture, industrial use) particularly linked to exportation over collective interests in protecting a healthy environment and balanced ecosystems. Thus, there is limited recognition of the role of land in the mitigation (reforestation and type of forestation) and adaptation to climate change goals (conservation of wetlands, peat bogs, glaciers, protected marine areas and climate refuges). In urban lands, this is shown by an insufficient management and conservation of urban ecosystems and urban-rural interface areas. In rural lands, conservation is based, on one hand, on protected areas of limited effectiveness –due to their reduced extension, especially in light of the future pressure exerted by climate change–, with a weak correlation with ecosystemic balances and low interconnectivity. On the other, it is supported by private initiatives, which have grown over time. These initiatives have been partially promoted by state subsidies, unequally distributed among large and small owners.

These gaps contribute to the sectorial fragmentation of management by type of use, with little coordination among actors in the same territory and among local, regional and national scales. Although experiences of voluntary self-organization at a local level exist, they are disconnected from each other and from public institutions, which undermines the construction of synergies between mitigation and adaptation, and between climate and land management. Additionally, there is

a deficiency in public information regarding the status of ecosystems, biodiversity and fires. This becomes more complex due to the reduced accessibility to existing data and the lack of common vulnerability and risk criteria for the ecosystems. The available information tends to be used in a limited and non-transparent manner in public policy. Similarly, the concentration of land tenure on large agricultural and forestry owners creates a situation of social instability due to conflicts with local communities. A disregard for local and indigenous knowledge and perspectives is also observed, as well as a rare protection of their rights due to limited participatory processes and the vantage point of certain groups, which makes an even distribution of climate burdens and benefits for present and future generations difficult.

To advance towards just climate action in land, we need to incorporate a strategic and preventive vision that promotes a more integrated management (among urban and rural lands, sectors and territories), explicitly considering territorial socio-ecosystemic specificities and dynamics while also improving participation in decision-making, transparency and availability, and use of information about the status of ecosystems and land tenure and uses.

BOX 7

The untapped potential of Existing instruments

There is potential to improve governance by making a greater use of existing instruments, historically limited by a dogmatic interpretation of regulations and the current Constitution, and a low public appreciation of the environment's social, environmental and climate benefits. For example, the expansion of protected areas has been restricted by their demarcation as public land. Since 2016, however, there is a Real Conservation Right (DRC, Derecho Real de Conservación) that enables the existence of private protected areas, but its use has been low. Its use, duly regulated and monitored, could help protect the effective conservation of valuable, underrepresented ecosystems that are significant for their territorial and ecological context. Recently, some courts have been recognizing the need to consider environmental rights on par with private rights, such as the recent refusal of the Office of the Comptroller General of the Republic to allow the substitution of native forest reforestation or regeneration by the recovery of surface for agricultural crops.





Climate governance of earth diagnosis

Principle	Gaps	Opportunities
Acción Climática Justa	Limited land use planning. Prevalence of economic development over social and environmental protection. Inequality in land tenure. Little protection of local and indigenous communities. Unequal regulation in urban and rural areas.	Growing recognition of environmental rights by courts. Opportunity to create climate refuges.
Anticipatory Approach	Tendency to land overexploitation. Lack of recovery and restoration policies. Scope limits for protected areas and other conservation instruments.	Possibility of creating private protected areas (Real Conservation Right). Private initiatives in the matter.
Territorial Socio-Ecosystemic Approach	Sectorial and territorial fragmentation of management. Little correspondence between conservation instruments and ecosystems. Disregard for local knowledge.	Voluntary self-organization experiences at a local level. Opportunity to integrate and strengthen territorial land use planning instruments.
Good Administration	Insufficiency of public information about land status and tenure. Participation limited by factual powers.	Existence of privately managed data that could be used.

Figure 6. Diagnosis for the land element.

CHAP.4

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

As indicated initially, this report has set to deliver a **conceptualization, diagnosis and recommendations** for the **integrated climate governance** of water, air, fire and earth in Chile.

In terms of **conceptualization**, the report provides an integrated analytical perspective of the sociopolitical dimension of climate change, overcoming the current fragmentation that has historically characterized both the international academic literature on climate governance and the national scientific representations in this regard. This conceptualization is reflected, on one hand, by a **common analysis framework** for examining the governance operating in the different elements, integrating the various levels of management, coordination and definition of goals and principles at which the governance operates, emphasizing the interaction between social and ecological processes, and leaving room for public, private and community actors, as well as their various coordination models. On the other hand, **guiding principles** are identified to guide and assess the Climate Governance of the Elements: **just climate action, anticipatory approach, territorial socio-ecosystemic approach, and good management**. We propose that these principles be the foundation for interpreting regulations, designing new instruments and assessing the existing ones.

In terms of **diagnosis**, we offer a comparative and global view of the main gaps within each element and in their interaction spaces, based on the principles described above. In particular, the main challenges

observed across all the elements include:

- i. A **limited and peripheral consideration of climate change** in governance, which leads to a partial consideration of the impact of future climate scenarios on the elements, as well as the lack of a **long-term** perspective in management;
- ii. A tendency towards a **reactive** rather than proactive management, with important shortcomings in **strategic and planning** terms, and weaknesses in terms of **conservation and prevention** measures;
- iii. A significant **sectorial and territorial fragmentation** of governance within each element and among elements, which results in not leveraging synergies and disregarding the importance of local particularities, and **prevents an adequate comprehensive management of ecological cycles**;
- iv. Constraints in terms of **participation**, availability of and access to **information, monitoring and assessment** of measures, transparency and **accountability**, as well as the persistence of significant **inequalities** both in the distribution of costs and benefits of climate change and the decision power and influence in this regard.

