

WATER POLICY IN CHILE AND BOLIVIA: A COMPARATIVE CASE STUDY

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By: Margaret Cartner

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The University of Mississippi

University of Mississippi  
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Approved:

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Advisor: Dr. Jeffrey Jackson

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Reader: Dr. William Schenck

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Reader: Dr. Marcos Mendoza

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## ABSTRACT

This thesis addresses three questions: why has universal potable water access not been achieved with the water policy changes made in Bolivia between 1990 and 2000? What can be learned from the water policy changes implemented in Chile between 1980 and 1999? Finally, what changes can be made to both countries' water policies to ensure the sustainable use of water resources? To answer these questions, this thesis reviews water policy changes in Chile as a result of World Bank loans before privatization in the 1980s and compare them to the water policy changes in Bolivia as a result of World Bank loans in the 1990s in the form of water privatization. I argue that water privatization is neither the solution to lack of water access nor the solution to water scarcity. Secondary sources were used to analyze the historical differences of water policy in Santiago, Chile and La Paz, Bolivia to see the effectiveness of privatization as a universal water provider and a solution to water scarcity. The results show that the water policy changes that were implemented in Santiago, Chile before privatization were more effective in supplying affordable water to citizens than the immediate privatization in La Paz, Bolivia. I also analyze the effectiveness of water privatization in both countries, as it pertains to the scarcity of water resources in each region. I argue that privatization of the water sector failed to prepare for water scarcity and I recommend institutional pluralism with sustainable water policy at the forefront as a solution to lack of water access and threat of water scarcity in Bolivia and Chile.

## INTRODUCTION

Global water supply is decreasing worldwide, bringing water resources to the forefront of policy concerns. A government's need to provide universal water access to its citizens is a global issue as it is necessary regardless of level of economic development. In recent decades proposed water policies have been implemented in South America to solve the lack of quality water access to urban citizens at affordable prices. La Paz, Bolivia and Santiago, Chile are two cases in which national governments changed water policy in order to improve water allocation, with distinct results. Influenced by neoliberal economic frameworks, both countries introduced water policy changes centered around the privatization of water resources.

David Harvey explains that neoliberalism was the “guiding principle of economic thought and management” in the late 1970s and early 1980s (Harvey 2007: 2). He defines neoliberalism as “a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets and free trade” (2). To implement these ideals, neoliberalist thought encourages the creation of markets in order to act as “an ethic in itself, capable of acting as a guide to all human action, and substituting for all previously held ethical beliefs” (3). It is for these reasons that neoliberal leaders such as those in the World Bank and International Monetary Fund (IMF) during this time period encouraged governments to use market exchange to maximize the distribution of social goods by bringing “all human action into the domain of the market” (3).

One of the frameworks neoliberal theorists introduced in this time period was the privatization of national enterprises such as gas, water and electricity. In this paper, privatization is defined as the “ownership of built facilities and the right to profit from the use of those

facilities” (Maestu 2013: 4). Governments in Latin America privatized these utilities in an effort to encourage investment and efficient allocation of resources by introducing them to free market activity. As part of privatization, the Bolivian government changed the water utilities to private companies and sold them to international water companies in order to bring expertise and international investment into its water systems.

The Chilean government however, created a water market in which private water rights were sold to individuals. The distinction between these private water rights and privatization of water utilities is important in this paper because one is the privatization of a company in which the company has the right to the water rights within the city as well as build and profit from facilities that distribute water to citizens. So in the privatization of water utilities, a private company is given rights to water resources in the city in which it operates. Private water rights however allow for a water market in which the rights to *access* water resources can be bought and sold. This market will be further explained later in the paper.

The 1970s economic recession in Latin America led to the implementation of neoliberal economic policies that encouraged the privatization of public resources such as water, gas and electricity (Spronk 2007). The privatization of water resources in Bolivia, was a mixture of policies implemented by President Sánchez de Lozada as a condition for receiving international aid from the World Bank in the 1990s (Laurie and Crespo 2007; de la Fuente 2003). Bolivian water policy changed as the water systems were sold to private foreign companies in an effort to use the foreign investment and revenue gained from the commodification of water to provide universal water access in its cities, La Paz and Cochabamba (Laurie and Crespo 2007).

