

Chilean water law and climate change challenges

Derecho de aguas chileno y los desafíos del cambio climático

Sofía Hübner Garretón*

The negative impact of climate change on the replenishment of water basins will affect the drinking-water availability and other economic sectors of the country. Consequently, Chile needs to be prepared to tackle these impacts, by having a reliable water law system.

Keywords: Climate Change, Water Law, National Adaptation Plan to Climate Change, Water Code Reform.

El impacto negativo del cambio climático en la reposición de las cuencas hidrográficas afectará la disponibilidad de agua potable y otros sectores económicos del país. En consecuencia, Chile debe estar preparado para enfrentar estos impactos contando con un sistema normativo de aguas confiable.

Palabras clave: Cambio Climático, Legislación de Aguas, Plan Nacional de Adaptación al Cambio Climático, Reforma del Código de Aguas.

ABSTRACT / RESUMEN

Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) defines "climate change" as:

[C]hange of 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 time periods¹.

Higher temperatures and less predictable and more extreme weather conditions are expected to impact distribution and availability of rainfall, river flows, snowmelt, and groundwater².

* Abogada Universidad Católica de Chile, Master of Environmental Law, University of Melbourne, Australia. Dirección Postal: El Golf 40, of. 603, Las Condes, Santiago de Chile. Correo electrónico: shubner@uc.cl

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¹ UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE 1992.

² UN-Water, 'Water and Climate Change' on *UN-Water* <<http://www.unwater.org/water-facts/climate-change/>>.

According to the *UNFCCC*, Chile brings together seven of the nine characteristics that this *Convention* has established to define a country vulnerable³ to climate change. These seven features are a) countries with low-lying coastal areas; b) countries with arid and semi-arid areas, forested areas and areas liable to forest decay; c) countries with areas prone to natural disasters; d) countries with areas liable to drought and desertification; e) countries with areas of high urban atmospheric pollution; f) countries with areas with fragile ecosystems, including mountainous ecosystems; g) countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products⁴.

Therefore, Chile is exposed to climate change in many ways, although the impacts are forecast to differ between the country's regions⁵. In general, 'scientists predict more hot days and higher average temperatures, less rainfall and more frequent droughts, especially in the central-south region'⁶. This will mean a significant negative impact on the replenishment of water basins⁷, which will affect the drinking-water availability and human health, but also will affect other important sectors for the country's economy such as agriculture, mining, forestry and hydropower⁸.

Therefore, it is essential to a country like Chile to be prepared to tackle climate change impacts, by having a reliable water law system⁹. In this regard, the *Water Code* enacted in 1981 regulates the water law system setting the use and allocation of water¹⁰. Also, the Chilean government launched a public policy framework which contemplates some adaptation strategies in order to challenge climate change¹¹.

However, in my view, neither the *Water Code* and the public policies are yet able to confront the threats of climate change, especially in respect to the drought that is affecting a significant part of the country. This essay will be focus in the central region of Chile which is experiencing the reduction in annual precipitation and significant increases in temperature and it is expected that these impacts will affect such area in the future as well¹². In Annex One

³ Pursuant to the Intergovernmental Panel on Climate Change (IPCC) "vulnerability" is defined as "[t]he propensity or predisposition to be adversely affected, [which] encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt". PACHAURI and MEYER 2014, 128.

⁴ UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE 1992, 8.

⁵ INTERNATIONAL ENERGY AGENCY, ENERGY POLICIES BEYOND IEA COUNTRIES CHILE 2018 2018, 119.

⁶ *Ibid.*

⁷ SARTORI 2017, 77.

⁸ INTERNATIONAL ENERGY AGENCY 2017, 120.

⁹ MEZA *et al.* 2012, 421 y 422.

¹⁰ Decreto con Fuerza de Ley N° 1122 of 1981.

¹¹ MINISTERIO DE OBRAS PÚBLICAS 2013.; FARIÁS and JADRIJEVIC 2017.; MINISTERIO DEL MEDIO AMBIENTE 2015.

¹² D GARREAUD *et al.* 2017.

below, it is possible to observe the effects of the drought in the Aculeo Lagoon, located in the Metropolitan Region at Central Chile.

On the one hand, the *Water Code* is not able to face climate change effects because it contemplates a regime of water rights which allocate the water as a private good, without distinguishing its use¹³. Moreover, most of the waters in the central area of Chile are almost allocated¹⁴. Under this context of the water rights as a private good, all the water have equal value, which leads to conflicts regarding the offer and demand of the water resources, which is every day scarcer¹⁵. Therefore, it is possible that –as a consequence of climate change– we will face the fact that water is no longer available for all water rights owners. This will be because all the available resource will be –legally– used by those water rights’ owners that first acquired the right.

On the other hand, public policies are also not able to confront water-related climate change impacts. Even when the country has made significant steps launching public policies in order to face climate change, regarding water, there is still lack of understanding about its extreme importance and how it is a mainstream element across other sectors also affected by climate change such as energy or farming¹⁶.

This essay begins with a general description of water as a vital element in our society, which is not only used for human life but economic development and supporting biodiversity. Then, I explain how this resource is threatened by climate change. I briefly describe the two most important effects of climate change in water resources such as droughts and flood, focusing on the former one. Then in section III, I describe the climate change effects on Chilean’s waters and how these waters will be severely affected by this phenomenon, where droughts and extreme temperatures are expected, particularly in the densely populated central region¹⁷. I highlight that this is serious for a country as Chile which water supply and economic activities ‘depend strongly on the amount of snow accumulation in winter and on the rate of glacier and snowmelt in the spring and summer seasons’¹⁸.

Next, in section IV, I explain the water law system of Chile, discussing whether this framework is able to face the pressure of climate change on water resources.

¹³ *Idem*.

¹⁴ MACPHERSON and O’DONNELL 2015. See also COSTA CORDELLA 2016, 347.

¹⁵ MACPHERSON and O’DONNELL 2015, 183. See also COSTA CORDELLA 2016, 347.

¹⁶ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT 2013, 14.

¹⁷ INTERNATIONAL ENERGY AGENCY 2018, 120.

¹⁸ MEZA *et al.* 2012, 422.

I. Water and Climate Change

Freshwater is a vulnerable resource¹⁹ but it fulfils three essential roles for the sustainability of global development: assurance of human health, economic development and support of important ecosystems²⁰. Therefore, freshwater is indispensable for all forms of life and human activities which almost all of them need freshwater in large quantities²¹.

The main characteristic of water is that it is a mainstream resource. This means that it is an element that has various uses, such as the necessary supply for the subsistence of ecosystems, human consumption, agriculture, livestock and even for energy production²². As the Intergovernmental Panel on Climate Change (IPCC) said in its Climate Change and Water Report 'climate, freshwater, biophysical and socio-economic systems are interconnected in complex ways, so a change in any one of these induces a change in another'²³. Therefore, water is vital. However, mainly through water, the effects of climate change will be felt²⁴. As the IPCC explains,

[i]n many regions, changing precipitation or melting snow and ice are altering hydrological systems, affecting water resources in terms of quantity and quality. Glaciers continue to shrink almost worldwide due to climate change, affecting runoff and water resources downstream²⁵.