On the other hand, some recent tendencies are identified (in terms of jurisprudence, private and community management initiatives, legislative projects and constitutional debate) that may represent opportunities to

advance towards an integrated, effective, coordinated, inclusive, legitimate and timely Climate Governance of the Elements.

Finally, in this last section, we offer **specific recommendations** for addressing the identified gaps and moving towards a **new governance and management model** for the elements, suitable for the challenges posed by climate change in the short, medium and long term. We propose a governance and management model that **adopts climate change as a central axis and purpose**,

considering the **mitigation and adaptation** challenges in an integrated manner, and inspired by the **CGE principles** suggested in this report. We consider that this model could allow for a better organization and coordination of actions and instruments, and a deeper consideration of the social-ecological interactions existing within each element and among them. To chart a path in this direction, **incremental actions** aimed at incorporating, improving and complementing the preexisting public policy instruments, as well as **transformative actions** that will require deep yet necessary changes to

BOX 8

Climate governance in the PLMCC

In June 2021, the Climate Change Framework Draft Law (PLMCC, Proyecto de Ley Marco de Cambio Climático) completed its first reading in the Senate's Environment and National Assets Commission, offering guidelines for the country's future climate governance. During its processing, the PLMCC broadened the text contained in its draft, incorporating some of the concerns in this report and becoming a significant advance towards achieving a more integrated, territorial, just and evidence-based climate governance. Regarding this text, this report makes two types of contributions:

1. First, it makes proposals to deepen the content of the PLMCC, particularly: a) stating the need for transformative actions (and not just incremental) to reach the mitigation and adaptation goals; b) delving into a socio-ecosystemic approach that recognizes the interactions connecting different sectors, systems and elements, as well as human beings and nature; and c) strengthening the mechanisms for public participation and integrated territorial management.
2. Second, it identifies specific interventions in other legal texts, institutions and instruments that are supplementary to those established in the PLMCC, which could act in synergy with it in order to promote a Climate Governance of the Elements suitable for the challenges posed by climate change. Thus, recognizing the important progress made by both the PLMCC and the Long-Term Climate Strategy (whose draft was submitted to public consultation in June 2021), the report offers a complement to keep moving forward with just climate action.

address the urgency, uncertainty and complexity of the challenges posed by climate change will be indicated.

In particular, there are two types of recommendations: a **first group** focused on the coming **constitutional debate** that offers the guidelines for a future Climate Governance of the Elements model and establishes just climate action as a central line of action both in terms of sustainable development and ecological conservation; and a **second group** of recommendations that offers **specific proposals to inform this model**. These suggestions are offered for **all governance levels** (local, regional, national) and include proposals in terms of legislative and institutional innovation, integrated territorial management, data management, monitoring, participation and transparency, and funding.

As the recommendations seek to advance towards a more integrated management of the elements, they focus on cross-cutting actions, embracing climate governance as a whole. However, a few specific proposals are also offered for each particular element. It is worth noting that the latter are illustrative and not exhaustive, and they seek to offer an indication of the types of actions and instruments that could contribute to moving forward in terms of climate action within each element, supplementing the existing instruments and those proposed by ongoing legislative initiatives, including the indications contained in the PLMCC and the ECLP.



The following table provides a summary of all the recommendations organized according to the principle of GCE:

SCALE		AMBITION		URGENCY	
N	National	T	Transformative	+	High
R	Regional (subnational)	I	Incremental	=	Intermediate
L	Local	C	Combined	-	Low