The late 1990s and early 2000s in Bolivia experienced public sector privatization, social unrest and political turmoil as the government tried to follow international advice and privatize

state enterprises such as water, gas and electricity (Spronk 2006). The debt crisis of the 1980s caused the World Bank to intervene in the Bolivian national economy and encourage privatization with “full cost recovery” in which all costs should be paid for by users and the elimination of water subsidies by the government (de la Fuente 2003:98). The Bolivian government started with the privatization of other industries such as mining which led to increased unemployment and urban migration of citizens in search for jobs (Spronk 2006). The increased populations in urban areas such as La Paz and Cochabamba created a demand for the expansion of water services and President Lozada, with the influence of the World Bank, introduced the privatization of the water company SEMAPA as a way to provide that (Spronk 2006). Privatization in La Paz and Cochabamba in 1997 and 1999 respectively led not to universal water access for their citizens, but instead led to social movements that demanded that the newly privatized water companies leave the country and the municipal water system return to government control (de la Fuente 2003; Laurie and Crespo 2006).

In 2000 a social cooperative, Coordinadora de Defensa del Agua y de la Vida, led protests with up to 50,000 people in which they demanded the removal of the monopoly on water rights given to *Agua del Tunari*, the international company to which the government sold the water system in 1999 (Spronk 2006). After renegotiations to which the government agreed to lower water prices to their original level within two months, but after failing to meet its promises, the Coordinadora built blockades and 100,000 people protested in the street (17). The Coordinadora successfully expelled *Tunari* on April 9, 2000, returning the water system back to the government (17).

Social movements inspired by the Coordinadora against *Agua del Illimani*, the international company that bought the water system in La Paz and El Alto, started in 2000 as

leaders in El Alto joined the Coordinadora from Cochabamba to make its own branch to protest the monopoly *Illimani* held over the water resources in the city (Laurie and Crespo 2006). The consequent Federation de Juntas Vecinales de El Alto (FEJUVE) would lead the movement against *Illimani* for the next five years until in 2005, the company agreed to leave the city and sell the water company back to the government (Laurie and Crespo 2006: 844).

In addition to the universal potable water provision, water privatization is a proposed solution to water scarcity as the market price would encourage consumers to use less water and therefore protect water resources (Perry, Rock and Seckler 1997). As different as the water policy change implementation was in Santiago and La Paz, the ecological results were similar. The decrease in the size of glaciers that feed the water sources La Paz due to climate change and the “over exploitation of water basins” in Chile are leading to year-long droughts causing the cities to suffer from water shortages (Martinez 2017; Lagorio 2014a: 1). Changes in water policy and the implementation of privatization has not led to the ecological protection of water resources as it was proposed to do as a side-effect of creating universal water access for citizens.

The history of water policy in Chile is comparable to that of Bolivia as the change in economic policy that came with the Pinochet government (1973-1990), privatized major public enterprises including the water sector (Bauer 1998). This type of privatization is different than that of Bolivia because private water rights were granted to individuals, while in Bolivia, universal water rights to all water resources were sold to a single company. In addition, the Chilean water company, EMOS, implemented two major water rehabilitation projects with the financial aid of the World Bank in 1980 and 1986 which managed to expand water infrastructure and develop a price system that subsidized the poor users. Chilean water policy changes occurred over the course of nineteen years (1980-1999) as a way to provide universal potable water access



in Santiago before the privatization of EMOS in 1999, and succeeded. Even with this successful hybridization of the water system in Santiago and the eventual privatization of EMOS, however, Santiago is facing water scarcity due to the regression of glaciers and pollution of mining companies, just like La Paz (FSRN 2016; Archundia, Duwig, Spadini, Uzu, Guerdrón, Morel, Cortéz, Ramos, Chincheros, and Martins 2017).

### Research Question and Hypothesis:

Water availability is important as it is necessary for life. It is at the forefront of peoples' minds in Bolivia and Chile as they see their water resources depleting and suffer days without water due to rationing. Water policy is becoming increasingly important as water scarcity threatens to limit water availability and therefore the lives of citizens in Santiago and La Paz. My questions are: 1.) Why has universal potable water access no been achieved as a consequence of the water policy changes in Bolivia between 1990 and 2000? 2.) What can be learned by comparing the Bolivian case with the water policy changes implemented in Chile between 1980 and 1999? And 3.) What changes can be made to both countries' water policies to ensure the sustainable use of water resources in the future?

