

# Water and sustainable development: Lessons from Chile

Chile has successfully incorporated water issues into its strategies for sustainable growth—offering valuable lessons to all policy makers involved in national development planning, not just those responsible for water. In Chile, water has been a key ingredient in fueling exports and economic growth, and the country's decision makers have also made provisions that protect the environment and provide affordable water for the poor. As a result, Chile provides an example of progress towards the three 'E's of integrated water resources management (IWRM): 'economic efficiency', 'social equity' and 'environmental sustainability'.

So, what can we learn from Chile's experiences? A recent in-depth review of the links between Chile's public policies, its economic and social development, and its water-resource use and management over the last 20 years<sup>1</sup> tells us. The review provides some helpful pointers for countries in the process of developing IWRM plans and strategies or of incorporating water into national sustainable development planning. It underlines several key messages from *Catalyzing Change: A Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies*:

- First, water resources planning needs to be strongly linked to a country's national sustainable development strategy, particularly since social and macro-economic policies are often the primary drivers of change in water management and use. In the case of Chile, water resources are governed through a strong system of institutions, laws, and rules that are closely related to the national development strategy.
- Second, water reform should involve a gradual, step-by-step approach tailored to a country's current stage of development and to its economic, social and political conditions. Doing this means defining priorities clearly and tackling the most pressing water problems first, taking into consideration the existence of realistic solutions and the level of public support. Such an approach is more likely to succeed than an attempt to fix all problems at once.
- Third, water strategies need to be adaptable, to allow decision makers to act on opportunities and identify and correct problems as conditions and needs change.

<sup>1</sup> Water, Development, and Public Policies: Strategies for the Inclusion of Water in Sustainable Development. H. Peña, M. Luraschi and S. Valenzuela. South American Technical Advisory Committee, Global Water Partnership, Santiago, Chile (2004).

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## Links between water and national development

As Chile has shown, the water sector itself does not necessarily exert the greatest influence on water resources and their management. Instead, social and macro-economic policies and concomitant decision-making in trade, agriculture, and other sectors, may have an even more profound effect. This is particularly true of policies related to a country's national development strategy, even though such policies can often seem to be completely unrelated to water. So, there is a clear need for water planners to make upstream policy makers aware of these effects. In the case of Chile, sound macro-economic policies have created an environment conducive to water development and conservation.

### Market-focused macro-economic policies and the impacts on water

In the mid-1970s Chile chose to pursue a development model based on three major themes: (1) maintaining macro-economic equilibrium (mainly by reducing inflation and foreign debt); (2) strengthening the role the market plays in the allocation of resources, including water; and (3) opening up the economy to world markets while exporting products for which the country had a comparative advantage. One result was a boom in private-sector-led exports of new products such as copper, fresh fruit, wood pulp, lumber, salmon, and wine—all of which use water in their production processes. Exports of these products alone were worth more than US\$12.1 billion in 2001.

This surge in exports has played a major role in Chile's economic success story. Exports of wine, for example, increased almost fourfold between 1995 and 2001, and Chile is now the fifth-largest wine exporter in the world. Copper exports also tripled after the early 1980s. And, over the last decade alone, aquaculture has become one of southern Chile's most important economic activities—the country is now the world's second-largest exporter of salmon and trout.

But what has this meant for water? Not surprisingly, a sharp rise in demand. However, much of this demand occurred in relatively water-poor basins, where it was driven by market forces or the availability of other inputs or resources, and not by the area's water endowments. Most of Chile's copper, for example, is mined and processed in the Atacama Desert. This has led to growing competition for water in some basins. Export needs are now competing with in-country needs for drinking water and farming for the domestic market, and water is rising in value.

The export of such products also results in the 'virtual transfer' of water out of the country. The amounts lost can be substantial: around 1,900 million cubic meters per year in the case of Chile's copper and fruit exports alone. This is around 1.4 times the amount of drinkable water produced per year in the country. Policy makers and water planners therefore need to be aware that if economic policies continue to encourage water-dependent exports, or if they diversify exports away from copper to products such as fruit (which uses more water per ton exported), then ever-greater quantities of water will need to be found.

### Economic growth: Pressure on the environment, but new solutions too

In Chile, development has placed additional pressure on the environment in general, and on water resources in particular. Over the two decades studied by the recent review, the use of wells in agriculture has increased sixfold, the use of wells for drinking water fourfold, and, during the last decade, 40 aquifers have been closed to new concessions. This said, environmental sustainability in Chile has actually improved in recent years. This was largely the result of factors outside the water sector, including economic growth, which has provided the financial and technological resources needed to bring about environmental

improvements, and an ideological shift, which resulted in greater attention to social and environmental issues on the part of the government and Chile's citizens.

*Improvements in water-use efficiency* have been considerable, especially in those areas linked to exports. In some cases these were a side effect of the drive to produce higher-quality products for the international market. For example, sophisticated water management systems are now used in many vineyards to grow grapes with the particular characteristics needed to make high-value fine wines. Other areas have also benefited from the spread of better irrigation systems—helped by a 1986 law which provided irrigation subsidies and which was later revised to include specific provisions for poorer farmers. As a result, not only did annual agricultural production rise by US\$353 million, on-farm water-use efficiency also increased sharply. This freed up extra water which is now used productively for other purposes, or to bolster natural water bodies and so safeguard the environmental services they provide.