Therefore, freshwater resources are very susceptible to be strongly impacted by the phenomenon of climate change, with broad consequences not only for human societies but also for ecosystems. Consequently, 'the relationship between climate change and freshwater resources is of primary concern and interest'²⁶. Hence, climate change is reshaping the future for freshwater.

In fact, because of climate change, some regions of the world will become hotter and drier and with more frequent and more severe periods of drought²⁷. On the other hand, other regions will become wetter, where the precipitations will come in the form of more severe storm events, challenging cities' water storage capacities and leading to flooding disasters²⁸.

¹⁹ BAUER 2004.

²⁰ SANTIBÁÑEZ 2016.

²¹ BATES *et al.* 2008, 7.

²² RÍOS LANGE 2017, 77.

²³ BATES *et al.* 2008, 7.

²⁴ UN-WATER 2012.

²⁵ PACHAURI and MEYER 2014, 51.

²⁶ BATES *et al.* 2008, 7.

²⁷ The United States' National Weather Service defines "drought" as a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry.

National Weather Service, 'Drought: Public Fact Sheet' (August 2006). See also KUNDIS 2018, 250.

²⁸ *Idem.*

Both droughts and floods generate serious problems regarding water availability and directly affect the freshwater supply²⁹. Droughts are 'exacerbating water scarcity and thereby negatively impacting people's health and productivity'³⁰. The drought has a vital connection to water supplies and consequently to the respective water law system of a country. Indeed, 'less precipitation means less water for use, and hence a need for law to prioritise uses and to allocate available water among those uses'³¹. Excessive water withdrawals can exacerbate the impact of drought³².

Floods³³, instead, threaten to destroy water points and sanitation facilities and contaminate water sources³⁴. In other words, higher precipitation may affect the cities' sewer systems. An uncontrolled surcharge may add microbial and chemical pollutants to water resources which are difficult to manage through the use of conventional drinking water treatment methods³⁵.

Therefore, extreme events such as droughts and floods are expected to occur more often because of climate change, and both can have detrimental impacts to water supply³⁶.

II. Climate Change Effects on Chilean's Water

Chile has 1251 rivers located in 101 major basins³⁷. Additionally, there are more than 12 784 lakes and lagoons of all kinds of shapes and sizes that in general, the water resources present in them contain good quality water and are important regulators of the flows in the basins³⁸. Furthermore, Chile has 24 114 glaciers, which contribute to the flow of runoff in the dry season³⁹.

In Chile, the volume of water from rainfall that runs through waterways is 51 218 m³ per person per year, exceeding the world average by eight times (6600 m³ / inhabitant/year)⁴⁰. Moreover, the total renewable water in Chile reaches 922 km³ per year, which places it in the 14th place in the world and fifth in Latin America⁴¹.

²⁹ *Idem*.

³⁰ UN-Water 2012.

³¹ KUNDIS 2018, 254.

³² BATES *et al.* 2008, 38.

³³ According to the United Nations, "flood" is [a] general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters from the unusual and rapid accumulation or runoff of surface waters from any source.

³⁴ UN-Water 2012.

³⁵ BATES *et al.* 2008, 71.

³⁶ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), above n 16, 14.

³⁷ MINISTERIO DE OBRAS PÚBLICAS 2016, 7

³⁸ MINISTERIO DE OBRAS PÚBLICAS 2013, 40; MINISTERIO DE OBRAS PÚBLICAS 2016, 6.

³⁹ MINISTERIO DE OBRAS PÚBLICAS 2016, 8.

⁴⁰ In 2012 the national average was 53.000m³; MINISTERIO DE OBRAS PÚBLICAS 2013, 9; MINISTERIO DE OBRAS PÚBLICAS 2016, 8.

⁴¹ SANTIBÁÑEZ, 2016, 7.

However, these values mask a very different reality regarding the availability of water at a regional level. Although in southern regions the average availability of water is above 7000 m³/ inhabitant/ year, from Arica to the Metropolitan Region (northern and central regions) the average of available water is only 500 m³/ inhabitant/ year, which is below the world average⁴².

This data takes more importance knowing that Chile is and will be severely affected by climate change and that water is one of the resources that will be threatened by those effects⁴³. Negative impacts are projected in drinking-water availability and human health, but also in other sectors such as mining, hydropower, agriculture and forestry, which are the economic engine of the country⁴⁴.

Several factors will influence the decrease in the quantity of water available in Chile, as a consequence of climate change. First, a variation in annual precipitation is projected by more than 30% in some areas of the country by 2040. For instances, Central Chile (where 70% of the total population lives) may see a significant reduction in precipitation. It is expected that this area will experience a decrease in precipitation of around 20 to 25% by 2040⁴⁵.

Second, regarding snow as a source of water, Chile will experience a reduction in the 'mountainous area capable of storing snow over successive years and shift in snowline towards higher altitudes'⁴⁶.

Third, climate change will affect glaciers as well. The retreat of those masses of ice will impact significantly on water supply. This is because these resources are a strategic water reserve. They not only supply water to river basins in summer, but also provide the most critical source of replenishment for rivers, lakes, and groundwater in arid regions during periods of drought⁴⁷. Therefore, this is certainly a reduction in Chile's safety net.

In fact, regarding groundwater, there has also been a decrease in availability of the water resource, where 110 aquifers of the national territory are currently with a committed demand exceeding its recharge⁴⁸.

Fourth, reduced available water flow is projected in most northern and southern river basins⁴⁹ while the remaining basins are expected to suffer slight reductions in flow levels in the short-term and substantial reductions in the mid-term⁵⁰.

⁴² MINISTERIO DE OBRAS PÚBLICAS 2016, 8.

⁴³ SANTIBAÑEZ 2017, 157.

⁴⁴ International Energy Agency 2018, 120.

⁴⁵ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2013, 131.

⁴⁶ *Idem*.

⁴⁷ *Idem*.

⁴⁸ FUNDACIÓN FUTURO LATINOAMERICANO 2019, 18

⁴⁹ Limarí Basin at the northern area and Cautín Basin at the most south.

⁵⁰ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2013, 131.

Fifth, a significant increase in the number of months with a hydrologic deficit is projected in practically all river basins, as consequences of the probable changes in availability and seasonal distribution of the water flows. This will affect the availability of water resources, with low-flows occurring more often⁵¹.

Sixth, an increase in drought is projected especially in the northern and central regions of the country.

Consequently, climate change will impact all the water resources that the country has as water supply such as precipitation, snow and glaciers.

1. The Drought in Chile as a Consequence of Climate Change

Central Chile is a Mediterranean - climate regions, which is characterized 'by a strong seasonality, with rainfall concentrated in autumn and winter'⁵² and intense solar radiation during spring, summer, and early autumn months⁵³.

However, Mediterranean regions may suffer both reductions in annual precipitation and significant increases in temperature, which could have as a consequence an increasingly severe drought⁵⁴. Even though intense one or two-year droughts are frequent in this region, this area has experimented an uninterrupted sequence of dry years since 2010⁵⁵. This has led in some consequences such as "the precipitation deficit diminished the Andean snowpack and resulted in amplified declines (up to 90%) of river flow, reservoir volumes and ground water levels along central Chile and westernmost Argentina. In some semi-arid basins we found a decrease in the runoff-to-rainfall coefficient"⁵⁶.

