

NATIONAL WATER COMMISSION

FIRST INTERNATIONAL LEGAL COLLOQUIUM ON REGULATION AND INTEGRATED WATER RESOURCES MANAGEMENT

Summary of Lectures

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FIRST INTERNATIONAL LEGAL COLLOQUIUM ON REGULATION AND INTEGRATED WATER RESOURCES MANAGEMENT

Roundtable 1: Water on Environment Conservation

JAPAN

AN OUTLINE OF WATER ENVIRONMENTAL MANAGEMENT IN JAPAN

Kunio Kohata

Abstract

The Basic Environment Law establishes two kinds of environmental quality standards (EQSs) related to water pollution; some related with protection of human health and others with living environment. Standards for protecting human health have been improved, however those for protecting the living environment in enclosed water bodies have not shown apparent improvements, this is attributed to eutrophication in lakes and enclosed coastal sea; therefore national and local governments have adopted strong measures.

1. Introduction

The rapid economic growth of Japan during the 1960s was accompanied by increased water pollution. This prompted adoption of measures. The matter is attended in the framework of: Basic Law for Environmental Pollution Control (1967, amended in 1970), that was superseded by the Basic Law for Environmental Pollution Control (1989), to enable more comprehensive measures for conserving sound environmental conditions; environmental quality standards (1970); the Environment Agency (1971), which took over the water environment policy in order to provide a centralized oversight for environmental conservation and was modified to become the Ministry of the Environment (2002); comprehensive and far-reaching legislation to regulate levels of pollutants in certain water bodies where organic pollutants were a recurring issue (1978); and the Law Concerning Special Measures for the Conservation of Lake Water Quality (1984), however, to this date, these measures have failed to yield results.

2. Management of Water Quality in Public Water Area

2.1. Effluent Regulations

The Water Pollution Control Law establishes the standards for effluents being discharged from specific facilities; these set specific concentrations for the various substances with regard to both human health and the living environment. Based on the Basic Environment Law, the national government established EQSs for water pollution; therefore there is a strong relation between both standards.

The Minister of the Environment determines the national uniform effluent standards as the minimum control values, that consider water discharged from specified facilities that have permission to discharge wastewater into public waters. Additionally, if the prefectural governors consider it necessary they can apply stringer regulations.

2.2. Environmental Quality Standards for Water Pollution

The Basic Environment Law establishes two kinds of EQSs to protect human health and for the living environment conservation, each type of standard establishes desirable levels to achieve and maintain policy objectives.

EQSs for protecting human health: in all the country, uniform regulations have been adopted for public and ground waters to achieve the first objective that is protection of human health. Currently, EQSs have been established for 26 substances in accordance with experience from the 70s and up to date; among other, regulated substances include: cadmium, total cyanide, lead, chromium, arsenic, total mercury, alkyl mercury, nitrate-N and nitrite-N, fluoride and boron. In the 1970's high concentrations of heavy metals in public water areas were observed, recently, the rate of exceeding samples maintains very low levels.

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EQSs for protecting the living environment: standards are set for each type of water body (rivers, lakes and reservoirs, sea and coastal areas), including organic and nutrients contaminants (biochemical and chemical oxygen demand, dissolved oxygen); to prevent eutrophication there are specific standards for nitrogen and phosphorus. Standard values for rivers, lakes and coastal waters are classified into categories and according to the water use (human consumption, fisheries, domestic use) they can vary in upriver and downriver flowing. National government reports annually on compliance of EQSs, recently it is observed that rivers water quality has improved significantly, contrary to what is happening in lakes and enclosed seas; this is attributed to eutrophication and implies new measures.

3. Measures against Eutrophication

Measures against eutrophication are classified into two categories and are considered in the Law concerning Special Measures for the Conservation of Lake Water Quality, that also take care of enclosed waters, and the Water Pollution Control Law for seas and coastal waters. At the beginning only chemical oxygen demand was controlled, but since the 5th period of the system total nitrogen and phosphorus are regulated.

3.1. Law Concerning Special Measures for the Conservation of Lake Water Quality

Based on a Cabinet decision and the Prefectural opinion, lakes and basins that need comprehensive measures are designated; according to the designation, conservation plans that contain the society union are designed and they contain the basic policy, plan period and water quality targets, with as a base, projects are done and concrete measures are adopted to preserve water quality. At the present time, 11 lakes and reservoirs are stipulated as designated lakes, including the two largest lakes (Lakes Biwa and Kasumigaura) and small lakes that accept large amounts of water pollutants from adjacent urbanized areas.

3.2. Area-wide Total Pollutant Load Control (TPLC)

Efforts must be focused on effectively reducing the pollutant loads in the populated and industrialized areas around large enclosed water bodies to improve their water quality. To ensure that EQSs for water pollution were met, the Water Pollution Control Law was amended in 1978 to implement an "Area-wide Total Pollutant Load Control System" for such large enclosed water bodies, which sets targets regions where the current standards are insufficient for achieving and maintaining EQSs. Therefore, standards have been established for nitrogen and phosphorus effluents in 88 enclosed saltwater bodies to prevent eutrophication, and EQSs for nitrogen and phosphorus pollution and pollutant load-controls for Tokyo and Ise Bays, and the Seto Inland and Ariake Seas.

4. Measures for Household Wastewater

An example of recent administrative advance, as measures for household wastewater, is the 2005 amendment of two laws to improve water quality. Law Concerning Special Measures for Conservation of Lake Water Quality define areas for effluent control, in agricultural and urban areas; it also expanded regulations for factories and established lake-environment conservation areas. The Sewerage Law was innovated to improve Comprehensive Basin-wide Planning of Sewerage Systems, it includes reduction targets and introduce transferable of Load Reduction Assignment, this is water quality trading.

5. Conclusions

Japanese citizens are now free from the threat of toxic substances in public water areas, but the water quality in enclosed water areas has not yet improved. The Japanese government should make more efforts to reduce the pollutant load from land.

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CANADA OVERVIEW OF WATER LAW AND CURRENT MANAGEMENT ISSUES IN BRITISH COLUMBIA, CANADA

Mark Haddock

Abstract

Most of the jurisdiction dealing with water is a provincial responsibility, although there is important federal authority relating to fisheries and, to some degree, threatened and endangered species. Provincially, there are many different officials with authority over water; the Auditor General has noted that there is a need for greater clarity of responsibility, management focus and coordination particularly when it comes to water source protection issues. Although British Columbia (BC) has lots of water, there are areas where water quantity is a very real issue (arid or semi-arid areas, demands of large urban and agricultural areas, as well as golf courses). Global warming suggests that water quantity may become more of an issue in the future. The lack of minimum in-stream flow requirements in BC for fish and wildlife purposes is becoming an important issue, particularly in areas facing diminished stream flows or increased demand. However, key issues at the present time are water source protection, particularly for areas reliant on ground water which are just beginning to be regulated, but current rules are limited to practices around the drilling and maintenance of wells. As water tables continue to decline in aquifer dependent areas, there will be an increasing call for more fulsome regulation and licensing of groundwater, as well as demand for better non-point source protection to address contamination risks from farm practices and other sources of nitrates and bacteria.

1. Introduction

A broad overview of forestry and soils aspects of water management is presents, also raised are legal and management approaches that have been in place over the last decade in BC. Canada generally has lots of water, particularly British Columbia is a very wet province; combination of the Pacific Ocean and mountainous terrain make it a province with lots of rain, snow and diverse ecosystems, even though parts of the interior, particularly in the south, are quite arid and present a significant population growth because of lower rainfall levels, resulting in some of the water management issues common to arid jurisdictions.

2. Constitutional and Legal Context

Canada is a federal state with a parliamentary system; its common law comes from British laws, with the exception of Quebec that has a civil law system due to his French origin. The Constitution Act (1867) sets out a division of legislative powers between the federal and provincial levels of government and establishes that the federal Parliament may not intrude on matters assigned exclusively to the provincial Legislatures, and vice-versa; a doctrine in which the federal law prevails over the provincial in the event of conflict has been developed. At the time the Constitution was developed, environmental issues were inexistent, so division of powers reflects fairly basic matters. On water there is shared jurisdiction, but most of the authority resides with the Provinces; for example, the federal government has jurisdiction over sea coast and inland fisheries, shipping and navigation, Provinces have jurisdiction over property and civil rights, which are the source of provincial powers concerning water, forestry and soils. To appreciate the legal context for water management it should be considered that both levels of government have the authority to abrogate common law rights that developed property rights relating to water known as riparian rights, which normally come with ownership of real property that either borders on, or includes, water bodies such as lakes, streams, rivers and ocean. Riparian rights include certain rights to water quantity and quality, access to water and rights to fish; law makers have the right to restrict or limit these rights, and have routinely done so.

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3. Federal Laws

The main piece of federal legislation that affects water is the Fisheries Act, which sets two prohibitions relevant to water quantity and quality; the first is against the harmful alteration, disruption or destruction of fish habitat and has been used to address water quantity, the second is against the deposit of deleterious substances into fish-bearing waters and is regularly used to address water quality issues, as polluting substances are often harmful to fish populations. Other relevant federal legislation which will not be detailed, because they do not have a significant role in water management in British Columbia are: Species at Risk Act, which could play a role in the future with respect to water-based habitat of endangered species; Navigable Waters Protection Act and the Canadian Environmental Protection Act which addresses toxic substances and ocean dumping.

4. British Columbia Laws

There are several provincial statutes that are relevant to water management and they include the Water Act, Water Protection Act, Health Act and the Environmental Management Act, when it comes to the relationship between forest practices and water, the Forest and Range Practices Act is also pertinent.

The primary legislation is the Water Act, which sets out a licensing scheme for the granting of water rights; it also vests ownership of all water and rights to use and flow, thereby repeals many of the common law rights of riparian property owners and it is clear for rights relating to water quantity. The Water Act sets out a licensing scheme for the use of water incorporating different principles (licenses acquired first in time are first in priority, licenses cancellation for non-use over periods of three years or greater -use it or lose it-, and specifications in licences for uses and volumes attached or "appurtenant" to land, that may be transferred with the consent of pertinent authorities). With recent amendments, the Water Act address groundwater, but they are not yet licensed and there is no charge for its use. Even the Act imposes some prohibitions against diverting, obstructing or making other changes to streams; it is mostly a licensing scheme and does not address the larger issues of water protection quality, quantity or conservation.

Although BC generally does not have substantial water supply issues, in some arid regions there are facing problems related to over-subscription of water resources; these areas are also facing enormous growth pressures from increasing population, urban development, and increased industrial agriculture activity. Another emerging issue water managers face in rich water areas is a large number of new applications (hydroelectric purposes, due to a change in government policy that allows its building and operation); these developments would dam and divert around 80 to 90% of the mean annual stream flow of smaller rivers, this is not an issue because eventually the water will return to the river bed, but it raises fisheries issues for the dewatered portion of the waterways.

In the mid-1990s was adopted a Water Protection Act, which accomplishes three things: it vests ownership of surface and groundwater in the provincial government; it prohibits the large scale export of water, considering private companies applications to export it to California; and it prohibits the transfer or diversion of water across major basins.

The Health Act grants certain public health officers broad powers of inspection and the ability to make orders if they believe the is a health hazard.

The Environmental Management Act is broad legislation dealing with pollution, i.e. the deposit of waste into the environment, which includes water; through this Act many water quality issues are addressed, either through permits, regulations or codes of practice. It is aimed primarily at industry, trades and businesses but contains a general prohibition against the deposit of substances in water in a manner that causes pollution; even it addresses point sources of pollution to a limited degree, in my opinion it is less effective to regulate non-point sources that can be important to ensuring water quality.

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5. Current Water Management Issues

Some of the challenges and the ways to address them are presented; several of the management approaches have been in place for some time, while others are still new and in the experimental stage.

5.1. Water Quantity

Certain regions are facing diminishing water supply largely due to a combination of factors such as global warming, urban growth and the increase of agricultural production; this is significant in the drier and warmer areas but it is also true in the lower Fraser Valley, that being a wet area where most of the population lives, has an important demand for water and lack of mechanisms to address major issues.

5.2. Water Quality

There are several threats to water quality in BC; some are common throughout the world, and some arise as a result of industries engaged in extraction of our natural resources. First natural threats are faced, such as the parasites *Giardia* -from animal feces that can be found in soil-, and *Cryptosporidium* -associated with bacteria-, both of which cause intestinal infections and can be fatal to people with immunosuppression. While these contamination risks are generally a concern even under natural conditions, it is heightened in places where industrial activities such as logging pose an elevated risk due to soil and slope stability issues that could result in landslides that deliver soil containing these parasites into water supplies. Use of fertilizers, pesticides and the management of animal wastes has become a significant water quality issue, particularly in those areas that rely on aquifers for water supply, this have led to high nitrate levels in groundwater, especially in areas that receive lots of precipitation. Population growth has also resulted in more intensive livestock operations which has magnified the risk posed by manure management practices, improperly constructed or maintained septic fields in areas not serviced by sewer systems also contribute to the problem; the level of sewage treatment is a controversial issue as well, but for the most part the discharge areas are not water supply areas for human consumption, that raise other environmental issues.

Farm practices are regulated under a “code of practice” that has the same force as a regulation, the Agricultural Waste Control Regulation under the Environmental Management Act limits manure storage times and conditions. Activities that release effluent with pollutants into water pose a risk to water quality, for an industry, trade or business that is specified in a regulation, these issues are addressed through permits or regulations under the Environmental Management Act; for other activities environmental enforcement officials must prove that “pollution” has occurred.

5.3. Water Supply

For the most part, community basins that supply water for human consumption are public lands that do not prevent other human or industrial activities; many of these basins do not have any special or different legal status than other areas, with the exception of the “community basin”. Vancouver and Victoria, have extensive control over their water supplies through dedicated basins that are either owned outright or leased from the Province by the “water districts” (legal entities created by statute to purvey water, which are overseen by elected representatives of the local government, for example the Greater Vancouver Water District –GVWD- holds a 999-year lease over Provincial lands in three large basins and prohibits public access in them, and although logging used to take place it is now prohibited after community opposition to the practice -which occasionally resulted in landslides and dirty water coming out of peoples’ taps-).

5.4. Auditor General Report

In 1999, the Auditor General, an independent officer of the Legislature who audits government performance, reviewed drinking water source protection and concluded that while these sources provide good water requiring minimal treatment; almost all face risks from human activities that are not adequately managed. The key findings of the report were: water-source management is not properly integrated among agencies with a mandate over water; improvements are needed in managing the effects of other resource uses (logging, cattle-grazing, mining, public

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recreation); the absence of groundwater management has resulted in increasing problems; and, small water systems are particularly vulnerable to the lack of water-source protection. To overcome these problems, the Auditor General recommend that the government: designate a lead agency that will represent the interests of drinking-water users and suppliers and coordinate action; improve accountability reporting on drinking-water sources; and, carry out a comprehensive evaluation of the rights of resource access of drinking-water suppliers to determine if those rights, and related responsibilities, were appropriate.

5.5. Water Management Planning

To address the issues raised by the Auditor General, the Water Act was amended in 2004 to allow for integrated water management planning where risks to water quality or water-user conflicts were identified. This type of planning is still a new experiment and has only been attempted in east of Vancouver, in which both rural and urban development converge in demand for limited aquifer water supply. Water quality is also an issue in farming practices, particularly manure management and the application of fertilizers and pesticides that increase groundwater contaminations risks; in fact two or three aquifers nearby are contaminated to the point that they are unfit for human consumption. Water management planning allows (or even expects) all those with responsibility to come together to address the issues and make recommendations for the future; while this exercise is not new, its main utility comes once the plan is completed, reviewed by the Minister of Environment, and then put forward to provincial Cabinet for approval, whose orders have the force of law. When approving these plans, Cabinet may limit the number of water licenses that may be approved in an area or require additional stipulations on drilling, alteration and testing of wells and pump installations; in other words, plans can be used to regulate in much more detail current legislation and regulations.

The first plan currently under way is being undertaken at the initiative of the local government (municipality), which has little direct authority over water but does have authority over land use. Considering some aquifers have dropped substantially resulting in wells going dry, new wells having to be drilled much deeper at significant cost, loss in the base flow of fish-bearing streams and negative impacts to important wetlands, the Plan recommended mandatory water metering, summer sprinkling restrictions, approval of drilling for wells and several other progressive measures; the first recommendations led to considerable public opposition due to mistrust, accustomed to the unrestricted use of groundwater it was considered that metering would lead eventually to charges for water use, also there were complaints pointing that higher regulations should be established first for large industrial users (industries, large irrigating areas and golf courses). The plan is not yet approved, but the exercise has demonstrated the need for (and difficulty) of water managers to effectively deal with public education, trust and resistance to change.

