Chapter 5
Legal and Institutional Framework of Water Resources

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Abstract The water sector in Chile underwent major changes as a result of decentralization and market reforms. The Water Code of 1981 is the main regulation governing terrestrial water use and water rights (WR) in Chile. Water is national property for public use. However, the Water Code grants permanent and transferable WR to individuals in order to achieve an efficient allocation of water through market transactions of water rights. Once water rights have been granted, they fall under the jurisdiction of private civil law, rather than administrative law. This chapter provides an overview of legal water regime in Chile, based on the review of six central topics: normative framework; regulatory model and legal nature of waters; origin of water rights; water management and administration; groundwater regime; and, finally, the most common conflicts that occur in the sector. On this basis, and considering legal and jurisprudential elements, we identify the defining features of Chile's Water Law, which mixes powers of a centralized State Administration, market tools and water user organizations.

Keywords Chile · Water code · Conflicts · Water law · Water institutionality · Water rights

5.1 Introduction

The water sector in Chile underwent major changes as a result of decentralization and market reforms. At present, the legal framework of Chilean Water Law is structured on the basis of a normative trilogy:

1. DL N° 2603 of 1979, which gave rise to the Water Code of 1981, and conferred legal recognition to customary and granted WR.

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G. Donoso (ed.), *Water Policy in Chile*, Global Issues in Water Policy 21,
https://doi.org/10.1007/978-3-319-76702-4_5

2. The Political Constitution of 1980, which, following the aforementioned DL N° 2603, distinguishes between "constituted" and "recognized" rights and establishes that water right (WR) holders have ownership over them and are constitutionally protected under warranty of private property.
3. The Water Code of 1981 (WC81), which has remained in force for more than 35 years, having been reformed in 2005.

The WC81 guarantees freedom in the use of water to which an agent has WR; thus, WR are not sector specific (Donoso 2015). Similarly, the WC81 abolishes the water use preferential lists, present in the previous Water Codes of 1951 and 1967. Additionally, WR do not expire and do not consider a "use it or lose it" clause.

Seeking to achieve efficient water allocations, the WC81 established that water rights are transferable in order to facilitate markets as an allocation mechanism. Hence, Chile's WC81 is illustrative of a transition from water management based on command and control to one based on economic policy instruments.

5.2 Normative Framework

The study of water law in Chile requires a brief description of the following three normative bodies[1]:

1. DL N° 2.603 of 1979 (Gobierno de Chile 1979);
2. Decrete N° 100 Political Constitution of the Republic of Chile of 1980 (Gobierno de Chile 1980); and,
3. DFL N° 1.122 of 1981 (Gobierno de Chile 1981), current Water Code of 1981 (WC81), which has undergone several reforms over the 35 years that it has been in force.

5.2.1 DL N° 2.603 of 1979: Recognition of Effective Water Uses

The purpose of this legal text was to start the process of normalizing all that is related to water and its various forms of exploitation (Gobierno de Chile 1979). To do so, it established a status that guarantees water rights (WR), granting their holders ownership over them. The content of this norm was quite brief, but very categorical. On one hand, it established that WR over water could be granted by the

[1]This section lists the main regulatory bodies on water in Chile. Notwithstanding, it should be noted that there are additional legal and regulatory regulations, As is, for example, the Supreme Decree N° 203 of 2014, establishing rules on exploration and exploitation of groundwater, to which reference will be made later in this chapter.

State/Administration, or recognized (obtained under immemorial use of the resource). On the other hand, it gave its holders constitutional protection over those rights and separated WR from land ownership, thus, setting the foundations for a future WR market.

The most relevant contribution of this legal body is contained in its 7th Article, which considers an *ownership presumption* over WR in favor of those who use the waters and are owners of the land or, if the foregoing does not apply, in favor of whoever is effectively using the water. Thus, this rule reflects the purpose of the legislator to consider that customary water uses, complying with corresponding requirements, constitute a real and effective right, worthy of constitutional protection, under the warranty of property rights. This premise supports the regularization process of customary water rights, which would be later established in the Transitory Article 2 of the WC81.

Finally, it is necessary to mention that DL N° 2.603 of 1979 authorized the President of the Republic to dictate the necessary rules to establish the "general water regime", which was materialized in the current Water Code of 1981 (WC81).

5.2.2 Political Constitution of the Republic of Chile of 1980 (Constitución Política de la República de Chile – CPR)

Following the guidelines of DL N° 2.603, Chile's CPR (Gobierno de Chile 1980) addressed water regulation in two manners: *explicitly*, in numeral 23 and final clause of numeral 24 of Article 19, and *implicitly* in numerals 1 and 8 of Article 19.