Principle	Recommendation	Recipients	Scale	Ambition	Urgency	Principle	Recommendation	Recipients	Scale	Ambition	Urgency
Just Climate Action	Stipulate just climate action in the Constitution as a cross-cutting axis for the State and the obligation of bodies to incorporate climate change into their management.	<ul style="list-style-type: none">Constitutional ConventionAll State bodies in their respective areas of competence	N	T	+	Territorial Socio-Ecosystemic Approach	Stipulate the principle of territoriality and the socio-ecosystemic approach in the Constitution; establish and strengthen the competencies of authorities in charge of territorial land use planning and zoning; and advance in territorial land use planning instruments for climate change.	<ul style="list-style-type: none">Constitutional ConventionRegional and local authorities	N R L	C	+
	Stipulate the human right to water in the Constitution and reform the Water Code to set social and ecological limits to DAAs.	<ul style="list-style-type: none">Constitutional ConventionNational Congress	N	T	+		Develop the Strategic Plans for Water Resources in Basins as committed in the NDC.	<ul style="list-style-type: none">Ministry of the EnvironmentMinistry of Public WorksRegional governments	R L	C	-
	Stipulate in the Constitution the obligation of all GHG emitters to assume the cost of their emissions and improve the tax regime associated with carbon, fossil fuels and local pollutants.	<ul style="list-style-type: none">Constitutional ConventionNational CongressMinistry of Finance	N	C	=		Stipulate the climate refuge zone in the Constitution and the specific regulations for implementing it.	<ul style="list-style-type: none">Constitutional ConventionNational Congress	N R	T	-
	Issue a Land Law and a Coastal Law to update and integrate the existing regulations and finish zoning the entire coastal area.	<ul style="list-style-type: none">National CongressMunicipalities	N L	C	=		Stipulate the integrated climate basin in the Constitution and create an inter-institutional body led by the Ministry of the Environment in charge of water and land management at a national level and climate basins.	<ul style="list-style-type: none">Constitutional ConventionMinistry of the EnvironmentRegional governments	N R	T	=
	Establish an intersectoral strategy with medium and long-term goals, along with transformative and synergic actions for atmospheric pollutants and climate forcers.	<ul style="list-style-type: none">Council of Ministers for Sustainability	N	C	=		Stipulate the good management obligation of the State in the Constitution and improve coordination among public actors.	<ul style="list-style-type: none">Constitutional ConventionBudget Office (DIPRES, Dirección de Presupuestos)Regional governments	N R	C	+
Anticipatory Approach	Stipulate the preventive and precautionary principle and the state of climate emergency in the Constitution.	<ul style="list-style-type: none">Constitutional Convention	N	T	+	Good Administration	Stipulate the right to citizen participation in the Constitution, generating institutional conditions to enforce it.	<ul style="list-style-type: none">Constitutional ConventionNational CongressAuthorities and stakeholders at various levels	N R L	C	+
	Strengthen the water quality regulation and the Rural Sanitation Services Law with an anticipatory approach.	<ul style="list-style-type: none">National CongressMunicipalities	N L	C	=		Define a line dedicated to climate change in the national (and regional) budget, and another destined to building human capabilities.	<ul style="list-style-type: none">Ministry of FinancePresidency of the RepublicRegional and local governments	N R L	T	+
	Establish obligations of private and public agents in the prevention and management of fire risks and establish a focus on the prevention and restoration of resilient social-ecological systems.	<ul style="list-style-type: none">National CongressMinagriCONAFForestry companies	N R	C	=		Improve <i>ex ante</i> and <i>ex post</i> assessment and accountability mechanisms for public administration and integrate the available national, regional and local information regarding air and GHG.	<ul style="list-style-type: none">Ministry of the Environment and Ministry of FinanceSuperintendence of the EnvironmentOffice of the Comptroller General of the RepublicCouncil of Ministers for SustainabilityOther national, regional and local authorities	N R L	C	-
	Incorporate risk management into territorial planning instruments and housing and poverty eradication policies.	<ul style="list-style-type: none">Regional and local authoritiesMINVUSocial Development Ministry (MIDESO, Ministerio de Desarrollo Social)	N R L	C	=		Crear un sistema nacional de indicadores, información y monitoreo, junto con plataformas de acceso y mejorar la transparencia, accesibilidad e integración de datos existentes y capacitar usuarios.	<ul style="list-style-type: none">Ministry of the EnvironmentNational Environmental Information System in collaboration with other ministries and authorities, and private stakeholders	N R L	I	-
	Expand the areas covered by the environmental courts and SEIA, recognizing the active legitimacy of indigenous peoples and the ecological function of property.	<ul style="list-style-type: none">National CongressMinistry of the EnvironmentSEIAEnvironmental courts	N R	I	-		Create a cross-cutting research axis in climate change and strengthen the Climate Change Observatory (e.g., creating a freshwater and glacier line).	<ul style="list-style-type: none">Ministry of Science, Technology, Knowledge and Innovation	N	I	-



Recommendations for the constitutional debate: fundamentals for a new climate governance of the elements model

Constitutional enshrinement of the following principles:

- ▶ **Principle of just climate action as a cross-cutting management axis for the State**, whose objective is to promote just and climate-resilient development pathways, including carbon neutrality. And as a means to achieve this, an integrated, anticipatory, territorial and socio-ecosystemic climate governance of the elements.
- ▶ **Preventive and precautionary principle**, which involves adopting, in the present, all necessary actions to prevent, avoid and reduce probable or hypothetical future risks, or mitigate their impacts if they occur based on the best scientific information available. The uncertainty or lack of sufficient scientific certainty regarding these risks must not be used under any circumstance as a reason to postpone the adoption of these actions.
- ▶ **Principles of territoriality and socio-ecosystemic approach**, as a foundation for a comprehensive management of the elements: i) promoting mitiga-

tion, adaptation and capacity strengthening measures relevant to the reality of each territory, people and the ecosystems that make it up, ii) favoring territorial land use planning units and modalities that reflect the dynamics, particularities, limits and interrelations of social-ecological systems, and iii) fostering coordination among multiple sectors and multiple territorial scales.

Constitutional enshrinement of the following rights:

- ▶ **Human right to water**, that ensures equal access to water and resilient water services in adequate quality and quantity, also guaranteeing the sustainability of ecosystems within the context of transparent information.
- ▶ **Right to citizen participation** that is effective, broad, timely, continuous, significant, transparent and informed, and **that influences environmental and climate decision-making**, considering cultural, ethnic, territorial and gender diversity.

Constitutional enshrinement of the following obligations:

- ▶ **Obligation of all GHG emitters to assume or bear the costs of preventing, controlling or neutralizing their emissions**, within the context of the carbon neutrality policy based on carbon budgets committed by Chile in its NDC.
- ▶ **Obligation of State bodies to incorporate instruments and actions that promote the mitigation of climate change and the adaptation to its effects** into the exercise of their powers.
- ▶ **Good management obligation of the State**, meaning that the actions of State bodies are rational, objective, transparent, coordinated, efficient and effective at the same time, based on the best scientific evidence available and on local, traditional and indigenous knowledge, and safeguarding the public interest.