Therefore, droughts and extreme temperatures are happening and are expected to increase more, especially in the densely populated central region of Chile⁵⁷. This will mean a significant negative impact on the replenishment of Chilean water basins⁵⁸ or in other words a severe impact on storages.

This is critical for a country as Chile which water supply and economic activities 'depend strongly on the amount of snow accumulation in winter and on the rate of glacier and snowmelt in the spring and summer seasons'⁵⁹.

Additionally, there are non-climate change related issues affecting the water resources, which have been showing signs of exhaustion several de-

⁵¹ *Idem*.

⁵² MEZA *et al.* 2012, 421.

⁵³ *Idem*.

⁵⁴ *Idem*.

⁵⁵ GARREAUD *et al.* 2017, 6307.

⁵⁶ *Idem*.

⁵⁷ INTERNATIONAL ENERGY AGENCY 2018, 120.

⁵⁸ SARTORI 2017, 77.

⁵⁹ MEZA *et al.* 2012, 422.

caes ago in the central zone of the country⁶⁰. This is due to the excessive increase in water demand for agriculture, mining and energy generation⁶¹. Indeed, according to the National Water Strategy, the agriculture and forestry sector is the primary user of water extracting around 73% of it⁶². The mining and the industry use both 21% of the water resources. For drinking water and treatment of sewage water, the use is 6%⁶³. Hydropower makes the greatest non-consumptive use of water resources⁶⁴, which must return the same flow unaltered to its original course.

The level of competition between these uses varies throughout the country and is particularly acute in the central area where all surface water has already been allocated⁶⁵. Indeed, it is a well-known reality in Chile that most of the basins are over-allocated, in such a way that there are many more water rights constituted than the water that is actually available in the basins⁶⁶. This increases the pressure then on water resources.

In fact, regarding the over-allocation of the resource, water rights recorded in the Public Registry of Waters of the General Water Authority –updated to December 2017– they exceed more than six times the collection of water nationwide⁶⁷.

As it is said in the strategic resume of the “Hydric Transition, The Future of the Water in Chile”, the effects of climate change and the overexploitation of water sources not only cause water shortages in some areas of the country, but are also damaging our water ecosystems that are important suppliers of the resource. “Water is a vital factor of production, so the decrease in supplies can result in slower growth. Some regions may see their rates of growth decreased by up to six per percent of GDP by 2050 as a result of water related problems”⁶⁸.

III. Chile’s Water Law System

Under the scenario described above, the management of this resource has become a key issue and requires a legal, social and economic analysis⁶⁹. In this respect, it is crucial to a country like Chile to be prepared, having a robust water law system to confront the threats of climate change⁷⁰.

⁶⁰ SANTIBÁÑEZ 2017, 30.

⁶¹ *Idem*.

⁶² MINISTERIO DE OBRAS PÚBLICAS 2013, 3.

⁶³ *Idem*.

⁶⁴ *Idem*.

⁶⁵ MINISTERIO DE OBRAS PÚBLICAS 2013, 3.

⁶⁶ COSTA CORDELLA 2016, 346.

⁶⁷ FUNDACIÓN FUTURO LATINOAMERICANO, 2019, 18

⁶⁸ *Ibíd.*, 16

⁶⁹ VERGARA BLANCO 2015, 148.

⁷⁰ MEZA *et al.* 2012, 422.

The water law system is regulated by the *Water Code*. In January 2018, this Code was amended in order to protect the water resource⁷¹. Also, there is another proposed reform which has been discussed in Congress since 2011, which refers to the legal nature of water rights.

Additionally, the Chilean government published an entire public policy framework which contemplates some adaptation strategies in order to challenge climate change⁷².

1. Water Code

Water allocation among different users such as drinking water, industrial, hydropower, and agriculture is based on water rights (*Derechos de Aprovechamiento de Aguas*). Since the water rights control the manner in which water is allocated, it is important to understand their reliability under climate change scenarios⁷³, because the droughts will affect the entire water law system of the country. As it was said before, many basins and aquifers are drying up but there are also very high levels of water demand, far exceeding the available supply of the resource⁷⁴. This leads that in many regions of the country the existing water rights exceed the actual availability of the resource⁷⁵.

The *Water Code* enacted in 1981⁷⁶ regulates the use and allocation of water in Chile. It states that water is a national property for public use (*Derecho Nacional de Uso Público*)⁷⁷, but it grants 'permanent, transferable water use rights to individuals and gave security to their owners so the resource cannot be expropriated without economic compensation'⁷⁸. Therefore, it represents a paradox. On one hand this resource is a national property for public use, which means that water is for the entire nation, but on the other hand, this same resource is privatised granting water rights, which can be used only by its owner.

This Code allows three ways in which a person can acquire water rights. The first option and the most common is the constitution of a new right as a new administrative act issued by the DGA, free of charge⁷⁹. Since January 2018, the applicant has to mention the use that the water will have, but such information is not determinative for granting the right⁸⁰. This was a missed opportunity to regulate more effectively the allocation of the water rights, establishing, for example, some priorities at the time to allocate the new water

⁷¹ Ley N° 21.064, of 2018.

⁷² MINISTERIO DE OBRAS PÚBLICAS 2013; FARIAS and JADRJEVIC 2017; MINISTERIO DEL MEDIO AMBIENTE 2015.

⁷³ MEZA *et al.* 2012, 421.

⁷⁴ VERGARA BLANCO 2015, 148.

⁷⁵ SANTIBÁÑEZ 2017, 5.

⁷⁶ Decreto con Fuerza de Ley N° 1122, of 1981.

⁷⁷ Ídem.

⁷⁸ MEZA *et al.* 2012, 422.

⁷⁹ Decreto con Fuerza de Ley N° 1122, of 1981.

⁸⁰ *Ibid*, 140.

rights. This is because this resource is every day scarcer, especially having in consideration climate change effects.

The DGA will grant the water rights after a study that proves the availability of the resource and the absence of water conflicts with other owners. Once granted, the *Water Code* gives complete and permanent freedom to use those water rights as long as the owner holds them, without considering dry seasons or giving priorities between rights' holders.

The second option is by a regularisation of unregistered ('customary') water use before the Court⁸¹. The applicant must demonstrate to the judge the uninterrupted use of water for five years, counted from when the *Water Code* came into force, without violence or in an illegal way, and without recognising the domain of others⁸².

The third option is private bargaining in water markets, through the sale of rights acquired from one of the two previous forms. Therefore, the *Water Code* regulates a free-market approach to the water resource, in which water rights are treated not merely as private property but as a fully marketable commodity⁸³. It is important to mention that the water rights are unbundled from the rights to the land.

In 2005, the *Water Code* was amended in order to establish the minimum ecological flow. This means that the DGA has to establish minimum ecological flows every time it grants a new water right. Internal manuals of the DGA define the minimum flow that each river needs to maintain the existing ecosystems and preserve the ecological quality⁸⁴.

Some critiques to the granting of water rights in the context of effects of climate change are first, that the *Water Code* stiffens and limits water management. This code gives to the Chilean State the power to transfer to users the usufruct of a resource whose availability is uncertain and changing. This has created a crisis where the interconnections established between water users in the different sections of a basin were not duly taken into account⁸⁵.

