
In the image of the market: the Chilean model of water resources management

Carl J. Bauer

Resources for the Future,
1616 P St. NW,
Washington, DC, 20036, USA
E-mail: bauer@rff.org

Abstract: Chile's free-market Water Code turned 20 years old in October 2001. This anniversary was an important milestone for both Chilean and international debates about water policy, because Chile has become the world's leading example of the free-market approach to water law and economics and water resources management – the textbook case of treating water rights, not merely as private property, but also as a fully marketable commodity. This approach is often referred to as the 'Chilean model'. This paper summarises key aspects of the Chilean experience since 1981, in order to draw lessons for international discussions about how to reform water laws, policies, and economics. The Chilean model of water resources management shows the need for a more institutional and interdisciplinary approach to the economics of water.

Keywords: Chile; international water policy reform; water economics; water law; water markets; water rights.

Reference: to this paper should be made as follows: Bauer, C.J. (2005) 'In the image of the market: the Chilean model of water resources management', *Int. J. Water*, Vol. 3, No. 2, pp.146–165.

Biographical notes: Carl Bauer is a Research Fellow at Resources for the Future in Washington, DC, where his work focuses on comparative water law, policy, and economics in Latin America and the USA. He was previously a Post-doctoral Fellow and Lecturer in environmental studies at the University of California, Berkeley. During 2001–2004, while conducting field research for Resources for the Future, Bauer was a Visiting Professor at universities in Santiago, Chile, and Mendoza, Argentina. He also regularly consults on water issues for international organisations. Bauer has a BA in geology, an MS in geography, and a PhD in law and social science.

1 Introduction

Chile's free-market Water Code turned twenty years old in October 2001. This anniversary was an important milestone for both Chilean and international debates about water policy, because Chile has become the world's leading example of the free-market approach to water law and economics – the textbook case of treating water rights, not merely as private property, but also as a fully marketable commodity. Other countries have recognised variations of private property rights to water, but none have

done so in as unconditional and deregulated a manner as Chile. Because the 1981 Water Code is so paradigmatic an example of free-market reform, some people have praised it as an intellectual and political triumph, while others have criticised it as a social and ideological aberration.

The predominant view outside Chile is that Chilean water markets and the Chilean model of water resources management have been a success. This has been the view of many economists and water experts in the World Bank, the Inter-American Development Bank, and related institutions, who have encouraged other countries to follow Chile's lead in water law reform. Since the early 1990s, these proponents have used their considerable resources and influence to promote a simplified description of the Chilean model and its results, both elsewhere in Latin America and in the wider international water policy arena. Although these proponents sometimes recognise flaws in the model, their general tendency has been to play down the importance of those flaws and instead to emphasise the model's advantages. For example, a senior water advisor at the World Bank has publicised Chilean water markets as a prominent international example of 'good practice' in managing water 'as an economic resource', while a paper for the Global Water Partnership has described Chile as 'a world leader in water governance' (Briscoe, 1996, pp.21, 22; Briscoe et al., 1998; Rogers and Hall, 2003, p.30).

In this paper, I argue that the above assessment of the Chilean experience is mistaken in important respects, and that the mistakes are due in large part to an overly narrow perspective on the economics of water. More than twenty years is a long enough period to show that the free-market model of water management in Chile has had both strengths and weaknesses, and that the weaknesses are structurally connected to the strengths. In other words, *both the strengths and the weaknesses are built into the current legal and institutional framework in Chile*, in ways that have made them effectively impossible to separate.

My broader purpose here, in addition to presenting a more balanced view of the Chilean experience, is to draw more general lessons for international debates about water policy reform. In this context I argue that the Chilean experience shows the need for a more institutional and inter-disciplinary approach to the *economics* of water. Such an approach increases the emphasis on the legal, political, institutional, and social aspects of economic analysis – aspects that are too often missing or considered only superficially in conventional economic approaches (Aguilera-Klink, 1998; Aguilera-Klink and Sánchez, 2002; Bromley, 1982; Ciriacy-Wantrup, 1967; Livingston, 1993; Wandschneider, 1986).¹

In the following section, I briefly describe recent international debates about global water problems and the need for major reforms of water resources law and policy in many countries, in order to explain the international significance of the Chilean experience. Next I summarise the key features of Chile's current water law, the 1981 Water Code, and its associated institutional framework. The bulk of the paper then provides an overview of the two dominant themes of water policy in Chile since 1990, when the country returned to democratic government after more than 16 years of military rule. These themes are, first, the empirical results of Chilean water markets, including the issues ignored or poorly addressed by those markets; and second, the political debate within Chile about whether to reform the Water Code. The two themes are closely related, because the legal rules defining property rights have had a strong impact on the operation of water markets and related institutions.

The Chilean model of water markets and water rights trading is different from other countries in at least one essential respect. In other countries that have allowed or encouraged water markets, in varying degrees and circumstances, these markets have been a policy instrument within the broader context of water resources law and regulation. In Chile this order is reversed: water resources management takes place in an institutional context that has been shaped by water markets. The Chilean Water Code is so laissez-faire that the overall legal and institutional framework has been built in the image of the free market – with strong private property rights, broad private economic freedoms, and weak government regulation.

When we look at Chilean water markets, therefore, we are also looking at the Chilean model of water management in general, to a greater extent than is the case with other countries. The goal of this paper is to highlight the broader aspects of water management in Chile rather than the specific issues of water markets, which I have examined in other publications (Bauer, 2004a, 2004b, 1998).² I also emphasise an institutional economic perspective by showing how legal rules and political forces have affected property rights, economic incentives, and market performance.

2 Significance of Chilean model in international debates about water policy

In the international context, the Chilean model of water law represents one response to what is increasingly recognised as a global ‘water crisis’ (Cosgrove and Rijsberman, 2000; Global Water Partnership, 2000a). Throughout the world, population and economic growth have been increasing the demand for water for a wide variety of uses – including drinking and domestic needs, agriculture, mining and manufacturing, electricity generation, environmental protection, navigation, recreation – and water resources have become ever more scarce in relation to these growing demands. Greater scarcity has led to increases in water’s economic value; to growing competition and conflict among different water users; and to increasing environmental impacts of water use. Because these trends are interrelated and reinforce each other, they have led to a vicious cycle of worsening water problems in many parts of the world. Water scarcity, of course, is often a problem of water *quality* as well as *quantity*.