5.6. Forestry and Water Management

Forestry is a major part of the BC economy, and given how extensive forested lands are, it is not surprising that conflicts between water users and forest companies have arisen. Many communities get their water supply from provincial lands for which the government has issued tenures or concessions; they also exists areas which rely on surface water for their domestic water supply, in which logging has led to turbid water and damage to the communities, logging roads can also be a source of sediment and on many occasions public health officers have to alert on for contamination by *Giardia* or *Cryptosporidium*.

Another issue associated with forestry is basin pollution due to herbicides. Reforestation is required by law, and there are rules to establish a "free growing" second tree crop following logging, logging companies frequently use herbicides to suppress the growth of shrubs and reduce competition for the trees they plant on the site; this practice is controversial, especially in basins that supply communities with water.

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5.7. Forest Practices Code

In response to public concerns and protests over community water supplies and quality, in the mid-1990s government introduced a Forest Practices Code that imposed a number of requirements on forest companies; the regulatory approach addressed plans and practices. The planning requires assessments that must be approved before the right to log could be granted through cutting permits.

The assessments should: contain basin assessments in those designated as community basins and sensitive fisheries basins, including potential hydrological impacts from the amount of logging that has taken place, they must be carried out by qualified professionals (engineers, agrologists, and foresters) and has to consider the amount of logging that had occurred and recommendations concerning the amount, manner and timing in which future logging could be carried out without harming the hydrological cycle and potentially water quality, quantity or suitability for fish; terrain stability assessments – logging in community basins could not be approved until unstable or potentially unstable slopes are identified, as well as the potential for soil erosion, this assessment also has to be carried out by a qualified professionals and could result in further studies if a company proposed to log on unstable slopes; and, riparian assessments to identify and classify all the streams in a basin before logging approvals.

According to the area, forest practices standards under the Code had mandatory and discretionary aspects. In riparian reserve zones were restrictive and tree removal was prohibited unless it was required for safety, to prevent wind throw of trees, for stream crossings (bridges) or for forest health reasons; road building in a reserve zone was not allowed unless it could be demonstrated that there was no other practicable option.

5.8. Forest and Range Practices Act

In 2002, the new provincial government decided that the assessments required under the Code were too onerous for the forest industry and replaced it with this Act; in the place of assessments, forest tenure holders would have to submit forest stewardship plans that set out results or strategies that meet certain government objectives set out at the Forest Planning and Practices Regulation in order to prevent cumulative hydrological impacts from primary forest activities (adverse impacts on quality or timing of the flow from waterworks and adverse impacts on human health that cannot be addressed by water treatment); this provision is subject to the proviso that any measures taken will not unduly impact the supply of timber from British Columbia forests; the measure emphasizes the government desire for revenue from logging, its critics argue that the Code has a precautionary approach and that current rules are reactive once the harm is done and that non-compliance will be difficult to prove.

5.9. Current Issue – Mountain Pine Beetle

British Columbia is currently facing a major crisis in terms of forest health due to an explosion in the population of mountain pine beetles brought on by global warming; these insects, which over-winter inside pine trees, have been endemic in BC forests for a very long time. Populations were previously kept in check by cold winters, in which a certain percentage of beetle larvae, but winters not cold enough result in massive increases in populations. Scientists consider that it takes three weeks of –30 degrees Celsius temperatures to keep populations in check, in the past, only larger trees were susceptible to beetle attack, but recently a huge number of beetles have been infesting younger forests, creating a huge problem for the health of forests. Trees killed by the beetle have a “shelf life” between 3 to 10 years, therefore to compensate value from the dead trees; the rate of logging has doubled. Recent studies from the Forest Practices Board (an independent auditor) predict that negative hydrological consequences would be brought from the clear cutting of large areas to salvage beetle-killed timber; other studies predict downstream impacts such as flooding as a result of higher peak flows in spring.

5.10. Range (Cattle Grazing)

Throughout BC it is common for ranchers to graze their cattle on public land under permits or licenses under the Range Act. Cattle need access to water, but pose risks to its quality by

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potentially adding sediment, harmful bacteria and parasites to drinking-water sources, because cattle prefer riparian areas, the approach to manage risks is a set of site-based rules that should be integrated to plans; similarly the Forest and Range Practices Act requires range tenure holders to prepare range use or range stewardship plans to meet government objectives: maintain or improve water resources; maintain or promote healthy riparian and upland areas; maintain or promote riparian vegetation that provides sufficient shade to maintain stream temperature within the natural range of variability; and maintain or promote desired riparian plant communities.

In addition, regulations set out certain range practices requirements; it is an offence to adversely affect the ability of a riparian area to: filter runoff, store and safely release water, withstand normal peak flow events without soil loss, channel movement or bank movement, and not to conserve fish and wildlife habitat values; moreover, it must be ensured that cattle do not cause material that is harmful to human health to be deposited in, or transported to, water that is diverted for human consumption. There are also rules so that certain range developments do not take place within 50 m. of a stream in a community basin.

In 2002, a special report by the Forest Practices Board found that about 71 percent of wetlands and streams in its survey area were in proper functioning condition, but that 17 percent of sites were at risk and 13 percent were non-functional and that drier ecosystems were most susceptible to riparian damage.

6. Administrative Tribunals for Dispute Resolution

Outside of the court system, the use of administrative tribunals for resolution of water disputes is limited. Under the Water Act, certain decisions of government water managers may be appealed to the Environmental Appeal Board; appeals are limited to the person who is subject to the order, an owner whose land is or is likely to be physically affected by the order, or another licensee, riparian owner or applicant for a license who considers that their rights are or will be prejudiced by the order. On forest and range practices, decisions may be appealed to a Forest Appeals Commission by the license holders or by the independent supervisory agency. General public has no standing to appeal.

The powers of both instances broad and they may confirm, reverse or modify the decision that is appealed to them; if a party to an appeal is not satisfied with the decision, it may seek judicial review in a court of law. To formal opportunities and mediation are limited on water-related disputes, generally speaking it could be said that in British Columbia no water-litigation exists.

7. Conclusions

Most of the jurisdiction dealing with water is a provincial responsibility, although there is important federal authority on fisheries and threatened and endangered species. Provincially, different officials have authority over water and there is a need for greater clarity of responsibility, management focus and coordination particularly when it comes to water source protection issues. Although British Columbia has lots of water, there are areas where water quantity is a problem. Currently, key issues are water source protection, particularly for areas reliant on ground water that are just beginning to be regulated. As water availability continue to decline in aquifer dependent areas, an increasing call for more fulsome regulation and licensing of groundwater will raise, as well as demand for better non-point source protection to address contamination risks from farm practices and other sources of nitrates and bacteria.

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Roundtable 2: Distribution of Functions for Water Management

ISRAEL

REGULATION OF AN INTEGRATED MANAGEMENT PROGRAM FOR WATER RESOURCES

Liat Shaham

Background

Israel is a very small country with 22,000 km² and 7.2 million inhabitants; while its north is fertile and with reasonable amounts of rainfall, over 2/3 of its terrain is considered desert with only 0 to 400mm of rain. The main source of freshwater is the Sea of Galilee in the north and it also uses water from the Coastal Aquifer and the Mountain Aquifer.

1. Defining the Problem, Deciding on Strategies

Since its inception, Israel's main challenge has been to supply sufficient amounts of drinking, agriculture and industrial water to all its inhabitants, despite a chronic state of severe water shortage without compromising on the quality of the water. Therefore, firstly Israel locate and map all its available sources of water; top to bottom have been surveyed, and today there is a clear idea of all its available water resources.

Strategies adopted are: guard freshwater reservoirs and ensure their continued existence; prevent water loss; use existing water efficiently, maximizing every drop; and, cultivate new sources of water. To enable this, four main strategic tools have been used: national integrated water management (vision, planning, execution); clear legal framework in which National Water Authority assumes responsibility and control; education towards a water saving society; and technology. The only way to address all water needs was to adopt a national level water management perspective, seeing all the needs, knowing how much the country has and where, deciding priorities, shifting water from where it was to where it was needed, knowing how much was still missing and finding a solution that would fill the gap.

2. Legal Framework

In 1959 a Water Law was instated to enable the above, it declares water is a public good and entrusts the government to guard and manage it. Accordingly, today Israel has three public types of entities that deal with water.

The National Water Authority, carries out government "Water Savings" policy in water and sewage by setting rules, standards and tariffs and monitors their operation. It also educates and promotes a "Water Saving Culture", with campaigns for the general public, through rules and standards promoting water-saving, and discourages waste by setting fines and penalties to public entities, private corporations and individuals.

Mekorot, a state-owned bulk water supplier, whose main functions are to establish, manage and treat the National Water System

Regional Water Companies and Municipalities, operate regional water and sanitation systems

3. National Water Management

After the law has been established, the country applied its national level water management vision to solve the south's dire need of water, designing a revolutionary system that would take water from the north and deliver it to the south. The system, built in the 50s and 60s, was called "The National Water Carrier" (NWC). In its day, the system in the young State of Israel was one of the biggest most intricate water transport systems in the world. The system: recharges the aquifers during winter, to ensure their continued existence, limits evaporation, and betters the water protection; connects almost all Israel's water resources; and, shifts saline water flow away from potable water reservoirs to the Dead Sea.

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The route of the NWC covers mountains, streams and rocky terrain, in the 35 kilometers of its route, the water travels through open canals.

4. Water Saving Culture – Combining Education, Technology and Legislation

Since the country's inception (1948) and even after the NWC was in operation, the general public has been urged not to waste water even before awareness of global warming was raised throughout the world. Campaigns encourage shutting of leaking faucets around houses, wash cars with buckets and call households to install toilet systems enabling half-tank flushing; the latter has been backed by an industry standard in all newly manufactured systems.

In the agricultural business sector, methods were developed to use the least possible amount of water, primarily through drip and low pressure irrigation; subsequently, laws were passed mandating the use of such technologies. This led to achieve the highest water efficiency, up to 80% utilization against the regular 40%, and to a very high crop yield, an example is the greenhouse tomato which production stands at 400 tons h/a.

In the municipal sewage systems an emphasis was put on guarding and monitoring the water since it enters the cities and up until it reaches the households, so that no water is lost on the way. Today, municipal water loss stands at a mere 9.7%. Municipalities that wish to install water saving mechanisms receive financial aid from the Water Authority; those that consume more than the amount allocated are heavily fined.

5. New Strategy – Creating Water

Since the mid 60s, freshwater has been distributed fairly; along with the mindedness toward responsible use of water and the technology, have been enough to meet all society's needs. Even with the population increases over the years and the correlating increase of crops needed to sustain it, and the modernizing world demanding more water, Israel has kept availability. However, with the planet warming and rainfall decreasing every year, the available freshwater has been steadily decreasing, therefore, the government of Israel decided on two strategic moves: recycle waste water in various levels, through secondary treatments for landscape irrigation and to a potable level for the use in agriculture, this also requires some education of the farmers, who first were hesitant to use such water, and incentives in the form of reduced fees; and, on the virtually endless source of sea water, previously deemed unusable due to salinity excess, the challenge is not only to remove the salt from the water, but also to make the complicated and costly process affordable, so that the country could widely use it and still be able to manage its budget normally for all the rest of society's needs.

To realize the above goals, Israel had to find and perfect purification and desalination technologies. As a result, today almost 80% of its wastewater is recycled and utilized for irrigation, additionally 160 MCM a year of seawater are being desalinated, at a cost of only \$0.52-\$0.60USD per CM. Within the next 5 years, the goal is to reach over 90% of wastewater recycling and over 500 MCM per year of seawater desalination. By 2013, Israel would cross the 50% threshold and would use more created water than freshwater.

6. Technology

Of course, none of the achievements could have been realized without technology development, which has enabled to maintain sustainability in desert conditions. As mentioned, main breakthroughs include: drip irrigation; the National Water Carrier; cost-effective seawater desalination; innovations in water metering; and, cutting edge purification technologies.

The government, realizing the importance of the water sector to Israel and the world, decided to initiate a new program called Israel NEWTech (Novel Efficient Water Technologies). The program's goal is to strengthen the sector from within and turn it into a dominant player on a global level, so therefore it operates in several ways: strengthening human capital, collaborating with high-schools and secondary level education establishments to open water related courses and studies

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and advanced mentorship courses for engineers and other professionals; strengthening research and development, scholarships and grants to university researchers in the field, aid to young companies and entrepreneurs in technological incubators; establishment of new dedicated research institute; promoting implementation of new technologies, through incentives to regional and municipal water management entities, through international cooperation with water authorities throughout the world; and, Helping expose the water technologies industry abroad, through signing of bi-lateral collaboration agreements, participating in global events and creating sector marketing tools.

UNITED STATES WATER BANKING IN THE WESTERN UNITED STATES: AN OVERVIEW AND RECENT DEVELOPMENT

Stephen M. Macfarlane

Abstract

Over the last twenty years, Western states, particularly California, have pursued the development of water markets as a means of addressing water allocation problems associated with drought and intensifying urban growth. Water banking has played an increasing role in this development, because they promote voluntary transfers of water to urban and environmental needs while addressing impacts from markets on third parties and local communities. The legal framework and institutional structure of water banks are still evolving; however issues concerning the relative rights of communities and water bank participants remain in need of clarification.

1. Legal Framework of Western Water Use

A. Public ownership of the water itself: water itself is a community resource, subject to control by states; there is no property or possessory.

B. Water rights, a right to use water: under state law water use is usufructory in nature and is afforded legal recognition and protection, subject to limitations, considers:

C. Reasonable and beneficial use: the beneficial use doctrine understand as “the basis, the measure, and the limit” is the bedrock principle of legislation and the main limitation over a water right; States differ on criteria over reasonable and beneficial, including the no right to “waste” water and purpose as fish and wildlife.

D. Generally governed by state – not federal – law: although the United States Supreme Court has also recognized federal reserved water rights (Indian reservations, National Forests, National Parks, among others). Water law initially developed as common law; during the early twentieth century, individual state legislatures enacted water codes; much state water law today is statutory.

E. Prior appropriation doctrine, “first in time, first in right”: developed in nineteenth century, appropriative rights historically involved a diversion of water from a stream, and the application of the diverted water to beneficial use. Protects senior water favouring irrigation; urban and environmental uses of water generally hold junior priorities and during times of shortage the late must cease in favour of older holders.

F. Appropriative rights can be lost by non-use, “Use it or lose it: water rights can be lost if not exercised (relinquishment, forfeiture, abandonment); many western states have also enacted forfeiture statutes, by which a water right is subject to forfeiture if it is not exercised for a prescribed period of time (often, five consecutive years); incentives to maximize use of water rights are also consider, reasonable and beneficial use does not mean the most efficient use of water and traditional limitation on conservation and transfers are also considered.

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2. The Liquidity Problem in the West

A. Urbanization and population growth: for over 100 years, the west has been the most urbanized part of the United States; more than 80% of the population of California, Arizona, Nevada, and Texas reside in large urban areas, between 2000 and 2006, California added 6 million inhabitants, for a population to nearly 36.5 million.

B. Environmental impacts of 100 years of water development: dams, canals and pumping facilities have altered the natural distribution of water and flows, with impacts on fisheries, water quality and land use.

C. Historic drought in the Colorado River basin, and return of drought to California: the basin is in the eighth year of drought, these have been the worst in a century.

D. Climate change and potential impacts: the implications and consequences on the West are unknown and vary across the region; some research's suggests that more precipitation may fall in the Sierra Nevada Mountains in the form of rain rather than snow.

3. Traditional Approaches to Water Shortages and Allocation Problems

A. Expand storage – build more dams: most of the large storage reservoirs were built between the 1920s and the 1970s; support for major water infrastructure projects has substantially diminished since the 1970s.

B. Groundwater pumping: center-pivot irrigation developed in the late 1940s, allows aquifers to be tapped for agriculture.

C. Import water from other basins: the growth of Los Angeles and San Francisco was aided by large-scale water importation projects that tapped basins far away.