Second, that the DGA takes into consideration the water available in the respective river but not in the basin. As a result of this, there has been over granting of water rights, establishing flows or volumes that exceed the sustainable levels that allow the use of the basin in the long term⁸⁶. This is fatal to tackle climate change because a strongest drought means an inevitable decrease in the basins water levels. This means a lower volume of water to distribute among users and maintain simultaneously the ecosystems.

⁸¹ *Ibid*, Transitory article 2.

⁸² *Idem*.

⁸³ BAUER 2004, 1.

⁸⁴ MACPHERSON and O'DONNELL 2015, 182.

⁸⁵ SANTIBÁÑEZ 2018.

⁸⁶ MINISTERIO DE OBRAS PÚBLICAS 2013, 22.

Third, there are interferences between the use of ground and surface water, which, according to current practices, are managed independently. However, this is a big mistake because 'most surface water features, from rivers to lakes to wetlands, interact with groundwater and, thus, groundwater plays an essential role in both surface water availability and quality'⁸⁷. Therefore, a lack of integrated management of groundwater and surface water can have significant (or even irreversible) consequences for both sources of water. Also, this lack of integrated management could lead in ecological features and could cause conflicts between surface and groundwater holders⁸⁸.

Fourth, the *Water Code* says very little about the uses of water other than irrigation and even less about the coordination of various uses. This lead to conflicts regarding the offer and demand of the water resources. This can be seen in the disputes that arise periodically about urban development plans, real estate, agricultural, tourism, power generation, among others⁸⁹, whose growth supposes an increase in the demand for water, necessary for all these activities⁹⁰. In view of that, makes sense modify the *Water Code* in order to prioritize the extraction of the freshwater resource according to the level of the river flow and the use that such resource will have since the current granting system prioritizes the extraction to whom first was granted the right.

Finally, regarding the minimum ecological flow, one of the main critiques about it is that when it was established, the Chilean water resources were almost wholly allocated⁹¹. Therefore, the contribution of the ecological flow is restricted only to those rivers where there is still water availability to constitute new water rights, which are the ones located in the southern regions of the country. This results in an imbalance in environmental care and the water resource in general, between north-central and southern Chile⁹². Therefore in this region all the water rights are almost traded without reserve for sustainability.

Therefore, it is worth asking, is this system prepared to face the threats of climate change on water resources? Can Chile, through this brief legal framework, ensure enough water for all the uses, such as the supply of drinking water, irrigation, energy, mining, tourism, among others?⁹³

In my opinion, the answer to these questions is a big no. As Kundis Craig says, '[w]ater law creates the foundational rules for how humans use and manage water'⁹⁴. As such it can play a substantial role responding to water-related climate change impacts⁹⁵. In this respect, 'flexibility is a key

⁸⁷ COSENS 2016, 382. See also MINISTERIO DE OBRAS PÚBLICAS 2013.

⁸⁸ PEÑA 2003, 9.

⁸⁹ Ídem.

⁹⁰ COSTA CORDELLA 2016, 343.

⁹¹ MACPHERSON and O'DONNELL 2015, 183.

⁹² COSTA CORDELLA 2016, 347.

⁹³ MACPHERSON AND O'DONNELL 2015, 172.

⁹⁴ KUNDIS 2018, 266.

⁹⁵ *Idem*.

attribute of water law's effectiveness in responding to drought⁹⁶, because a flexible water law will allow the allocation and re-allocation of the available water supply in drought periods⁹⁷. Additionally, flexibility in the law generally increases people's capability to adapt to climate change impacts⁹⁸. Also, water law itself can promote or inhibit both the resilience of existing sources to climate change impacts and the development of alternative water supplies⁹⁹.

Pursuant to the above mentioned, in my view, the *Water Code* –which was published 40 years ago– was issued considering the existence of an inexhaustible water resource without foreseeing future droughts. This led in the allocation of practically all of the water resources in the central regions of Chile, which is precisely one of the areas affected by the drought today¹⁰⁰. And those rights will be the property of who obtained them in perpetuity¹⁰¹. Under this legal framework, it is not possible to re allocate the water rights granted¹⁰². Moreover, all of those water rights have the same value and the same priority extract the amount of water granted, even in periods of droughts¹⁰³. Thus, as it was said, the *Water Code* is very rigid and limit the water management¹⁰⁴. This means that the *Water Code* is not flexible at all and is not able to face the climate phenomenon which does not contemplate any solution to the shortage¹⁰⁵. Therefore, Chile requires a law able to prioritise uses and to allocate available water among those uses. A law that allows water rights owners to share their volume of water with other owners in scarcity. In addition, the law should authorize the water authority to acquire water rights in the name of the environment and thus protect ecosystems in the interests of sustainability. In this way, it will be possible to recover water rights that have already been granted, which will mean amount of water free of use for ecological protection and public recreation¹⁰⁶.

Moreover, the *Water Code* is incapable of handling critical water management issues, such as river basin management, social equity, coordination of multiple water uses, environmental protection, and resolution of water conflicts¹⁰⁷. All of these issues would be significantly increased by the water-related climate change impacts. In fact, today conflicts exist between community and mining and farming companies because of water shortage, that are not

⁹⁶ *Idem.*

⁹⁷ KUNDIS 2018, 252.

⁹⁸ *Idem.*

⁹⁹ *Idem.*

¹⁰⁰ MACPHERSON AND O'DONNELL 2015, 183.

¹⁰¹ There are some exceptions to the perpetuity, such as not paying the fine for non-use the rights, and the subsequently auction of those rights.

¹⁰² Decreto con Fuerza de Ley N° 1122, of 1981.

¹⁰³ *Idem.*

¹⁰⁴ SANTIBÁÑEZ 2018.

¹⁰⁵ COSTA CORDELLA 2016, 342.

¹⁰⁶ SANTIBÁÑEZ 2018.

¹⁰⁷ BAUER 2004, 2.

possible to address with the *Water Code*¹⁰⁸. Therefore, strategic water planning can be a useful model to reduce such conflicts.

Some countries, with arid places where drought is a perpetual threat, provide good illustrations of how governments adapt water law to actual hydrological scenarios¹⁰⁹. One example of this is the modern version of the England riparianism. The riparianism or riparian rights are 'the accorded legal rights to use surface water to landowners whose properties border a waterway.' However, in the modern version, 'riparian landowners share rights to make reasonable use of the water resource, subject to the co-equal rights of all other riparians on the same waterbody to do the same'¹¹⁰. Therefore, what is highlighted here is that riparian rights owners share their rights to make reasonable use of the resource. Which means a collective vision at the extracting time water, unlike the Chilean vision, which is more individualistic.

However, in my view, the Australian example is the most notable in order to face the drought, which improved the English common-law riparianism¹¹¹. Australian states' and territories –with a few exceptions– 'allocate water entitlements entirely through licenses'¹¹², unbundling water rights from land rights¹¹³. These water entitlements have a share component which "provided flexibility for entitlement holders in the way they manage water assets. This includes the ability to manage entitlements to deal with variability in a water resource and accessing the full value of an entitlement"¹¹⁴. ... Australian water users tend to "share the shortage" during drought, each reducing its water use to accommodate the available supply, and licensed water suppliers often have use reduction targets built into their licenses"¹¹⁵.