International recognition of these problems of water scarcity and conflict has led to urgent calls for reforming water laws, policies, and management, and to substantial debate about what those reforms should accomplish. These debates have taken place at high-profile international conferences, such as the Earth Summit in Rio de Janeiro in 1992 and the Second World Water Forum at The Hague in 2000, and within international development organisations, such as the World Bank, the United Nations, and many others.

There is broad international consensus that water policy reforms should move towards what is called ‘integrated water resources management’ (or IWRM). IWRM, like ‘sustainable development,’ refers to a set of general principles rather than specific policy guidelines, and hence much of the consensus is largely rhetorical. The basic idea of IWRM is to adopt a comprehensive, interdisciplinary, and holistic approach while dealing with water resource issues, including their social, political, economic, technical, and environmental aspects (Global Water Partnership, 2000b; World Bank, 1993). Such an approach focuses on the water cycle as a whole rather than specific water sectors

or water uses in isolation, and therefore focuses on river basins and watersheds as the most appropriate geographic units for water management. This approach places more emphasis on the relationships between water uses and land uses; between groundwater and surface water; between water quality and water quantity; and between natural sciences and social sciences.

The goal of IWRM is to incorporate all of the three elements that are generally considered to make up sustainable development: economic efficiency and growth, social equity, and environmental protection. Addressing all these issues in practice, of course, is extremely difficult. The growing recognition of this difficulty has led to the recent international focus on improving water 'governance', which has been defined as

"the range of political, social, economic, and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society." (Rogers and Hall, 2003, p.7)

Probably the most controversial issue in these international debates about water policy reform and IWRM has been the proper role for economics. Taking a more economic approach to water management is often referred to as the argument that water 'should be recognised as an economic good,' in the phrase made famous by the so-called Dublin Principles of IWRM. (These principles were drafted at an international water conference held in Dublin, Ireland, in 1992.) But what does this phrase mean, and what are its policy implications? There has been a great deal of debate about these questions, with most of the debate revolving around the advantages and disadvantages of free markets and privatisation.

The debate about what it means to manage water as an 'economic good' has revealed a wide variety of different intellectual, disciplinary, and political approaches to economic analysis. We can describe this variety as a spectrum from 'narrow' to 'broad' economic perspectives: 'narrow' refers to more technical, quantitative, and neoclassical analyses (which may or may not have an ideological preference for free markets), while broader perspectives draw more on history and other social sciences, focus more attention on institutional issues, and generally take a more qualitative approach. The crucial distinction between these different economic perspectives is how they address the institutional context and foundations of markets – in simple terms, the rules of the game. (When I use the terms 'institutions' and 'institutional arrangements', I refer broadly to the legal, political, and social norms, rules, and organisational structures that shape the patterns of human behaviour.) Please note that I am *not* arguing that narrow economic perspectives always ignore or deny the importance of such institutions. What I argue instead is that their analyses of institutions either do not go very deep or are overly determined by neoclassical theory and methods (Bauer, 2004a, pp.6–30).

With respect to the debate about recognising water 'as an economic good', there have been three main positions. On one extreme is the argument that water should be managed as a private and fully tradable commodity, subject to the forces of supply and demand in an unregulated market, and that water's economic value is the same as its market price. From this perspective, water is considered to be a private good rather than a public good. On the other extreme is the argument that water should be exempted from market forces, because water is so essential to human existence that it belongs in the category of basic human rights, and should be managed according to criteria of social equity and justice rather than economic efficiency. From this perspective, water is considered to be a 'social good' rather than an economic good, which essentially rejects the use of economic

analysis. An intermediate position is that water should be recognised as a scarce resource, which means that we face difficult choices and trade-offs in how we allocate water to different uses. These trade-offs will be less painful if we can increase the efficiency of water use and allocation. Market incentives can be powerful instruments for this purpose, as long as they are adequately regulated to reflect other public interests as well as economic efficiency. This intermediate position corresponds to a moderate neoclassical perspective.

Both the free-market and intermediate positions agree on fundamental economic principles about scarcity, efficiency, and the importance of economic incentives. But the two positions have quite different implications for the role of markets and for legal, institutional, and regulatory arrangements, as the case of Chile illustrates clearly. The institutional arrangements that are critical to IWRM are those required for defining and enforcing property rights; for coordinating different water uses within river basins; for internalising environmental and economic externalities; for resolving conflicts; and for monitoring compliance. By their nature, these processes are all interrelated. Moreover, they have unavoidable social and political aspects, since they allocate costs and benefits among different people and determine who gains and who loses. To the extent that different economic perspectives shape these institutional arrangements, therefore, the stakes are high.

This is the context in which the Chilean experience has global significance, due to its unusually strong free-market approach to managing water 'as an economic good'. In short, the Chilean experience offers a unique opportunity to examine the following essential question: *Is a narrow and free-market approach to economics compatible with the broader and long-term goals of integrated water resources management?*

3 Chile's 1981 Water Code: key features and political background

Chile's current Water Code is a classic example of what in Latin America is often called the 'law of the pendulum': the historical tendency to swing from one extreme to the other in political and economic affairs, without finding a point of balance somewhere in the middle. From the Spanish colonial period through the mid 20th century, water legislation in Chile recognised private rights to use water under some circumstances, although these rights were subject to considerable degrees of public regulation. In 1967, a reformist Chilean government swung the pendulum towards greatly expanded governmental authority over water use and water management, at the expense of private property rights, by passing a new water law as part of an ambitious agricultural land reform. In 1981 an authoritarian military regime, which had overthrown a socialist government in 1973, swung the pendulum to the opposite, free-market extreme, where it remains to this day.³ (Note that in this section I describe the 1981 Water Code in its original form, which was still unchanged in early 2005; later I discuss recent political debates in Chile about reforming some of the features described here.)