Constitutional enshrinement of the following instruments:

- ▶ **State of climate emergency**, which allows granting extraordinary powers to the authority to act in an anticipatory manner in case that plausible and serious risks associated with climate change are identified, whether with the purpose of preventing them, mitigating their effects, or promoting a quick recovery and an effective adaptation.
- ▶ **Integrated climate basin**, as a new territorial unit for climate management that integrates the cen-



tral, regional and local levels, as well as the management of water, land, air and fire prevention, promoting coherence among territorial planning instruments, transport policies, regional and municipal development plans, etc.

- ▶ **Climate refuge area**, as an area characterized by its value as a climate regulator, ecological and scientific value, to which a special integrated management regime for development and conservation is applied that guarantees the care and protection of ecosystems and the climate services they offer based on the best available evidence.

Recommendations for the existing governance: specific measures for advancing towards just climate action

To reform the existing legislation to establish just climate action as a public line of action and establish the obligations of private and public actors in the use of nature, as well as the collective right to a healthy environment. These reforms are formulated observing the aforementioned principles, obligations and rights.

Some of these reforms should consider:

- ▶ Advancing in specific regulations that allow identifying, preserving and protecting **climate refuges**.
- ▶ **Reforming the Water Code** to move towards a hybrid system that reconciles the regulation of water with future climate scenarios, limiting DAAs in time, regulating and establishing priorities for their use based on compatibility with the climate, setting ecological limits to their ownership and giving differentiated treatment to those that are more intensive or less compatible with future climate


scenarios. Additionally, strengthening the notion of public ownership of water and the power of the State to request the revoking of rights and sanctions when they are not used, abused (including water theft) or when the public interest requires it.

- ▶ Strengthening the **regulation of water quality**, particularly of groundwater, as well as the protection of glaciers and water ecosystems (such as wetlands and peat bogs). Implementing the methodologies used by the Ministry of the Environment for establishing water quality regulations in the Public Works Ministry.
- ▶ Evaluating the implementation and progress of the **Rural Sanitation Services Law** to detect early needs for institutional redesign, considering the institutional changes in terms of water and climate change indicated in this proposal.
- ▶ Issuing a **Land Law** that integrates the different territorial land use planning instruments and tools existing at a sectorial and territorial level, and that includes an ecosystemic understanding of land and polycentric understanding of its governance. This law should recognize and be formulated with



the guidelines and orientations included in the new Territorial Land Use Planning National Policy and in the draft for a Framework Law on Climate Change. It must also be accompanied by a reform to the current Forests Law.

- ▶ Issuing a **Coastal Law** that allows updating the existing regulations for managing coastal zones, introducing new planning instruments and promoting coordination among the pertinent institutions, considering the interaction among terrestrial and marine ecosystems, in addition to incorporating considerations relative to climate change. It should also make progress in concluding the zoning of the coastal area.
- ▶ Establishing -in higher territorial land use planning instruments, for example, PROTs- **private and public obligations in the prevention and management of fire risks**, considering the diversity of territories (particularly distinguishing forestry regions from those that are not) and establishing specific responsibilities for holders of forestry projects aimed at preventing fires and repairing if they happen, for example, establishing buffer zones. These prevention and management actions should also be aimed at protecting people and safeguarding ecosystems.
- ▶ Studying the possibility of **expanding the areas covered by environmental courts and the SEIA**, including a clarification of the active legitimacy of indigenous peoples and the ecological function of property.



To reform and redirect **territorial land use planning and zoning mechanisms** towards an integrated management of the territory, explicitly incorporating a socio-ecosystemic approach, climate action, risk management, and when relevant, the use of Nature-Based Solutions. This will involve advancing towards a greater use, effectiveness and coordination of existing instruments (for example, Regional Land Use Plans, Inter-municipal Zoning Plans, etc.) and supplementing them in the medium-long term in a new institutionalism devoted to this integrated management.

In particular:

- ▶ To grant **explicit climate change competencies** to the authorities in charge of territorial planning and land use planning and strengthen municipal ordinances and other local instruments that allow addressing the heterogeneity of the territories. Similarly, to advance in specific territorial land use planning instruments for climate basins, urban-rural interface areas, coastal areas and oceans that effectively incorporate the different local actors and perspectives in territorial planning.
- ▶ **To improve coordination among public actors**, incorporating cross-cutting indicators into the goals and official performance indicators of the Budget Office (DIPRES, Dirección de Presupuestos) aimed at reducing climate forcers and enhancing resilience, and promoting the role of regional governors, especially in the case of large urban centers, in coordinating local management.
- ▶ To develop **Strategic Plans for Water Resources in Basins** committed in the NDC, engaging all the users of the watershed and in coordination with the Regional Climate Change Action Plans. The latter are expected to consider the information of that instrument when defining measures and actions.
- ▶ To create an **inter-institutional body** led by the Ministry of the Environment responsible for water and land management (at a national level) and climate basins in order to safeguard the integration of the central, regional and local levels and the communities. This institution will be able to coordinate or supplement the project of a Water Undersecretariat presented by MOP, yet explicitly seeking to guarantee a comprehensive view, transcending the productive approach and providing explicit integration between water and other elements such as land or air.
- ▶ **To expand and connect protected areas**, including marine protected areas, incorporating funding into the current system and focusing on areas that are both vulnerable and underrepresented in the National System of Protected Wildlife Areas by the State (SNASPE, Sistema Nacional de Áreas Silvestres Protegidas del Estado) and the Ministry of the Environment's National Registry of Protected Areas, improving coordination among areas dedicated to conservation. Likewise, promoting the use of the Real Conservation Right as a complement to protected public areas, preventing its possible misuse for speculative purposes or those that exclude effective environmental conservation, is also recommended.
- ▶ **To incorporate risk management globally into territorial planning instruments (IPTs, instrumentos de planificación territorial)** and into housing and poverty eradication policies, rethinking how territories are inhabited, with a preventive focus that enables building resilience against any type of disaster.
- ▶ To deepen the **redesign of fire risk management** with a focus on the prevention and restoration of resilient social-ecological systems (without neglecting preparation and responsiveness to future emergencies) and to review the financial resources for such management in areas where there are no forestry industries assuming part of the prevention and repair work (for example, Aysén).