Agriculture is not the only area to see improvements. Working in water-scarce areas has increased the prices of water rights and forced the mining sector to increase the efficiency

### A brief history of water reform in Chile

Chile's move towards more sustainable development and management of its water resources has been gradual, and it is by no means complete. The 1981 National Water Law laid out a strategic vision of water resources development that focused primarily on improving economic efficiency. The aim was to establish strong water use rights, create water markets, and reduce the role of the State in water development.

This law, while it recognized water as national property, established transferable water use rights—independent of any other rights, such as land ownership—that have the characteristics of property under civil law. The State was to be responsible for allocating the original water use rights, free of charge, permanently, and without any limit on the quantity demanded, to all private individuals that requested them. In the event of two or more requests for the same water and insufficient water availability to grant them all, rights were to be allocated through auctions.

While the law was in many ways successful in encouraging water-related investments and improved water efficiency, the allocation of water rights without any limits and restrictions quickly gave rise to several problems, such as the accumulation of water rights for hoarding, speculation, and as a means of preventing the entry of competitors into various markets.

The Water Code Reform, which was passed in 2005 after 12 years of debate, sought to correct these problems and to address social equity and environmental sustainability concerns that were largely absent from the 1981 legislation. This included the need to reconcile: water as a national property for public benefit with the guarantee of strong water use rights; economic incentives and competition with protection of the public interest; and the State's role in managing a complex resource crucial to development with the promotion of private initiative and management transparency.

Some provisions of the reform include:

- Giving the President authority to exclude water resources from economic competition in cases where doing so is necessary to protect the public interest.
- Obliging the General Directorate of Water Resources (DGA) to consider environmental aspects in the process of establishing new water rights, especially in terms of determining ecological water flows and protecting sustainable aquifer management.
- Charging a license fee for unused water rights and limiting requests for water use rights to genuine needs, as a deterrent against hoarding and speculation.

The reform also strengthens the involvement of water users in public decisions. The new legislation authorizes the creation of groundwater user organizations and enables the country's many water communities to be recognized as legal entities.

of its water use threefold over the last 20 years, while water use in wood pulp production has fallen by 70% per ton produced. Plus, macro-economic policies to improve cost recovery have caused household water consumption to fall by 10%, in reaction to a 38% increase in domestic water supply charges between 1998 and 2002. This reduction in water consumption was achieved without compromising access to water by the poor, who were granted subsidies.

*Cleaner production practices* triggered by globalization have also benefited the environment. Chile's drive to increase exports meant that certification was needed for some products. Such certification is becoming ever-more important, because consumers in importing countries are now demanding high-quality products produced without damaging the environment or the health of workers. This has encouraged some sectors (such as mining, agriculture and wood pulp production) to go beyond national requirements and agree to clean production programs. Greater globalization has also meant that Chile has benefited from a transfer of experience and technology from more developed countries, which has further reduced environmental impacts.

*Increased private-sector investment in sanitation* has been encouraged by Chile's focus on maintaining its macro-economic equilibrium, coupled with the many safeguards now in place to protect foreign capital. This has boosted the development of Chile's sewerage, as well as its water supply sector. So, for example, the percentage of sewage treated in Chile leapt from 17% in 1997 to 81% in 2005, and by 2010 almost all the country's sewage is likely to be treated.

*New water and environmental laws and regulations* have also been put in place. During the 1980s, Chile's policies on water resources were guided by the same market-oriented principles as the reform of the country's economy. Market forces have, for example, played a major role in ensuring that water is allocated to the highest value uses—an important principle of IWRM. Chile's water laws have created strong water use rights that can be bought and sold, triggering the formation of water markets.

Since 1990, a new emphasis has been given to social and environmental issues. These reflect both an ideological shift in the thinking of the government—which now seeks to better safeguard the health of the country's people and environment—and an increasing awareness of environmental issues on the part of Chile's citizens. A good example is the 1994 Basic Environment Law, which was the first holistic environmental legislation to be passed in Chile, and the first to tackle the problem of water pollution seriously.

The 1994 Law, introduced to replace various isolated standards, made it possible to apply a more integrated policy framework, which could be enforced through complementary action by different agencies. This led to new environmental standards for both water quality and discharges into watercourses. It also resulted in new plans designed to prevent and clean up pollution, and the creation of the System for Evaluation of Environmental Impact (SEIA), which is now used to evaluate every large investment project planned.

As well as bringing in new regulations, Chile has also made moves to enforce existing ones. For example, a major drought in the late 1990s led to greater powers being given to the regulatory authorities. This made it easier to force companies to comply with industrial discharge regulations.

In 2005, reform of the country's Water Code (see box) sought to establish a more stable balance between the public interest and the rights of private individuals and among social and productive demands and environmental considerations. This reform, which reflects trends in the development of Chilean society, specifies realistic roles for public and private sectors that are in keeping with the functioning of the economic system.