D. Conservation: responses to the Dust Bowl of the Great Depression and water rationing in California during the drought in the late 1970s.

4. 1980s: Public Trust Doctrine¹, Water Markets and Transfers

A. Public trust doctrine revived in some states: in 1983, the California Supreme Court extended the public trust doctrine, as a limitation on water rights, to include protection of ecological and recreational values in water use. The Mono Lake decision went further the simple water public access and set out that water rights could be modified to protect.

B. Interest in market mechanisms grows: transactions for bilateral transfers between entitlement holders, California changes state law to facilitate transfers; additionally drought of late 1980s/early 1990s accelerated interest in transfers.

C. Legal constraints remain.

5. Legal Constraints on Water Transfers

A. Third party impacts: the bilateral nature of water transfers raises questions about impacts to other water right holders and resources (groundwater, fish and wildlife resources). Appropriative rights can be transferred, subject to the no injury rule and public interest.

B. Transaction costs: obtaining state approval for water right transfers can be slow and costly.

C. Forfeiture and relinquishment: the proposed transfers of water rights that have not been actively used may be subject to forfeiture and abandonment claims under state law.

D. Environmental considerations, e.g. the Endangered Species Act and constraints on moving water: in addition to statutory protections as part of the transfer approval process, there may be limitations on if species listed as threatened or endangered are harm under the appropriate legislation.

¹ The Public Trust Doctrine is the principle by which certain resources are preserved for public use, which government is obliged to maintain for the population reasonable use.

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6. Water Banking – A Solution?

- A. Relatively recent: before the early-1990s, state-approved water banks were only operating in Idaho and California.
- B. Legal framework is still evolving: the “rules” for water banks are still developing on a state-by-state basis.
- C. Water banking now practiced in most western states: nearly all western states now have water banks in some form.
- D. No uniform models: water banks may be state-wide, local, regional or basin in scale; may involve groundwater or surface water and have different operational rules.

7. What is Water Banking?

One definition: an institutionalized process specifically designed to facilitate the transfer of developed water to new uses; a water bank is an institutional intermediary that brings together buyers and sellers under known procedures and with some kind of public sanction for its activities. The common characteristics include:

- A. Forbearance in the exercise of an entitlement to water, entitlement is usually retained by the holder.
- B. Allows entitlement to be “banked” for later use by the holder, or
- C. Transferred to another user with a need for it
- D. Multiple buyers and sellers, transactions are often multilateral rather than bilateral.
- E. Some form of regulatory oversight/administration, there are agreed-upon rules for deposits, withdrawals and sales.
- F. Can involve surface or subsurface storage, storage banking programs are rapidly developing.

8. Examples of Water Banks

- A. State-wide surface water banks based on transfers (Idaho Water Bank -1979-; California State Drought Water Bank -1991, 1992 and 1994-);
- B. Groundwater banking (Kern Water Bank and Semitropic Water Storage District in San Joaquin Valley, California, Deschutes Groundwater Mitigation Program in Oregon);
- C. Basin- and Inter-state “water banks” (Yakima and Okanogan basins in Washington, Intentionally Created Surplus, Colorado River and Truckee River Operating Agreement).

9. California Drought Water Bank of 1991: Lessons Learned

- A. Sources of water sold to the bank: related to land fallowing, groundwater pumping and previously stored; concerns over economic and social impacts on selling regions; worries over potential loss of entitlements; and, export of groundwater.
- B. Water transferred to “areas of critical need”, municipal areas and farms with permanent crops: lessons relate with potential impacts of bank on fish, wildlife and in stream uses.
- C. State Water Board cut out of transfer approval process: the California Department of Water Resources organized and operated the bank, the state agency with jurisdiction over water rights and potential third party impacts was not involved.

10. West wide: Legal and Policy Issues Remain

- A. Temporary fixes: until recently, water banks have been used as emergency, and temporary, responses to drought.
- B. Inadequate institutional oversight: insufficiently inclusive, community rights may not be adequately represented.
- C. Third party impacts: perception vs. reality, concerns persist; local impacts; laws limiting exports in origin areas; assessing need for water transferred through a bank.
- D. Environmental concerns.

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11. The Truckee River Operating Agreement (TROA)

- A. Shares features of water banks, while addressing lingering legal issues.
- B. Signed on September 6, 2008.
- C. Authorized by the “Settlement Act” of 1990, is a broad statute providing authorization to resolve numerous long-standing disputes over water allocation and use in the Truckee and Carson River and the Lake Tahoe basins. The Act directs the Secretary of the Interior to negotiate an operating agreement with the States of California and Nevada, and prescribes certain terms and conditions for it.

12. What is TROA?

- A. An Agreement, authorized by the U.S. Congress, which will also be issued as a federal regulation.
- B. Is mandatory for the U.S. Federal government, the States of California and Nevada; the Pyramid Lake Paiute Tribe and the Water Authority for the Truckee Meadows; additionally Cities and Counties in the Truckee River Basin participate with no obligations.
- C. Core of TROA is ability to store additional water upstream with coordination of storage, releases and exchanges.
- D. Allows all Truckee River Reservoirs to be operated as though they are one reservoir.

13. How Does TROA Work?

- A. Water which parties have a right to use but do not need for current demand, is stored under rights and rules of the mechanism.
- B. States approve transfer applications, subject to TROA.
- C. Parties to TROA may establish categories of “credit water” stored in Truckee River Reservoirs for: in stream flows and inflows to Pyramid Lake; municipal drought supply; water quality; new projects for irrigated agriculture; and, incidental benefits to recreation.
- D. TROA allows one category of credit water to be converted into another, with no loss of entitlement.
- E. Allows Parties to exchange credit waters in storage.
- F. Specifies priorities of water in storage – which waters spill first.
- G. Analyzes Environmental impacts.
- H. The Administration oversees operations and ensures protection of existing rights.

14. TROA and Water Banking

- A. The “credit union” approach – a party must sign TROA to participate.
- B. Streamlined transfers, no loss of entitlements.
- C. Minimizes transaction costs.
- D. Provides water for environmental and urban needs, while protecting agricultural water entitlements.
- E. Protection against potential third-party impacts.

15. Actions Required to Implement TROA

- A. TROA must be issued as “Exclusive Federal Regulation” governing operations of Truckee River reservoirs.
- B. Water rights changes:
- C. Judicial modifications to two federal water decrees.
- D. Final dismissal of litigation: the Settlement Act requires that several long-standing lawsuits over Truckee River water rights be finally resolved.

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Roundtable 3: Economic and financial instruments for water management

CHILE

AUCTION IN WATER USE RIGHTS ON THE LEGISLATION OF CHILE

Trinidad Prieto Andueza

Introduction

“Auction in water use rights”, as an economic and financial instrument for hydric resources management is established in the Chilean legislation.

Most societies deem the “market” as the more appropriate instrument for its goods distribution; among them is water, a vital element and source of diverse economic activities. It is considered that through “markets” it is possible to achieve a suitable distribution and/or allocation of water resources; avoid large flow concentrations; encourage effective use of them, and to promote a greater number of transactions when due to physical or administrative reasons it is not possible to originally acquire new rights from a specific natural source.

Some general aspects of the Chilean law are: waters are national assets for public use, what is given to gives individuals is a right of use over water, which is real and implies the use and employment of water; and, the use right corresponds to the holder who can use, enjoy and dispose of it.

Water policy has not always been adhered to those principles. The domain, acquisition, transfer and process of constitution covered by legislation over the years shows great contrasts. Differences among standards in the Water Code of 1951 and 1969, as well as in the 1981 Code 1981, in force and amended in 2005 and 2006 are summarized below.

In the 1951 Code, the auction of water applications did not exist and according to the use of waters submission, a sound system consisting for the precedence order was established by the authority; the rule stated that if there were several applications for the same waters, the award was made in the following preference order: drink and water service to the population and industrial centers; households and sanitation of settlements; railway supply and saltpeter production; irrigation; electric or power generating plants; industries, mills and factories; and, other uses. The precedence was for major and utility companies, and in equal conditions, they were selected in accordance with the submission dates.

The 1969 Code only set out three priorities for preference order: beverage and drinking water services on communities and industrial centers; household uses and settlements sanitation; and, other uses. It also considered preference for activities of greatest importance and usefulness, and on equal terms, also gave precedence according to submission dates.

Economic principles and policies of the military regime, as reflected in the drafting of the Constitution of 1980, affect the water approach applying the free trade and free transferability principles of water rights; also, to avoid duplication on functions approaches and measures, it established that a single institution was to conduct studies, planning and grants for water rights.

1. Development

The 1981 Code replaced the water rights gratuity allocation system with a bidding system among several petitioners, when applications were incompatible, to ensure the best use of water resources. Additionally, this system was designed to prevent speculation generated by free granting of water. This Code sets out the concept of Public Economic Order, understood as a set of principles and rules of constitutional rights, primarily of economic content, such as equality on public encumbrances, the right to develop any economic activity, non-discrimination in economic aspects and property rights (constitutional guarantees). Considering this principle, when there are multiple submissions on the same water and the availability of the resource is insufficient to satisfy all of them, the Auction of Applications figure was established.

Additionally, it empowers the General Waters Directorate (GWD) to dictate the correspondent Auction Bases; payment procedures; adjustments, bonds and warranties;

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conduction of auctions and who can participate in them; the flow to be auctioned expressed in auction shares; and, the way fees will be allocated. Furthermore, it allows GWD to offer in public auction available rights that have not been requested. Upon entry into force of this Code, the market was seen as the main instrument in the resources allocation.

Innovations introduced in 2005 to the 1981 Code consider extending auction to applications for groundwater use, exploration areas and provisional rights. Additionally, it provides a six months extension to verify assumptions regarding the auction figure and, only in auction of surface waters, allows new participants.

It should be noted that currently, the basic principle established on water use rights is onerousness through auction and that gratuity is the exception; a free grant only takes place when after 6 months of entering an application there is no other submission or other apply for waters of the aquifer.

Formal requirements for notice of auction include: auction basis, which determines how the act will be carried out; citation, publication notice in a newspaper in Santiago and in a daily in the community, province, capital or region where the stream or natural flow subject to auction stands; notice requirements, including date, time and place of auction; a period of at least 10 days between last publication and sale; GWD certified communication for those interested, indicating the compromised area from the availability standpoint; and, carry out the auction after objections of third parties are solved.

Characteristics of offers consider that these will be on the basis of a cash payment, and also that the purchaser or purchasers can pay the value of the adjudication in equal annuities over a period not exceeding 10 years and that bidding bases will establish background and conditions, as well as adjustments and interest to be applied to the balance of price and the relevant bonds and guarantees.

The auction of use rights consider that the basis will establish failure penalties and that the auction is conducted by the GWD. In an auction on equitable conditions those who have submitted applications, the Treasury and any public sector institution could concur; in case of surface waters anyone can concur. In this case, the purchasers can charge to the payment the procedural costs incurred in the application process (expenses, publication and inspection). The available flow is divided into units, not larger of what was applied for in the application that requires less and the right for each unit is awarded to the highest bidder, and so on until the total flow offered is completed. Who gets a share, is entitled to be awarded, for the same price, the number of units wanted to complete the requested amount. After the auction, a minute is done and it is incorporated in the resolution that constitutes the right, it reflects the agreement between the awardee and the General Water Directorate.

Applications for rights use of mutually incompatible groundwater's are subject to one or more public auctions; flows are verified through constant flow pumping tests and is understood that two or more applications fall on the same waters when groundwater catchments through which the resource will be taken are located in the same shared hydrological exploitation sector.

Under the 2005 amendments, Article 142 provides that all rights applications pending to be solved, mutually incompatible, will be subject to one or several public auctions performed by the General Water Directorate, according to the established procedure. Implementation of this transitional rule has been challenged, considering that the auction figure does not apply to petitions made before the Law entry into force and that they should be resolved through the direct assignment of the requested rights.

Some claims resources have been presented to Courts of Appeals. Among them is the case of the Electricity Generation Company of Chile S.A. (ENDESA), today AES Gener S.A., that in June 1989 had requested the establishment of a right of non-consumptive use of surface water in the Rio Manso and within the next six months requested a right for non-consumptive use of surface water on the same waters; on September 2006, it withdrew the request. In September 2007, the GWD

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issued a Resolution which laid the auction basis for the exploitation rights of surface and flows on the Rio Manso.

ENDESA brought an appeal against the GWD Resolution, noting that the contested administrative act was issued outside the powers of the authority that supported it, considering that as a result of their withdrawal there was no other application pending for the same waters. The GWD position was that the Water Code establishes requirements that must concur, within 6 months, even if afterwards one of the concerned desist from any application, and that since the auction had been set it was mandatory to cite it, given that the auction circumstance was due to public law rule and indisputable and that may not be waived. The GWD also noted that the withdrawal could not be considered as a valid mean of individuals to wound Article 142 of the Water Code.

The Santiago Court of Appeals issued its resolution considering that it was a non-controversial fact that both applications were mutually incompatible and that were unresolved at the date the Law entered into force, therefore it was fully applicable to them and they will be going to one or several public auctions. It indicated that on equal terms parties that had submitted the application, as well as the Treasury and any institution in the public sector could participate in the auction, it also specify that if the auction was on surface water, anyone could take part on it. Considering the transitional rule, it was found that there was a third-party right and that an individual action could not affect it, especially when there was a waive for a right, it was also noted that the rule was a mandate for the authority and that its fulfillment should not be weakened by an individual mere expression of willingness, particularly due to his public nature. Finally it was concluded that the GWD had not committed any illegality in setting the basis for the auction, which by law must be executed and therefore the claim could not succeed, so ENDESAs claim was rejected. The company brought an appeal for annulment before the Supreme Court; on September 2008 the Supreme Court had as withdrawn the appeal of the petitioner.

Upon entry into force of the 1981 Water Code, that considers the Market as the main instrument in allocation of resources, the Auction figure for rights of use applications was established to solve problems due to multiple applications over the same waters and to insufficient availability to satisfy all requirements.

The 1981 Code replaced the gratuity system of allocations for water rights with a bidding system among several applicants when submission were mutually incompatible, in order to ensure the best use of hydric resources and prevent speculation arise by free granting rights for water use.

Article 142 of the Code sets forth the auction figure as the mean for resources allocation in case of incompatible applications. Finally, the 2005 amendments have not altered the principles and the system enshrined in the 1981 and they tend to introduce complementary rules to reinforce the auction as a legal tool to ensure a proper allocation and distribution of hydric resources when a scarcity problem is present.

MEXICO APPROACHING WATER REGULATIONS FROM A FINANCIAL PERSPECTIVE IN TODAY'S WORLD

Donají Valencia

Abstract

Unanimity exists regarding the need to efficiently manage water and there is coincidence about the lack of infrastructure to achieve it; another coincidence, irrefutable, lays in the not at all insignificant amounts of investment needed. The differences consist in the means to turn large development projects into a reality. The aim of this article is to include in the law debate an essential dimension of infrastructure creation, its financing; therefore it encompasses the effect of both the legislation and the contracts on the quality of a water project as a credit subject. While water regulations and contracts are not in and itself financial instruments, they both fundamentally

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determine the credit quality of a project; thus, the feasibility as well as the quality of financing that a project receives are a function of these two factors. Finally, it emphasizes the importance of incorporating all those actors involved in the management and consumption of water; not only as an ethical, social and pragmatic need that, if ignored, inexorably impedes the development of water infrastructure, but also as a credit imperative.

1. Introduction

In general, infrastructure deficit of a country is as large as its ambitious goals; in developing countries such as Mexico, the lack of basic infrastructure is so significant that investment needed represents impressive sums. The CONAGUA investment program has a goal of \$227,130 million pesos and investments are ponder as necessary and some should have been done years ago. To determine the CONAGUA projects size, one reference is enough: awarding of the first highway package of the Highway Concessions Rescue Trust Support (Fideicomiso de Apoyo para el Rescate de Autopistas Concesionadas FARAC) under the Asset Building Program reached \$44,051 million pesos and seven months pass away between the beginning of the licitation process and the date the concession was allocated. Relationship among investment amount, complexity, time to allocate and the beginning of work are not alike; nevertheless, a simplistic approach would be that to award water infrastructure projects in the amount provided would require at least three years. This estimation does not consider that the water investment program is disperse, implying that there are several investment packages ranging from investment in irrigation districts and sanitation facilities to the drainage system in Mexico City, and that each have different and separate investment processes.