This second example shows again the importance to share and adapt the rights considering the water availability.

Therefore, it is essential to reform the Chilean legal system according to the new water conditions, because fresh water is a scarce and essential resource for life, environmental protection and economic production¹¹⁶, and it requires good management in order to face the pressures of climate change on water resources. The examples given are a good way to approach to an idea of how to reform the *Water Code*, considering that the freshwater resource belongs to all Chileans. Therefore, an important advance in this matter could be that those who already have water rights may prioritize, share, flexi-

¹⁰⁸ COSTA CORDELLA 2016, 343.

¹⁰⁹ KUNDIS 2018, 254.

¹¹⁰ *Ibid*, 255.

¹¹¹ *Ibid*, 256.

¹¹² *Idem*.

¹¹³ GARDNER *et al.* 2018, 246–252; KUNDIS 2016, 256; MACPHERSON and O'DONNELL 2015, 171.

¹¹⁴ *Idem*.

¹¹⁵ KUNDIS 2016, 257. See also COSENS 2016, 376–379.

¹¹⁶ COSTA CORDELLA 2016, 335.

ble and adapt these rights according to their uses and according to the levels of the flow that the basins and rivers have.

2. The Water Code reforms

The discussion regarding the reform of the *Water Code* started when Chile returned to democracy in 1990¹¹⁷, especially regarding the nature of water rights.

In January 2018, in order to protect the Chilean waters, the *Water Code* was amended regarding the submission of information of water rights' holder, control and inspections, and sanctions, reinforcing the powers of the DGA¹¹⁸. The purpose of this reform is to demand more information from users, in order to know how much water exists in each of the country's basins. Such holders will be forced to install –at their cost– devices that allow to control and gauge the water, in addition to a system of instantaneous transmission of that information directly to the DGA¹¹⁹.

Additionally, it provides tools for inspecting to the DGA, in order to be aware of water theft or other infractions. Finally, this amendment significantly increases the fines for committing infractions up to equivalent \$96.610.000 Chilean pesos¹²⁰.

This reform is a step to have greater knowledge of the water extraction that people do along the country. Authorities will be able to handle more accurate information regarding the availability of water, and people will be inhibited to extract water illegally as a consequence of the high fines.

In my opinion, this modification is worth celebrating because it protects our waters. Now the DGA can know exactly how much water is extracted by each owner of water rights, ensuring that there will be no extra withdrawals to those allowed. This gives security and protection to rivers, basins and groundwater knowing how much water is extracted, having high fines in case of infringement.

Despite the fact mentioned above, there is another reform which has been discussed in Congress since 2011, which refers to the legal nature of water rights. Indeed, this reform has the intent to modify the permanent nature of water rights becoming the new granted rights temporals for a maximum length of 30 years, according to the availability of the source of supply and/or the sustainability of the aquifer. This reform will not modify the water rights already granted.

To this reform, I would add the flexible nature of water rights, which can be able to accommodate the different climatic situations and especially the

¹¹⁷ BAUER 2004, 53.

¹¹⁸ Ley N° 21.064, of 2018.

¹¹⁹ *Idem*.

¹²⁰ *Idem*.

effects that climate change can generate. As the examples seen previously in Australia and England.

However, as it was mentioned most of the water was already allocated, especially in the central area of the country¹²¹. Therefore, this amendment will not have impact in order to address the effects of climate change.

A second amendment is to introduce the expiration of water rights for the following grounds: i) for non-use of the rights after four years for consumptive water rights and eight years for non-consumptive. With the actual *Code*, the holder of water rights that not use the amount of water that was granted is liable to pay a fine annually¹²². ii) When the waters are used for a purpose other than that which has been granted. In this respect, since 2018, it is mandatory to inform to the DGA the purpose for what are going to be used the water rights that are required. iii) For the non-registration of the rights in the Real Estate Registrar¹²³. This is with the purpose of having a real knowledge of the water rights that are granted in Chile.

In my opinion, this second amendment can help more addressing the effects of climate change than the first one. Instead of charging a fine for not using the water granted, this reform will make expire such rights, which means that these waters will be back to the public domain.

However –and in relation to the second ground– it is necessary that the authority has enough capacity of control to ensure that the water is being used for what it was granted and that no useless use of water is generated to avoid the extinction of the right.

Additionally, in my view, it would be possible to create a government or independent institution that can obtain water rights that are not being used by their owners or directly purchase water rights to be able to acquire, little by little, those rights that have already been granted with overexploitation of the basins.

The above would help to have a backup to protect ecosystems and achieve greater water distribution with the owners of each basin.

3. Public Policies

As it was explained above, the *Water Code* is unable to face the climate change pressures on the water resources. That is why –among other reasons– that the Chilean government is putting all its efforts into publishing public policies to address such impacts.

¹²¹ MACPHERSON AND O'DONNELL 2015, 183. See also COSTA CORDELLA 2016, 347.

¹²² Decreto con Fuerza de Ley N° 1122, of 1981.

¹²³ LIBERTAD Y DESARROLLO 2017.

Prior to talking about public policies on water and climate change, I will make a brief chronology and explanation of the context of how and why Chile comes to develop public policies on climate change.

'Since Chile ratified the [UNFCCC] in 1994, and joined the Kyoto Protocol in 2002, it has been participating actively in the discussions and international efforts in this context'¹²⁴.

The first thing that the country did in this regard was launched the National Climate Change Strategy in 2006 which two years later was operationalised through the National Action Plan for Climate Change I (NAPCC I) for the period 2008-2012, which recognised Chile was vulnerable socially, economically and environmentally to climate change¹²⁵.

Then, the *Law N° 20.417/2010 which creates the Ministry of the Environment, the Environment Assessment Agency and the Environmental Superintendence*, was enacted in 2010. This law modified the *Environmental Law*, establishing in its section 70 subsection h) that the Ministry of the Environment shall 'propose policies and formulate plans, programs and action planes on climate change'¹²⁶. Therefore, since 2010 with the enactment of this law, the State of Chile determined that climate change was something to work for.

Additionally, the *Law N° 20.417/2010* created the Department of Climate Change, which depends on the Ministry of the Environment and is a 'major milestone in the public management of climate change in Chile'¹²⁷. The mission of this Department is to contribute to the sustainable and resilient development of the impacts of climate change and a low carbon economy in the country. This must be sought through the integration and promotion of more and better sectoral public policies that allow the local level to face climate change and implement mitigation actions¹²⁸.

Later, in 2017 Chile ratified the Paris Agreement by Supreme Decree No 30¹²⁹. Because of this agreement, Chile presented the National Determined Contribution (NDC), committing to develop and implement climate policies and actions that allow local adaptation, mitigation and compliance with global agreements¹³⁰.

Then, having better knowledge, concrete progress regarding the actions established in the NAPCC I, and a greater political commitment at both the national and international levels, the Chilean government launched the National Action Plan for Climate Change II (NAPCC II) for the period 2017-2022.

¹²⁴ MINISTERIO DEL MEDIO AMBIENTE 2016, 37.

¹²⁵ FARÍAS and JADRIJEVIC 2017, 15.

¹²⁶ Ley N° 19.300, of 1994.

