Chile: A Dynamic Water Market

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Libertad y Desarrollo (www.lyd.cl)

March 2009

About the Author

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INTRODUCTION

Thirty years ago, Chile's water management was not very different from water management in many parts of the developing world today. Management was top-down, there was excessive intervention from administrative authorities, and provision of water services was relatively poor. Yet today, Chile boasts near universal coverage of water provision in urban areas and 72 per cent coverage for rural households, one of the highest rates in South America.[1]

This is largely due to the emergence of water markets in Chile, where rights to water resources have been traded freely for over two decades. Chile successfully created an appropriate institutional framework that permitted ownership of water resources, independent of land ownership, and the free transfer of these water rights between users.

1981 WATER CODE

Chile's Civil Code of 1857 (inherited from Spanish law) recognized that "the rivers and all waters running within natural banks are national goods for public use", and access to them was granted by "competent authority". But the terms of use were restrictive: water could only be utilized for the single use for which it had been approved, and the authority could revoke its grant if the terms of use were not respected.

For much of the 20th century, the central political administration made decisions as to whom water rights were granted and for which uses. There was little understanding of relative quantities of water (e.g. where water was abundant or scarce). Likewise, some users benefited from a generous allocation of water grants, while nearby users were left struggling.

The Water Code of 1981 changed this by applying market mechanisms to the re-assignment of water rights. Within its clauses, the Code stresses the establishment of well-defined property rights. Not only do these water rights contain the right to use the water, but also, the owner benefits from and disposes of it. Rights are assigned definitively and in perpetuity. Water is considered to be an asset in itself (as opposed to an asset tied to land ownership) which means that water rights are transferable independent of land ownership.

Under the Code, water remains in the public domain, but users are awarded the same protection over individual water rights as one would have over land property. This security has allowed for the efficient allocation of water for different uses -- whether industry (such as mining companies and electricity generators), agriculture or household consumption. It also gives legal security to investors in those enterprises. In turn, this incentivizes the owner to manage and improve the quality of the water resource. This governance structure was developed to take historical or common law property rights into account, and it incentivizes existing owners of water rights – especially small farmers – to register their property (a process that is still ongoing).

In addition to the free play between supply and demand, another considerable benefit yielded by this market-based system is the efficient allocation of available water to

1 World Development Indicators Online, World Bank, accessed March 2009.

different uses. Water rights are awarded ultimately to the most efficient projects and uses. Unlike the preceding system, no use of water is awarded legal preference over another and no permission must be obtained for different types of use. Similarly, no user is given priority over another. The administrative authority (Chile's General Water Directorate) cannot refuse to grant water rights provided that water is available and that the grant does not prejudice others who have already applied for water rights. In addition, the central authority no longer has the right to terminate water rights if they are left unused by their owners. All of the above rules work together to guarantee that water is adequately priced, that supply and demand are linked to each other, and that ultimately, water resources are allocated between and by different users – not by a distant, misinformed administrative authority.

Another key element in the allocation of the resource has been the incorporation of a bidding mechanism to award both surface and underground water rights, when two or more parties are interested in the same water resource and there is insufficient availability for both. The only difference is that in the case of underground water, the auction is closed, meaning that only those who applied alongside others six months prior can participate. This difference means that the greater costs needed to develop infrastructure and connect to the groundwater can be covered. In the case of surface water, the auction is open and any user can bid.

Finally, one of the key components of this governance regime has been the establishment of a mechanism to solve any differences that may arise between the different users of the water originating from the same sources. When conflicts do arise, the board of the users' association works as an arbitrator, and disgruntled users can also appeal to the Courts of Justice. Protecting users' water rights is crucial to preserving confidence in the market mechanism and its proper functioning.[2]

In the years following the 1981 Water Code, vibrant markets emerged around water resources. Users that could use the resources most efficiently, often water and sanitation companies, became some of the biggest buyers of water rights. As demand for water increased, companies increased the price of water in urban areas to adjust for the mismatch between supply and demand, and to reflect increasing scarcity in certain areas. They also invested heavily in improvements to infrastructure, so as to minimize water losses.