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## Evidence for a realistic, step-by-step approach to water policy reform

### Focusing on the feasible

Chile’s experiences show that it is vitally important for a country to assess the feasibility of reforms based on its economic, political and social situation. In Chile, economic development and political change over time made social and environmental objectives—such as subsidizing services to the poor and cleaning up the environment—both affordable and more of a priority.

A number of factors helped to ensure the success of Chile’s reforms. One is the fact that the country’s public administration is relatively efficient and quite well-respected by the general public. This made it possible to implement complex policies, such as subsidizing drinking water for low-income families and ensuring that competition for irrigation subsidies remains open and transparent. Such policies would be difficult to implement if people lacked faith in the integrity of public services. Another factor is that the Chilean people display a high level of ‘social discipline’—they tend to pay their drinking-water bills, for example.

### Step-by-step reforms

A strategy for the gradual reform of water-sector policies can work well—if it addresses realistic and pragmatic priorities. In Chile, the first priority was to improve access to water supplies and sewerage services. Only when good progress had been made towards these goals, and when per capita incomes had doubled, did investment in controlling water pollution begin. Also, privatization of water utilities was incorporated only when a public regulatory system was well-established.

A later priority was to increase tariffs for water supply and sewerage, so that private utilities could provide these services and charge for their real costs. This occurred with no effective social protest—because it coincided with a period of high economic growth (7% per year) when real incomes were rising significantly. It is very unlikely that the transition would have been so smooth during a period of economic stagnation.

Investments in the water sector, for example in irrigation, have also been prioritized according to current economic and social needs. Key to this has been a well-established system involving the ranking of investments, based on tried-and-tested economic and social evaluations.

## The importance of adaptability

The development of water resource management in Chile shows that IWRM strategies must be adaptable and dynamic, not fixed and inflexible. There the process has been one of on-going improvement and fine-tuning in response to changing conditions and new problems, both within and outside the water sector.

Decision makers need to take into account the fact that policies can have both positive and negative effects that can vary greatly between different sectors and geographical areas, and can manifest themselves at different times. For example, problems regarding the hoarding of water-use rights arose very soon after Chile introduced its 1981 Water Law (see box).

By contrast, there was a lag of some years between the start of the boom in water-dependent exports and the explosive demand for groundwater rights seen in the 1990s. This lag was probably due to the under-use of water rights owned before the export boom

began. In addition, the 1981 Water Law made provisions for the development of an active water market in agriculture. However, such trading of agricultural water rights has not yet become a reality, barring a few exceptions. In the areas of mining and municipal water supply there has been more success.

Droughts have also forced Chile to adapt its policies. In the late 1990s drought exposed weaknesses in the regulatory framework governing water supply, sewerage and the production of hydroelectric power.

Reforms of the Water Law in 2005 are another example of adaptations to changing conditions (see box). These granted the water directorate the authority it needed to better control and monitor supplies, while water rights that are held, but not used, are now subject to a tax. The reforms also seek to address a new and increasingly important challenge for water management in Chile, the overexploitation of aquifers.

## Key policy recommendations

- Develop water resource planning and management strategies in relation to the specific development model in place in a given country.
- Adopt an integrated approach to economic, social and water-resource planning and management, by including the widest possible range of sectors—to ensure successful water resource management and sustainable development.
- Calculate the ‘hidden’ water transfers in exports and allow for these in both development planning and water resource management.
- Consider using a phased approach to water-resource management as opposed to policies that call for immediate integration of all water-related planning and management—economic development resulting in social benefits may enable environmental objectives to be met in the long term.

This brief was prepared by Sandy Williams and Sarah Carriger under the direction of the GWP Technical Committee. It is based on *Water, Development, and Public Policies: Strategies for the Inclusion of Water in Sustainable Development* by Humberto Peña, Director of the General Directorate of Water Resources (DGA) of Chile and member of both the GWP South American Technical Advisory Committee (SAMTAC) and the GWP Technical Committee; and Marco Luraschi and Soledad Valenzuela of ECONAT Consultores.

### About the Catalyzing Change Series

The brief is part of a series of policy and technical briefs designed to help countries accelerate their efforts to achieve the action target for the preparation of IWRM and water efficiency strategies and plans set by the 2002 World Summit on Sustainable Development (WSSD) and reinforced by the 2005 World Summit. The series tackles key issues and potential stumbling blocks and attempts to give countries at the beginning of the process the benefit of lessons learned from those further down the path.

The series complements *Catalyzing Change: A Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies*. The handbook and all associated briefs can be downloaded from [www.gwpforum.org](http://www.gwpforum.org) or hard copies can be requested from [gwp@gwpforum.org](mailto:gwp@gwpforum.org).

The briefs in this series are intended to be dynamic rather than static documents. We will continue to update and improve them based on your input. Please send comments and questions to Christie Walkuski at [walkuski@iri.columbia.edu](mailto:walkuski@iri.columbia.edu).