¹²⁷ MINISTERIO DEL MEDIO AMBIENTE 2016, 15.

¹²⁸ Cambio Climático [Climate Change] on Ministry of the Environment <<http://portal.mma.gob.cl/cambio-climatico/>>.

¹²⁹ Decreto Supremo N° 30, of 2017.

¹³⁰ <<http://portal.mma.gob.cl/cambio-climatico/>>.

The NAPCC II is a public policy that integrates and guides the actions to be taken concerning climate change¹³¹. The NAPCC II is composed of four areas: Adaptation, Mitigation, Means of Implementation, and Management of Climate Change at the Regional and Community Levels.

Fulfilling its commitments, Chile published in 2014 the National Adaptation Plan to Climate Change. It is one of the goals established in the NAPCC I. It defines the long-term public policies regarding adaptation to the effects of climate change¹³². It also establishes sectoral adaptation plans such as Farming, Biodiversity, Fisheries and Aquaculture, Health, Infrastructure Services, Cities, Energy, Tourism and Water Resources.

Concerning the sectoral plan of Water Resources, it was expected to be published at the end of 2018, however, is still pending¹³³.

Additionally, the Ministry of Public Works –the ministry in charge of the DGA– published the National Water Strategy in 2012, for the periods 2012-2025 in order to reconcile the different interests and uses of water resources, create public policies and make the reforms that would be necessary. These three interests all need to take into consideration the effects of climate change¹³⁴.

For the rest of this essay, I will explain some of the documents mentioned above, in order to illustrate whether the Chilean public policy framework is able to deal with the challenges that climate change presents to this country on the water resources.

a. *National Water strategy*

The Ministry of Public Works launched the National Water Strategy in 2012, for the periods 2012-2025 in order to settle the different interests and uses of water, create public policies and make the reforms that would be necessary, having in consideration the effects of climate change to this resource¹³⁵. The central institution to carry out this national strategy is the DGA¹³⁶.

In order to develop this strategy, the Ministry took into consideration the water management of both surface and underground water. The strategy sees water as an essential element in the national economy and society and recognises its multiple uses and the interaction between such different uses¹³⁷.

This strategy is framed in five points. The first point is “efficient and sustainable water management”. It has to consider the water rights granted,

¹³¹ FARIÁS and JADRIJEVIC 2017, 11.

¹³² <<http://portal.mma.gob.cl/cambio-climatico/>>.

¹³³ *Ídem*.

¹³⁴ MINISTERIO DE OBRAS PÚBLICAS 2013, 5.

¹³⁵ *Ibid*, 3.

¹³⁶ *Idem*.

¹³⁷ MINISTERIO DE OBRAS PÚBLICAS 2013, 5.

ensure water access for the population and the satisfaction of all other different uses. The primary goals for achieving this point are the Integrated Water Resources Management (IWRM)¹³⁸ and the Integrated Watershed Management¹³⁹. In this regard, the management of water resources must consider both surface and groundwater, the forms and cycles of interaction between them, as well as all the productive and non-productive uses that this resource has within a particular basin¹⁴⁰. Additionally, reserves of flows will be kept for non-traditional uses, in specific basins in which it is deemed necessary for their development, on the basis of technical studies that account for such need¹⁴¹.

In my view, this first point will try to manage this weak aspect in the *Water Code*, considering an integrated water resourced management that will contemplate the surface and groundwater resources, ensuring that all different users will have enough water and also the access of water for the Chilean citizens.

An “Integrated Water Resources Management” will allow a better and efficient use of the resource. It will ensure the different uses that are given to the resource by its different holders of water rights. But above all, it is to be expected that it allows each basin and groundwater not to be affected by over-exploitation or effects of climate change.

The second point is to improve the institutional structure for the administration of the water resources. The DGA is the most representative organisation of water institutions but does not have exclusive powers. It coexists with 43 agencies that share the 102 functions related to water¹⁴². In 2012, the Organisation for Economic Co-Operation and Development (OECD) recognised Chile as the country with the greatest diversity of administrative authorities involved in water management, which leads to difficulties in coordinating its development¹⁴³.

Therefore, the current scenario regarding water resources requires a strengthened institutional framework to rationalize and coordinate the multiple competencies of state agencies that currently coexist in the sector¹⁴⁴. This will ensure that the planning of the resource, its allocation, protection, control

¹³⁸ THE GLOBAL WATER PARTNERSHIP defines IWRM as a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment. *What Is IWRM?* (12 July 2011) Global Water Partnership <<https://www.gwp.org/en/GWP-CEE/about/why/what-is-iwrm/>>.

¹³⁹ MINISTERIO DE OBRAS PÚBLICAS 2013, 4.

¹⁴⁰ *Ibid*, 25.

¹⁴¹ *Ibid*.

¹⁴² COSTA CORDELLA 2016, 339.

¹⁴³ ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2012 40.

¹⁴⁴ MINISTERIO DE OBRAS PÚBLICAS 2013, 5.

and resolution of conflicts, will be carried out technically, making compatible the exercise of water rights and the public interest associated with its use¹⁴⁵.

Institutional reform will allow not only better coordination between the different actors but also a decrease in the times of action that will then allow the effects of climate change in this matter to be handled with greater certainty and speed.

This is a cornerstone to face the challenges that present climate change, especially the drought which is affecting the volumes of water available in the Chilean basin significantly. Improving water governance can support the achievement of better water management allowing the access to water according to its specific uses.

However, at the time of writing this essay, the water institutional structure has not change. This policy was launched in 2012 –six years ago– and there is not even a draft bill regarding this matter¹⁴⁶. Moreover, as it is shown later, this point is being replicated by the public policies published the following years.

Therefore, it is possible to see again in terms of water, a lack of will to prosper with the improvements and progress of this area. The fact that there is not even an attempt to strengthen the institutional framework, replicates what happens with the *Water Code* where several attempts have been made to modify the nature of water rights without result.

The third point is to face scarcity, one of the great effects of climate change. To achieve this goal, the Minister of Public Works said that it is important to take measures not only to overcome the short-term situation but also to address the shortage more permanently: The construction of reservoirs is an important but not sufficient element. Thus, the artificial infiltration of aquifers will be encouraged, non-traditional alternatives such as desalination will be explored, and unconventional sources of water will be studied and evaluated, such as submarine pipelines, conduction of water flows from basins with the availability of the resource towards basins of the country that they have shortages, among others¹⁴⁷.

Therefore, from this point of view, a great advance is seen in looking for alternatives that allow facing the drought. Now, it would be necessary to see how much of this has been studied effectively and how much of it is feasible to implement. But will be crucial to observe how these actions that will generate water would be regulated. The regime of use of these waters must be governed by a more flexible code, which allocates water having into conside-

¹⁴⁵ *Idem*.

¹⁴⁶ *Tramitación de Proyectos [Draft Bills Tracking]* Senado de Chile <<http://www.senado.cl/appsenado/templates/tramitacion/index.php?>>.

¹⁴⁷ MINISTERIO DE OBRAS PÚBLICAS 2013, 5.

ration social equity, the conservation of the country's living heritage, ecosystems and due respect of everybody interests¹⁴⁸.

The fourth and fifth points are social equity and an informed citizenry. For the length of this essay, I will not explain these two points.