WATER AND SEWERAGE

In 1988, a new regulatory regime for water and sanitation was established. The government reorganized the sector under 13 public regional water companies. There were only two main public companies prior to this; one that serviced the capital and one in the second largest city. Both were replaced by two new public companies. Public services of water provision through government ministries were also consolidated into public companies. The public authorities recognized that water was not an unlimited resource and that public sector prices did not reflect the actual economic and environmental costs of providing water and sanitation. In a first step towards

2 For more information, see (Donoso, 2006)

privatization, the government applied a "crawling peg" mechanism, which applied a gradual increase in water and sewage rates.[3]

In 1998, the government began the partial privatization of the water companies. Within three years, five out of the 13 companies were privatized, and these five served more than three-quarters of Chilean households. As of 2001, the government decided not to privatize other public water companies, but to grant 30-year concessions to the private sector. This is the case for seven of the 13 companies that were previously public. The remaining company, ESSAM, was bought by one of the five companies that were privatized earlier.

Comparisons of efficiency and performance between the privatized companies and those that remained public are revealing: On key indicators of efficiency analysed by Chile's Superintendency of Water and Sanitation Services (the water regulator – SISS), private companies showed an improvement, while public companies' performance actually deteriorated.

- Private companies invested 70 per cent more in 2001 than they did in 1998 – but public companies invested almost 70 per cent less in the same time period.[4]
- Rates charged by private companies did increase 20 per cent more on average than public company rates, but much of this difference can be explained by the substantial difference in investments.
- In addition, "the rates charged by private companies are still 40 percent lower on average than those charged by their public counterparts". (This difference may partially be explained by the fact that the government retained control over the highest-cost companies, primarily those located in drought-prone northern Chile.)

However, efficiency in water use was clearly superior in private companies than in public ones, and improvements were made at an astounding pace. As a result of adjusted water rates, consumers reduced their water use by almost 10 per cent in almost three years.

THE EVIDENCE ON WATER MARKETS

The establishment of water rights, combined with the government's steady retreat from water provision, has encouraged a sustainable use of resources, especially in areas where water is relatively scarce. A wide range of studies confirm that in areas prone to water scarcity, there is vibrant trading in water markets.[5]

A recent study on water rights transactions[6] analyses the performance of the water market in the Limarí basin, which irrigates on average 32,000 hectares of farmland every year.[7] The study concludes that the market for water rights (both permanent rights and temporary usage rights) is quite developed and efficient. From 1980 to 2000, the percentage of reassigned water rights in each water users' association,

3 (Bitrán & Valenzuela, 2002)
4 (Bitrán & Valenzuela, 2002)
5 See (Gazmuri &Rosegrant, 1996; Ríos & Quiroz, 1995; Hearne & Easter, 1995; Donoso, Montero & Vicuña, 2001), as quoted in (Donoso, 2006)
6 (Cristi et al., 2000)
7 (Zegarra, 2002)

independent of land, fluctuated from 20% to 50%. Increases in prices (ranging from 41% to 240%) in the period 1986-2000 indicate that the market really does reflect the relative scarcity of water resources – and thereby, water is being used in higher-valued activities.

At the same time, the Chilean Water Code has also granted a great degree of security to investors. This has benefitted farmers, the mining industry, electricity generators, and companies who provide water services, amongst others, because they have been able to develop their projects with reliable access to water as an input. Sixty-eight percent of water withdrawals are non-consumptive, used for the generation of hydroelectricity.[8]

- Initial estimates of efficiency improvements yielded in agricultural water use, covering the period 1975-1992, are between 22 and 26 percent.[9]
- Following privatization of the water companies, urban areas have nearly 100% coverage for drinking water and 95% coverage for sewerage. As of late 2007, coverage of sewage treatment (e.g. wastewater being treated) in urban areas was at 82.3%, whereas in 1998, it was only 17%.[10] With the incorporation of sewage treatment, the price of drinking water increased commensurately to generate revenue for investment in this new service.
- Water use in wood pulp production has fallen by 70 percent.[11]
- Water use efficiency has also improved in Chile's mining sector in the past two decades. Just as water rights are being traded to varying degrees in other areas of the country between different users, mining companies also purchase water rights from agricultural users.[12] But the relative scarcity of water in Chile's arid northern regions has contributed to some uncertainty over future water use between urban consumers, farmers and the mining sector (e.g. an increasing demand from the mining sector, but constraints on actual quantities of water available).

Such figures speak highly of the efficiency – in both economic and environmental terms – of Chile's management of water.