5.2.2.1 Water Regulation in the Realm of Public Goods (Article 19 No. 23 CPR).

This article establishes the so-called *summa divisio* of goods and natural resources in the Chilean legal system, outlining the legal regime to which property may be subjected, distinguishing between *public* goods and *private* goods[2], leaving aside the common goods (*res communis omnium)*. Water is classified as "national good of public use" (bien nacional de uso público) in articles 595 of the Civil Code (Gobierno de Chile 1857) and 5 of the WC81, but not in the CPR. It is important to point out that a reform proposal of the CPR, originally submitted in 2007 and currently being debated in Congress, proposes to explicitly establish in the CPR that "water is a national good of public use".

[2] From a legal point of view.

5.2.2.2 Water Regulation and the Explicit Protection of Water Rights (Article 19 No. 24 CPR).

Although the CPR does not incorporate a special chapter on natural resources regulation, numeral 24 of Article 19 deals with the specific cases of mines and waters. Regarding waters, the final section of this numeral points out that the rights of individuals over recognized or constituted waters in accordance with the law, will grant their owners property over them.

Based on the above, the CPR:

1. Establishes and guarantees ownership of water rights, which are real administrative rights[3]. Thus, WR ownership falls under the private property legislation being able, unlike in *rerum natura waters* (in themselves), to be transferred, transmitted, prescribed and freely renounced, as of the 2005 WC81 reform.
2. Classifies WR as granted and recognized. As already established by DL 2.603 of 1979, the CPR establishes that WR may be "recognized or constituted in accordance with the law", constitutionally ratifying the dual origin of WR.
3. Implicitly considers water as a public good, from a legal point of view. The fact that Article 19 N° 24 of the CPR refers to WR as "constituted" [by the authority], implies that only the State can grant WR over public waters (neither private nor *res nullius*), through a concession procedure.

5.2.2.3 The Right to Live in a Pollution-Free Environment (Article 19 N° 8 CPR).

This article complements the legal framework of public property and natural resources established in the CPR. This numeral adds that the use and exploitation of natural resources must consider the protection, care and preservation of these, in order to ensure the constitutional guarantee of living in a pollution-free environment.

5.2.2.4 Human Right to Water (Article 19 N° 1 CPR).

The CPR protects life as a right and thus, implicitly considers the human right to water. The judicial power has used this constitutional guarantee, which protects and recognizes people's right to water for consumption and subsistence, as legal

[3] WR as a "real administrative right" is (i) a subjective public right, to the extent that it is a clear legal power recognized to its owner; (ii) a real right, insofar as it is exercised over a public good, such as waters, and has *erga omnes* efficacy; and, (iii) has an administrative nature, since it is the State, through the Dirección General de Aguas (DGA. General Water Directorate), that grants the WR.

arguments in court cases[4]. The proposed reform of the CPR, aims to declare that water is a resource for public use and establishes a priority for human consumption, adding new grounds to appeal for the protection of the right to water for domestic human consumption and sanitation[5].

5.2.3 Water Code of 1981 and Its Amendments

The main guidelines of the WC81, the regulatory core of Chilean Water Law, are the:

1. Consideration of waters as a national good of public use when they are available in their natural source. This character is a manifestation of the regulatory power of the State/legislature, which declares them public (neither appropriable by the state nor directly by individuals) by means of *publicatio*.
2. Existence of a concession procedure, through which the competent administrative authority grants or constitutes WR in favor of individuals. In parallel, and with the same value and hierarchy, establishes a procedure for the legal recognition of WR based on customary uses of waters and other special situations. This is a manifestation of the State's authority (Administrator/Legislator) in the original allocation of water rights.
3. Existence of real administrative rights, named Water Rights, which empower their owners to use the water in a private and exclusive way, and can be freely transferred. This gives WR legal security, intangibility, and transferability, allowing for a market based WR reallocation mechanism.
4. Establishment of a dual water institutional system. A centralized administration, exercised by the competent administrative authority, the National Water Directorate (DGA). A functionally decentralized management, corresponding to users collectively organized in each river basin in water user associations (WUA). Here the State is manifested through an administrative body, and society, through the *self-management* of water resources.

[4] For example: Reyes Barraza, Pablo and Aguas Andinas S.A (2011): Court of Appeals of San Miguel, Rol 101-2011, October 14, 2011; Larraín Amaya, Luis and Valenzuela Díaz, Mario (2014): Court of Appeals of San Miguel, Rol 252-2014, November 11, 2014; Dougnac Cordero, Vivianne and Comité de Administración del Condominio Las Vertientes de Zapata (2015): Court of Appeals of San Miguel, Rol 53-2015, March 26, 2015; Montes Arancibia, Alberto and Parcelación Piedra Molino (2015): Court of Appeals of San Miguel, Rol 1106–2015, December 11, 2015; and, Reyes Zapata, Jorge (2016): Court of Appeals of San Miguel, Rol 2052–2015, April 14, 2016.