The 1981 Water Code was written at the high point of the political influence of a group of radical neo-liberal economists. In general terms, the law greatly strengthened private property rights, increased private autonomy in water use, and favoured free markets in water rights to a degree that was unprecedented both in Chile and in other countries. The new Water Code separated water rights from land ownership, for the first time in Chilean history, and declared them to be freely tradable: they can be bought, sold,

mortgaged, inherited, and transferred like any other real estate. As a corollary, the Code sharply reduced the government's role and authority in water resources management, regulation, and development. The Water Code's essential philosophy is *laissez-faire*: it does not directly mandate or establish a market in water rights, but instead aims to set up the legal rules and preconditions for such a market to emerge spontaneously, as a result of private initiative. The law's basic principles and institutional framework both reflect and are protected by Chile's current Constitution, which was adopted in 1980, by the same military government that wrote the Water Code. Both Water Code and Constitution have remained in effect since Chile's return to democratic government in 1990 (the military refused to leave power until their political opponents had committed themselves to respecting the 1980 Constitution).

In formal legal terms, the Water Code declares that water resources are inalienably public property (*bienes nacionales de uso público*), to which the national government may grant private parties the exclusive rights to private use. The government water rights agency is the *Dirección General de Aguas* (DGA), or General Water Directorate, which is located within the Ministry of Public Works. Despite this formal definition, the law in fact strengthens private control over water rights and weakens government authority in many ways, in comparison with previous Chilean legislation. Applicants for new rights no longer have to specify or justify their intended water uses to the DGA. The agency is required to grant new rights if there is water physically and legally available, and new water rights are granted free of charge. The Water Code does not establish any legal priorities among different kinds of water use: such determinations are left to private individuals and the free market. If there is not enough water to satisfy simultaneous applications for new rights, the DGA has no power to choose among competing applicants. Instead the law requires that the agency holds a public auction and sells the new rights to the highest bidder, though in practice such auctions have been very rare.

Once they have been granted, water rights are governed by private civil law, are included in the general system of real estate title registration, and are explicitly guaranteed as private property under the Constitution. Moreover, all water rights acquired under legislation prior to 1981 are recognised and protected by the current Water Code. The owners of water rights can freely change how they use those rights without notifying the DGA or asking its administrative approval. Water rights owners do not pay any taxes or fees to the government, and in this respect water rights are not like other real estate.⁴ Moreover, owners have no legal obligation to use their water rights and they face no legal or financial penalty for their lack of use. In other words, there is no legal doctrine requiring 'beneficial use', popularly known as the 'use it or lose it' doctrine. This unconditional nature of private water rights differs from all previous legislation in Chile, and also differs from the water laws of all other countries around the world (Solanes, 1996). Taken together, these provisions allow unrestricted private speculation in water rights, which has been one of the Water Code's most controversial aspects.

The DGA has very little regulatory authority over private water use, and has no power to intervene in or settle conflicts between water users. The agency cannot cancel or restrict existing water rights, except by expropriation, which requires specific legislation and payment in cash and is extremely rare. Nearly all decisions about water use and management are made by individual water rights owners or by private associations of canal users (in the case of irrigated agriculture). The DGA retains some important technical and administrative functions, such as

gathering and maintaining hydrologic data, inspecting larger dams and canals, and enforcing the rules governing the functioning of private canal associations. The agency can also prepare studies, reports, and policy recommendations, but these have little or no regulatory force. The Water Code does not address issues of water quality or environmental protection.

The Water Code's *laissez-faire* principles are especially clear in the areas of river basin management, coordination of multiple water uses, and resolution of water conflicts. Because the military government's primary concern about water law in the 1970s was about irrigation rights, which were key to rolling back the land reform of 1967–1973, the Code says very little about other water uses or about how to coordinate them. (The one exception was the creation of a new kind of property right called 'non-consumptive' water rights, which were intended to foster hydroelectric development in the upper parts of river basins without affecting agricultural water uses downstream. These new rights were poorly defined, however, as a series of conflicts with the owners of 'consumptive' water rights would show in the 1990s.)⁵ Dealing with these broader water management issues depends on the Water Code's general free-market principles and institutional framework, rather than on specific provisions: in other words, these issues are to be handled by private bargaining among the owners of water rights. When private bargaining fails, the only alternative is to go to the ordinary civil courts. This institutional framework reflects the 1980 Constitution as well as the Water Code, as mentioned above.

Like most legislation – even legislation adopted by a military government without public discussion – Chile's 1981 Water Code was a product of political negotiation.⁶ This was especially important in determining the specific rules defining property rights, and therefore the economic incentives affecting water use and allocation. In most respects the neo-liberal economists who dominated the drafting of the Code got what they wanted: a legal framework that favoured a free market. They had to yield on one key point, however, which was the proposed creation of annual water rights taxes. Although the economists argued that such taxes were essential to creating the appropriate economic incentives and price signals for efficient water use, agricultural interests marshalled enough political resistance to block the proposal. Farmers and agricultural landowners refused to pay new taxes, regardless of the economic arguments in favour of doing so. These legal rules and economic incentives have been much debated in the 1990s, as discussed below.

4 Overview of empirical results: looking back from 2004

What have been the empirical results of Chile's experiment with unregulated water markets? After more than twenty years, we can assess these results in at least two different ways:

- (1) by comparing them to the 1981 Water Code's original objectives
- (2) by comparing them to the issues considered to be critical in more recent international discussions of integrated water resources management.⁷

In terms of (1), the law's primary objectives were to strengthen private property rights, particularly in the agricultural sector, and to foster free-market incentives in water use and allocation generally. The Water Code, together with the 1980 Constitution, has been most effective in meeting the first objective.

- The legal security of private property rights has been greatly increased, which has encouraged private investment in water use and infrastructure. The amount of this investment has varied a lot in different parts of the country. It has been most important for new mining development, especially in northern Chile, and for planting high-value fruits and vegetables for export.
- The counter-reform in agrarian land tenure has been consolidated.
- Government regulation of water use and water management has been tightly restricted.
- The freedom to trade water rights has allowed reallocation of water resources in certain circumstances and geographic areas.
- The autonomy of private canal users' associations from government has been affirmed, which in some cases has encouraged these organisations to improve their administrative and technical capacity – however, these organisations operate only within the agricultural sector and rarely include non-agricultural water uses.
- The creation of non-consumptive water rights has encouraged hydroelectric power development, first by government enterprises and later by private companies – though not without serious and uncompensated impacts on other water users, particularly irrigators.