Preparation of the bid basis requires political, legal and social safeguards that have their own rhythm and unavoidably need to be considered; for example legal limits of the award process, that are mainly unmovable, and the social dimension, especially in the water issue.

Other challenges, not least important are the current state of financial markets and the prospect difficulties construction companies are facing. However, it should be taken into account that infrastructure is one of the mechanisms that governments in the world are planning to activate to counterbalance the economic slowdown. This will improve the construction companies' perspectives; but governments will have to compete with other countries, which to obtain funds and professional expertises also are going to assign tax incentives for infrastructure.

At the international level, Mexico has an outstanding credit reputation, this means it has a credit history that demonstrates capability and, when lacking liquidity, willingness to pay; it is also an attractive market.

Especially in Mexico, demand exists for long-term investments in key projects to accompany investment profiles of pension funds and insurance companies, such as investments for the water sector. Until now, the electric and highway sectors have been attracting investment portfolios; these sectors, as well as the water sector, provide investment amortization over the long term and are strategic sectors or essential assets for the country development; however in Mexico investments placed in capital markets are comparatively smaller in the water sector.

There is no doubt that water is a sector that offers the attractive of other strategic areas that have attracted significant investment, it is also clear that it is a financeable sector as evidenced by Brazil and Chile. Mexico, should analyze necessary conditions and desirable laws to attract investment into the water sector.

In synthesis, although the investment goal is exceptional and the context is challenging, there are positive factors to be considered and managed to achieve the goals of water infrastructure projects. The document tries to outline some of the touchstone that catalyze or obstruct development of infrastructure projects, such as negotiation, construction and operation. The analysis is not intended to be exhaustive or categorical. Every investment has players, rules, restrictions and incentives, which as a whole implies that every project needs a different treatment

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and approach. The aim is to bring issues that recurrently are present and that is necessary to attend with balance, accuracy and knowledge by each participant to achieve a specific purpose: water infrastructure in Mexico.

2. Government's Role in Project Financing

The government plays more of a role: it is a contractor, but also a regulator and even sometimes the contracting entity also act as the authority. Although these roles gain or lose relevance according to stage of the project, the Government often plays the three roles at the same time, privileging one function over another.

During the contracting stage, the Government negotiates; for it, not only knowledge of law and the subject are necessary, understanding of negotiation rules is also needed, as well as the mechanisms and incentives that motivate action of the parties involved in the project. Often the government interlocutor demands impossible; results, besides the loss of credibility, are obstacles that immediately or eventually stall the allocation, execution and/or operation of the construction work. Therefore expertise and intuition about the usefulness of other parts in the project are essential to be in a demanding position, but also to cede and succeed in the interests of public administration within the limits prescribed by law. One aspect of the government interlocutor is its power decision. It is common that the executive officer do not directly negotiates contracts, this is counterproductive: arrangements are never reached, contracts are not signed and works are never built. The existence of an efficient decisions making mechanism to allow move on negotiations is important.

When the government interlocutor is in constant communication with the officer or official who ultimately will sign the contract and it in fact reflects suggestions of all involved instances, the process is longer, but comes to an end; this is the exception, usually once the content of each clause has been detailed, a new actor appears and opens again the negotiation, when the new player has been incorporated, another appears and so on. Other variant is the constant change of interlocutors and the absence of a reliable communication channel, in other words the excess of officers or officials responsible in a project. In a contract, small parallel negotiations where there are as many lines of action as leaders and persons in charge are inconvenient.

Another dimension of the role the Government plays is referred to the project as such. It is important that the Government performs itself credibly and, in consequence, hand over a complete project. Ideally, the project must have all permits so that it can be carried to term, except in those cases in which the permits only could be obtained in the future, depending on construction progress. If the ideal is not possible, then it is indispensable that future dates and the consequences for non-compliance in presentation of permits and rights of property are transparent for the involved; it is a fundamental requirement to effectively transfer the risk of non-compliance on the work schedule, otherwise the one that failures to comply and remains exposed is the Government. There are various cases in which the lack of permits and rights has caused millionaires losses to governments.

In a system where different jurisdictions coexist, that is to say where municipal, state and federal levels operate, coordination and commitment are needed in the case of a project. Coordinated action must be connatural in the water case, since the sector logic is ruled by basins; nevertheless it is common that competing jurisdictions operate in a disarticulated way and sometimes in contraposition. The role of a government that assigns or bid works is to foresee and solve requirements of other involved governmental instances, attending their concerns. It is important not only to coordinate government levels, but also to orchestrate the cabinet, since another variant is the joint action of several governmental entities that go in different directions; here it is clear, that a consensus process must be developed.

An aspect that always has been important in water, but which scarcely has an open space, is social participation. In some cases water is considered to be a human right; regardless endorsement or not of this position, it is certain that to ignore the social aspect can give the best

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project a shot of grace. Certainly, a project that confronts a not handled social resistance carries costs for the one who executes it and constrains participation of companies; such costs result in more expensive infrastructure and eventually can paralyze execution or operation. Therefore, the social dimension has become another of the criteria to evaluate a project.

A project with actors and political opposed positions in different entities and jurisdictions that have not been solved, that does not have social support, which lacks the necessary permits, where the governmental interlocutor presents positions impossible to satisfy and that give up its right to negotiate, at best turns out more expensive; in the worst of the cases, it neither advances, nor finds participants in a national and international challenging context.

3. Laws and funding for infrastructure projects

Legislation analysis of a sector and of all those laws that, though not necessarily of the sector, affect a business is always an obliged chapter of any project evaluation and part of considerations that finally will determine the entry of participants to a licitation. In infrastructure, especially in water, the legal analysis is not one more chapter but a key factor, water it is a highly regulated sector and some of the central elements that determine security and investment profitability are precisely in the Law.

Unlike what happens with the private companies, in public goods and services, representation of ownership changes from time to time, that is to say the natural persons who represent the government are replaced regularly. With complete certainty, the change will come before the investment is recovered; therefore legislation provides the only real referent on which it is possible to structure a long-term investment.

A fundamental element of the legislation analysis is aspects related to the right to perceive the consideration established in the contract. Naturally, the price or quantification of the consideration and the term during which there is a right to the consideration are relevant in the analysis, but equal importance has the analysis of the catastrophic scenery and the possibility of determining the consideration under irregular circumstances. That is to say, it is necessary to determine what happens at worst of the cases. What happens if the work does not come to term or if the service is not given during the agreed period? Does Law establish grounds of early termination? Are the grounds of termination clear and easily determinable? What does regulation say on compensation for the realized investment? Which is the mechanism by means of which the compensation is obtained? Is the recovery of the investment procedure prompt or it is anticipated as tortuous and improbably fair?

Unlike the provision of discretionary private consumer goods, infrastructure provides strategic goods and services and rules are necessary to assure that the good or service is provided. In addition water, especially, receives a unique treatment since it constitutes the pinnacle of essence. Beyond that, in some cases there is gratuity of water services to guarantee minimal access to the good, there are other aspects in which legislation establishes regimes that, trying to assure provision of the good or service, end up preventing the existence of the good or service itself since conditions imposed inhibit the investment. Clear cases are the grounds of early termination.

At all times, the State has to keep the legal authority to cancel a contract and to restore the good or the service that has been interrupted and/or is deficient, but it must not be translated in disability to determine the grounds for which a contract can expire, not in the inability to determine how much it is received as consideration. In other words, it is possible that there is an alternative in the legislation in which the contract expires, the good or the service is restored and the investment recovered. The question is that if grounds of early termination for a contract, when delimiting reasons and expeditiousness in which the term of exploitation can be slowed down, affect one of the central nodes for profitability calculation since they determine the minimal periods during which a consideration is expected.

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The grounds of early termination are fundamental not only to evaluate the period of investment and the catastrophic scenarios, but also to determine the horizon in which recovery of the investment is expected. At a higher risk of early expiration of a contract and therefore to not recover the projected investment, there is greater a rate of return or price demanded and less disposition to structure a long term investment.

Not only it is important to determine when and why the contract can expire, but also what happens in those cases, and also how and who settle the contract. By definition every investor seeks to recover the investment and when for any reason grounds of early termination appears, the contractor has the same expectation, recover the investment. That is to say, to attract any investment a mechanism should exist in order to inspire confidence that consideration for the work that has been executed or the service that has lent is going to be recovered.

Provided that with complete certainty during construction, time of exploitation or provision of a service period, the necessity and convenience of additional works and/or modifications to the original project will arise, it is precise to foresee it in the legislation and, if necessary, establish limits of legality for additional works. Not only it is necessary to clarify whom and how further works can be authorized, it is also necessary to establish how additional works are going to be paid so that their recover is unquestionable. The lack of definition on this topic not only ignores reality, but sooner or later it is translated into frictions and creates political and legal contingencies that dim and obstacle the project; furthermore, when these contingencies receive negative coverage in the press, additional costs arise, such as impacts in the reputation and expenditures to handle it; there are cases as that of Chile, in which it is pursued to limit additional works that can be ordered under the cover of a grant, to a certain percentage in relation with the originally assigned work.

Part of confidence comes from clarity and how remote is the early termination, as well as from the functionality of verification and payment of investments mechanism; another part depends on the third one that decides on disputes that verification did not solve or that only will be verifiable when its acceptability is decided. In any case, both the impartiality and the agility with which the third one decides the dispute are central to determine the investment safety. A particularly toxic combination is that one in which, a long list of grounds of termination is included -mainly undeterminable and/or that happen with supreme facility and therefore can cause the early termination of the contract at the free will of one of the parts- and the possibility to hold basically to technical criteria controversies resolution among the parts is completely excluded.

In Chile, until now the outcome of controversies as for infrastructure construction has been exemplary with regards of the investments treatment with a formula that though not always favours the Government and its seeks a reform, has managed to direct flow of investments towards infrastructure with the consistent construction of endless works. The reform in discussion will change the arbitration system of "amicable compounder to mixed", which means that resolutions have to be in conformity with law and based on the prevailing legislation, and not only on the judge criterion, as it occurs today. To the margin of the reform project, presently the form in which the Chilean legislation regulates this topic is that, on one hand, the early termination is subject to a very high standard -the contract does not end arbitrary under any pretext and in any case- and on the other hand the controversies are entrusted to a tripartite panel where government as well as the concessionaire nominate a professional on the topic, and this one call a third one, and as a whole they decide as arbitrators umpires. Chile has set a precedent² that reveals the investments modus operandi, reflecting what in credit terms is named as will of payment, which performs supreme importance to accede to capital markets in favourable terms.

An entity with questionable payment tradition or that hesitates and search exceptions regarding its contracted obligations finds fewer opportunities of financing and, when they are found

² In the Supreme Court of Chile an agreement was achieved so the Department of Public Works, which had tried to revert a resolution of Court of Appeals and an arbitral commission, will pay for extras works and delays in the construction of jails

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they are low quality; eventually, non-payment is expensive and perception of noncompliance can spread beyond the entity that fail to fulfill or in the first instance seemed to fail, causing a domino effect.

The mere introduction of the experts' panel figure has the virtue of revealing disposition to tie a decision exclusively to technical criteria, establishing a very high standard for a resolution in any future controversy. Also manages to significantly delimit risks for investment since the previous dispute submission introduces technical criteria, clarifies the subject and focuses arguments on the correct angle, delimiting the object of the controversy. It is important to mention that the parts can favour the experts panel, simply because it offers a mechanism and a forum that does not carry times of resolution involved in a court trial; paralysis of infrastructure work is not a business for the contractor, not productive for the Government, it can be that both the Public Administration and the contractor seek to avoid trial and to rely on the expert opinion of the third independent that could help to solve the difference with readiness.

4. Contracts and Financing of Water Projects

Whereas laws are analyzed, contracts are dissected. Phrase to phrase, the paragraphs that will constitute the guidelines that will delineate the world of the acceptable and the unacceptable for every project, are examined and negotiated. Partly this is because, unlike the law, in a contract the maneuver action is larger, it is to say, the parts determine its content; it is necessary to set the business in black and white, but the principal motive is the possibility of a confusing contract that could led to erroneous interpretations. Is not surprising that for the parties the principal negotiation object is the contract.

The contracts have a common structure of minimal content, which naturally sets up the negotiation agenda. Nevertheless, there are clauses that require special attention; those are the ones which are constantly appealed during the contract execution and which are the mechanism that allows the project to advance towards its end. These clauses include aspects related to the work program, as well as form of payment and supervision aspects on execution of the contract.

Realistic programming of periods and milestones to reach during the execution of the contract allows an execution without surprises. Ambitious work programs are hardly ever fulfilled and having stopped being relevant, they open the door for continuous renegotiations of completion date. It is better to assure that milestones are attainable, that is that conditions and periods are given to finish in the expected date and, in case of unforeseen, there is sufficient roominess. These not only requires permits, already mentioned, but also that the work program has been checked and accepted by the executer. It is possible that the contractor accepts the impossible to obtain the contract, consciously that eventually the program is easily questionable and therefore it will be renegotiated; therefore it is necessary to assure the program is analyzed by disinterested experts.

Commonly work programs reflect considerations of very different nature from that which should determine the program design. What in general happens is that social and political pressures end up being the element along which work programs are designed. The consequence is predictable and generally carries the worst of two worlds: delays with fulfillment of the program and dissatisfaction or partial satisfaction of the political or social goal.

Supervision gives the starting signal in every stage in which a milestone of the construction program has been reached; when marking milestones, time runs for the contractor to execute the next phase and, successively, up to finishing in the agreed date or covering a contractual penalty if a reasonable program has not been fulfilled. Supervision also assures that work advances, that observations are solved and that payment to the contractor corresponds to executed work. Supervision and the mechanism by means of which the same operates constitute at best the only forum to solve differences, this happens when the supervising function has been properly designed; in the worst situation they are a preamble of the controversies resolution forum elected in the contract. Supervision is the valve that allows imbalances regulation along the execution of a contract. Not only clauses that regulate how the supervision works in a contract are important, the

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election of the supervisor is a key element; there is no clause to replace the conciliation power of a competent supervisor or a disposition that effectively regulates execution of the contract when the supervisor is subject to conflict of interests, reputation of the supervisor and its technical manage, as well as not depending in any form, especially economically, from the parties are important factors. Supervision entails knowledge of the local economy, which in general a local supervisor is in better position to provide; this consideration is particularly important for payment when due to adjustments on the work program, the contractor adjusts inputs and adds concepts that the supervisor has to validate.

5. Conclusions

As mentioned, the national and international economic environment is challenging. The economic contraction has affected the companies' fortress -especially those related to the construction-, but also many countries, which have been debilitated as result of the price drop of raw materials, oil, and copper and of exports in general.

Countries with a fulfillment and responsible treatment to the investments tradition are positioned in a suitable place to be benefited and to use their reputation. In addition, good infrastructure projects are precisely what it is necessary to reactivate the economy and those capable to be translated in good investments for both parties, certainly will find interested stakeholders able to present competitive projects that will find financing and finally will be carried out.

Unstable countries, with fragile contracting schemes and unfavourable precedents, possibly have stayed out of the scanty credit competition; and if interest in them exists, the same will be speculative, that is to say the contractor will not be ready to recover the investment in the long term and possibly will only take part in schemes that guarantee a short term recovery with a high price.

It must not be forgotten that players and paradigms under which in the world projects were financed, including infrastructure, are changing and that in the short term they are uncertain, therefore what it is particularly important is that elements within reach of contracting parties, those modifiable that can be used to better position project, are used with imagination to lessen uncertainty.

Consequently, some of the elements that of fact and of right make a project more attractive were outlined, doing particular emphasis in the understanding and empathy of concerns and exogenous interests that affect participants in a contract, with the last purpose of interweaving a structure that considers and handles to its favour the incentives traction of contracting parties.

Undoubtedly the topic can be further examined. There are many other aspects, not included, to consider in the legal and financial engineering of water infrastructure and in general in project development, the hope is that the raised elements motivate interest to deepen in the topic.

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Roundtable 4: Water Management in Basins and Cross-border Aquiferous

GERMANY

WATER MANAGEMENT IN THE CROSS-BORDER BASIN OF THE RHINE RIVER

Jürgen Baumann

Abstract

The Rhine River is one of the largest in Western Europe. In the last century seventies and eighties decades, it was the most polluted river, called the "sewer of Europe". With joint efforts of nine countries that share the basin of the Rhine it was cleaned. Today it is a water body which meets again with water quality that enables a habitat for a wide range of aquatic life. However, it was a long road with many obstacles.