[5] More background can be found in Bulletins N° 6.124-09, 6.141-09, 6.254-09, 6.697-07, 7.108-07, 8.355-07, 9.321-12, 10.496-07 and 10.497-07 whose unified status can be seen in http://www.senado.cl/appsenado/templates/tramitacion/index.php

5.2.3.1 Legal Nature of Waters

Article 595 of the Civil Code (Gobierno de Chile 1857), which was reinforced by Article 5 of the WC81, establishes that water is a "national good of public use". This follows a general tendency in Comparative Law that gives water a public character. While the 1981 Code considers water to be in the public domain, it grants WR through a concession in perpetuity, conceding WR holders total freedom to use the allocated water for the purpose they wish. The need for a concession as an enabling and legitimating requirement for WR arises from the final section of numeral 24 of article 19 of the CPR, which speaks of "constituted" rights, alluding to those that come from a concessionary act. In addition, Articles 22 and 140–141 of the WC81 refer to the action of "constituting" WR, carried out by the competent administrative authority, which ratifies the concession requirement in this field.

A WR holder is not required to justify the future water use once the WR is constituted. In addition, the current legislation does not privilege any use over the other; thus, when granting new rights there are no legal preferences among different possible uses. The granted WR is formalized in a resolution of the DGA that must be reduced to public deed. They must also be registered in the National Real Estate Agencies (Conservador de Bienes Raíces, CBR) and recorded in the Public Water Registry (Catastro Público de Aguas, CPA).

However, there are WR constituted under a concession by the authority, which, despite having been formally granted, lack registration. These are, in essence, old rights granted prior to the entry into force of the WC81, which were affected by the abolition of the conservatory-registration function established by the Agrarian Reform Law of 1967, which was only resumed in 1981. Thus, between 1967 and 1981 there was a registration parenthesis of WR, which gave rise to uncertainties and disorders, which, to a significant extent, remain until today.

Additionally, many recognized WR have a different origin from this concessional procedure. These are WR that were born from customary uses of water, which over time are considered a genuine right, both by the State and water users themselves. They are most common in the agricultural sector, where farmers irrigate with WR devoid of all formality. The lack of formality is due to the fact that customary WR are not registered in any official registry (Rivera 2013).

The transitory second article of the WC81 establishes the procedure to inscribe and register these customary WR. The regularization procedure has two stages: an administrative stage where the DGA publishes and informs other water users of the regularization request, and a judicial stage where the water user must legally demonstrate the existence of an effective customary water use. The regularization of the customary water use right is finalized when the WR is registered in the CBR and CPA, under the specifications established in the WC81. Efforts have been made to regularize and register customary WR in order to resolve overlapping claims of water. This is especially important for WR that were redistributed under the Agrarian Reform and might be contested by previous owners. However, the regularization procedure has not been effective (Donoso 2015). This lack of regularization and registration can be explained by the following reasons (World Bank 2011; Rivera 2013):

1. The lack of incentives and penalties to regularize and register customary WR. Even though the second transitory article of the WC81 allows users to regularize their customary WR, there are no impediments to exercise their rights even though they are unregistered[6].
2. Costly and lengthy regularization procedures, due to the complexity and strictness of the verification process. However, it is also due to an excessive judicialization; of the customary WR that have been certified by the DGA since 1981, between 40% and 65% are still awaiting a court ruling.

5.2.3.2 WR Typology and Characteristics

The distinctive elements that characterize a WR are the specification of a geographical extraction point, the requested water flow, indication of whether they are consumptive or non-consumptive, permanent or contingent, and exercised continuously, discontinuously or alternating. Consumptive WR are granted to uses that do not require water to be returned to the natural source after being used. On the other hand, non-consumptive WR obliges water users to return the water in the same quantity and quality. Additionally, non-consumptive WR must be used in a manner that does not interfere with or limit the exercise of consumptive rights.

Permanent WR are rights that authorize the extraction of a specified water flow, unless when water supply is insufficient to satisfy all permanent WR and they are recognized as shares of water flows. Contingent WR only authorize the user to extract water once permanent rights holders have extracted their quota. Continuous rights are those WR that allow users to extract water continually over time. On the other hand, discontinuous WR are those that only permit water to be extracted at given time periods. Finally, alternating WR are those in which the use of water is distributed among two or more people who use the water successively.