Also in terms of (1), the law has been much less effective in achieving objectives having to do with the smooth operation of water markets and market incentives. Note that some of these results represent a lack of success, rather than failure; others are more clearly negative.

- Market incentives to promote more efficient water use, particularly within the agricultural sector, have not worked as expected. Irrigation efficiency remains low nationwide, and in the few areas where it has increased, the change reflects factors other than the water market – namely, investment to improve crop yields or reduce costs of labour and canal maintenance. Investment in these areas has been encouraged by the legal security of property rights, but not by market incentives to sell unused or surplus water rights; such rights are rarely sold.
- The government has had to continue to subsidise the construction and maintenance of irrigation works at small, medium, and large scales, contrary to the hopes of the economists who shaped the writing of the law.
- Examples of significant market activity, as indicated by the amount of water resources reallocated or by the frequency of water rights transactions, remain limited to a few areas of the desert north and the metropolitan area of Santiago.

- The definitions of water rights remain vague or incomplete; the legal and technical details are inadequate and confusing in most of the country.
- The idea that water market forces would benefit peasants and poor farmers by improving their access to or ownership of water supplies has generally failed. If anything, the water market seems to have harmed many of these farmers more than it has helped them, although there is not enough evidence to make strong generalisations.
- Reliance on private bargaining to coordinate different water uses and resolve river basin conflicts, particularly between consumptive and non-consumptive water rights (i.e., between irrigators and hydroelectric companies), has failed. Neither the DGA nor the courts have adequately or reliably redressed the problem.
- In the hydroelectric sector, non-consumptive water rights have been subject to problems of speculation, concentrated ownership, and private monopoly power.

The mixed performance of Chilean water markets is due to the variety of factors that shape these markets' wider social, institutional, and geographic contexts. Institutional arrangements – the rules of the game – have been among the most important of these factors. The Water Code's *laissez-faire* definition of property rights has obviously had a strong impact on the specific economic incentives and disincentives that are faced by water users and water rights owners.

In terms of (2), the most negative results of the Water Code have involved issues that were of little concern in Chile 20–25 years ago, but that have emerged as ever more critical since the early 1990s. These are the economic, environmental, and social problems that are at the heart of contemporary international debates about integrated water resources management and water governance:

- Management of river basins, coordination of multiple water uses, and conjunctive management of surface water and groundwater.
- Resolution of water conflicts through either judicial or non-judicial processes.
- Internalisation of both economic and environmental externalities.
- Clarification, enforcement, and monitoring of the relationships among different property rights and duties, such as between consumptive and non-consumptive water rights.
- Environmental and ecosystem protection, including the maintenance of in-stream flows for environmental purposes.
- Public assistance to poor farmers to improve social equity in matters of water rights and water markets.

Under the current Chilean institutional framework, these issues have been addressed in an *ad hoc* or ineffective manner, and in some cases have not been addressed at all. These flaws or gaps in the existing framework have been widely recognised by Chilean water experts, regardless of their theoretical or political viewpoints. More research is needed about these problems, because most of the research that has been done to date about Chile's Water Code has focused almost exclusively on water markets and water rights trading, particularly within the agricultural sector. As a result, we now understand fairly

well how these markets have worked in practice, but this improved understanding has come at the cost of neglecting other issues of water management and institutional performance that are at least as important, as listed in the preceding paragraph. In other words, people have been so obsessed with the water market that they have tended to overlook the fact that there is much more to water resources management than simply the allocation of resources – whatever the allocation mechanism may be.

Because the Water Code did not address the broader economic, environmental, and social problems that are important today, it may be unfair to criticise the Code for its failure to solve them. But that is not the point here. Rather, the current legal and institutional framework, which is determined by the Constitution as well as by the Water Code, has shown itself incapable of handling these unforeseen problems. The current framework, as we have seen, is characterised by a combination of elements that reinforce each other to maintain the status quo: strong and broadly defined private economic rights; tightly restricted government regulatory authority; and a powerful but erratic judiciary that is untrained in public policy analysis, reluctant to intervene in issues with political implications, and committed to a narrow and formalistic conception of law.⁸ The problems of water management will only get worse as the demands and competition for water continue to increase, putting ever more pressure on the existing institutional framework.

In view of these mixed results and the problems identified, what are the prospects for improving the current framework? Some kind of significant reform is essential, but the political and constitutional barriers to such reform in Chile are high. The Water Code's legal and institutional framework, shaped by its original focus on agriculture and rooted in the political and ideological context of the late 1970s, is locked in constitutionally. This has made it very difficult to change.

5 Changing the rules of the game: Chilean efforts to reform the Water Code

The entire period since 1990, when Chile returned to democratic government, has been characterised by strong political disagreement about whether to reform the Water Code – and if so, how? Three successive national governments have proposed a series of legal and policy reforms in the areas of water rights and water management. (All three of these governments have been formed by the same coalition of centre-left political parties that has governed Chile since 1990.) These proposals have generated heated political and policy debate, and so far opposition from rightwing political parties and private sector interest groups has blocked their approval. As of 2004, the fate of the reforms remains quite uncertain. What is clear, however, is that any measures that may be approved in the near future will be much more limited than the reformers had hoped in the early to mid 1990s.⁹

Since 1990, the government's essential criticism of the Water Code has been that the law's neo-liberal features are too extreme – in other words, that the pendulum has swung too far towards free markets and deregulation, and that it is time to return to a more balanced position. Hence the government has proposed a number of legal changes that would alter key aspects of the Water Code, but without swinging the pendulum back to the other extreme, as represented by the 1967 Water Code (Dirección General de Aguas, 1999)¹⁰. From the perspective of the current Water Code's defenders, however, the

government's approach has been either misguided or untrustworthy, and any movement of the pendulum towards a more intermediate position would be a potentially dangerous increase in state control (Figueroa, 1997).¹¹

The core issue of Chilean water policy debates since 1990, therefore, has been profound disagreement about some of the most basic rules defining property rights to water, and therefore, also disagreement about the proper role of government and the proper scope of public regulations in water management. During this period there have been two major rounds of debate, corresponding to two different packages of proposed reforms that were sent by the government's executive branch to the Congress. The first package, proposed in late 1992, was aggressive and clumsy and it was shot down within a year. The second package was proposed in 1996: it was more limited, careful, and pragmatic, and it was still being debated eight years later. The debates have taken place on at least two different levels, and the arguments have often gotten mixed up. On one hand, people have argued about the social legitimacy and fairness of the basic rules and definitions; on the other hand, they have argued about the rules' economic efficiency and practical impacts on water use.