I hypothesize that the success of the Chilean water market changes lies in the slow implementation of the changes as well as the changes as a social development investment on the part of the water company. The investment made by *Empresa Metropolitana de Obras Sanitaria* (EMOS) in the Santiago water system led to the successful allocation of water and a price system that allowed all users to afford it. Meanwhile the failure of the Bolivian water policy changes lies in the absolute control over water resources given to a foreign private company, which sought profit rather than expansion for the fair distribution of this social good, along with the quick

implementation of privatization without investment or policy change beforehand. I think that institutional pluralism, investment in technology and encouraging societal understanding of the finite nature of water resources will be necessary to ensure the sustainable use of water resources in other countries.

## LITERATURE REVIEW

### *Water Allocation:*

Water allocation law has been in effect since Ancient Mesopotamian times as humans have tried to fairly distribute one of the most important resources in our world. It was created to regulate the use of water resources as a public good to ensure that the use of water by one citizen did not impede the use of the same resource by another citizen (Cech 2005). Every ancient empire expanded on the rules and regulations in regards to water allocation, the first of which to name their code being the Roman Empire. The Romans dictated the Common Law of Water, or the Riparian Doctrine. According to these documents, “water in a stream belongs to the public for use by fisherman and for navigation and cannot be controlled by private individuals” (Cech 2005: 213). Another idea implemented in the Roman Law is “reasonable use,” meaning use is limited to that which contributes to production as long as navigation is not interrupted.

Additionally, the Riparian Doctrine required landowners to return any diverted water back to the stream or river after use without any change in quality or quantity. With the Spanish in the 13<sup>th</sup> century, the government altered the Riparian Doctrine to make water resources the property of the crown. This shift is important to my project because the Spanish influence upon Latin America was so significant through colonization and remains significant today.

The Spanish government created *Las sietes partidas* as their governing doctrine for water allocation that claimed that all “water, land and minerals” belong to the crown (Cech 2005: 214). According to the *partidas*, private ownership required special permission from the crown but rainfall and water flow could be accessed without such permission. When the Spanish Empire stretched to the New World, it used the *sietes partidas* to give colonizers autonomy to extend

water allocation so as to make the land more productive and therefore more profitable for the crown. With Madrid so far away from the colonies, the crown allowed each town to regulate their own water allocation and often encouraged the continuation of water allocation systems put in place by native populations. Water allocation was seen as a necessity for growth and sustainability and was divided up as such to fairly supply all of the inhabitants of a city or town (Cech 2005: 215). Today, water is not as ubiquitous as it once was. Freshwater resources are depleting and becoming polluted and human demand for the resource has increased along with population, leaving a difficult set of decisions to be made in the way of adequate dispersion and equal access for all.

Latin America is known for its lack of “development” compared to the “more developed” nations in North America. There are numerous strands of thought as to why this is the case (Acemoglu and Robinson 2012). One of the most prevalent issues today is water allocation and the potential for limiting growth and development within Latin America (Easterly and Serven 2003). Geographically speaking, Latin American countries have a wide array of environments from forest to arid lands to coastal regions. This makes water allocation difficult because some areas have access to plenty of water while other areas have none. On top of this, climate change is altering the game in regard to the amount of water available in different places. Because of this, water allocation is becoming increasingly important and countries are seeing the need to reorganize their allocation systems in order to protect their industries, citizens and land.

One suggested solution to global water scarcity is water privatization (Perry , Rock and Seckler 1997). Treating water as an economic good has the potential to encourage investment in the water sector, and limit usage as people recognize that increased usage leads to higher prices and lower supply (Perry et al. 1997). Because of people’s inescapable need for water, however,

water privatization faces criticism particularly when its implementation has proven to be difficult. Efforts to privatize water in Latin American have led to social movements demanding water as a human right rather than an economic good.