To advance towards a better coordination of atmospheric decontamination and climate change mitigation objectives.

To this end:

- ▶ Evaluate a potential **increment in the current carbon tax**, which currently impacts mainly collection and does not generate sufficient incentives for behavioral change.
- ▶ **Extend the application of taxes to local pollutants**, or other mobile and fixed sources. They are currently focused only on thermoelectric plants and vehicles.
- ▶ **Broadly apply the shadow price of carbon** established by the competent authority. This shadow price is currently used only for some types of works, but it should be used in all social assessments of the national investment system. Additionally, incorporate mechanisms to include adaptation to climate change and future uncertainty.
- ▶ **Reform the tax regime of fossil fuels** so that it matches the goal of achieving carbon neutrality and the obligation of GHG emitters to assume the cost of their emissions, so that these more polluting fuels pay higher taxes. This may involve extending the application of the current carbon taxes, increasing their entity and eliminating subsidies or tax exemptions that may benefit the emitters.
- ▶ **Set an intersectoral strategy with medium and long-term goals for the** transport, electrical system and industrial (mining companies, cellulose, etc.) sectors, the forestry and agricultural sector and cities, prioritizing transformative actions that impact both atmospheric pollutants and climate forcers, especially short-lived ones such as black carbon, methane, ozone and their precursors. These actions should include at least:
 - Shifting from firewood to less polluting forms of heating, such as pellets, district heating, electrification;
 - Addressing fuel poverty and improving the thermal insulation of houses, especially in central and southern Chile;
 - Developing more sustainable urban planning, including its print beyond political-administrative limits;
 - Advancing in a sustainable cargo and passenger transport system and in the decarbonization of the power grid;
 - Establishing a modern and low-emission industrial and agricultural production guided by comprehensive impact assessments.



To improve information access and availability, in order to advance towards robust evidence-based decisions and promote climate action:

- ▶ To create a **cross-cutting action axis for the Ministry of Science, Technology, Knowledge and Innovation** that incorporates climate science into State management so that the available knowledge on the matter can be considered in the administrative bodies' decision-making, facilitating its access to the private sector and the communities.
- ▶ To create a **national system for indicators, information management and monitoring** associated with mitigation, risk and adaptation to climate change, as well as with environmental management, ensuring transparency, traceability, accuracy, comparability and citizen access conditions.
- ▶ To generate online **information platforms** that integrate, synthesize and favor access to updated technical and scientific information, including the knowledge and experiences of the communities and the private sector in order to avoid data dispersion and facilitate the exchange of knowledge among involved social actors and stakeholders.

- ▶ To improve the **transparency, accessibility and integration** of data about land uses and tenure, DAAs and the status of ecosystems, as well as its spatial coverage and temporal serialization. This implies reinforcing the National Environmental Information System (SINIA, Sistema Nacional de Información Ambiental) and its integration with other existing platforms and databases.
- ▶ To create a **freshwater and glacier line in the Climate Change Observatory** of the Ministry of Science, Technology, Knowledge and Innovation in collaboration with the Public Works and Environment Ministries.
- ▶ **To improve the national, regional and local information available in terms of air and GHG** in order to integrate the emission inventory systems (RETC, INGEI and SNICHile), searching for consistency among local and global pollutant records on their temporal and territorial scales. To improve air quality monitoring and emissions control systems in areas where they are insufficient and standardize the presented information to increase transparency and citizen trust.
- ▶ **To generate dissemination and training activities** for decision-makers, researchers, professionals and the community about the management and advanced use of data and information platforms indicated in the points above.

To define funding, monitoring, assessment and accountability instruments dedicated to climate change:

- ▶ To define a **climate change line in the State budget** that allows having specific funding for plans and policies associated with the mitigation of and adaptation to climate change at multiple levels (sectorial, regional, municipal), with particular attention to Nature-Based Solutions, while also making the State's expenses in this area more transparent for internal as well as international reporting purposes.
- ▶ To define a line in the **national budget dedicated to incrementing the training of human capabilities** in climate action, risk management, integrated and social-ecological territorial management, climate justice, prospective analysis of scenarios, and *ex ante* and *ex post* assessment of public policies.
- ▶ **To improve *ex ante* assessment mechanisms** for policies and measures, supplementing the information about costs and benefits of the General Assessment of Economic and Social Impact (AGIES, Análisis General del Impacto Económico y Social) and integrating impacts in multiple dimensions: economic, social and environmental.
- ▶ **To implement an *ex post* impact assessment** in instruments, policies and programs, linking it with specific goals in terms of carbon neutrality and resilience, where the Ministry of the Environment must report advances subject to periodical evaluation by the Finance Ministry and the Council of Ministers for Sustainability.