Therefore, we see that since 2012 there is a spirit of managing a nationwide strategy to protect water, our most precious resource. However, eight years have passed and little of this has been achieved in this regard.

b. National Action Plan for Climate Change II - NAPCC II

This plan considers all the progress that has been made in the area of climate change in Chile¹⁴⁹. The plan includes the lessons learned from the execution of NAPCC I and the management of climate change in recent years. It also includes the advances to date and the future challenges that the country may face, as well as the initiatives in development, institutional aspects, financing, synergies and the vision of the different sectors in this regard¹⁵⁰.

The NAPCC II is composed of four areas: adaptation, mitigation, means of implementation, and management of climate change at the regional and community levels. Regarding water resources, the most relevant areas are adaptation and means of implementation.

The IPCC defines adaptation as '[t]he process of adjustment to actual or expected climate and its effects'¹⁵¹. Regarding NAPCC II, the main purpose of it is to: strengthen Chile's capacity to adapt to climate change by deepening knowledge of its impacts and the vulnerability of the country and generating planned actions that minimise the adverse effects and take advantage of the positive effects for its economic and social development and ensure its sustainability and conserving its natural and cultural heritage¹⁵².

The means of implementation, for these effects, are those steps necessary for the execution of adaptation and mitigation measures that deal with the impacts of climate change. This includes having a strengthened legal and institutional framework for climate change, developing scientific knowledge available for decision making, strengthening the capacities of both individuals and institutions at the national and regional levels, and facilitating the transfer process of technology and the search for financial resources¹⁵³.

c. National Climate Change Adaptation Plan - NCCAP

This plan was a commitment assumed in the NAPCC I. It has nine specific sectorial plans such as Farming, Biodiversity, Fisheries and Aquaculture,

¹⁴⁸ SANTIBÁÑEZ 2018.

¹⁴⁹ FARIÁS AND JADRIJEVIC 2017, 8.

¹⁵⁰ *Ibid*, 11.

¹⁵¹ PACHAURI and MEYER 2014, 118.

¹⁵² FARIÁS and JADRIJEVIC 2017, 39.

¹⁵³ *Ibid*, 56.

Health, Infrastructure, Cities, Water Resources, Energy and Tourism. The first six are already approved, and the other three were expected to be approved at the end of 2018¹⁵⁴, however there are still not launched¹⁵⁵. These sectors are considered especially vulnerable to climate change. Therefore, the creation of sectoral plans has as its purpose the need to take measures to avoid economic, environmental and social losses¹⁵⁶.

This National Adaptation Plan has as the chief aim the effective implementation of climate change adaptation measures to reduce Chile's vulnerability indexes¹⁵⁷. To do this, it has a series of objectives of a general nature, but the sectorial adaptation plans will do the particular measures¹⁵⁸. Therefore, the primary mission of the National Adaptation Plan is to establish the framework and parameters under which the task of adaptation in the country should be developed¹⁵⁹.

This adaptation plan contemplates four cross-cutting actions: i) scientific research; ii) environmental communication and education; iii) institutional strengthening and iv) disaster risk reduction¹⁶⁰.

Therefore, the National Adaptation Plan established the framework under which the adaptation policies in the water resources sector must be specifically elaborated.

d. Resources Sectoral Adaptation Plan

As it was said above, this sectoral plan is not published yet. However, the National Adaptation Plan and the website of the Ministry of the Environment, state the main priorities for this sectoral plan. Some of them are also established in the National Water Strategy made by the Ministry of Public Works, explained in the number 1 above.

Some of this main priorities' actions are the following. First a sustainable management of water resources, which will allow an adequate protection of the quantity and quality of water¹⁶¹. A second action is to improve the institutional framework for resource planning, allocation, protection, control and resolution of conflicts¹⁶². A third action is to prevent and face water scarcity. This means overcome short-term shortage and address it on a permanent ba-

¹⁵⁴ FARIAS 2014, 26.

¹⁵⁵ A draft of the Energy Adaptation Plan was launched on November 2017 and a draft of the Tourism Adaptation Plan was submitted to citizen consultation from September 16, 2019 to November 11, 2019. Recuperado de: http://consultaciudadanas.mma.gob.cl/mma-epac/app/home_ciudadano?execution=e1s2

¹⁵⁶ MINISTERIO DEL MEDIO AMBIENTE 2015, 50.

¹⁵⁷ FARIAS 2014, 20.

¹⁵⁸ MINISTERIO DEL MEDIO AMBIENTE 2015, 50.

¹⁵⁹ ARAYA 2014, 9.

¹⁶⁰ MINISTERIO DEL MEDIO AMBIENTE 2015, 43.

¹⁶¹ *Ibid.*, 63; <<http://portal.mma.gob.cl/cambio-climatico/>>.

¹⁶² *Idem.*

sis. This implies the understanding of the hydrological cycle in the management of the resources, artificial recharge of aquifers, obtaining resources from new sources, such as desalination plants, construction of water infrastructure and others¹⁶³.

A fourth action is to strengthen and expand monitoring systems¹⁶⁴. A fifth action is to maintain and strengthen the inventory, monitoring and study of glaciers¹⁶⁵. A sixth action is to reuse the water resources. This means to study the possibilities of treatment and reuse of grey water and the implementation of differentiated systems in urban areas, including legal considerations for such effects¹⁶⁶. A final action is to educate the population, promoting the culture of water conservation in the community and actions for the efficient use of the resource¹⁶⁷. Regarding this last action, I would go as far as to say that today there is already awareness by the Chilean population of taking care of water.

Therefore, it is possible to observe that there is an extensive list of measures and actions in order to protect water resources from the effects of climate change, that will be in full force and effect with the enactment of the Water Resources Sectoral Adaptation Plan.

Many of the ideas proposed in this public policy coincide with the criticisms and proposals for improvements made to the *Water Code* explained before. The implementation of these measures would allow the water law to be better prepared to face the effects of climate change.

Additionally, the sectoral adaptation plans that are in force have measures that expressly refer to water adaptation to climate change, in order to preserve the resource. However, in these sectoral plans, water has a secondary role since the water resource is considered only by its different uses and is not considered as an essential element that needs to be studied and protected with priority. Therefore, in my view this could be a limitation in the implementation of the Water Resources Sectoral Adaptation Plan itself.

Thus, in my opinion, the country is in debt in this respect for not giving priority to the water plan over the others sectoral plans, especially considering the fact that the drought is actually affecting the country. This is reinforced even more by the fact that water is a resource that involves all other sectors. In this respect, water is not just a significant "sector", but it is also a vital resource, which when threatened could affect other fields such as agriculture, energy, biodiversity, infrastructure, health, among others¹⁶⁸. Therefore, from my point of view, it seems strange that of the nine specific sectoral plans, the

¹⁶³ *Idem*.

¹⁶⁴ *Idem*. This complements the amendment already made in the *Water Code* in 2018.

¹⁶⁵ *Idem*.

¹⁶⁶ *Idem*.

¹⁶⁷ *Idem*.

¹⁶⁸ ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2013, 14.

one related to water had not been made in the first place, considering in one hand that the National Strategy of the MOP (Ministerio de Obras Públicas) already existed since 2012 and on the other hand, that water is an essential and transversal resource to other sectors.