This paper discusses only the proposed changes to the basic legal rules and economic incentives affecting water rights. Other issues of water policy have also been included in the proposed reforms – such as river basin management and in-stream flow protection – but these other issues have been overshadowed and eventually displaced by the heated controversy over property rights.¹²

In 1992, the government proposed returning to the traditional legal rule that obtaining and owning water rights required putting them to some concrete and socially beneficial use. Thus an applicant to the DGA for new water rights would have to specify their planned uses, and any rights not used for a period of five years could be cancelled by the DGA without compensation, and reallocated to other water users who had more immediate and concrete needs. This 'use it or lose it' rule had been part of both of Chile's previous Water Codes and was familiar to Chilean water experts and water users. (The same rule is also common in many other countries; in the Western USA, it is known as the 'beneficial use doctrine'.)

The government's proposal generated fierce resistance from private sector interest groups (particularly those representing agricultural water users), from neo-liberal economists, and from rightwing politicians. Some of these opponents shared the government's criticisms of speculation, potential monopoly power, and the lack of use of water rights, agreeing that these problems were obstacles to the country's economic development and should be reformed. Even these opponents, however, rejected the government's approach to solving the problem. There were two main criticisms: first, the 'use it or lose it' rule was clearly unconstitutional, since the government could not place new restrictions on vested property rights without paying compensation to the owners. Second, the proposal revealed an excessively centralised, 'statist' (*estatista*) economic perspective that suggested that the government's proclaimed commitment to the neo-liberal economic model was shallow or insincere (recall that both the economic model and the Constitution had been inherited from the military government). If the Water Code had flaws, these opponents argued, the flaws should be corrected in a manner compatible with the law's core market principles – that is, by adopting some kind of economic incentive instead of imposing a legal requirement.

The government abandoned the 'use it or lose it' rule by the end of 1993. Since then, the debate has been between two alternative economic instruments, each of which would

involve redefining the rules affecting property rights to water in order to improve the economic incentives for water use and allocation. One alternative would be to establish annual taxes on water rights, just as on land and other real estate, which would be payable whether or not the rights were used. This, of course, was exactly the system advocated by neo-liberal economists in the late 1970s, but the military regime had rejected it because the political and administrative costs were too high. Since the mid 1990s this form of water rights taxes has been favoured, at least rhetorically, by the government's rightwing opposition.

The other alternative, which has been favoured by the government, would be to establish an annual fee to be paid by the owners of any water rights that were *not* being used. This alternative, therefore, would provide an economic incentive to use water rights in order to avoid paying the fee. This 'fee for non-use,' known as a *patente*, was a concept borrowed from Chilean mining law, which, like water law, involves private rights to exploit publicly owned resources. Fees for non-use can be designed in various ways. They can apply to all existing water rights, or only to newly granted or future rights that have not yet been used by their owners. In addition, the government has proposed fees that vary by region (they would be much higher in the arid North, where water is most scarce); that increase over time, if the rights remained unused; and that would be much higher for non-consumptive water rights than for consumptive rights. This latter point was especially important because in the later 1990s one of the government's major concerns about water rights had to do with problems in regulating private monopoly power in the country's electric sector, which depends heavily on hydroelectric generation.

6 Pros and cons of the economic instruments under debate

There have been plausible arguments both for and against each of the proposed economic instruments: water rights taxes vs. fees for non-use. To summarise briefly, the government's arguments in favour of fees for non-use have been the following:

- fees for non-use are a first step in reform that could be implemented in the short term, that would improve the efficiency of water use, and that do not rule out more ambitious and sophisticated economic instruments in the future
- taxes or other charges for water use would be more difficult and complex to implement, and would require stronger political will, more technical and administrative capacity, and a larger budget
- there is already a fairly broad social and political consensus that speculation and hoarding are unacceptable features of the Water Code, and fees for non-use address those features directly
- fees for non-use would impose fewer restrictions on existing water rights and thereby raise narrower constitutional issues about property rights
- in practice, fees for non-use would affect non-consumptive (i.e., hydroelectric) water rights much more than consumptive rights, and therefore, agricultural interests should not object and implementation should be manageable.

On the other hand, the arguments in favour of water rights taxes instead of fees for non-use, as explained by the government's political opponents and by a number of economists, have been the following:

- fees for non-use would not in fact be easier to implement than taxes, because both measures require very similar technical and legal information about water rights and similar administrative capacity
- fees for non-use would create perverse incentives that would encourage inefficient use of water rights, whereas taxes would provide clear economic incentives for more efficient water use and allocation
- taxes would strengthen the legal security of water rights by reinforcing their status as private property
- taxes would benefit farmers because farmers are currently the only water users who already pay some form of taxes on water rights, indirectly through taxes on irrigated land
- if non-consumptive water rights and monopoly power in the electric sector are the primary target of the reform, then the reform should be designed to reach that target directly rather than tinker with the foundations of the water rights system in general.

The essential point is this, however: Even if we accept the criticisms of fees for non-use as well-founded, *water rights taxes in Chile are a false alternative*. They are appealing in theory and rhetoric but impossible in practice, at least for the foreseeable future. The same factors that sank these taxes in the late 1970s are at least as powerful today. To *implement* a system of water rights taxes would demand a massive and nationwide political, administrative, legal, and technical effort: both to establish the system in the first place and then to maintain it over time. Creating and operating such a system would require as much administrative discretion as a system of fees for non-use, despite some anti-reformers' claims to the contrary, and hence would be just as open to bureaucratic abuse or corruption.