In most countries, including Bolivia and Chile, water is considered a public good, meaning that all citizens have the right to use it. Problems arise however when the use by one citizen affects the use by another, meaning contamination, overuse, or rerouting, known as “third party effects” or “externalities” in this context (Donoso 2006). Furthermore, governments can often not afford to supply good quality water to all of the country’s citizens because of inefficient infrastructure, lack of engineering expertise, and corruption.

In the mid 1900s, Latin America adopted protectionist policies such as import substitution to try to keep wealth and economic growth within the country. As such, the governments were responsible for the supply and management of multiple industries that were not able to attract foreign investment. While Import Substitution Industries (ISI) sparked significant economic growth for Latin American countries, high interest rates and lack of foreign direct investment caused economic stagnation, and their international debt grew, bringing the World Bank to intervene in the economies of these countries. As a result of the increased international debt, the international lenders sent economists to the indebted countries such as Chile and Bolivia. Economists encouraged privatization to spur foreign investment and spark economic development to lead to the end of international debt. Since these economists recommended privatization as the solution to economic stagnation, the World Bank set privatization of public services as a requirement to receive financial aid (De la Fuente 2003).

In the 1980s international aid corporations encouraged developing countries to adopt liberal economic reform as a stipulation for continued financial aid. As such, many Latin

American countries privatized their public industries, such as electricity, mining and water. The process of privatization cost many citizens their jobs, encouraged urbanization and increased the prices of these goods so much that citizens and social movement organizations resisted the privatization brought by the “developed world”. While each country underwent a unique reform, results were often similar as citizens started movements to fight the privatization of their industries.

Privatization fits into the school of thought known as Integrated Water Resource Management (IWRM) through which academics and water experts have tried and are trying to enhance global water availability. IWRM is defined as “the process of promoting the coordinated development and management of water, land and related resources to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Setegn and Maria Donoso 2015: 2). Privatization is a proposed form of IWRM as an option for water allocation expansion. A review of the scholarship on water privatization is useful for our purposes here.

*Privatization:*

Josefina Maestu, Director of the United Nations Office to Support the International Decade for Action “Water for Life”, defines water privatization as “ownership of built facilities and the right to profit from the use of those facilities” within the water sector (2013: 4). Privatization in the cases of Santiago and La Paz includes the unlimited water rights granted to the water companies in each city. The hope of water privatization is that the pursuit of profit will lead to better service, infrastructure and quality while also encouraging water users to limit their use (Maestu 2013). Privatization also would ideally bring foreign direct investment, allowing the

financing of water services to come from outside the country and give water companies the incentive to expand water supply while improving water service.

In Maestu's book, she describes the water trading experience in the western United States to demonstrate the successful use of a water market. Here, the water price system allows for different users to pay different amounts in order for different sectors to use the appropriate amount of water to remain productive. The agriculture sector, for example, is charged less than urban users in the western United States because its products benefit all of the citizens (Maestu 2013). An important aspect to this water market however is the high amount of investment required to keep the water market running. Latin American nations often lack the technology and the capital to finance the same systems.

According to CJ Perry and his colleagues, Coordinator of Research at the International Irrigation Management Institute, a non-profit scientific research organization focused on the sustainable use of water resources in developing countries, the public sector has failed in its responsibilities to provide water to its citizens in Latin America. In his article "Water as an Economic Good: A solution or a problem?" he explains that the public sector allows corruption to plague the water supply systems (Perry et al. 1997). Since powerful water users can bribe the officials in charge of water management, incentives are separate from performance (Perry et al. 1997). These problems lead to the same inequalities that have always plagued developing countries; the few rich benefit from the corrupt system while the poor masses suffer.

For Perry et al., privatization is the solution. It can free up government resources, encourage efficiency and allow the rich and poor to invest equally into water systems. Pricing systems would be set up to ensure that the water the citizens depend on for life is charged at a lower rate than the excess usage of water by the people who can afford it. In line with this

thinking, Perry describes water markets as the best way to introduce water privatization. Water markets would allow for water to be used according to value to individual users, and subsidies would allow for poor users to have water access.