In conclusion, without intending to minimise the advances that the Chilean State has made in public policies, in my opinion, the current tools are not yet enough to reach solutions to face the effects of climate change in the waters of Chile. Water has not yet been given the vital importance that it has, giving priority to its management and protection. Knowledge and understanding of the economic, social and environmental significance of water are still missing¹⁶⁹.

Additionally, it is necessary to reform the *Water Code* in the same line of this public policies. This means a water rights reform backed up by water management and institutional reforms. Also, it is essential to find a way to recover those waters that have been completely allocated in the areas affected by the drought. This means to find a solution to address the over-allocation of water rights which neither of the public policies or the *Water Code* have.

In this context would be necessary to create a new institution with the faculties to manage and purchase water rights or acquire them in the public auction. Also, for recover some water rights would be required –in my view– to amend the *Water Code* in order to establish water rights for a maximum length, according to the availability of the source of supply and/or the sustainability of the aquifer. Also, would be needed and amendment that sets the expiration for non-use the water rights instead of the fine that is established now in the *Code* or the possibility that those owners sell that rights that they acquire for free.

Additionally, to be prepared to face the climate change effects in the matter of water, will be necessary to determine flexibility in the new water rights that will be grant. In this way, will be easy to have better management and sharing the resource in difficulties and scarcity of it. Follow the example of Australia would allow having ideas of how to implement it.

Finally, is mandatory to empower the water authority with more faculties to inspect the illegal extraction and the protection of the ecosystems.

4. Climate Change Law

In July 2018, the government announced the intention to enact a climate change law. This is an important step that Chile will take in the following years¹⁷⁰. This law is a commitment of the current government which is part

¹⁶⁹ TORTAJADA 2016, 4.

¹⁷⁰ *Gobierno Anuncia Inicio de Elaboración de Ley de Cambio Climático Para Chile [Government Announces the Development of Chile's Climate Change Law]* (5 July 2018) Ministry of the Environment <<http://portal.mma.gob.cl/gobierno-anuncia-inicio-de-elaboracion-de-ley-de-cambio-climatico-para-chile/>>.

of the international recommendations for countries in this matter¹⁷¹. The draft bill was submitted to public consultation from June 18, 2019 to July 31, 2019¹⁷².

This law will clarify the objectives of reducing greenhouse gas emissions and adapting to climate change, as well as establishing a system of climate governance that will adequately address the challenges imposed by this reality¹⁷³.

Climate change laws are legal norms of a general and mandatory nature in order to be able to regulate the problems caused by the climatic phenomenon. In this way will be the end of the lack of legal certainty generated by the non-binding instruments, granting useful powers to the authorities for the adoption of efficient measures to face the impacts of climate change¹⁷⁴.

Therefore, I expect that with the enactment of this climate change law will be easier to consider and address the water-related climate change effects, especially with the allocations of water rights and its priorities. It will allow a better combination of the 1980 *Code* with the law and modern public policies with a range perspective regarding climate change.

Conclusion

Even though the waters of Chile are and will be seriously affected by climate change, especially by droughts, the national water law system is not prepared for it. The *Water Code* is not flexible at all and is not able to face the climate phenomenon. It does not contemplate any solution to the shortage¹⁷⁵. Most of the water resources had been allocated in the central area of Chile, and all of them have the same right to obtain the amount of water that was granted to them. However, water is becoming scarcer every day.

Drought has a vital impact on water supplies and consequently to the respective water law system of a country. Indeed, 'less precipitation means less water for use, and hence a need for law to prioritise uses and to allocate available water among those uses'¹⁷⁶.

Therefore, it is important that the Chilean *Water Code* evolve to respond to the water-related climate threats that are affecting the country¹⁷⁷. Australia, as a country with arid places where drought is a perpetual threat, is a good example to follow in this respect, which water entitlements have a share com-

¹⁷¹ *Idem*.

¹⁷² *Proceso de consulta pública del anteproyecto de ley marco de cambio climático [Public consultation process of the draft Climate Change Law]*. Ministry of the Environment. <https://mma.gob.cl/proceso-de-consulta-publica-del-anteproyecto-de-ley-marco-de-cambio-climatico/>.

¹⁷³ *Idem*.

¹⁷⁴ MORAGA and MECKIEVI 2016, 4.

¹⁷⁵ COSTA CORDELLA 2016, 342.

¹⁷⁶ KUNDIS 2018, 254.

¹⁷⁷ *Ibid*, 250.

ponent which 'provided flexibility for entitlement holders in the way they manage water assets'¹⁷⁸.

Concerning the *Water Code* reform enacted in January 2018, it is an important measure to have better knowledge regarding water extraction along the country. It is vital to build knowledge basis about how much water there is and how much is being used. This reform aims that authorities can handle more accurate information about the availability of water, and people will be inhibited to extract water illegally as a consequence of the high fines.

However, the reform of the *Water Code* regarding the nature of the water rights will not be useful to confront the drought, because the water was already allocated, especially in the central area of the country¹⁷⁹.

Regarding the public policies framework, the central issue is the intention of strengthening the water institutional framework. In this respect, the OECD recognised Chile as the country with the greatest diversity of administrative authorities involved in the water management, which leads to difficulties in coordinating its development¹⁸⁰. However, by this time none of the institutional framework has been implemented.

Concerning the sectorial adaptation plans, the Chilean State is misunderstanding the importance of the water resource since it is not giving priority to the water plan over the others sectoral plans, especially considering the fact the drought is actually affecting the country. Furthermore, water is a resource that involves all other sectors, thus, it is not just a significant "sector", but it is also a vital resource, which threat could affect other areas such as agriculture, energy, biodiversity, infrastructure, health, among others¹⁸¹.

And as it was exposed, the public policies repeat over and over again the same point to face climate change effects, however there are not changes implemented in that line. Thus, the lack of will to manage the ideas written in public policies is evident, leaving such ideas only as good intentions.

Therefore, in my view, the legal tools that the Chilean government has to challenge the water-related climate change impacts are not enough. 'More robust policy, institutional, development, and management frameworks need to be developed and implemented in collaboration with users and affected sectors of society'¹⁸² in order to confront climate change in the water field.

¹⁷⁸ KUNDIS 2018, 254; COSENS 2016, 382; MACPHERSON and O'DONNELL 2015, 181.

¹⁷⁹ MACPHERSON and O'DONNELL 2015, 183. See also COSTA CORDELLA, 347.

¹⁸⁰ ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD) 2012, 40.

¹⁸¹ *Ibid.*, 14.

¹⁸² TORTAJADA 2016, 4.

Annex One

Pictures of Aculeo Lagoon - Metropolitan Region (Central Chile)

The purpose of this Annex is to show with two comparative pictures, how the drought affected the Aculeo Lagoon, that was located in the Metropolitan Region, 65 kms southwest of Santiago.

Figure 1: Aculeo Lagoon January 2009.



Source: <https://www.flickr.com/photos/machimon2006/3216199027/>

Figure 2: Aculeo Lagoon May 2018



Source: <https://www.emol.com/noticias/Nacional/2018/05/09/905496/La-laguna-de-Aculeo-se-seco-por-completo-y-vecinos-ruegan-por-lluvias-para-recuperarla.html>

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