The legal security, intangibility, and transferability of WR allows for a market-based WR reallocation mechanism. In order to control potential negative effects on third parties due to the transfer of WR, the DGA must authorize the WR transfers in natural water sources.

5.2.3.3 Initial WR Allocation Procedure

The procedure to acquire a WR starts with an application presented to the DGA that must meet the following requirements:

1. Identification of the water source from which the water is to be extracted, specifying whether the source is surface water or groundwater;

[6] The actual WC reform, currently in Second constitutional process (Senate), is processed under Bulletin N° 7.543-12, registered in 2011. Its status can be seen in http://www.senado.cl/appsenado/templates/tramitacion/index.php

2. Definition of the quantity of water to be extracted, expressed in liters per second;
3. Yield and depth in the case of groundwater;
4. Specification of the water extraction points and the method of extraction; in the case of non-consumptive WR it is mandatory to indicate the point of restitution of the water; and
5. Definition of whether the right is consumptive or non-consumptive, permanent or contingent, continuous, discontinuous or alternating.

The requested WR is granted as long as there is water availability to satisfy the total water flow demanded, without affecting the rights of third parties. In the absence of competition for the same WR the right is granted free of charge. It is important to point out that there is no legal or even regulatory concept, regarding what should be understood as "water availability". Therefore, the Courts of Justice have had to give content to this notion, a task in which they have shown to be rather deferential to the DGA's criteria. The Courts have given a dual notion of "water availability". Firstly, they state, there must be "material" provision, that is to say, physical presence of the resource. Secondly, there must be "judicial" availability, which means that the natural source must be free of WR saturation.

When there are two or more requests and the available flow is insufficient for the total requested streamflow, WR are granted to the highest bidder (highest price) in an auction procedure. The auction mechanism is also used to resolve competing claims on the right to explore a specific source of groundwater located in fiscal territory. Contrary to what was expected, a minimum proportion of the new granted WR were allocated via an auction. In addition, there is evidence that in a relevant proportion of the auctions that have occurred there are signs of little rivalry (Peña et al. 2017).

5.2.3.4 Non-use Tariff

The State's concern about a significant lack of effective water use, particularly in the case of non-consumptive WR, led to the introduction of a non-use tariff in the WC81 reform of 2005. Due to the difficulties of monitoring the effective use of all WR, the non-use tariff is applied to all WR that do not count with the necessary water intake infrastructure to extract the granted water flow (Gobierno de Chile 1981, articles 129 bis 4–129 bis 21).

The non-use tariff takes into account the macroregion where the WR is located, so as to consider water scarcity in its calculation. Additionally, it contemplates a temporal factor that increases the non-use tariff if the WR remains without use.

Due to the lack of evidence on the effectiveness of this policy instrument, the actual WC81 reform under debate in the Senate, contemplates the implementation of a "use or lose it clause".

5.2.3.5 Regulation of Transfers of WR

Normally, the transaction of WR implies a change of water intake location. This last operation must be authorized by the DGA, in order to prevent potential negative effects on third parties. Transfer requests are broadcast three times and published in a newspaper at the national and provincial levels, so that other users will be informed and can analyze whether this transfer could affect them. Additionally, if it is a WR associated with projects that have been environmentally evaluated (through an environmental qualification resolution), the Environmental Impact Assessment Study System (*SEIA*) requires water users to mitigate or compensate environmental damages that may result from the transfer of WR.

5.2.3.6 Legal Status of Groundwater

In Chile the WC81, keeping the heritage of legal texts that preceded it, was essentially designed to regulate surface water, even though it included both surface and groundwater. However, the particularities of groundwater resources require, in several aspects, specialized legislation, which, in general is not considered in the WC81. In what follows, we review the main characteristics of the Chilean groundwater regulation model (Rivera 2015, 2016).

The Water Codes of 1951 (Gobierno de Chile 1951: Article 5°), of 1967 (Gobierno de Chile 1969, Article 5°) and 1981 (Article 2°) defined groundwater as "*those that are hidden within the core of the earth and have not been found"*. This conceptualization is part of the general provisions of all Water Codes dictated since 1951 in our country. The fact that they are not naturally visible complicates not only the knowledge and understanding of their characteristics and dynamics, but also their use, administration and control.