John Cohen and Stephen Peterson propose institutional pluralism as the alternative to privatization in public sector products. Institutional pluralism is centered around the idea of breaking up monopolies. To do this, institutional pluralism divides roles spatially (or geographically) instead of by institution (Cohen and Peterson 1999). According to David Osborne and Ted Gaebler, as cited in Cohen and Peterson's book, the government should act as an entrepreneur that can "structure the marketplace to fulfill a public purpose" (Cohen and Peterson 1999: 87). This idea is that the government should also be a participant within the market. The idea behind their proposal is to use private market resources to facilitate the sale of public resources while the government monitors the market in order to assure water access for all citizens. This way, multiple companies (private and public) can compete to supply consumer demand while the government manages the market to ensure the sustainable use of water resources as well as affordable water access. These companies would compete within regions in which the local government would dictate the limitations of the market to best represent the population they would serve.

#### *Ecological Issues:*

The ecological effects of water use are becoming increasingly important as fresh water resources become scarce. Chile and Bolivia both rely heavily on glaciers for their freshwater supply. Climate change has resulted in significant glacier recession making citizens aware of the need for sustainable water resource management (Martinez 2017). Perry claims that treating



water as an economic good would endanger the long-term sustainability of water resources as companies would try to increase sales and therefore water usage (Perry et al. 1997). If privatization leads to financial incentives for the companies to sell more water, then the water resources of a country are not being used in the most sustainable way. With the recession of glaciers, Bolivia and Chile cannot afford to waste water resources simply for the financial gain of a private company, water is not a resource that a civilization can survive without.

Professor in Water Management at the University of Twente in the Netherlands, A. Y. Hoekstra founded the concept of a “water footprint”. He defines a *blue water footprint* as the “consumptive use of ground and surface water flows” (Hoekstra and Mekonnen, 2012). In his study, *Global Monthly Water Scarcity: Blue Water Footprints versus Blue Water Availability*, he and his colleagues explain the blue water footprint of the inhabitants of 401 different river basins throughout the world by measuring the level of water scarcity in each region. The degree of water scarcity is determined by the ratio of the blue water footprint in a basin to the blue water available. The *blue water availability* is the “volume of water that can be consumed without expected adverse ecological impacts” (Hoekstra, Mekonnen, Chapman, Matthews and Ritcher 2012). In this study he recognizes the seasonal change in water availability and studies blue water scarcity by month rather than year. This allows us to see that average water availability per year does not accurately depict the level of water scarcity in different seasons. This is important because as the seasons change, water availability changes and therefore the severity of water scarcity also changes. Hoekstra et al. reveal that in a given year 201 basins, half of the basins studied, with 2.67 billion inhabitants experience severe water scarcity at least one month of the year (Hoekstra et al. 2012: 3).

Hoekstra et al. explain that many societies overuse their water resources such that the ecological health of the river basins is changed. His “presumptive environmental flow requirement” specifies that water consumption of a river basin should be less than 20% of the water available in order to protect the ecological health of the river basin. This is an important idea for water policy to acknowledge in order to produce sustainable water policies for cities that will allow future use of these resources.

Although this report lacks specific data on Bolivia, the data show that areas in northern Chile suffer 12 months with water scarcity over 100% and areas in Argentina have up to three months a year of over 100% water scarcity. Water scarcity over 100% indicates that the water usage of the river basins in these areas is over 20% of the blue water availability and therefore is not sustainable. Hoekstra’s definitions and frameworks are important for the context of water usage and scarcity in these two countries. As increased urbanization endangers the quality of water, glacial regression threatens water availability. In the face of the scarcity of such a vital resource, experts on water management have proposed a myriad of solutions that include more efficient and productive water systems and keeping the presumptive environmental flow requirement in mind while making water policy.

Stephen Brichieri-Colombi proposes a Water in the National Economy (WINE) strategy as an alternative to privatization. According to Brichieri-Colombi, water planners should be decision makers “over the Earth” and should be trusted to solve water scarcity with solutions other than increased infrastructure (Brichieri-Colombi, 2009). He proposes that we look at water in a socio-economic context and consider solutions that alter the demand and supply of water rather than the appropriate policy for the distribution of it. He believes that thinking of water simply as a commodity is not enough. Instead, we must now consider variables that were

previously considered “externalities” such as social contexts and political regimes in order to fully consider the water resources and availability around the world.