Although neo-liberals and some other economists favour these taxes for theoretical reasons, there is no reason to believe that rightwing politicians or private sector interest groups would *in fact* put their weight behind such an ambitious and controversial reform – indeed it would be little short of a miracle. It is hard to imagine what compelling political pressure could make current property owners act against their immediate material interests. It is just as true now as it was 25 years ago that Chilean farmers would reach for their shotguns rather than pay new water rights taxes, regardless of the argument that such taxes would benefit agriculture more, in relation to other water-using economic sectors. For big non-agricultural water users, such as mining companies and electric companies, the status quo has been highly beneficial, even if they do sometimes admit that it is based on bad economic theory (because owning water rights has no cost). Moreover, conservative politicians who have already challenged the constitutionality of imposing fees for non-use on future water rights would almost certainly challenge new taxes on existing rights, and indeed they would have a stronger constitutional argument. In the face of all this opposition, today's democratic government has much less power to impose its will than the military government had 25 years ago.

In short, the notion of water rights taxes is a rhetorical device and political tactic rather than a real counter-proposal. The obstacles to implementing such taxes are so high that it is hard to escape the conclusion that at least some of their advocates are being deliberately insincere, if not hypocritical. As the DGA's head lawyer pointed out in late 2001, to insist on taxes instead of fees for non-use, in present-day Chile, is really to oppose any reform at all (Jaeger, 2001). In 2004, the proposed reforms remained stalled in the Chilean legislature. (A limited version of fees for non-use was apparently approved in early 2005, propelled in part by Chile's growing electric crisis. This crisis has resulted from a shortage of natural gas from Argentina and has increased pressures for hydroelectric development in Chile.)

7 Political and institutional constraints in Chile

Reforming Chile's Water Code after the country's return to democracy has proven to be much more difficult politically than the Chilean government had expected, or than foreign observers have supposed. After more than ten years of sustained effort, both the terms of debate and the scope of the proposed reforms have narrowed considerably. There has been general political agreement about the need to improve the economic incentives for water use, which would require some change in the legal rules that define water rights, but as of late 2004 it has been impossible to reach agreement on the specifics. In retrospect, it is clear that the government over-estimated the opposition's willingness to negotiate. As a result the government has spent many years trying to achieve what was supposed to be a relatively minor and initial step in the reform process – establishing fees for non-use of water rights – at the cost of pushing aside more important issues.

The bottom line in political terms is that the Water Code reforms have failed to pass because the 1980 Constitution and its associated institutional arrangements are so strongly weighted in favour of rightwing political interests, laissez-faire economics, and vested property rights. No meaningful legal reform is possible without the agreement of those same political and economic interests. Although the current stalemate is in some sense a victory for the Water Code's defenders, it leaves pending all of the broader issues of integrated and sustainable water resources management in Chile. The strength of the Water Code's institutional framework in resisting reform has been due to its rigidity. But if it is politically impossible to modify economic incentives that are widely agreed to be flawed, and to have distorted the market's capacity to accurately reflect the value of water use, then more ambitious reforms – in the areas of environmental flows, management of river basins, and resolution of water conflicts – would appear to be doomed, at least in the foreseeable future.

This situation, with its difficulties and constraints, should be widely publicised in countries that are interested in the Chilean water rights system. The Chilean experience highlights the *political* nature of economic instruments: both in the initial decision to adopt them and in any subsequent attempts to modify them.

8 Lessons for international water policy reforms

The basic argument in this paper is that international efforts to reform water policies must foster a broader and more interdisciplinary approach to water economics, and that Chile's experience with a free-market water law shows the problems that can flow from taking too narrow an approach. Taking a broader approach means doing more legal, institutional, and political analyses of markets and economic instruments. Taking a narrower and more orthodox economic approach leads to policy recommendations that cannot adequately meet the challenges of integrated water resources management. My hope is that this analysis of the Chilean experience will help to raise the level of international debate about IWRM, particularly about its economic and institutional aspects.

After more than 20 years, Chile's experience with a narrow and free-market approach to water rights has shown that this approach has some important economic benefits, but that these benefits are closely associated with serious problems and costs. The Chilean model has had two main economic benefits: first, the legal security of private property rights has encouraged private investment in water use, for both agricultural and non-agricultural uses; and second, the freedom to buy and sell water rights has led to the reallocation of water resources in certain areas and under certain circumstances. These are important benefits, even though market incentives have been only partly functional in practice, and they are the kind of results that pro-market policies hope to deliver. Many other countries would improve their water use and management if they could achieve similar results.

However, those benefits are directly linked to a legal, regulatory, and constitutional framework that has proven not only rigid and resistant to change but also incapable of handling the complex problems of river basin management, water conflicts, and environmental protection. These more complex problems, of course, are precisely the fundamental challenges of integrated water resources management. In addition, peasants and poor farmers have for the most part not received the economic benefits, which indicates that social equity is another weak point of the current framework.

The strengths of the Chilean model, in other words, are also its weaknesses: the same legal and institutional features that have led to the model's success in some areas have effectively guaranteed its failure in others. The ability of the institutional framework to resist reform is the strength of rigidity. Its regulatory limitations, incomplete price signals, and lack of balance have been built to last. Even if we put the most positive spin on the model's economic benefits, for the nation as a whole these flaws are a high price to pay, particularly over the long term.

This analysis points to the inaccurate manner in which the Chilean model has often been described in international water policy circles, particularly by the economists who have been the model's strongest supporters. The Chilean experience is cited as an example of successful free-market reforms, and although supporters may recognise some problems in the model, they present them as secondary issues that do not affect the overall positive assessment. Hence the absence of effective institutions for managing river basins or resolving water conflicts is mentioned as an afterthought, or played down as a separate issue that can be addressed later, or seen as acceptable in light of the model's presumed advantages. According to this viewpoint, the problems have been identified and the Chilean government is in the process of solving them.¹³ Thus, the spotlight remains on water markets and water rights trading, which are supposedly the

model's strong points. The message to other countries is that they can adopt the Chilean model of water markets without also adopting its deeper institutional weaknesses in other areas of water resources management.

Such assessments are mistaken and misleading and based on insufficient knowledge about Chilean politics and institutions. The flaws in the Chilean model are structural: that is, they are integral parts of the same legal and institutional arrangements that underlie the water market. These flaws are not separable from the rest of the model. On the contrary, they are the necessary institutional consequences of such strongly free-market reforms of property rights and government regulation. The aspects of the model that privatise water rights so unconditionally, and define them as freely tradable commodities, are inextricably connected to the aspects that weaken and restrict the regulatory framework. This is not a theoretical matter: in Chile these structural connections have been demonstrated in practice over the past 20 years, both by the mixed empirical results of the Water Code and by the long and fruitless process of attempted Water Code reform.