The current Water Code contains insufficient rules to effectively regulate groundwater resources. Thus, groundwater development has taken place in an institutional setting that placed no or few limits on groundwater use. In order to overcome this situation of regulatory scarcity, in 2014, the Supreme Decree N° 203 of 2013 of the MOP (Gobierno de Chile 2013), established regulation on groundwater exploration and exploitation. In this decree, the Executive recognizes the need to "*regulate the exploration and exploitation of groundwater, setting certain legal and technical regulations, within a framework of sustainability and efficiency without affecting the exercise of rights of third parties constituted on the same waters*".

Article 58 of the WC81 establishes that any person can explore in order to find groundwater on their property. However, exploration on public property requires an authorization by the DGA; should two or more petitions for exploration be presented for the same geographic area, the DGA will allocate the right through an auction.

If the exploration is successful and groundwater is found, the user can petition the DGA for a new groundwater right. The groundwater right petition must:

(a) Identify the aquifer from which the water is to be extracted;
(b) Define the quantity of water to be extracted, expressed in liters per second;
(c) Yield and depth of the extraction well;
(d) Specify the water extraction points and the method of extraction; and
(e) Define of whether the right is permanent or contingent, continuous, discontinuous or alternating.

The administrative procedure requires that this groundwater right petition must be published in the Diario Oficial, in a daily Santiago newspaper, and in a regional newspaper, where applicable. If there is competition for the solicited water rights, they are to be allocated through an auction.

The current regulation establishes that groundwater resources can be classified as: free, under restriction, or under prohibition. A groundwater resource classified as free implies that new WR can be granted to petitioners. Groundwater declared under restriction[7] only allows provisional WR to be granted; meanwhile, if it is under prohibition[8], no new WR can be granted[9].

At present, Articles 63 and 65 of the WC81 and Article 39 of the DS N° 203 establish that a Groundwater Association (GWA) must exist when groundwater is classified as restricted or prohibited. Even though 153 aquifers have a declaration of restriction and 4 aquifers have a declaration of prohibition, only 11 GWA are registered in the Public Water Registry or Catastro Público de Aguas (DGA 2016). This low number of GWA reveals the lack of understanding of the potential benefits of an effective collective management (Rivera 2016). In the absence of GWAs, the WC81 establishes that the DGA is responsible for controlling and monitoring groundwater withdrawals. However, evidence has shown that the DGA does not have the necessary resources (human, technical, and financial) to monitor all groundwater extractions (Montginoul et al. 2016; World Bank 2011).

Lastly, at present there is no conjunctive management of surface and groundwater, even though the WC81 reform of 2005 establishes that surface and groundwater must be jointly managed. Therefore, more than 12 years after the WC81 reform of 2005, groundwater continues to be individually managed, without effective controls and without joint management strategies with surface waters (Rivera 2016).

[7] The DGA can declare an aquifer under restriction if there is a risk of negative impacts of new WR on existing WRs.

[8] The DGA can declare an aquifer under prohibition if there is clear evidence of a risk of resource depletion due to over extraction.

[9] The DGA has the authority to provisionally grant groundwater rights in those areas that have been declared under restriction. The effects of these provisional WR on other groundwater use rights holders are studied. Should negative impacts be identified in these areas, these provisional WR are annulled by the DGA; *i.e.* groundwater may no longer be extracted with these WR. However, if no effects are identified after 5 years of water extraction, these provisional WR can become definite WR.

5.2.3.7 Legal Status of Desalinated Water

The WC81 only regulates inland waters, ruling out its application to maritime waters. However, both have the same basic legal nature of public goods[10]. In the case of inland waters, a WR granted by the DGA empowers its holders to exercise a right for its use. Maritime waters, on the contrary, do not require a use right. Investment and implementation of desalinization plants, however, require a license granted by the Ministry of Defense (MINDEF) to use an area of Chile's coastline[11].

Desalinization investment proposals must present an environmental impact assessment to the Environmental Impact Assessment System (SEIA). Thus, they must obtain the respective environmental authorization for its construction and operation, after an analysis of the compliance with environmental rules.

However, the lack of specific regulation on the matter, as well as the lack of planning can constitute an important barrier for the adequate development of this industry in Chile.

5.3 Water Quality and Environmental Regulation

Water quality and ecosystem protection were not relevant objectives of the WC 1981, its main focus was and still is on water quantity and allocation. The 2005 reform of the Water WC81 considered the environment as a special water-using sector incorporating the requirement to establish minimum ecological flows (MEF). This was reinforced with the 2010 reform of Chile's Environmental Law, Law 19,300, which regulates the protection of aquatic ecosystems through the implementation of ecological water flows. Article 129 bis 1 of the WC81, stipulates that when issuing new surface WR, the DGA must ensure the preservation of the environment, and for these purposes must establish MEF, which shall only affect newly constituted surface WR. However, it has been pointed out that before the WC81reform of 2005, most river basins located in the North and Central Macroregions were fully allocated, in some cases overallocated, and, thus, it has not been possible to fully implement minimum ecological flows due to the lack of water (Riestra 2018). River basins that have protected minimum ecological flows are mainly located in the Southern Macroregion where water is more abundant.