1. The Course of the Rhine River and its Basin

With a 1320 km length, the Rhine River is one of the most important in Europe. The area of its basin covers 185,000 km² and is distributed to nine countries. Its origin are the Swiss Alps (Rhine Alps) then flows into the lake of Constance one of the major drinking water supplies in Europe, with an area of 539km² and a volume of 48.1 km³, has a high importance to storage rain water and melting water from the Alps, as well as to regulate and standardize the flow of the Rhine River downstream. From Lake Constance, it flows west to the city of Basel (High Rhine), from there, flows north through a depression of 35 km between the Voges and Palatine Hills, and the Black Forest and the Oden Forest (Upper Rhine), the High Rhine and the Upper Rhine are characterized by a chain of locks that ensure navigation and generate electricity (ca. 10 000 GWh/year). The southern part of the Upper Rhine, between Basle and Breisach was altered by the construction of flood prevention measures and a side channel (Rheinseitenkanal), the northern section of the Upper Rhine still shows in parts natural meanders.

From Bingen, the Rhine crosses the "Rheinische Schiefergebirge" mountain block (Middle Rhine) in Koblenz on the Rhine, River Moselle flows and in an eroded valley it flows into the city of Bonn. The Middle Rhine is characterized by a stone and rock channel, hop in which its speed increases and due to its location in the valley there are few flooding areas. Turning Bonn, it left the mountainous area and continues as Lower Rhine, distinguished by a plain and spots of islands. In Bimman / Lobith starts the Dutch part of the Rhine (Rhine Delta) and in Nimwegen it is divided into three main streams that up to the North Sea form the Delta.

Seventy million people live in the Rhine basin and approximately 20 million of them receive their drinking water from the river, a figure that reflects the importance of this river in Europe: in the basin is over 50% of world chemical production.

2. A Brief History of the Rhine River

In the decade of the eighties, there was a joke in Germany that dramatically reflects the condition of the river at that time: "Hands up or I'll shot", said a masked man to a man in the bench, "Don't be ridiculous" he answered – "is clear your gun is a toy", "correct" the thief says, "but is loaded with water from the Rhine River". This emphasizes the extreme pollution of this water body, a river that was almost "dead" and regarded as the sewer of Europe. 150 years before, the Rhine was a clean river with enormous fish richness; it was considered the best in Europe for salmon fishing; in the early nineteenth century it was a navigation flow and thus in 1815 the "Central Commission for the Navigation on the Rhine" was created (1815). Because of its importance the basin population and industrial activities grew.

In 1885 fishermen complained regarding the odor of salmon, first warning of the increasing pollution of the river. Therefore, in the first agreement on salmon fishing issues about the need for wastewater treatment from neighbouring cities were also dealt, nevertheless with the rapid industrial development in the late nineteenth and early twentieth centuries, the river pollution

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continued to rise. For the first time in 1921, the Government of Holland protested before the German parliament for the pollution of the Rhine, as an outcome a committee of experts was installed, which did not reach a solution. In 1934, without success, Netherlands protested before the Government of France for the waste of potassium mines in Alsace. Pollution continued to rise with grave consequences for drinking water supply, fisheries and agriculture; therefore in 1946 the Netherlands sent a memorandum to the Government of Switzerland and with its support an exchange of diplomatic notes began.

In 1950, the Governments of the Netherlands, Germany, France, Luxembourg and Switzerland agreed the creation of the "International Commission for the Protection of the Rhine - (IKSR)", but its tasks were not well defined and not mandatory. Netherlands pressure continued and in 1963 the "Convention on the International Commission for the Protection of the Rhine against Pollution" was signed, by opposition of Germany and France binding commitments were not established. In 1972 the Netherlands proposed to raise the Commission's work to a higher political level and the first meeting of Ministers of Environment was organized, based on it the "Convention on the Protection of the Rhine Against Chemical Pollution" (1976) was formulated, Germany and France feared negative effects due to restrictions on industrial development and France did not ratify it.

All the attempts of Government of the Netherlands had failed and in 1984 the city of Rotterdam decided to act by itself, since it was one of the most affected by pollution of the Rhine; the constant contribution of sediments was representing very high costs, as their level of contamination did not allow download desilting to the North Sea without special treatment. Rotterdam instructs an environmental consulting and a law firm to sue the factories that discharge pollutants, this "Rotterdam Initiative" accomplished voluntary agreements to reduce discharges of industrial pollutants. At the political level, the Holland-France conflict continues and Holland is forced to take a drastic measure, in 1985 it threatens France to withdraw its ambassador and to freeze diplomatic relations; so, France ratified the Agreement

2.1. The Sandoz Catastrophe

Shortly after (1986) a catastrophe that changed the history of the Rhine and induced a dramatic political change in Germany and Europe occurred; on November 2, a warehouse of chemical pesticides Sandoz (Basel) burned, with water used by fire fighters to extinguish the fire approximately 30 tons of acids, pesticides and mercury substances entered the Rhine, this led to: death of the entire population of eels and of other species only a few individuals survived; the drinking facilities had to suspend their work, causing problems in drinking water supply for a great part of the population; and, sanitation of the river returned to the situation it had 10 years earlier. On November 19, the "Ministers Conference" was carried out in Rotterdam; the Dutch delegation suggested as the sanitation target "restoration of salmon", a very ambitious goal, as salmon requires water of high quality and eco-friendly conditions, the Ministers agreed to achieve it in 2000 and again salmon became a symbol of the Rhine

2.2. Program of Action for the Rhine 1987 - 2000

The Conference also instructed the IKSR to develop a "Rhine Action Programme" to ensure clean water supply in the future, to establish an early warning system for disasters and reduce pollution in the delta due to sediments. The program was divided into three phases: Phase 1 (1987-1989): Development of priority substances list, Phase 2 (1989-1995): Carry out the agreed measures and implement them in accordance with the "State of the Art " principle, and Phase 3 (1995-2000): Assessment of achievements and establish possible additional measures.

To reduce punctual introduction of pollutants in the basin, a program initiated to establish Wastewater Treatment Plants, which had a major impact on substantially improvements in water quality of the Rhine The extent of contamination was proportional to the budget required; in the last 25 years the total investment was 50 billion Euros, in addition to the large plants, hundreds of small plants were established along all the sub-basins.

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In January 2001 in Strasbourg the "Ministers of the Rhine Conference" was celebrated to assess the impacts of the Program. Result was impressive; water quality had improved significantly and discharge of most priority substances was reduced (70-100%), even though ambitious goals for some heavy metals and pesticides have not yet been achieved. The warning and prevention of accidents program had a major impact on the reduction of incidents and the aquatic fauna has been recovered in such a manner that 63 different species were relocated on the Rhine. The successes were possible because the goals were clearly defined and agreements were implemented in all countries sharing the basin, a key point was the regular report on progress and shortcomings, which created a political will to provide the necessary resources and impose heavy obligations on the industry.

Countries used IKSR as a platform to work together, over 150 experts specified goals, coordinated actions and evaluated progress. The IKSR Secretariat informed society, coordinated meetings and contacts with NGOs, private and industrial sector associations and nature protection coalitions. The IKSR formed a nucleus for a modern water protection strategy and became a model for other "basin commissions" later established (1990, Elba; 1994, Danube; and 1996, Oder).

2.3. Program "Rhine 2020"

The conference in Strasbourg agreed another voluntary program for sustainable development, called "Rhine 2020", the main themes and approaches are: development of biotopes, ensure supply and quality of drinking water, and keep on the development of measures against flooding. Further, the IKSR supported the coordinated implementation of the European Union Water Framework and Flood Directives.

After control of punctual sources contamination, currently the main focus are diffuse sources -principally from agricultural activities and erosion processes on the surface of agricultural land-, involving nitrogen and phosphorus nutrients, pesticides and partially heavy metals. At the 14th Ministers of the Rhine Conference (2007), it was agreed to focus on development of the "Rhine River" ecosystem through the coordinated implementation of the Framework Directive and the "Rhine 2020" Program, it was also approved to combine protection and use issues; as a new task, adaptation strategies for water sector to climate change impacts will be developed.

3. The Importance of the Rhine River for Drinking Water Supply

The Rhine is a major source of drinking water in the basin, to guarantee and ensure the quality and quantity of drinking water supply for more than 20 million people, the "International Association of Waterworks in the Rhine Catchment Area - IAWR" is the responsible institution, it integrates as members 3 Associations (113 companies with 223 central water supply) which together hold 98,000 km network of pipes and on average each company supplies 26.8 million m³ per year of drinking water; the bigger the company is Gelsenwasser and supplies a volume of 213.5 million m³ per year, water consumption per capita per day in its catchment area is about 173 l, with a wide variation between countries. In Germany the average is 143 l/inhabit/d, in Switzerland amounted to 225 l/person/d.

4. Conclusions

The history of the Rhine shows that problems between users of the "upper and middle basin" and "lower basin" can lead to serious conflicts. Economic and political issues hindered political arrangements to improve and clean the river. It was shown that initiatives such as the Rotterdam Initiative can play an important role in promoting international voluntary agreements. People along the Rhine has a great affinity with the river, they call it "Father Rhine", this, perhaps unconsciously, has supported efforts to restore this great cultural heritage.

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SPAIN SOCIAL PARTICIPACION ON WATER MANAGEMENT

Manuel Omedas Margueli

Abstract

There is no ideal form of water management and participation that has a universal character. The organizational model should be adapted to cultural conditions of each nation and territory. Efficient participation in water management is the art of combining the maximum power decentralization with conservation. Decision making capacity must be inherent to participation; on decision making the active parties are the ones that must have a more important role, therefore water users are those who should have a key participation. Formal participation on water structured around partnerships and semi-public and transparent organizations have more social interest than those operating under the opacity lens (concertation, deals and negotiation). For a participative management it is essential to have a register of partnerships and to promote the competition game between them, to protect interests identified defined in water management.

Water management by hydrographic basins or demarcations, as required by the Water Framework Directive of the European Union (WFDEU), further to be the most efficient and sustainable water management allows within the "home of the river", which constitutes the basin organism, a participative management in which there is decentralization in decision making and balance of power among government, users and civil society.

Introduction

Founder of the first River Basin Agency in Spain (1926), the Hydrographic Confederation of the Ebro, used to say that if public awareness on plans and water projects is not mobilized, they will not come to living reality. Today, the challenge is valid; the WFDEU requires developing an active participation in all Member States to achieve the goal of meeting water demands and particularly to restore water ecosystems of the old continent.

Active participation is something that emerges in numerous forums, conferences, letters, nets and treaties; but the first thought is: active participation is not an end in itself, is a means to achieve efficiency in water management, meet growing demands for water in the world and to maintain or restore the water environment. Unfortunately there are participatory processes that do not facilitate the efficient water management and do not meet these social demands.

1. Social Participation Advantages and Limitations in Water Management

Reflections:

Define participation boundaries in water management is an art, on political and administration sciences there is always been a clash between those who criticize excessive management participation ("assemblage management") and those who argue that democracy without sufficient participation is empty of content and that participation is the best form of social dinamization. Limits of participation are defined by Schumpeter as the excessive concentration of power and according to Berelson by bankruptcy in the stability of the system.

There is no ideal form of management and participation that has a universal character. The organizational model should be adapted to cultural conditions of each nation and territory. Idiosyncrasy of Spain results from a large cultural heritage on the water management and participatory processes; there are vestiges of users' organizations two centuries before Christ. The WFDUE reflects the importance of territorial and cultural uniqueness in the water management and takes into account the regional specificity: in the preamble it notes that diverse conditions and needs in the Community require specific solutions, that must be taken into account in planning and implementing measures to ensure protection and sustainable use of water on the context of basins, developing measures programs adjusted to regional and local conditions.

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Participation should satisfy the greater involvement of greatest interested principle, participation in a democracy is a mean of exerting political influence outside the electoral contest. In the collegial decision-making bodies of the Confederation of Spain (Governing Board, Water Boards, Reservoirs Commissions, Exploitation Boards) water users are the ones that have one third of the vote, this dominance of users is not well seen by NGOs that reclaim greater representation in those bodies.

Informal participation based on informal consultation, compromise and negotiation the model among interests associations, has limits. The boom of NGOs working on water management and water environment are limited because in many cases they lack an overall strategy of the world of water and of society and because dependence of the institutional apparatus is not unlimited. Recovery of the public towards the water culture should go hand in hand with strengthening the political dimension, which enters the electoral contest. A problem in Spain, in the Confederation of the Ebro, is that many groups are self proclaimed representatives of popular will, without any endorsement of that support. Registration of associations and competition among them for the defense of defined interests is an achievement to obtain. The most important aspect of participation is that it has to be inherent to decision making; on the contrary it becomes institutional advertising.

2. Social Participation in Spain

Water in Spain has historically been a constraint to development; therefore management of scarcity is a constant throughout history. Some significant events in the recent history of water management must be taken into account because: they are a contribution to the success of water management and demonstrate appreciation and thankfulness to great men and women who preceded us.

Empowerment of social fabric around water management. In 1926 the founder of the Confederation, Lorenzo Pardo, explained that the reason for the Integrated Management Agency relied on the generalization, harmony, interest coupling and congregation of well oriented efforts; in less than two years, 1875 corporations, associations and entities of the basin were represented in the Union Hydrographic Confederation Assembly of the Ebro. Momentum in the early organization years, representative of technological advances and works result awesome even in our time. Origin of the Confederation was primarily based on the empowerment of the associative network as a basis for a decentralized and participatory water management.

In the present Confederation of the Ebro association is around communities of users that being more than three thousand, are those who of fact realize the water resources management. They are corporations under public law, each one has statues and rights over water uses; in drought cases, very common in the basin, the communities are the ones that take decisions to jointly and solidarity distribute the lack of water and consequently the economic losses on crops, sometimes enormous. Despite the large number of user communities, the Confederation needs to potentiate its association; the major challenges are to ensure that groundwater users in each aquifer constitute a community to defend rational exploitation in quality and quantity. The in force Water Law gives authority to the Basin Agency to ex officio constitute them, but its constitution is still not generalized since underground waters were out of its mandate until 1985 and it is complicated to take appropriate action due to widespread overexploitation of aquifers. Another great challenge is to playful uses around water in join associations that represent them, to be present in the collegiate organs of the Confederation of the Ebro; the way is opened.

The environmental NGOs present more difficulties to define their representation in water management, its incorporation to the Water Basin Board is by designation among organizations that a priori are considered more representative, but I think democratic mechanisms should be articulated so designated members assume authority and responsibility in decision-making. The in force Water Law (2001) provides for the establishment of users communities that can be called new-style (among others, joint surface water-groundwater use communities, supply consortiums or communities, and spillages users communities).

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Confederate model: Integration of various associations in Basin Organizations collegiate organs, or in other forms that may exist can acquire diverse figures; but in any case, it shouldn't be formalism with no decision capacity. Federal or confederate model offers interesting options, but they are so open that they mean not much if authority and responsibility of each association is not analyzed. In the Confederation of the Ebro, there is a power balance among representatives of the collegiate organs, who plan and manage water; users have one third of power, the Autonomous Communities (regional governments) other third and the rest belongs to the General State Administration, local entities and environmental and social associations.