In short, *the Chilean experience shows that the legal and institutional arrangements that are associated with a narrow and free-market approach to water economics are **not** compatible with the arrangements required for integrated and sustainable water resources management over time.*

Another way of putting this argument is to return to the image of IWRM and sustainable development as a tripod whose three legs are economic efficiency and growth, social equity, and environmental sustainability. The Chilean model of water management has one strong economic leg and two weak social and environmental legs, making it unbalanced overall. The social and environmental legs cannot be strengthened without weakening the economic leg in ways that – at least in Chile – are politically and constitutionally difficult. Moreover, even the economic leg is weaker than it appears because the ineffective mechanisms for resolving conflicts and internalising externalities also reduce economic efficiency and growth, especially over the long term. Because the Chilean approach to managing water as an economic good puts all the emphasis on water as a *private* good and tradable commodity, it is very difficult to recognise or enforce the other aspects of water as a *public* good.

For people in other countries and in international organisations who are interested in water law and policy reforms, this offers sobering lessons. The most obvious warning is that other countries should not copy or closely follow the Chilean water law model, at least not without a thorough understanding of the model's weaknesses, as well as its strengths. Both the flaws and the rigidity of the Chilean institutional framework should be made clear to other countries interested in the Chilean approach. The problems for IWRM should not be presented as if they were secondary, separate from the water market, or readily solved. The failure of the World Bank and other boosters to make this clear in their advocacy of the Chilean model has been highly irresponsible.¹⁴

Many of the details of the Chilean model are unique to Chile and have been shaped by the local political and economic context, particularly by the Chilean Constitution. It is also probable that this document has an unusual weight and importance in Chile that is matched by few constitutions in other countries, since the Chilean Constitution dictates the basic rules for economic institutions as well as for the political system. It might seem possible to create an 'improved' version of the Chilean Water Code by keeping the model's better features and avoiding its more serious flaws. From this viewpoint, if Chile went too far in the free-market direction and is now locked in place by its history,

politics, and constitution, then that is Chile's problem – it does not prevent other countries from learning from Chile's mistakes.

From an institutional perspective, however, the prospects for such an improved version in other countries are slim. Regardless of the specifics of the Chilean case, any country that tries to follow the *laissez-faire* economic approach of Chilean water law will necessarily confront similar institutional and political problems. How is it possible to create a legal and institutional framework that provides such strong guarantees for private property and economic freedom, and such wide scope for free trading of water rights and private decision-making about water use, without also severely restricting government regulation and legislative reform? If a country does not want to grant the judiciary such broad powers to review the actions of government agencies, how else can those agencies be prevented from interfering in water markets and property rights? If private economic rights are so strong and public regulation is so weak, through what institutional mechanisms other than the courts can conflicts be resolved effectively? How much room can there be for environmental protection in such a framework, and how can the level of that protection increase over time?

If other countries want to follow the Chilean approach to water economics, they will have to adopt a legal and institutional framework that is functionally equivalent to Chile's. If instead a country chooses a stronger regulatory framework or places more conditions on private rights, that country is, by definition, no longer following the Chilean economic approach. Hence, one of the deeper lessons of the Chilean water model is to show how different economic perspectives have different consequences for institutional design. The Chilean experience shows the lasting problems that result when a narrow economic perspective is combined with the political power to design legal institutions in its own image.

In international debates about integrated water resources management, the principle that water should be recognised as an economic good should not be thought of as a separate or independent component of law and policy reforms. In particular, countries and governments should not make the mistake of thinking that they could implement reforms in two steps, by first adopting a free-market approach to water economics as a straightforward initial step, and then turning their attention to the remaining problems of IWRM and water governance. At that later point, their hands will already be tied by a definition of property rights that has major political and institutional implications. On the contrary, reformers should put greater and earlier efforts into mechanisms for resolving conflicts, and reflect carefully on how to define and enforce property rights for something as complicated as water.

We do not want to throw the baby out with the bathwater. I am arguing here against 'free' markets and narrow economics, not against all use of market-based instruments and analyses in water management. The goal of a broader and more inter-disciplinary approach to water economics is to build on conventional neoclassical principles, not to reject them. We can get the most benefits from markets by recognising their limits and not asking them to handle problems beyond their scope. That is why older approaches to institutional economics need to be revived – approaches that are rooted in qualitative and historical analyses and draw on politics, law, and other social sciences in order to understand 'economic' issues. Such an approach is especially important in developing countries, where institutional and social contexts are significantly different from the developed countries, where most economic theory has originated and continues to be shaped.

The current global water crisis is driven by growing *scarcity* and growing *conflict*, the two critical water problems that are ever more tightly bound together. While economic principles can be powerful tools for dealing with water *scarcity*, legal and political institutions are the key to resolving water *conflicts*. Moreover, scarcity is not simply a physical problem – rather, it depends on social context and is often driven by social factors more than physical factors (Aguilera-Klink et al., 2000). This further underlines the importance of legal and political institutions in shaping the use of economic principles. In short, the Chilean experience confirms the need for a more critical and inter-disciplinary perspective on water law and economics.

Acknowledgements

This paper has been adapted from portions of the author's recent book, *Siren Song: Chilean Water Law as a Model for International Reform* (RFF Press, 2004). *Siren Song* has also been published in Spanish translation as *Canto de Sirenas*, Bakeaz, Bilbao, Spain, 2004. This research was supported by Resources for the Future and by a grant from the William and Flora Hewlett Foundation.