Chile's water quality regulatory system is led by the Ministry of Environment, since its creation in 2010, and is mainly regulated by the Law N° 19.300 of 1994, the Law N°20.417 of 2010 and the Law N° 20.600 of 2012. The basic regulatory water quality instruments are: (a) environmental water quality standards, (b) decontamination plans and strategies, (c) emission standards, and (d) environmental impact assessments for new investments.

[10] From a legal point of view.

[11] The use of Chile's coastline is responsibility of the Ministry of National Defense (MINDEF) – especially the Deputy Ministry of Navy- whose mandate is to control and supervise the entire coast and territorial sea.

5.4 Water Governance

Water governance in Chile has evolved throughout history according to the natural and social context in which water resources management has been developed. It has gone from a simple structure in the Colony to a model that is characterized by the coexistence of centralized and decentralized institutions (Vergara 2014; World Bank 2013). Centralized organizations comprise the administrative bodies of the State, in which the DGA plays the most important role. These centralized institutions include water quantity and quality management bodies and the judicial system that resolves most water conflicts. Decentralized bodies, on the other hand, are represented by Water User Associations (WUA), which are private organizations that manage and distribute water at the local level and are not part of the State administration.

World Bank (2013) identified 43 institutional actors in the form of institutions, management units or groups of users or stakeholders involved in the management of water resources in Chile (Fig. 5.1).

5.4.1 Centralized Institutions

Under the WC81, the State reduced its intervention in water resources management to a minimum and increased the management powers of WR holders that are organized in water user associations. The water resource management roles assigned to the State include the:

1. The constitution of WR.
2. Measurement and determination of water resources availability.
3. Generation and maintenance of the necessary water resources and WR market information that permits for a well-informed management of water resources.
4. Regulation of water resource uses avoiding third party effects and their overexploitation. For that purpose, the State must analyze the availability of water resources and potential water use conflicts before granting new WR and other authorizations such WR transfers.

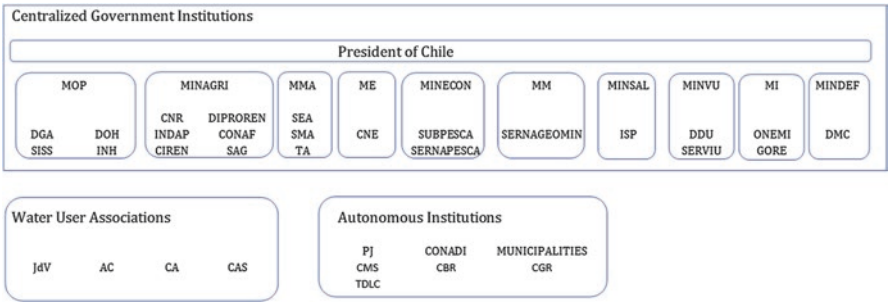

Fig. 5.1 Water institutionality. (World Bank 2013) (Institutional abbreviations are defined in the Acronyms Lists)

Table 5.1 Functions of the DGA

1. Surface and groundwater regulation	2. Develop and enforce national water policy
3. Granting WR	4. WR transfer authorization
5. Water resources information	6. WR market information
7. Update the public water registry	8. Promotion and oversight of WUA
9. Determine minimum ecological flows	10. Water rights use modification (e.g. water sharing)
11. Management of emergency situations due to flooding and droughts	12. Oversight and sanction in the hypotheses contemplated in the law
13. Water use monitoring and enforcement	

Source: Based on Donoso (2014), World Bank (2013), and Vergara (2014)

5. Conservation and protection of water resources and ecosystems, by means of an environmental impact assessment system and environmental policies.

The DGA, as the leading government agency in water resources management, develops and enforces national water policy. In this role, it has led efforts to amend the WC81 and developed a National Water Policy. Its main functions are presented in Table 5.1.

In general, the DGA has maintained a limited role in accordance with the paradigm of limited state interference on which the WC81 is inspired.