- **To generate accountability mechanisms** with indicators and instruments, whose content is publicly accessed and may be overseen by the Superintendence of the Environment and/or the Office of the General Comptroller of the Republic.

Finally, for all of the above, **institutional conditions must be generated in order to regulate citizen participation spaces as a structural element** in decision-making and environmental and climate action at all levels (local, basins, regional and national), minimizing power asymmetries among the involved social actors and stakeholders.

To this end, the following must be completed:

- Establish participation mechanisms that operate **effectively and equally in the design, planning, execution and evaluation stages** of policies and projects, considering local and cultural particularities around participation.
- **Establish participation in an identifiable manner** in the wording of laws and regulations associated with environmental and climate management.
- **Increase the level of involvement and influence** of these mechanisms in decision-making.
- **Provide sufficient resources and capabilities** for their implementation.
- Safeguard **equal opportunity of access to available information and knowledge**.
- In general, set **minimum participation standards** in climate decision-making (preparation and implementation of policies and instruments, among others) in accordance with international standards.



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GLOSSARY

Adaptation:

In human systems, the process of adjusting to the real or projected climate and its effects in order to moderate damages or leverage beneficial opportunities. In natural systems, the process of adjusting to the real climate and its effects; human intervention may facilitate an adjustment to the projected climate and its effects (IPCC, 2018).

Incremental Adaptation:

Adaptation process that maintains the essence and integrity of a system or process on a given scale. In some cases, gradual adaptation may culminate in transformative adaptation (Aldunce *et al.*, 2021).

Transformative adaptation:

Adaptation process that changes the fundamental attributes of a social-ecological system in anticipation of climate change and its impacts (Aldunce *et al.*, 2021).

Climate change:

A variation in the climate state identifiable by variations in the mean value or in the variability of its properties, which persists for prolonged periods, generally decades or longer periods. Climate change may result from natural internal processes or external forcings such as modulations of solar cycles, volcano eruptions and persistent anthropogenic changes in the composition of the atmosphere or the use of land. In its Article 1, the United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable periods

of time” (IPCC, 2018). Thus, the UNFCCC makes a distinction between climate change attributable to human activities that alter the atmospheric composition and climate variability attributable to natural causes.

Land use change:

A change in the use and/or management of the land’s superficial cover derived from human activities. It implies transformation in the density, type of activity and form of utilization, and with this, a change in the natural, economic and sociocultural dynamics present in the territory (Marquet *et al.*, 2019).

Black carbon:

A type of aerosol originated mainly from the incomplete burning of fossil fuels, biofuels and biomass (also known as soot), although it also occurs naturally. It remains in the atmosphere for only a few days or weeks. It is the suspended particle component with the greater capacity for absorbing light, and it has a warming effect because it absorbs heat in the atmosphere and reduces albedo when it is deposited in ice or snow (IPCC, 2018). Also see “short-lived climate forcers”.

Nationally Determined Contribution (NDC):

A term used in accordance with the United Nations Framework Convention on Climate Change (UNFCCC) according to which a country adhered to the Paris Agreement specifies the country’s plans for reducing its emissions. Some countries’ NDC also addresses how they will adapt to the impacts of climate change, what type of support they need from other countries and what type of support they will provide to other countries in order to adopt pathways with low carbon emissions and strengthen climate resilience (IPCC, 2018).

Integrated climate basin:

A territorial regulation and planning unit that integrates the central, regional and local levels, as well as the management of water, land, air and fire prevention, promoting coherence among territorial planning instruments, transport policies, regional and municipal development plans, etc.

Disasters (social-environmental):

Serious alterations in the normal functioning of a community or a society due to dangerous physical phenomena that interact with vulnerable social conditions, causing generalized adverse human, material, economic or environmental effects that require an immediate response to the emergency in order to meet essential human needs, and which may require external support for recovery (IPCC, 2018).

Elements:

Social-ecological systems on multiple scales that generate contributions that are positive (e.g., water: domestic, productive, cultural water services...; fire: power; air: health, wellbeing, climate...; land: productive, recreational, cultural land uses...) and negative (water: floods; air: greenhouse gases and pollutants; fire: fires; land: landslides, climate forcers...) with respect to a range of collectively valued assets and services (Díaz *et al.*, 2018).

State of climate emergency:

A constitutional state of emergency in which extraordinary powers are granted to the authority to take anticipatory action when plausible and serious risks associated with climate change have been identified, either to prevent them, mitigate their effects, or promote a quick recovery and effective adaptation.

Long-Term Climate Strategy (ECLP, Estrategia Climática de Largo Plazo):

It 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 address the challenges posed by climate change; move towards a development with low greenhouse gas emissions until neutrality is reached and maintained; reduce vulnerability and increase resilience to the adverse effects of climate change; and fulfill the international commitments assumed by the State of Chile in this regard (Ministerio de Medio Ambiente, s/a).

Climate forcers:

Natural (e.g., changes in solar radiation) or anthropic agents (e.g., increase in greenhouse gases due to the use of fossil fuels) that modify the climate (Huneus *et al.*, 2020).