Brichieri-Colombi’s theory is one not used in water policy in either country but it is supported by my research in that social contexts and political regimes defined the water availability in these countries. Furthermore, his theory of decreasing water usage as a social change rather than a policy or economic one is important for my study because environmental protection is not usually a priority in the most efficient forms of production in industries outside the water sector. A societal understanding for the need to protect water resources is important for the future so that citizens are more conscious and therefore support more sustainable water policy.

All of these frameworks come into play when discussing the water policies in Chile and Bolivia, as both countries tried to create water systems that would finance themselves and still allow water access to all of their citizens through privatization. The ecological contexts of these countries are similar as they are both experiencing glacier regression and as a consequence, water scarcity. Water resources on Earth are becoming increasingly scarce and therefore increasingly valuable. In this paper, I research the water policies of Chile and Bolivia in an effort to build a holistic historical account of how water policy has affected water access in each country and furthermore, how those policies have prepared for the threat of water scarcity. Previous research has analyzed water availability for citizens in La Paz and Santiago, however this research analyzes these water policies as they pertain to water availability and proposes changes to water policy to best handle water scarcity in the future.

## METHODS

For this paper, I have compiled and analyzed secondary sources to depict the water privatization implementations in Bolivia and Chile and demonstrate how these frameworks did not successfully supply their citizens with affordable water nor did they protect the sustainability of their water resources. I use historical analysis of water policy politics to show how social political histories affected the water policies and how those in turn affected water availability as we see it today.

I used the university library databases to collect articles on water policy in Bolivia and what led to the Bolivian Water Wars. As I found information on the water policy and the transition to privatization in La Paz and Cochabamba, Bolivia, I read further into water policy frameworks literature from all over the world. I found the water market in Chile to be the only one in the world and one of three regions (including Australia and the western United States) to separate water rights from property rights. Since Bolivia and Chile are neighbors and water is a geographical resource, I wanted to compare the relative success of the water policy in Chile to that of Bolivia.

I consulted studies with specific price, allocation and environmental data to compare the results of water policy in both countries and to propose water policy changes to provide water access to the citizens of each country. I compare proposed Integrated Water Resource Management frameworks and their implementation in each country with their respective outcomes to propose a water policy framework in which a societal and political shift will allow for water resources to be treated with financial and social value as it is a resource that is not solely an economic nor social good.

## EMPIRICAL CHAPTER A: CHILE

### *Water Policy History*

Carl J. Bauer, an expert in the field of water policy and water rights gives a brief history as it pertains to water policy in Chile in his book *Against the Current: Privatization, Water Markets, and the State in Chile* (1998). The history of water policy in Chile can be analyzed from the economic downturn in the 1920s and subsequent protectionist policies. The government invested heavily in infrastructure and industry as well as encouraged import substitutions which led to the virtual isolation of Chile as it closed itself off from international trade (Bauer 1998: 3). The 1960s in Chile were plagued with slow growth, chronic inflation and high poverty rates. During this time, the reformist party, inspired by the Cuban Revolution like much of Latin America in this era, in the form of the Christian Democrats, gained political power in 1964 with Eduardo Frei (Bauer 1998: 4). Frei increased the state's economic intervention, including expanding state authority over water use.

In 1967 the Christian Democrat government passed the 1967 Agrarian Reform aimed to redistribute wealth by redistributing large pieces of land amongst peasant farmers and farm laborers (4). In the process of redistributing land, the government often expropriated land without compensating the original owners. Frei's socialist agenda was carried on by his successor, Salvador Allende, who expanded the state role in the economy and accelerated the actions of the Agrarian Reform (4). He nationalized private industries in an effort to immediately control the financial status of the nation. According to Bauer neither Frei's nor Allende's plans achieved the social equity they set out to gain, and Allende was overthrown in a military coup by Augusto Pinochet and his military Junta (4).

The authoritarian government focused entirely on free-market principles and economic reforms, in reaction to the socialist policies of previous leaders. With the help of the Chicago Boys, men who studied at the University of Chicago (the leader of academic neoliberal thought of the time), the new government reduced the state's role in planning, regulation, ownership and provision of social services (5). The new model opened the country to the world economy by being export oriented and emphasizing comparative advantage.