As previously pointed out, there are various institutions involved in water management, whose functions complement and/or compete with those of the DGA. The Waterworks Directorate (DOH) is a unit of the MOP that plans, designs, coordinates and supervises the construction of major hydraulic public works, such as water dams. Its programmes include not only infrastructure investment for water management, but also storm-water infrastructure, flood control, and infrastructure for rural drinking water supply. A third important institution is the National Irrigation Commission (CNR) of the Ministry of Agriculture (MINAGRI) that establishes the policies and plans for irrigation uses. The CNR is headed by a Council of Ministers and an Executive Director. The Council of Ministers that includes the Ministers of Agriculture, Economy, Development and Tourism, Finance, Public Works, and Social Development coordinates the institutions involved in irrigation and drainage. The CNR conducts research and implements projects in order to submit proposals to the Council of Ministers. The CNR also administers the subsidy whose objective is to encourage the adoption of water conservation technology by farmers (Law 18.450 of 1985).

An assessment of Chile's centralized water governance evidenced a low performance (World Bank 2013). This is mainly due to the following institutional weaknesses:

1. Limited institutional role of the DGA.
2. Lack of institutional coordination.

3. Deficiency in strategic water planning and management formulation and monitoring.
4. Problems in the generation and dissemination of relevant information for water management.
5. Lack of participatory instruments for an integrated water management.
6. Insufficient institutional budgets.

5.4.2 Decentralized Institutions

The WC81 entrusts water management, administration, and distribution, to water rights (WR) holders that are organized in WUA. These do not form part of the administration of the State, but exercise public functions (Rojas 2016). Water user management has existed in Chile since the colonial era (Melo and Retamal 2012).

Three types of WUA exist in Chile that are recognized by the WC81: water communities (comunidades de aguas – CA), channel user associations (associaciones de canalistas – AC), and vigilance committees (juntas de vigilancia – JdV). CA are comprised by two or more WR holders that (i) share the same water distribution channel or (ii) extract groundwater from the same aquifer or hydrogeological section of an aquifer. The AC considers all WR holders and CA that depend on the same channel system. Finally, JdV are comprised of all the water users, AC and CA that extract water from a shared river, river section, or stream. Table 5.2 presents the main functions of these WUA

According to official figures released by the DGA, as of December 2015, a total of 3489 water user associations were registered in the CPA: 46 JdV, 200 AC, 3232 CA and 11 GWA (DGA 2015). These figures do not include WUA that are organized but have not yet completed their formalization and registration process.

Many of these WUA have professional management (Donoso 2015). The effectiveness of some of these institutions in managing irrigation systems and reducing transactions costs for water market transactions has been noted (Hearne and Donoso 2005). However, according to the DGA and the CNR, a large percentage of these institutions have not updated their capacity to meet new challenges. Additionally, Bauer (1998) and Vergara et al. (2013) point out that WUA have not been effective in resolving conflicts.

In general, the performance of the WUAs is regular (World Bank 2011, 2013). This can be explained by the fact that an important proportion of WUAs do not fully satisfy Ostrom's 8 principles for an effective collective groundwater management. The main difficulties that limit WUA effective water management are (Vergara et al. 2013):

1. Legal and administrative obstacles in the determination of their statutes and rules of operation.
2. Lack of adequate professional management.

Table 5.2 Main functions of WUA

	Water communities	Channel associations	Vigilance committees
Water source on which they have influence	Artificial channels	Artificial channels	Natural surface water and groundwater sources
Jurisdiction	They act over the water flow that does not exceed the capacity of its channels	They act over the water flow that does not exceed the capacity of its channels	They have jurisdiction on the entire basin or watershed or an independent section of a natural stream or aquifer
Members	Two or more WR holders that extract water from a water channel	WR holders that extract water from a water channel system	Water Channel associations, water communities and individual water rights holders
Functions	Channel maintenance	Channel system maintenance	Water distribution and management in natural water sources – Both surface and groundwater
	Water distribution and management	Water distribution and management	Establish water sharing system under water scarcity
	Conflict resolution	Conflict resolution	Maintain water intake infrastructure
	Monitoring, enforcement, and penalties	Monitoring, enforcement, and penalties	Conflict resolution
			Monitoring, enforcement, and penalties
			Transfer of WR between different water intake structures
			Ensure that upstream water management decisions do not affect downstream users

Source: Author's elaboration based on articles 186 – 293 of the WC81

3. Insufficient budgets for an effective water management and to maintain and improve their water infrastructure.
4. Strong administrative presence and intervention in some basins where hydraulic works have been built by the State.
5. River and aquifer sections with autonomous and independent WUA, limiting an integrated water management.
6. Lack of effective integration of all water users in the JdV, especially groundwater user associations and non-consumptive WR holders.
7. Lack of complete registry of WR.

To address some of these concerns, the CNR, DGA, and DOH have implemented programmes to strengthen WUA (Peña 2001; Puig 1998).