The Basin Agency manages on one hand basin hydrological ecosystem strictly subject to the Water Law, this means it is an administration with action capacity, and on the other is the "common house" where management is performed on a decentralized and participatory manner. A summary of the role of each member of the Confederation is:

- **Assembly:** Democratic and representative body of water users, integrated by members, Autonomous Communities -regional administrations- and the State Administration, as well as water users. Its functions are report budgets to the Exploitation Boards; propose representatives of the Reservoir Commission; elect the Vice-Chairman of the Confederation; choose 1/3 of the members of the Governing Board.
- **Exploitation Boards:** Users of one part of the basin territory are represented and they coordinate exploitation of hydraulic works and water resources of allocated tributary rivers, the elected members join the Assembly of users, pass annual budgets and technicians of Basin Agency report back to users at the end of each hydrological year.
- **Reservoir Commission:** Formulates proposed filling and emptying of reservoirs, where there is no unanimity, the President of the organization decides; only 3 of its 66 members belong to the State administration.
- **Board of Works:** Integrated by future beneficiaries, receive directly technical and economic information; there have not been developed and can be considered as purely formal.
- **Council Water Basin:** Its mission is to raise a proposal for a basin water plan to the Government of the Nation, who afterwards will be approved by Royal Decree. The in force Water Plan of the Ebro River (1998) will be amended and its approval is expected in 2009, considering the participatory scheme as essential in water management, in it the balance of power is carried out.
- **Committee of Competent Authorities:** Coordination Body, accomplish a second reading of the River Basin Management Plan; composed of 9 directors of each of the Autonomous Communities that integrate the basin, 3 representatives of local administration and 8 of the General State Administration, besides the Chairman of the Agency.
- **Governing Board:** Executive Body approves action plans and budgets; takes management action (declaration of overexploited aquifers, wetlands initiatives, adoption of amendments on bonded and police zones, among others). Among other, adopts criteria on compensation due to damages to public water, sanctions and on Users Communities; has 49 members (18 of the Autonomous Communities, 16 of the assembly of users and 8 of the General State Administration).

Confederations particularly that at the Ebro are characterized by its democratic and participatory decision-making nature, in which users have a decisive role in management and budgets. Management is decentralized and Autonomous Communities have the highest representation in the decision organs, nevertheless, they have not assumed as own the Common House represented by the Confederation. Constitution of the Competent Authorities Committee (2007), to fulfill the objectives of the Water Framework Directive, perhaps opens a larger joint responsibility.

In conclusion, it can be assured that the confederate model offers many advantages, has survived political whims and is adaptable to a State of Autonomies. The model is a great organizational experience in Spain; if there were no Confederations, they should be established to manage water holistically. As in the case of the Ebro, the use of shared water and the inter-

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communal interrelationship is enormous, for it, the future has to pass through the strengthening of the Confederations and the adaptation to new environmental and participation awareness.

Informal participation: The WFDEU provides three distinct actions of involvement: information to society, public consultation, and active participation. Public information is relatively easy (among others brochures, internet, advertising campaigns, surveys); public consultation can also be enhanced with economic resources and with appropriate professionals, the Directive provides consultation periods.

Active participation means to mobilize society to pursue a collective project that is consistent, and as fair as possible. Its advantages in the planning process are summarized in: improving quality of demarcation plans, in cases of discretionary aspects it is better that social actors decide and not just editors; improving implementation of the plan and prevent litigation; and, plans have more moral support. However, not all are benefits in active participation, stakeholders can implement a covenant or may obstruct it, and such cases have happened in the Autonomous Communities of the Ebro Basin.

When the Participation Plan of the Ebro was designed, some provisions have been taken into account. Therefore, some recommendations on the active participation manual are: incorporate social science professionals to the participation process, to avoid misunderstandings; stakeholders must be involved as soon as possible, even in each water body through an approach to the territory and its people, the process must be selective because is not desirable to extend participation to all the society, as it would be unfeasible and many people does not have the slightest interest in water management aspects, so participants should be chosen by two criteria, those that play in the planning process and their representativeness; give credibility, honesty and legitimacy to the call and the conveners, through confident social agents in each of the structures; local knowledge and approach to decision centers, called people represent communities, analysis and decisions have to be taken at symbolic sites next to the river; meetings should be open, listening to all attendees and trying to encourage honesty; and, administrative cooperation. In this last case, the WFDUE requires good ecological status of our rivers and the new Demarcation Plan calls for a foresight on water use and environmental degradation; these issues are closely linked to economic and social development which clearly is not the exclusive competence of the Basin Agency therefore, in addition to the desirability of acting in a coordinated, cooperation is mandatory.

Commitments of participation: On formal and informal participation, credibility and fair play are essential; participatory management implies empowerment and delegation in decision-making. The WFDUE requires that Demarcation Plans have a six years term, after which the competent authorities of each river basin districts must report on compliance and failure of the measures involved, this monitoring and control must be implemented to follow up the commitments made in participation. Water management as an integral part of Basin Organizations presents fortress in performance of Water Plans and therefore the planning commitments; being bodies with representation from Administrations, private interests and civil society, their decisions are more stable and not subject to political opportunism.

3. Conclusions

Democratic and participatory water management involves a high complexity and requires a great effort; despite that, this model is a guarantee for the dispute settlement on water use conflicts, efficiency in its use, projects promotion and ultimately to create a culture of social commitment for the resource good management.

There is no an ideal form of water management and participation that has a universal character. The organizational model should be adapted to cultural conditions of each nation and territory. Efficient participation in water management is the art of combining the maximum decentralization of power with conservation. Participation has to have inherent capacity on decision making, in which water users must have a key sharing. Formal water participation is desirable, structured around public, semi public and transparent partnerships; even, informal participation

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based on consultation, compromise and negotiation among interested associations should be promoted. It is essential to have a register of partnerships and promote the competition game for the defense of identified interests in water management.

Water management by hydrographic basins or demarcations as required by WFDEU, besides being the more efficient and sustainable water management model, allows basin agencies to carry out a participatory management and a decentralized decision making, as well as a balanced power among government, users and civil society. Basin water management and democratic and participatory management is not easy, since sometimes it comes into conflict with other political and administrative interests, so a culture that seeks to consolidate the model and its continuous improvement must be created. International collaboration is an important aid to reinforce this water management model with clear social benefits.

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Roundtable 5: Water on Urban Development

CHINA

MAJOR WATER INFRASTRUCTURE PROJECTS FOR DEVELOPMENT IN P. R. CHINA

Guozhi DU

Abstract

Even total quantity of water resources in China is high; per capita average availability is very low. Since water is unevenly distributed, water shortage is a challenge on water resource management. Floods, soil erosion and pollution are other challenges. In order to supply economic and social development, water resource management China is taking new Strategies and Measures to increase water supply capacity, control floods and protect environment. Major water infrastructure projects are fundamental measures and will put into practice the new strategies. Three major water infrastructure projects are introduced in this paper, each one represent different aims and separately benefits.

1. Introduction

Located on the east edge of Asian Continent, People's Republic of China (PRC) possesses a land area of 9.6 million km² with a population of 1.321 billion. Total quantity of water resources is 2,800 billion m³ and it ranks 4th of the world; nevertheless average water resources per capita is 2240 m³, only ¼ of the world average, ranking 88th of the world. China enjoys a large number of rivers and lakes, over 2500 rivers have a basin area of more than 1000km², lakes cover an area of 71787km², and it has important hydro-energy resources held in the numerous rivers and lakes. The fall of Yangtze River and Yellow River is 5400m and 4830m respectively. Water is unevenly distributed within a year, 70% of the water is centralized in the flood season (4 months); total runoff varies dramatically between wet and dry years; water is also unevenly distributed in different areas, the north receives 19%, with 46% of the population, 60% of cultivated land and 44% of GDP, while the south gets 81% of the water with 54% of the population, 35% of cultivated land and 56% of GDP.

2. Challenges

Economic and social development constantly demands water, and water issue tends to be the key factor that restrains the sustainable development of Chinese economy and society. In 2030, China's population will be 1.6 billion, and water availability per capita will only be 1,750 m³, while total water demand will be 700-800 billion m³, compare to the current level, water supply capacity needs to be increased by 130- 230 billion m³. Water shortage is so serious that the annual shortage is 30-400 billion m³, farmland suffering from drought is 7-20 million ha, and 400 cities suffers water stress or water shortage, of these 110 cities are seriously affected by water shortage and 0.25 billion rural population has less drinking water.

Flood disasters remain a heavy burden; in the middle and lower reaches of major rivers, more than 2/3 of fixed assets, 1/3 cultivated land, nearly 1/2 population and over 620 cities are located, frequently threatened by the floods; local floods occur every year and when flashed they often result in heavy damages; soil erosion reaches 3.56 million km² (± 37% of the total land); from the total soil erosion area, water erosion area is 1.65 million km², while wind erosion area is 1.91 million km². Water environment is worsening; eutrophication occurs in varies degrees in 75% of lakes, and pollution caused by this affects more than 90% of urban water bodies in varies degree. In 2002 the water assessment through 123,000 km find that water quality in 14.2% of the river section is classified as class IV and 24.4% is classified as class V or below than class V.

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With 6% of renewable water resources and 9% of cultivated land, China sustains 22% of the world population and its economic development; considering the mentioned challenges, new strategies and measures need to be taken to develop water resource management.

3. Strategy and Measures

3.1. Water Management Thinking

To face the nature water conditions and the challenges, at all levels the water management thinking is changing, carrying out the strategic concept of “Scientific Approach to Development” and promoting sustainable development of water resources. There are two important areas: Promoting a harmonious coexistence between man and nature, following the law of nature; and, safeguarding economic and social development with sustainable utilization of water resources.

3.2. Measures

Several measures have been taken, such as: promoting a coexistence of human being with floods and establishing a complete guarantee system for flood control; combining water development with its conservation, establishing a guarantee system for a reliable water supply and high-efficient utilization; coordinating of domestic, industrial, agricultural and ecological water use, through a guarantee system for sustaining ecosystem and environment; and, developing an environment-friendly economy, controlling strictly the sewage to promote the management of water resources.

Major laws and regulations on water resources management of People’s Republic of China include: Water Law, issued in 1988 and revised in 2002; Law on Water Pollution Control, 1984; Law on Environmental Protection, 1989; and, Law on Water and Soil Conservation, 1991. The development of water management laws and regulations is quickly in these years. There are about 20 administrative laws and regulations, more than 90 rules and standards of the Ministry of Water Resources (MWR), and more than 800 local government rules and regulations. These laws and regulations facilitate the administration of water resources.

3.3. Water Administrative System

Water administrative system integrates river basin management with administrative region management. Acting as the administrative department of water under the State Council, Ministry of Water Resources takes the responsibility of integrated management of water resources and supervision, and its responsibilities are: formulate policies; integrate water resource management and protection; develop resources for rural areas, irrigation, drainage and the hydropower; water and soils conservation; waterworks construction and management; control floods and drought relieve. Other Department or Commissions take part in the development, utilization, conservation and protection of the water resources. River basin authorities exercise power of water resources management and supervision within their jurisdictions, which is defined by laws and regulations and authorized by the water administrative department of water under the State Council.

4. Infrastructure Projects

4.1. Existing Major Projects

A great number of infrastructure projects have been built and are used in water resource management. The total number of reservoirs all over country was 85,412, with a total capacity of 635 billion m³, of which 493 were large reservoirs with a total capacity of 484 billion m³. Water gated of all kinds constructed all over the country was 41,110, of which 438 were large water gates; the length of river embankments constructed in the whole country reached to 283,800 km, of which the rate of up-to-standard accounts to 38.4%. The total detention basin capacity was 120 billion m³, water supply facilitated by water storage, diversion and lifting works amounted to 744 billion m³. The percentage of water supply by water storage works, water diversion, pumping stations and electric tube wells takes 38.5%, 34.3%, 13.8% and 13.4% respectively. Total effective irrigated area reached to 57.78 million ha, that accounted to 44% of the national total cultivated land; water-

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saving irrigated area reached to 23.5 million ha, that account for 40.7% of the total effective irrigated area.

4.2. Major Infrastructure Projects Carrying Out

Several major infrastructure projects are carrying out, including the South to North Water Transfer Project, the Three Gorges Project and the Risk Mitigation and Strengthening of Endangered Reservoir Projects.

4.2.1 The South to North Water Transfer Project

Water shortage in Huang-Huai-Hai (3Hs) river basins is very serious; utilization of these river basins are 67%, 59%, 90%, much higher than the acceptable ratio of 40%. Every year, over use in stream water is 3-9.5 billion m³, over exploit ground water is 11.5 billion m³. Water shortage is 14.5-21 billion m³, in 2010 it will be 21-28 billion m³ and in 2030 it will be 32-39.5 billion m³.

The project considers three schemes: East Route starts from downstream of Yangtze river, and ends at Tianjin Municipality and Shandong Peninsula, based on the existing rivers or canals which length is 1150km; total lift head is 65m, and this needs 75 pumping stations of 13 cascades, annual water diversion reaches 14.8 billion m³ (8.9 billion m³ in the first stage). The Middle Route starts from Danjiangkou Reservoir in Hanjiang river, tributaries of middle stream of Yangtze river, and ends at Beijing and Tianjin municipality, the length of main channel to Beijing is 1267km; the canal to Tianjin is 154km and annual water diversion is 13 billion m³ (9.5 billion m³ in the first stage). West Route Project is diverting water from upper stream or tributaries of Yangtze River, for example Dadu, Yalong and Tongtian Rivers); and supplementing water to upper stream of the Yellow River; considers construction of 7 dams with 63-273m height, the altitude of works location is about 3500m above sea level, annual water diversion is 17 billion m³ (4 billion m³ in the first-stage, 5 billion m³ in the second-stage and 8 billion m³ in the third-stage). The total tunnels/canals length is 260km in the first stage.

The cost of first stages of the East and Middle routes rise to 140.2 thousands millions of Yuan's; both will benefit with 13 billion m³ the plains of them 3Hs, which will relieve the water shortage in the area, in addition they will promote social and economic development. The project can support the current ecological - environmental problems inside limits and gradually reverse them in the plains of 3Hs.

4.2.2 The Three Gorges Project

The project will bring great benefits, such as flood control, green power production and navigation development. The aims and benefits of flood control are to improve the flood control capacity from 10 years to 100 years, without using a water detention area and protecting the lower area of Yangtze River. Hydropower capacity of 182,000,000 Kw will be installed, which can produce average electricity per year 84.7billion Kw/h. This project will increase navigation capacity from 100 million tons/year to 500 million tons/year; the inundated area is 632 km², 127 cities or towns and 841,000 people will be inundated.

JAPAN WATER QUALITY OFICIAL NORMS

Yoichi Harada

1. Introduction

JICA (Japan International Cooperation Agency) is an aid donor agency for providing technical cooperation, concessionary loans and grant aid. JICA aims to contribute to the promotion of international cooperation as well as the sound development of Japanese and global economy by supporting the socioeconomic development, recovery or economic stability of developing regions. The project will last 2 years, and is based on the governmental agreement between Mexico and Japan, to establish new water quality criteria.

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2. History of Water Quality Standard in Japan

Water quality standard is an important tool for the management of water environment. The water quality standard in Japan has been developed along with the environmental situation on urban development; in the 1950's, diseases related to water pollution became serious due to unregulated discharges of cadmium, mercury compounds, PCBs and so on.

In 1958, a controversy between a paper-manufacturing factory and fishermen occurred, detecting that there was a necessity for regulations and laws on water pollution. Since then, laws were issued, modified and changed to regulate the water quality standard, that have incorporated aspects that go from pollution control in the 1960's to environmental conservation/management in the 1990's. Conservation of ecosystems, aquatic life and living environment has been taken into consideration since the year 2000. Environmental water quality standard are issued by law, and additional standards are regulated by each Prefecture.

3. Explanation of the Project

Background: In Mexico, the first water quality criteria come from 1989; however they lacked judicial enforcement, therefore, environmental quality of water became a serious problem due to development and economical growth. The National Water Program (2007-2012)³ points it and improvement of water pollution is mentioned as one of the objectives of the program; in this regard, it considers modification of criteria from many viewpoints such as toxicity, information of pesticides, water usage and industrial situations, among others. Based on this situation, the Mexican government requested technical cooperation to Japan for revising the water quality criteria; to establish or modify the Mexican Norms and Official Mexican Norms⁴, according to new criteria.

Project Purpose and Overall Goal: The global aim of the project to be developed, with JICA's support, is to establish as Mexican Norm (NMX) the quality criteria of the water and use them as water quality standards; in this sense, its purpose is to enhance CONAGUA's aptitude to establish water quality criteria (WQC).

Main Products: Three main products are expected. The first is to enhance the ability to identify parameters (chemical and others) (PFC) in freshwater to protect aquatic life and improve human health; therefore it is considered to assess the guidelines for establishing criteria; establishing new guidelines; identify parameters for criteria; establish a manual on criteria; and seminars and workshops will take place.

The second product will expand the capacity to decide on the maximum allowable concentrations and levels of identified PFC appropriate to enhance the moderate tropical environment in the American continent. A comparison and review of concentrations and the maximum permissible levels will be delivered; criteria and guidelines will be evaluated; a method of analysis will be determined; and, manuals and workshops will be conducted.