In the latter case (of mining), desalination of seawater is one possibility to increase supplies, but the costs of transporting such water to the high altitudes where mining operations occur would be immense. Depending on the relative value of the water to each set of users, "water swaps" are a solution which could potentially be used. Water could be desalinated and processed for urban uses, and could even paid for by mining companies in some way – either directly and/or by purchasing water rights from the

8 (Hearne & Donoso, 2005)
9 "In addition, two studies have attempted to measure the increase in aggregate water use efficiency in agriculture from 1975 to 1992. The first study found a 26 percent increase in efficiency (Munita, 1994), and the second one a 22 percent increase (Frias, 1992). Considering the lowest estimate, and taking into account that Chile's total irrigated area, with permanent rights, amounts to 1,200,000 hectares, this is equivalent to freeing-up enough water to irrigate an additional 264,000 hectares of crops of average water-use intensity." As quoted in (Rosegrant & Gazmuri, 1994)
10 See 2007 statistics on sewerage coverage in urban areas at http://www.siss.cl/articles-6025_cobertura_tas.xls
11 See Global Water Partnership Policy Brief 2
12 See Jorge Arrueste's Presentation on "Water Availability for Mining Usage"

urban users. The mining companies could thereby utilize water which is physically available. Although this is a theoretical proposition, it would be mutually beneficial to the parties involved – and not impossible, given Chile's pre-existing structures for defining and transferring water rights. There are already indications of a move in this direction, as a water company has recently purchased a desalination company, with the aim of swapping water with mining enterprises.

ENSURING EQUITABLE ACCESS

Initially, opponents of private water provision argued that the poorest would struggle to cope with increasing water tariffs. In the 1970s and 80s, water connections became almost universal in urban areas, and there was indeed a genuine fear that this progress would be reversed, first through the government's tariff adjustment and then through privatization. Although privatization would yield a reduction in long-term rates as a result of investment and increased efficiency, the short-term increases threatened to harm vulnerable portions of the population.

To address this situation, an individual water consumption subsidy was introduced in 1989. Subsidies accounted for anywhere between 25 to 85 per cent of a household's water and sewage bill. The subsidized households are required to pay for anything in excess of 20 cubic meters a month (allowance in 2009). It is interesting to note that even when households stayed within this limit, they were always required to pay a portion of the bill. This provided an incentive for all people to be rational in their use of water, rather than perpetuating the tendency for people to waste water for which they have not paid.

Though the subsidy itself was determined by government, water companies were charged with its implementation and enforcement. Municipalities are billed by the companies for the subsidies on a regular basis, just as they bill any private water user. Municipalities are even subject to late payment fees. This structure has meant that both public and private parties have an incentive to be efficient – authorities know they must pay regularly to guarantee the success of the subsidy scheme, while businesses continue to provide good service to both full-paying customers and subsidized customers.

In 2001, the scheme totalled 500,000 subsidies and cost US$20.1 million. Around 15% of households were covered by the scheme, receiving an average subsidy of US$10 monthly. It is of course difficult to tell, in retrospect, whether these costs were necessary. What is certain is that the subsidy scheme made the privatization more politically viable.

CONCLUSION

Various academics have criticized Chile's market-based water system on the basis of equality of access, environmental protection and what they perceive to be a weak institutional framework. Other authors have identified areas of weakness, most often relating to the definition and legal status of rights: for example, rights of downstream users or "traditional, non-constituted rights".

But these problems are likely to exist under any water governance system. The transparency inherent to the 1981 Water Code goes a long way towards reducing these and other grievances. The General Water Directorate supervises transfers. It also

ensures that information regarding transfers is publicly available, so that parties can challenge decisions and voice their opposition if needed. Also, the judicial system plays a significant role in settling conflicts over consumptive and non-consumptive rights.

Chile's water system has been able to update itself regularly in light of new challenges. From the 1990s onwards, there has been pressure to review water legislation. After 13 years of discussion in the National Congress, balancing the ideological differences within its centre left government, it introduced the payment of a license for the non-use of water resources. Through this tax, the Chilean government collected about US$15 million in 2008.

Notwithstanding ideological differences, Chile's market-based system for the allocation of water resources remains in place. The system is still relatively recent, and hopefully, over time, there will be more empirical studies on how better to define water rights and create a market can optimize the use and conservation of water resources. There is no doubt that Chile is in an exemplary position in piloting this institutional system on the international scene.

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