5.5 Conflict Resolution

The main water conflict resolution bodies are

1. Ordinary Courts of Law (OCL): Given the inexistence of Specialized Administrative Litigation Courts in the country, water disputes are resolved by the Ordinary Courts of Law. The competent court is defined according to the type of conflict, but most water conflicts are concentrated in the Courts of Appeals (one in each regional capital) and in the Supreme Court, without prejudice to the intervention of Civil Courts that exist on the basis of each municipality or group of municipalities.
2. Comptroller General of the Republic (CGR): Although the essential function of the CGR is to review and control the legality of administrative acts, it is not unusual that this entity reviews certain disputes that arise between individuals and applied administrative procedures.
3. DGA: While the DGA also has no jurisdictional powers, in the facts it acts as a judge when conflicts arise in certain administrative procedures (whether during the constitution of new WR or relating to the exercise of WR). There are two rebuttal mechanisms for the DGA resolutions. One is the appeal for reconsideration, which is brought before the same administrative authority (Article 136 WC81), and a second one is a claim resource brought to the competent Court of Appeals (art. 137 WC81).
4. WUAs: These organizations have jurisdictional powers with express basis and legal support, corresponding to their board of directors the exercise of conflict resolution. These boards of directors of WUAs should act as an arbitral tribunal to resolve conflicts arising between its members on water allocation or exercise of their rights and those arising between their members and the user organization itself (Articles 244 to 247, 258 and 267 WC81).
5. Environmental Courts (TA): In 2010, the TA was created; these are a specialized environmental conflict resolution body. An important percentage of the conflicts resolved by the TA refers to water issues, focusing on resource quality issues.

WUAs are responsible for resolving conflicts of disputes among their members regarding the use of water rights WR (Rivera et al. 2016; Hearne and Donoso 2014). The power and ability to cope with conflicts within a WUA largely depends on the level of organization, such as budget, staff, and members' schooling (Rivera et al. 2016).

Water conflicts in Chile have increased during the past years (Vergara et al. 2013; Bauer 2015). Most of these controversies occur between the DGA and WR holders. In recent years, it is possible to identify some common focus and notes in water conflicts that are resolved by the OCL. There is evidence of a certain deference of the OCL to the DGA and, thus, few times the OCL sentence is in favor of the individuals. In the past years, however, the Supreme Court has shown a more energetic judicial control regarding DGA's action, especially with regard to standards, rules and principles governing the actions of the State's Administration.

There are multiple sources of conflicts. One of them are the conflicts that have arisen between users and the DGA with respect to the WR granting procedure and the definition of water availability. The procedures to regularize customary WR has generated conflicts between customary WR holders and the DGA, as well. The application of the non-use tariff has also been conflictive, in particular with respect to the definition of water extraction infrastructures.

In relation to all these sources of legal conflicts it is possible to note a lack of and need for water expertise by the Courts, in spite an improvement in the approach of High Courts of Justice to some of them in the last years. Therefore, and considering Chilean legislative tendency towards the creation of specialized Courts with administrative jurisdiction, consideration should be given to the incorporation of specialized water Courts, with a collective and interdisciplinary composition (law, hydrology, hydrogeology, engineering, and economics, among others) (Vergara et al. 2013).

5.6 Conclusions

The legal framework of Chilean Water Law is structured on the basis of a normative trilogy. In first place the DL N° 2.603 of 1979, which gave rise to the Water Code of 1981, and conferred legal recognition to customary and granted WR. Secondly, the Political Constitution of 1980, which, following the aforementioned DL N° 2.603, distinguishes between "constituted" and "recognized" water rights and establishes that WR holders have ownership over them and are constitutionally protected. In third place, the WC81, which has remained in force for more than 35 years, having been reformed in 2005. At present, a new reform of the WC81 is under consideration in Congress[12].

The Chilean water management model is characterized by the domains of the State, the WUAs and market in the fundamental functions of water use and management. Its essential characteristics are, (1) the WR ownership regime which guarantees to the owner the use and possession as any other good capable of private appropriation; (2) the application of a WR market; (3) the concept of a subsidiary State, and (4) the essential role of WUAs in the management of a common good.

Water legislation in Chile was designed, in essence, to regulate the use of surface waters. The WC 1981 did not pay much attention to the sustainable management of groundwater because at that time, groundwater extraction was a marginal water source. Even though special regulatory groundwater management regulations have been issued in recent years, groundwater has a terse legal treatment and several issues and problems persist, limiting an effective and sustainable groundwater management.

[12] Bulletin N° 7.543–12, registered in 2011 (http://www.senado.cl/appsenado/templates/tramitacion/index.php

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