The third product will be that CONAGUA will have sufficiently reliable capacity to analyze chemicals in the water quality criteria (WQC), such as total organic carbon (TOC), agricultural chemicals, Volatile Organic Compounds (VOC). To this end, transfer of relevant technology will be selected, limits of quantification will be determined, reports will be prepared and workshops will be carried out.

Seminar, Workshop and Joint Coordination Committee (JCC): All activities and results will be informed through seminars, workshops and a Joint Coordination Committee.

4. Utilization and Review of Water Quality Criteria

Utilization and review of Water Quality Criteria considers relation among different laws on industrial discharges, drinking water, discharges of wastewater and treated water; therefore, criteria to be established upon completion of the project will relate to them. Otherwise, balance of water

³ El Programa Nacional Hídrico 2007-2012

⁴ Normas Mexicanas y Normas Oficiales Mexicanas

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environment could be destroyed. In this sense, the environmental management of water based on comprehensive legal activities will be necessary. Moreover, water quality criteria shall be reviewed periodically considering situations such as the use of toxic substances, technological advances in chemical analysis and results of water quality monitoring.

SPAIN - AENOR NORMALIZATION IN THE AREA OF WATER ENGINEERING, QUALITY AND MANAGEMENT

Rafael Postigo Sierra

Abstract

The topic is divided into four parts. General issues related to standardization; classical definition, the rules involved benefits in terms of its use for these actors, where the standardization work is done and on what issues there are rules in the fields of engineering, quality and water management; how standardization is a useful tool for administrations to develop regulations, in this case European and Spanish references are presented. In accordance with the international, European and Spanish normative committees; particularization of work is presented. As an example of a National European Agency for Standardization Data, data on the Spanish Association for Standardization and Certification (AENOR) is offered.

1. Introduction

The idea is to raise awareness of how is the state of the art on standardization in the field of engineering, quality and water management, through a notion of standards as tools for the different parties involved and to spoke of the great available variety of these "tools". Thus, there are general notions of where the standards are developed (at what levels), what parts are involved in its development and benefits that are derived from its use.

2. Standardization

Standardization is defined as the activity aimed to develop of standards; a standard is any technical specification of repetitive or continuous application, which is not compulsory (except if imposed by contract between the parties involved, that the administration set them or for other reasons), established with participation of all concerned parties, which is approved by nationally and internationally recognized organization.

Through standards elimination of technical and trade barriers is promoted, therefore they help development, since is a common language for those affected by them or which consider necessary their use. Use of standards or norms has different benefits for different actors, among others, for administrations to simplify legal procedures, facilitate policy development and to help expedite trade. For manufacturers, to streamline productivity, improve management design, expedite orders and services, facilitate trade and simplify purchases. For consumers, to establish quality and safety standards, access on information about the product/service and facilitate comparisons. Additionally there is an interrelationship between the different users. An example of relational cycle may be as follows, a national administration use, because it seemed appropriate, requirements described in a European standard or regulation (for example marketing of a product), which simplifies the legal text that reflects the requirements and which represent minor infrastructure to obtain necessary information to impose them. The product manufacturer, in sticking to specifications of this rule, which is mandatory in various surrounding countries, can expand its potential market. The consumer is confident that a product meets a standard and gets useful information in its economic relations with the manufacturer or seller.

At international level, for standardization work there are three key agencies: the International Organization for Standardization (ISO), responsible for not electric standardization, involves national standards bodies of member countries for up to 146 countries. The International Electrotechnical Commission (IEC), which develops standards activities in the electric and

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electrotechnical sector and whose members are worldwide more than 60 National Standards Organizations; and International Telecommunication Union (ITU), which carries out standardization activities in the field of telecommunications.

In Europe, as well as internationally, there are three main bodies: the European Committee for Standardization (CEN), responsible for standardization in all sectors except in electrotechnical and telecommunications, in which the National Standardization Organizations of the countries of the European Union and the European Free Trade Association (EFTA) participate. The European Committee for Electrotechnical Standardization (CENELEC), develops standards activities in the electrotechnical sector, participation is the same as in the CEN; and European Telecommunications Standards Institute (ETSI), developing standards in the telecommunications sector, unlike the others, the Institute has among its members, network operators, service providers, research companies, besides the Administration and national standards bodies.

At a national level, standardization work is developed in National Organisms recognized by governments, they monitor European and international the standards and develop strictly national standards. In Spain, this organism is AENOR.

Standardization in the field of water engineering, quality and management includes: management, evaluation and improvement of water services; technical and infrastructure safety requirements related with water services (supply, treatment and disposal); water quality for human consumption; and mud characterization. From this information, it appears that there is hardly any area related to water that is not covered by standards.

There is a relationship between standardization and regulation, the first being a useful tool for the second. For the Administration, advantages of using standards in regulations are: trade support without unnecessary technical barriers; world recognition; same benefits for developed and developing countries; different levels of use; total control of regulatory requirements; and, participation in its elaboration. Additionally on this issue, there is a guide, published by ISO and IEC, AENOR published a Spanish version, and in it, there are examples of standards employed regulation, use levels and progress of the mentioned advantages.

The Directive for Construction Products (Dir.89/106/EC) is among regulations related to water, based on normalization for its compliance, it is one of the New Approach directives that has been developed within the European Commission to develop regulations that establish basic requirements to fulfill, for example products / services. To meet these requirements, the actor affected by the regulation may attend a number of standards by which compliance conformity is presumed; annexes to these norms set forth the relationship between the directives and standards. Other Directives are related to quality of water intended for human consumption (Drinking Water Directive –Dir.98/83/EC-), on treatment of urban waste water (Urban Waste Water Treatment Directive -Dir.91/271/EC); also, there is the European Acceptance Scheme (EAS) on construction materials in contact with drinking water. A practical example in Spain is the RD.140/2003 on health criteria of water quality for human consumption. This Royal Decree is a transposition of European legislation, it establishes that to accredit laboratories that test water, they must meet a set of norms, and furthermore there are rules that describe the compounds, and its specifications, to be used in water treatment.

3. International Committees for Standardization in the Field of Water Engineering, Quality and Management

There are international, European and Spanish standards committees, where standardization work related to the water cycle is performed.

In the case of ISO, ISO/TC 224 Standardization of the activities of the drinking water supply and sewerage addresses quality of service and performance indicators. The activity field takes care of the definition and measurement of services activities related to provision of potable water and sewerage systems; as well as the definition of common language to various stakeholders, including meaning characteristics of service elements, according to consumers expectations, requirements to

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meet drinking water supply management and sewage system, and service and quality criteria related with performance indicators system, without any objective or threshold values. So far, this committee has developed three standards related to drinking water and wastewater management, evaluation and improvement. The first (ISO 24510) provides guidelines for evaluation and improvement of water services from the services perspective users; the other two (ISO 246511 and ISO 24512) establish guidelines for management of entities providing services and evaluation of them, and are a very important tool for those entities.

As noted, use of standards has a number of advantages; a clear example can be found here. Legislators may use the norms to establish requirements for granting concessions to different companies. Users can claim to the entity providing the service, if it declares that it complies with the requirements of standards and does fulfill them, and the entity that provides services can found in standards examples to implement in its internal procedures to improve various operation aspects.

Another international committee on water issues is the ISO/TC 147 on Water Quality, whose activity field is standardization in water quality, including definition of terms, sampling of water, measurement and reporting of water characteristics, except acceptability limits for water quality that in each case should be established by competent authorities or bodies.

Currently, there are about 238 standards issued by the Committee, a large group of standards (20) carries the ISO 5667 code and seeks to establish guidelines on water sampling, depending on the type of water/sludge and its origin; another group is the vocabulary related to water quality (9 standards) that has the ISO 6107 code. In addition, for each type of compound that might be present in water, it seeks to develop a standard to determine and quantify its presence. There are other types of standards related to water quality, such as the biological classification of rivers.

In Europe, four committees cover the entire water cycle and issues related to water quality. The first is the CEN/TC 164 on Water Supply, which set standards for the installation and requirements regarding systems and implementation of components used for water supply on production plants, including water treatment and faucets attached to sanitary device, in order to maintain water quality as outlined in Directive 80/778. Being a broad field, 15 Working Groups operate and there is a very extensive normative body with 205 standards published, covering aspects such as supply infrastructure, treatment and protection against pollution of waters so that they are appropriate according to its different uses and requirements so its supply is safety.

Once the water is used according to established practice, waters become a waste to be processed properly; in this field is the standardization work of the Committee CEN/TC 165 Waste water engineering. This Committee is very fragmented, with 43 Working Groups, splitting standards to be developed; a block of standards is related to drainage infrastructure, other handle aspects of water treatment plants and other concerns over terminology. Here, there are also various norms not related to the topics described above.

The CEN/TC 230 Committee, Water Analysis, is a European equivalent of ISO/TC 147 and its field of activity is very similar to the previous one, they have in common that both exclude standards for water quality acceptability limits. Its associated work areas addresses are physical and biomechanical aspects, as well as biological and microbiological issues; it has published 145 standards integrated by those developed mostly in collaboration with the ISO, or by not internationally developed standards that are of interest.

To close the water cycle, the CEN/TC 308 is a Committee for sludge characterization; its standards seek to typify the different sludge due to water treatment in order to develop guidelines for good practices on production, reuse and final disposal. It should be noted that the Committee excludes hazardous sludge from industry. Three Working Groups operate (characterization, good practices and preserve measures to improve and extend the use, and disposal routes). The vast majority of the produced documents are characterization standards, being the rest technical reports to cover other aspects dealt within this committee.

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In Spain, as an example of national standardization work, AENOR has 2 standards committees, the AEN/CTN 149 Water Engineering and the subcommittee AEN/CTN 77/SC 1 on Water Quality, they developed clearly national standards and it is decided if at the national level the adoption of ISO standards is appropriate. In such committees monitoring of the standardization work at international and European level is developed. AENOR, being a member of CEN, acquires commitments that forced it to adopt the standards developed in Europe. The AEN/CTN 149 responds to the ISO/TC 224, CEN/TC 165 and CEN/TC 164; the AEN/CTN 77/SC 1 attends ISO 147, CEN/TC 164, CEN/TC 230 and CEN/TC 308.

Spain has 56 presences (experts and delegates) in the international committees to represent its national position, or that of its bodies (laboratories, manufacturers, operators of drinking water and wastewater, among others).

4. Asociación Española de Normalización y Certificación (AENOR)⁵

AENOR is a non-profit private association, based in Madrid, which has been operating for over 22 years; it is an independent institution established to develop multi-sectorial standards and certification activities, thus helping to improve the quality and competitiveness of companies, products and services, as well as protecting the environment, and therefore the welfare of society. It is a multi-sectorial entity, member of ISO and IEC at the international level, in Europe of CEN, CENELEC and ETSI and in America of COPANT.

Currently has developed more than 27,000 standards integrated in a catalogue, it has more than 180 Technical Standardization Committees, emits more than 1,700 new rules every year and assumes 103 international responsibilities. The Association has 29 centers in Spain, Portugal, Italy, Mexico, Chile, El Salvador, Peru, Brazil, Bulgaria and Uruguay.

⁵ Spanish Association for Standardization and Certification

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Roundtable 6: Water in agricultural development

AUSTRALIA AUSTRALIAN WATER LAWS – MANAGING DIMINISHING WATER SUPPLIES IN THE MURRAY-DARLING BASIN

Megan Dyson

Abstract

This paper briefly charts the development of Australian legal frameworks for managing water resources, explaining the different roles of State and Federal Governments. It shows how State laws are well-designed to support management of water resources during short term scarcity as well as longer term changes in water availability. However, the paper also shows how the fragmentation of water management between different States within the Murray-Darling Basin prevents an effective and equitable response to severe drought and longer term change induced by global warming. The paper explores the recent changes in the balance between State and Commonwealth management of water resources within the Murray-Darling Basin and discusses how these laws should bring about better management of water resources within the Basin.

1. Context and Background to Australian Legal System for Water Management

The Commonwealth of Australia now comprises six States and two Territories, the Constitution limits the Federal Government faculty to legislate and some States have the power to legislate on several aspects. Despite not having a specific power to do so, the Commonwealth has legislated for both the environment and water resources, using certain of the more broadly-expressed Constitutional powers; for example the Water Act 2007, to give effect to treaties including the Convention on Biological Diversity and the Ramsar Convention.

Australia's Legal Inheritance: The fact of British settlement of Australia has at least two important ramifications for Australian water law. The first is that settlement had the effect of vesting the whole territory of the continent (including its water resources) in the British Crown. The second is that the English common law governing rights to take water was also inherited; accordingly, a landowner had an unlimited right to use water occurring on the land for stock and domestic purposes, even for any other purpose, provided that, in the case of water flowing within a watercourse, the taking did not cause the flow of water downstream to be 'sensibly diminished'.

Asserting State Control Over Water Rights: In the late 1880s, the Victorian and New South Wales Parliaments moved explicitly to 'vest' the right to the use and flow of certain water resources in their jurisdictions in the State Crown; therefore the vesting of rights preserved certain limited rights of landholders to take water. The idea was to allow the Crown to grant rights to take water while requiring that all other taking be by authority granted by the Crown; to pass its Irrigation act (1886), Victoria considered water and irrigation management in several countries of America, including Mexico where private acquisition was permitted for domestic purposes, but not for irrigation or industrial uses. Since then an assertion of the State's right to control the taking of water resources through the issue of licenses by the Crown has been a central feature of Australian State water laws.

Water Management in the Murray-Darling Basin:

The Murray-Darling Basin is named for the two major rivers of the catchment and covers about 14% of Australia, it also contains numerous aquifers, most of which are connected to the river systems. The Basin is the most productive agricultural region, containing around 70% of the irrigated agriculture.

The Murray-Darling Basin Agreement: Sharing the waters of the Murray-Darling Basin has long been the subject of disagreement and intense political negotiation

In 1915 the Governments of South Australia, Victoria, New South Wales (NSW) and the Commonwealth adopted the River Murray Waters Agreement, that provided for the construction

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and joint funding of the major dams and weirs that regulate the system, and established the water-sharing provisions, which main principles still apply today. The Agreement provides that South Australia (the downstream State) receives a minimum monthly flow, New South Wales and Victoria will share equally half of the flows of the main River.

The instrument evolved over time and its most recent version is the 1992 Agreement, that besides the water sharing provisions outlined above, considers control and management, including funding of the jointly owned; since the late 1980s, it also addresses salinity management, and since 1995 includes a mechanism for trade in water rights across and diversions caps. The Murray-Darling Basin Agreement 2008 will again re-cast the agreement between the governments when it comes into effect.

2. Legal Regimes for Water Management within the Murray-Darling Basin: National Policy, but Individual State Legal Regimes

Management of water in the Basin is fragmented amongst the laws of four States and a Territory. Laws in each State for the most part meet recent national water policy standards, and they are probably adequate; however, the laws essentially protect the interests of the populace of the State, and are not directed toward securing whole-of-Basin management.

National Water Policy: The Council of Australian Governments (COAG) endorsed a Water Reform Framework Agreement in 1994, which favoured legislative changes in managing water resources and water industries. Each State establishes legal basis for statutory water plans, provide water for the environment and to identify a pool of water available for consumptive use which would be allocated to water users on the basis of enforceable water licenses. The National Water Initiative (NWI) was agreed in June 2004, considering eight key elements related with environmental sustainability. The central aim is the requirement for statutory water plans to secure ecological outcomes, describing the environmental and other public benefit outcomes for water systems and defining the appropriate water management arrangements to achieve those outcomes; the plans are the basis for water management and allocation decisions.

The NWI resulted in further reforms of State laws and it increased consistency among approaches to water planning and management. During drought, these are referred to: using statutory water plans to identify environmental needs, granting rights to take water for consumptive use on the basis of shared uses; making seasonal determinations about how much water is in fact available to be taken in respect of each of those shares; unbundling water entitlements into separate components (right to a share, right to extract at a particular time and place, and right to use water at a particular location); and allowing water entitlements to be traded when water resources are physically connected (both within a State and between States).