References

- Aguilera-Klink, F. (1998) 'Hacia una nueva economía del agua: cuestiones fundamentales', in Arrojo, P. and Martínez, J. (Eds.): *El Agua a Debate Desde la Universidad: Hacia una Nueva Cultura del Agua*, Navarro and Navarro, Zaragoza, Spain, pp.15–31.
- Aguilera-Klink, F. and Sánchez, M. (2002) *Los Mercados de Agua en Tenerife*, Bakeaz, Bilbao, Spain.
- Aguilera-Klink, F., Pérez-Moriana, E., and Sánchez-García, J. (2000) 'The social construction of scarcity: The case of water in Tenerife (Canary Islands)', *Ecological Economics*, Vol. 34, pp.233–245.
- Bauer, C. (1998) *Against the Current: Privatization, Water Markets, and the State in Chile*, Kluwer Academic Publishers, Boston, MA.
- Bauer, C. (2004a) *Siren Song: Chilean Water Law as a Model for International Reform*, RFF Press, Washington, DC.
- Bauer, C. (2004b) 'Results of Chilean water markets: empirical research since 1990', *Water Resources Research*, W09S06, DOI: 10.1029/2003WR002838, Vol. 40.
- Briscoe, J. (1996) 'Water as an economic good: the idea and what it means in practice', Paper presented at *World Congress of the International Commission on Irrigation and Drainage*, Cairo, Egypt, September.
- Briscoe, J., Anguita, P. and Peña, H. (1998) *Managing Water as an Economic Resource: Reflections on the Chilean Experience*, Environment Department Paper No. 62, World Bank, Washington, DC.
- Bromley, D. (1982) 'Land and water problems: an institutional perspective', *American Journal of Agricultural Economics*, December, pp.834–844.
- Ciriacy-Wantrup, S.V. (1967) 'Water economics: relations to law and policy', in Clark, R. (Ed.): *Waters and Water Rights*, Allen Smith Co., Publishers, Indianapolis, IN.
- Cosgrove, W. and Rijsberman, F. (2000) *World Water Vision: Making Water Everybody's Business*, World Water Council, London.
- Dirección General de Aguas (1999) *Política Nacional de Recursos Hídricos*, Ministerio de Obras Públicas, Santiago, Chile, available on the web at www.dga.cl.

- Figuroa, L. (1997) 'Consecuencias prácticas de las modificaciones al Código de Aguas', Paper presented at *IV National Convention of Water Users*, Arica, Chile, October.
- Global Water Partnership (2000a) *Toward Water Security: A Framework for Action*, Global Water Partnership, Stockholm, Sweden.
- Global Water Partnership (2000b) *Integrated Water Resources Management*, TEC Background Paper No. 4, Global Water Partnership, Stockholm, Sweden.
- Instituto Libertad y Desarrollo (2003) 'Reforma al Código de Aguas: Otro paso atrás', *Temas Públicos* No. 624, Instituto Libertad y Desarrollo, Santiago, Chile.
- Jaeger, P. (2001) 'Panelist commentary', *4th Chilean Water Law Conference*, Catholic University, Santiago, Chile, November.
- Livingston, M. (1993) 'Normative and positive aspects of institutional economics: the implications for water policy', *Water Resources Research*, Vol. 29, pp.815–821.
- Rogers, P. and Hall, A. (2003) *Effective Water Governance*, TEC Background Paper No. 7, Global Water Partnership, Stockholm, Sweden.
- Romero, S. (1998) 'Panorama general del mercado de aguas y equidad y eficiencia en la asignación originaria de derechos de aguas', *Revista Derecho de Aguas*, Vol. 9, pp.321–328.
- Solanes, M. (1996) 'Mercados de derechos de agua: componentes institucionales', *Revista de la CEPAL*, No. 59, pp.83–96.
- Wandschneider, P. (1986) 'Neoclassical and institutionalist explanations of changes in Northwest water institutions', *Journal of Economic Issues*, Vol. 20, pp.87–107.
- World Bank (1993) *Water Resources Management: a World Bank Policy Paper*, World Bank, Washington, DC.

Notes

- ¹For examples of institutional approaches to water economics, see Aguilera-Klink (1998), Aguilera-Klink and Sánchez (2002), Bromley (1982), Ciriacy-Wantrup (1967), Livingston (1993), and Wandschneider (1986).
- ²Due to limitations of space, in this paper I can only summarise some of the more important aspects of the Chilean experience. For more complete discussion and references, see Bauer (1998, 2004a, 2004b).
- ³For more historical background as well as greater detail about the 1981 Water Code, including the discussions inside Chile's military government in the late 1970s, see Bauer (1998, pp.33–50, 2004a, pp.31–50).
- ⁴Farmers are a partial exception, since they pay taxes on agricultural land ownership and this land is appraised at higher values if it is irrigated. Hence irrigators pay some taxes on water rights indirectly, although as described above water rights are not legally tied to land ownership. In any case, these land taxes are low, and their component that reflects water supply has had very little impact on water use or management.
- ⁵Bauer (1998, pp.84–110); Bauer (2004a, pp.98–115).
- ⁶Bauer (1998, pp.40–45); Bauer (2004a, pp.35–50).
- ⁷Limits of space permit only a very brief summary of these results here: for more detailed discussion and references see Bauer (2004a, pp.74–117) and Bauer (2004b).
- ⁸On judicial performance, see Bauer (2004a, pp.96–115), Bauer (1998, pp.11–25, pp.80–110).
- ⁹This discussion of Chilean efforts to reform the Water Code, in this and the following two sections of this paper, has been summarised from Bauer (2004a, pp.51–73, 125–131). Chilean politicians apparently approved a limited reform in early 2005, as mentioned in the text at the end of Section 6.
- ¹⁰For the Chilean government's position, see Dirección General de Aguas (1999).

¹¹For examples of opposition to the government's proposed reforms see Figueroa (1997), Instituto Libertad y Desarrollo (2003) and Romero (1998).

¹²For a much more detailed narrative and discussion of the political and policy debates in Chile, see Bauer (2004a, pp. 51–73, 125–131).

¹³One example is a World Bank paper arguing that, despite the problems mentioned, the Chilean 'system of tradable water rights and associated water markets is a great achievement and is universally agreed to be the bedrock on which to refine Chilean water management practices' (Briscoe et al., 1998, p.9). Another example is a paper for the Global Water Partnership arguing that although 'many mistakes with openness, transparency, participation, and ecosystem concerns were made in the hurry to get effective water markets established ... The system is adaptive and now these concerns are being addressed 20 years after the initial laws were passed' (Rogers and Hall 2003, pp.30–31).

¹⁴The World Bank has also described water markets in the Canary Islands of Spain in a similarly positive and unfounded manner; see Aguilera-Klink and Sánchez (2002).