Debates between what Bauer calls the hardliners (authoritarian nationalists) and the softliners (Catholic corporatists or gremialistas, and neoliberal economists) led to the creation of the Constitution of 1980. Within this constitution, chief architect and gremialista Jaime Guzmán, set up a “new institutional order” to set the framework for what they called a “protected democracy” (13).

Part of this framework was the Water Code of 1981 in which the Chilean government set a basis for how water rights were to be distributed thereafter. Professor of agrarian economics at the Pontificia Universidad Católica de Chile, Guillermo Donoso, writes extensively of this code and according to him, it dictated that water is “national good for public use” (Donoso 2006: 158). It protected water use rights, and granted permanent, transferable water-use rights to individuals with the goal to create efficient allocation of water through market transactions (Donoso 2006). In an effort to make the water allocation system function like a free market, the Code created water use rights (WUR) and allowed them to be traded freely. The right of use over water has the same constitutional rights as those for property, allowing individuals to “use, enjoy and legally dispose of water with complete freedom” (159). The government made these efforts in order to set up a water rights market in which supply and demand would allow for water to be transferred from lower to higher value activities. This means that whoever values the use of the WUR the

most, would pay the highest price and therefore WUR owners would use them for the most efficient purposes. The Water Code also decreased the intervention of the government in the institution of water, and transferred that responsibility to water user associations (Maestu 2013).

The definition and application of WUR is specific and complicated. Guillermo Donoso, a professor in the College of Agriculture and Forestry Engineering at the Universidad Católica de Chile, explains the different types of WUR, and how they are allocated in his article “Water markets: case study of Chile’s 1981 Water Code” (Donoso 2006). The application to gain water allocation rights includes three main components. The applicant must identify the source from which the water is to be gathered, with the specification of surface water versus ground water. Secondly, he/she must also indicate the quantity of water that will be extracted (in liters/second). Third, applicants are to specify which points along the source the water will be extracted and lastly, note whether the right is “consumptive or non-consumptive, permanent or contingent, continuous, discontinuous or alternating” (Donoso 2006: 160). Applicants need not be landowners, they can apply for water rights independently from their property ownership.

*Consumptive water use rights* are surface and groundwater WUR that “does not require that the water be returned after being used, and the owner of this right may totally consume the water in any activity” (Donoso 2006: 160). *Non-consumptive water rights* are rights in which the right owner may divert water for use but must return it unaltered to its original channel (Donoso 2006, 160). Non-consumptive rights may not interfere with consumptive water rights by altering quality nor quantity (160). *Permanent water rights* include the right to use water in certain amounts, measured as volume by unit of time. *Contingent water rights* are those that allow rights owners access to a water source only after permanent water rights owners have satisfied their needs (160). In a time of scarcity however, both permanent water rights owners and contingent

water rights owners split water flows evenly (160). *Continuous water rights* allow right owner to access water any time of day or night any day of the year while *discontinuous water rights* only give owners access to water for specified periods of time (Donoso 2006). Finally, *alternating water rights* allow for two or more owners to use the water resources “successively” (Donoso 2006: 160).

At first, applying for WUR was free and the application only needed only be published in the *Diario Oficial*, the daily Santiago newspaper and again in the local newspaper wherever the applicant applied for his/her WUR (Donoso 2006). Auctions were held by the government to resolve any water right competition, the WUR going to the highest bidder and therefore ideally routing water usage to the highest value activity (Donoso 2013). Free WUR and no minimum requirements for usage led to water hoarding. Eventually the state discussed non-use tariffs to prevent false water scarcity, but they were never enforced because agricultural WUR owners preferred to keep their rights in the chance of water scarcity (Donoso 2013, Bauer 1998). If there is a societal interest in the allocation of water that cannot offer the highest bid, the President of the Republic can overturn the bidding process and allocate the available water accordingly (Donoso 2006: 162). New water rights can be granted but they must go through the same application process and must prove that the new rights do not infringe on any already allocated WUR (161).

As far as water management however, WUR owners are mainly responsible for their water resources. As such, WUR owners created Water User Associations (WUA) in which WUR owners can manage the trading of water rights and oversee their usage. There are three types of Water User Associations: water communities, vigilance committees, and canal user associations (Donoso 2013). Water communities are any formal group of users that share a common source of

















































































