Greenhouse gases:

Gaseous component in the atmosphere, natural or anthropogenic, that absorbs and emits radiation at given wavelengths of the Earth's radiation spectrum emitted by the surface of the Earth, the atmosphere itself and the clouds. This causes the greenhouse effect (IPCC, 2018).

Short-lived climate forcers:

Set of compounds mainly composed of the atmosphere's short-lived compounds, unlike greenhouse gases that form a homogenous mix. These compounds do not accumulate in the atmosphere on a decennial or centennial scale, and therefore, their effect on climate is felt predominantly in the first 10 years after their emission,

although their changes can still cause long-term climate effects, for example, a change in the sea level. They may have a cooling or warming effect (IPCC, 2018).

Governance:

The manner in which societies define objectives and priorities, make decisions, and implement and supervise actions of various nature to achieve these objectives and priorities. It comprises the entire range of existing means for agreeing, managing, applying and supervising policies and measures. At this point, the concept recognizes the contribution of different government levels (global, international, regional, sub-national and local), as well as the role of the private sector, non-governmental actors and the civil society in addressing the numerous types of issues faced by the global community. (Billi *et al.*, 2021).

Transformative governance:

A governance that seeks to change these fundamental attributes, generating deep changes in personal values, social structures or practices.

Climate Governance of the Elements:

Organized set of processes and institutions focused on planning, coordinating, funding, applying, evaluating and refining short, medium and long-term actions (policies, measures, instruments, interventions, etc.) aimed at regulating the contributions of the elements in a context of climate change, promoting the mitigation of the causes of climate change and the adaptation to its effects within the scope of each Element (considering their interrelations).

Urban-rural interface:

It is the area where houses and other structures meet,

are in contact or intermingle with vegetation. It is a spatial extension that accounts for the transition between consolidated urbanized areas and rural areas, many of them in an intense process of transformation that is evidenced by changes in the structure of land ownership and use, shifting from natural areas or agricultural activities in their broadest sense to a residential use with a low occupation intensity, but which shows physical, morphological, economic, environmental and sociocultural transformations of the territory. It is a specific process derived from the inorganic growth of cities (Salazar Burrows, 2010).

Climate Justice:

A type of justice that links development to human rights, so that a focus centered on humans is achieved to deal with climate change, protect the rights of the most vulnerable people, and distribute the burdens and benefits of climate change and its impacts in an equal, impartial manner (IPCC, 2018). In its participatory dimension, climate justice results in the significant participation of the people involved in or affected by decisions related to climate change (Hervé, 2015).

Particulate matter:

Solid and liquid particles suspended in the air. Particles with a diameter of less than 2.5 micrometers (μm) are called PM2.5, and they are also known as fine particulate matter. Similarly, particles with a diameter of less than 10 μm are called PM10 and are also known as thick particulate matter. PM10 contains PM2.5 (Huneus *et al.*, 2020).

MP2.5:

See "Particulate matter"

Mitigation (of climate change):

Human intervention aimed at reducing emissions or improving greenhouse gas sinks.

Primary environmental quality standard:

Standards that set the values for maximum or minimum permissible concentrations and periods of elements, compounds, substances, chemical or biological derivatives, energies, radiations, vibrations, noises or their combination, whose presence in the environment or lack thereof may constitute a risk for the life or health of the population (Ministerio Secretaría General de la Presidencia, 2020).

Secondary environmental quality standard:

A standard that sets the values for maximum or minimum permissible concentrations and periods of substances, elements, energy or their combination, whose presence in the environment or lack thereof may constitute a risk for the protection or conservation of the environment, or the preservation of nature (Ministerio Secretaría General de la Presidencia, 2020).

Emission standards:

Standards that establish the maximum permitted quantity for a pollutant, measured in the effluent of the source of emission (Ministerio Secretaría General de la Presidencia, 2020).

Land use planning:

Technical exercise whose purpose is to define rules for the use of the territory, seeking its harmonious development in its social, economic and environmental dimensions, rationally coordinating political, economic, ecosystemic, social and cultural objectives with the capabilities and conditions existing in the territory in order to safeguard public interest in the long term and

in tune with sustainability (Ministerio del Interior y Seguridad Pública, 2021).

Participation:

Set of processes, mechanisms and activities that promote the exchange of information, the joint development of diagnoses and potential solutions, and joint decision-making among public, private, community, civil society and academic actors.

Forestry management plans:

It is an instrument that plans the management of the ecological heritage or the sustainable use of forestry resources for the fundamental purpose of "safeguarding biological diversity, ensuring the upholding of the conditions that enable the evolution and development of species and ecosystems contained in the area that is the object of its action" (Biblioteca del Congreso Nacional, s/a).

Prevention and/or decontamination plans:

Environmental management instruments that have the purpose of reducing the levels of air pollution to protect the health of the population by implementing specific measures and actions (Huneeus *et al.*, 2020).

Municipal zoning plan:

It is a territorial planning instrument containing a set of provisions about proper building conditions, urban spaces and comfort within the functional relationship among residential, work, equipment and recreational areas (Artículo 41 LGUC) (Ministerio de Vivienda y Urbanismo, s/a).

Climate governance of the elements principles:

They indicate general desirable criteria for the Climate Governance of the Elements. They allow assessing the

suitability of a given set of institutions for the challenges implied by climate change, as well as guiding the public policy aimed at moving towards more climate-sensitive forms of social planning.

Resilience:

Ability of social, economic and environmental systems to anticipate, absorb, adapt to and/or recover from a dangerous event, tendency or disruption associated with climate change, maintaining their functioning and organization while also preserving their capacity to adapt, learn and transform. It is linked both to the idea of vulnerability (boosting the responsiveness that reduces the present risk) and adaptation (implying the system's ability to make gradual adjustments that reduce its future risk). (Folke, 2016; Urquiza *et al.*, 2021).

Climate risk:

Potential for adverse consequences of a climate-related threat or of the adaptation or mitigation responses to this danger for the life of people, livelihoods, health and wellbeing, ecosystems and species, economic, social and cultural assets, services (including ecosystemic services) and infrastructure. The risks derive from the interaction of the expected probability and intensity of (hydro)climatic events (threat), the existence of elements or components in the territories affected by the threat (exposure) and their predisposition to be negatively affected (vulnerability). In turn, vulnerability depends on the sensitivity of specific components of the affected system and the system's global ability to adequately respond and/or proactively adapt to the threats to which it is exposed (shortly, its resilience) (CR2, 2018).

Water security:

It refers to safeguarding equal access to water at ade-

quate quantity and quality levels, considering the natural and social particularities of each territory for its sustenance and use over time for human consumption, health, survival and socio-economic development in a way that is compatible with the conservation and preservation of ecosystems, and promoting resilience faced with hydroclimatic threats and the prevention of pollution (Urquiza y Billi, 2020). The reliable provision of water in acceptable quantity and quality for health, the production of goods and services, and livelihoods, along with an acceptable level of water-related risks (Sadoff y Muller, 2010).

Drought:

Period with precipitations below the historical average (usually 20% or greater deficit; meteorological drought) for sufficient time (at least one season, typically 1-2 years) that may result in a substantial decrease in surface and groundwater resources (hydrological drought) (Wilhite, 2000).

Megadrought:

In the case of central Chile, megadrought lasts for prolonged periods (over 5 years) and is extensive (a good portion of central Chile). The current one presents a precipitation deficit. The current megadrought began in 2010 and has lasted for a decade (so far) (Garreaud *et al.* 2017).

Environmental Impact Assessment System (SEIA):

The environmental impact assessment system, regulated in Law 19.300 (Art. 2 j) and its regulations, is a preventive environmental management instrument that contains the environmental impact assessment procedure, understanding this as a procedure that, based on an Environmental Impact Study or Statement, determines whether the environmental impact of an ac-

tivity or project is within current standards (Ministerio Secretaría General de la Presidencia, 2020).

Monitoring, reporting and verification system (MRV):

It is a system that monitors, reports and verifies information related to mitigation, adaptation, climate funding, and development of technologies and capabilities, along with the review process of this information.

Social-ecological system:

An integrated system that includes human societies and ecosystems in which human beings are part of nature. The functions of this system stem from the interactions and interdependence of social and ecological subsystems. The structure of the system is characterized by reciprocal feedback, emphasizing that human beings must be considered a part of nature, and not separate from it.

Nature-Based Solutions:

Actions to protect, sustainably manage and restore natural or modified ecosystems, which effectively and adaptively redirect social challenges, and simultaneously provide human wellbeing and benefits for biodiversity (Cohen-Shacham *et al.*, 2016).

Territory:

A spatial unit signified, appropriated and defined based on social, natural, economic, political and cultural processes that seeks to take ideas and notions that move along an objective and subjective plane to a material, defined and restricted dimension. A territory accounts for multiple processes, and for this reason, it cannot be solely reduced to a cartographic expression, even though this is a very significant and relevant aspect for understanding it. Territory is therefore a concept that faithfully reflects a complexity involving

social, natural, economic, political and cultural aspects in order to refer to a specific dimension of people's daily life, units that allow political and administrative action, ways of understanding and assimilating socio-ecosystemic dynamics, and visualizing and understanding the coordination of economic and political processes, among others, all of them interrelated and in permanent interaction (Aliste, 2010).

Transformation:

A change in the fundamental attributes of natural and human systems (IPCC 1,5, 2018) which implies profound and many times irreversible innovations in various areas, for example, economic, technological or social. A system's fundamental attributes shall be understood as those that define and support it, for example, values, different ways of inhabiting, practices and mechanisms of life reproduction, or economic and cultural activities (Aldunce *et al.*, 2021; IPCC, 2018, O'Brien, 2017).

Climate variability:

It denotes the variations in the average state and other statistical characteristics (typical deviation, extreme events, etc.) of climate on all spatial and temporal scales broader than those of meteorological phenomena. Variability may be due to natural internal processes of the climate system (internal variability) or to variations in the natural or anthropogenic external forcing (external variability). Also see climate change (IPCC, 2018).

Climate refuge zone:

Geographical areas that due to their particular geoclimatic, hydrological and oceanographic characteristics, and/or a not very altered condition of their ecosystems, could be able to soften the negative effects of climate change, enabling the variability of their ecosystems and species, or to maintain or reco-

ver a carbon sink and climate regulator role. According to this, a special regime for their integrated development and conservation management is applied to them that guarantees the care and protection of the ecosystems and climate services they provide based on the best available evidence. This definition matches the one in the PLMCC at the time of publication of this report.





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comunicaciones.cr2@dgf.uchile.cl



(+562) 2978 4446



Blanco Encalada 2002, 4to piso. FCFM - Universidad de Chile