Example of Current State Water Management Laws - NSW: The State of New South Wales has implemented most of the NWI reforms. Its Water Management Act (2000) considers that landholders have certain basic rights to take water, they can use water for its own domestic use, or for watering stock kept on the land; any person may also capture up to 10% of the average runoff water from their land. A water access license must be held to authorize any other taking of water. The Act requires a statutory water sharing plan (WSP) for each water resource that is classified as being at high risk of suffering harm, or classified as having high conservation value. Each WSP must establish environmental water rules and, consistently with limits to the availability of water, provide for the grant and management of access licenses in a way that protects the water source and its dependent ecosystems and also protects the basic landholder rights. The WSP may also provide for conditions to be imposed on access that result in a reduction in the share of water held under the license; the Act provides for compensation to be paid in certain circumstances. Being statutory instruments, their validity can only be challenged by judicial review.

Access licenses entitle the holder to gain access to a specified share of the available water of a particular resource. The amount of water is determined seasonally and only the credited water may be diverted. The access license itself does not authorize the building and use of works to

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divert and use the water; for it, separate authorizations are issued, which take into account impacts on the water resource and other users of the physical extraction and use of water at a particular location. Any licenses can be traded permanently or temporarily, completely or partially.

3. Responsiveness of State Legal Regimes to Drought – Sharing Water between Users within Each State

How do States' legal regimes support effective management during drought? Policy developments mentioned have gone a significant way towards allowing for this type of management approach, so that the recognized ideal for water allocation is now a share of available water, rather than a fixed annual volume. The River Murray region is entering its eighth consecutive year of drought; major storages managed under the Murray-Darling Basin Agreement are currently at 20% capacity.

The system of seasonal allocations responds to how much water is physically available and has been used for many years in Victoria and NSW in managing irrigation rights on rivers whose flows are regulated by large dams. The system is well accepted and may often mean that an irrigation season might open at only 30% allocation, rising later in the year, depending on inflows and dam levels, to close to 100%, according to flows and level of large dams. The allocation system reduces legal challenge because it is enshrined in the relevant Act of Parliament.

Tradable water entitlements have proved to be of great assistance during drought. Water users who find their seasonal allocation too small to be profitable may sell it for that season. The scarcity of water increases its market value meaning the selling irrigator can mitigate its losses or even make a better profit in that year, and the purchasing irrigator can aggregate sufficient water to provide a successful crop. Water trading tends to concentrate in higher value crops.

Laws in each Basin State also permit the use of emergency powers to reduce the ability to take water during times of short-term insufficiency. The laws originated from the period prior to introduction of a share-based system of water allocation, and have been retained as a fall-back should it be required.

How do States' Legal Regimes Respond to Long-term Drying?: There may come a point, when it is evident that water dependent ecosystems are under severe stress; assumptions about how much water will 'normally' be available for consumptive use, and how much the environment requires to function well are simply wrong. The NWI standards are also designed to respond to permanent changes in water availability, by reducing the 'consumptive pool' and the nominal value of each share. Reduction can be achieved through compulsory or voluntary means; the first ones are supported by State legislation or buy-back of entitlements for environmental use. The issue of compensation can be avoided by simply buying-back water entitlements for the environment, which has been done by Basin States and the Commonwealth.

On reduction of access to water, compulsory reduction has a cost. The NWI risk assignment framework proposes that water entitlement holders should bear the costs of reductions to allocations due to seasonal climatic variations and periodic events such as drought. Reductions that are made due to improvements in knowledge about the sustainable diversion limit should also be borne by entitlement holders until 2014. After that date, water entitlement holders will bear only 3% of reduction in any ten-year period, with the remainder shared by State and Commonwealth Governments. Governments are to bear all the cost of reductions arising from changes in government policy (for example, if they set new environmental objectives). In 2005 NSW incorporated the NWI risk assignment framework into its Water Management Act and it is expected that the remaining States will be doing the same over the next 12 months.

4. Responsiveness of the Regime for Co-operative Federalism' During Drought – Sharing Water between States

The long period of drought, increased temperatures and drastically reduced inflows to the shared storages, highlight the differences in allocation policies between the States and the absence

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of adequate provision for environmental water needs or even for sharing water for critical human needs. The apparent impossibility of achieving effective whole-of-Basin management through a State-based legal system is the central reason why the Commonwealth has had to step in, to provide what State laws cannot – impartial assessment and sharing of waters across the entire river basin.

Volume of Inflows since 2006 have severely declined: In 2005, the Australian National Water Commission concluded that 10% of river length in the Murray-Darling Basin is “severely impaired”; having lost at least 50% of expected aquatic invertebrates, more than 95% was assessed as being in a ‘degraded’ condition.

Water outlook predictions (Commonwealth Scientific and Industrial Research Organization – CSIRO- July 2008), predicts that if the 1997-2006 climate persists, then by 2030, surface water availability for the River Murray region will fall by 30% (according to the longer term average) and that at the end-of-system flows will fall by 50%. The prediction is only half as bad if modeled at the median rate of change used in the 4th report of the International Panel on Climate Change: surface water availability falling by 14% and end-of-system flows by 24%. In the Murray-Darling Basin, waters are shared by important wetlands, including those listed in Ramsar, lakes and the Coorong (National Park) and flows through system are inadequate to sustain these environments and other water users.

Co-operative Federalism: In the early 1990s, the Darling River suffered an algal bloom and more attention started to be paid to the significance of flow regimes to the health of the Basin’s river systems. By 1995 the parties to the Murray-Darling Basin Agreement reached a historic agreement to cap the level of diversions; however, the health of the rivers, particularly in the lower reaches of the Murray, continued to decline.

In 2003, the Commonwealth and Basin States signed the Living Murray Intergovernmental Agreement, where funds are compromised to recover water for the environment and to coordinate management of recovered water for agreed objectives; nevertheless, due to drought, only a tiny proportion of the recovered water has been allocated for use. There is growing evidence that the quantities required to restore health are higher than previously thought; competition between the States for the available water compounds the difficulties faced for effective Basin-wide management, particularly during drought seasons.

In spite of this competition, co-operative federalism has seen the States work together during the current drought to deal with imminent threats to human needs and industry. The contingency plans developed to share water during extreme circumstances include a variation to normal sharing practices under the Agreement, such as the disconnection of selected wetlands in each State and limits on all water users.

The 2007 Commonwealth Response: The missing component for effective river basin management has been a system for allocating water based on a sustainable diversion limit designed to accommodate the whole complex and inter-related river and groundwater systems. The Commonwealth Government response, announced in January 2007, is the Water Act 2007 and a funding package for buy back and efficiency improvements; the Act considers a Statutory Water Plan for the Murray-Darling Basin resources, defines limit on consumptive use, considering all waters – not just surface water- and accredited catchment-level (State) plans.

The Water Act and Murray-Darling Basin Agreement 2008: Under the Water Act, in 2008 further reforms for the Murray-Darling Basin were achieved. Negotiations among States of the Basin took place and the Federal Government provides additional funding. Thus, management of storages and delivery of State water shares—limits were considered through a Ministerial Council and Committee; it was also agreed that Basin Authority will include water sharing for ‘critical human needs’ in the Basin Plan.

What are the essential elements of laws which provide for water management when water availability is variable and declining? Different physical and political and social circumstances require different laws. However, it is possible to identify the essential elements of Australian State

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water law that have enabled effective response to drought within each State's borders, as described above. To summarize, these elements are: defining environmental water requirements and the 'consumptive pool' through an enforceable statutory instrument such as a water plan; allocating water entitlements to the consumptive pool only, and allocating the entitlements in the form of shares of the available water; allocating water to the shares based on a seasonal assessment of available water; providing for reduction in shares; separating shares to a water resource from rights to take and use water; and allowing full trading of entitlements (within environmental constraints).

What is absent from current laws for effective cross-border management when water availability is declining? The drought across the southern Murray-Darling Basin has tested relationships between governments, effectiveness of State laws and the Murray-Darling Basin Agreement. In spite of the very important fundamentals that have helped to provide for water management within States, laws need to be able to ensure: that sustainable diversion limits take no account of State borders; environmental recovery after drought; that environmental water releases made upstream cannot form part of allocations made for consumptive uses downstream; and, that the specification of State shares contained in the Murray-Darling Basin Agreement does not hinder the movement of water through the Basin

Can the Water Act and a New Agreement provide for these Shortcomings?: The role of the Basin Plan in setting sustainable diversion limits for all water resources within the Basin, regardless of State borders, is the single most powerful provision of the Water Act. Sustainable diversion limits will begin to take effect in from 2013, when the first of the existing State plans concludes The Act indicates two possible methods – a particular quantity per year, or a formula or other method to be used to calculate a quantity per year.

It the writer's view that the Basin Plan could design the sustainable diversion limits and the requirements, in a way that automatically provides for the preferential return of water for environmental recovery after drought. Additionally the Plan must include a specific 'environmental watering plan' and overcoming certain 'State share' prescriptions to avoid difficulties in the effective movement of environmental flows

5. Conclusions

National water policy reforms in Australia marked improvements in State water resources management laws. State laws that have adopted a 'share-based' system of water entitlements, with seasonal allocations made on the basis of available water, and with full tradability of water rights, provide a legal regime that is able to operate effectively in the face of drought and cater for longer term decline in water availability.

The missing link for effective management of the Murray-Darling Basin has been an independently set, enforceable, limit on the amount of water allowed to be diverted for consumptive use; a limit that provides for the environmental requirements of the river systems as they flow across four States to the mouth of the River Murray. The new Commonwealth Water Act will provide that missing link. Other hurdles remain for the effective Basin management, but most should also be able to be overcome through mechanisms provided under the Water Act.

TURKEY RIVER BASIN MANAGEMENT PLANS IN TURKEY

Attila ATAÇ, Nedim YEŞİL

Abstract

As being an accession country to European Union, transposition of Turkish water legislation to that of EU become compulsory. Being water the main element of the environment, the EU enacted a framework directive on water resources management (Directive 2000/60/EC of the European Parliament and of the Council) establishing a framework for the Community action in the

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field of water policy, which main purpose is to establish a framework for the conservation of surface, coastal, ground and transitional waters.

This Directive, whose main objective is to manage all water resources in a basin on an integrated basis, has a crucial importance in the following years and during the harmonization and implementation activities related with water management in Turkey, which has 25 hydrographic basins.

1. Introduction

Worldwide demand for utilization of water resources has been increasing parallel to the rapid growth; communities become more sensitive to the problems related to water resources that are one of the main components of the natural environment. This was reflected in the International Water and Environment Conference (Dublin, 1992), that stated water is a finite and a vulnerable resource and essential to sustain life, development and the environment.

The most efficient use or management of water resources is compulsory for maximizing the economical, environmental, and social benefits; a more efficient and effective water resource management is caused by defining the system as a basin scale by limiting it with natural boundaries. On the other hand, hydrologic cycles show integrity from a scientific point of view and so needs to be observed and assessed in an integrated manner.

Integrated water resources management has some policy principles, including protection of all forms of life in terms of basic needs and base sustainability of resource in order to control flood and pollution and to protect basin; besides these and other principles, on the integrated water resources management economic and efficient use are inseparable, as well as stakeholder participation.

2. Current River Basin Management Perception in Turkey

In Turkey, multiple governmental actors and not governmental organizations are related to the water sector. The General Directorate of State Hydraulic Works (DSI) is the principal institution responsible for the development of the water resources, nevertheless other institutions exist with important tasks and responsibilities in the attention of sub subjects related. In occasions, it causes duplicities or attributions overlapping and this difficult the resource management.

It is considered that currently, in the development and management of water resources, policies of rational use and sustainable development are not completely instrumented; additionally there is perceived that sufficient application of the basin management principles does not exist. The most effective solution to overcome these difficulties is the application of a good designed "Basin Management Plan". In the frame of this management model, activities of the institutions responsible for the development of the water resources must be checked; moreover, in order to harmonize activities, the water resources in the basin, its utilization and pollution must be examined in a priority way considering the borders of the basin, the problems and determining the long-term demand.

The most detailed and significant study which was performed on water resources management about water management in a basin scale and corresponding proposed administrative structure is an action plan called as "National Environment Action Plan: Water Resources Management.". This suggests an Integrated Water Resources Management which requires the protection of water resources for both preserving the ecological balance and supplying water needs.

3. European Union Approach and River Basin Management

The EU Water Framework Directive (EUWFD) sets a new and innovative approach in the field of water management with the following main principles: integrated approach, requiring close consultation and cooperation in water management planning and development; all waters must be addressed in an integrated manner (surface water, coastal and sea waters, and groundwater); sets

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ambitious objectives to ensure that all water meet “good status” by 2015; adopts combined approach of emission limit values and quality standards; public consultation, in the process of water management planning; information sharing; and, economic instruments (polluter pays and full cost recovery principles).

The EUWFD requires water management plans considering: characteristics of River Basin District; summary of significant pressure and impact of human activity; identification and mapping of protected areas; map of monitoring networks; list of environmental objectives; summary of economic analysis; summary of programmed measures; detailed register of programs; summary of public information and consultation measures; list of competent authorities; and, contact points and procedures for obtaining background and comments from the public.

4. Main Challenges in the Implementation of EU River Basin Management Model and Plans in Turkey

Implementation of EU Water Framework Directive faces some main difficulties. On legislative issues, many organizations are involved in water management with overlapping and conflicting tasks; also different laws and regulations authorize a number of different institutions to manage the same water resources, further most regulations have been developed independently, without taking earlier regulations into account or modifying or abolishing regulations in place.

Complications on coordination issues are one of the major weakness on the planning structure for integrated river basin management; this because different organizations conduct their activities on water resources according to their own plans, causing unnecessary repetitions on studies, waste of time and waste of money for the same water resource.

On implementation, there is no clear division of tasks and responsibilities between national and regional authorities; weak monitoring and enforcement of regulations and current administrative structure to enable water management on the level of river basin districts are major obstacles in order to ensure the integrated river basin management principles. This requires sufficient responsibilities delegation at the regional and river basin district level.

In Turkey, distribution of resources is not homogeneous and finance is sometimes used insufficient and in a non-effective manner; also, prices/charges are not sufficient to guarantee the service level required.

Although DSI has a wide range of water monitoring network, this is not enough to cover the entire requirement for preparing an integrated river basin management plan in each basin; all data on water resources should be brought together in common database and necessary information flow should be provided.

Participation of water users to the planning process of river basin management is not sufficient; common attitude is to make and approve the plans on water resources in the national level and participation of private sectors to water investment is very limited and water infrastructures are mostly built by using public financial resources.

The EUWFD has some comments about the management of transboundary water resources, although there are suggestions, they depend on the fact that EU is a party to many international transboundary waters conventions to which Turkey is not a party and only will become in case of its full membership to the EU.

5. Case Study: Büyük Menderes River Basin Management Plan in the Context of EU Water Framework Directive

“Implementation of the Water Framework Directive in Turkey”, was the first project for the harmonization of Water Framework Directive in Turkey; it demanded a comprehensive and integrated approach to water management and had a wide scope and ambitious targets. One of the key aspects was the concept of water management on a river basin scale. Key issues in this project were the enhancement of the cooperation between different decision-making bodies involved in water management, and enabling public participation in the process.

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As a pilot project and to attend a regional scale, a Draft River Basin Management Plan was developed for the Büyük Menderes River Basin. The delta of this River is a vast wetland of international importance for wildlife; further, in it is one geothermal power station in the Kizildere region that causes boron pollution, in the river also there are textile and leather industries, domestic pollution also is observed near settlement areas. In total 165 municipalities are present in this area, of which 6 have sewerage system, of these only 3 are connected to a wastewater treatment plant. Agricultural pollution is another problem, as 40% of the land is agriculture. Besides, a high tourist pressure exists at the western edge of the basin, especially around the Lake Bafa and the delta.

In the project scope, two functional groups were established; one was at national level and the other was at river basin level. All major stakeholders on a national level were represented in National Platform which was established in the beginning of the project. The National Platform was designed to facilitate decision making regarding national Water Framework Directive (WFD) related issues. The second group, called as River Basin Working Group, was set for participation of all related public and local organizations in the basin; in order to execute the regional aspects of WFD in Büyük Menderes River Basin, its utmost task was the preparation of a draft river basin management plan.

The studies for preparation of an integrated river basin management plan started with a stakeholder analysis, this showed that the main identified problems relate to water pollution and administrative problems. According to the participants interests, a regional platform was established in the water management issues in the entire basin, the main conclusions were: identification of users, organizations and other interested parties and their roles in water management; assessment of present issues and problems in water use and their respective relations; fields of work and their emphasis; and preliminary working rules;

On the short-term, the Basin Hydrological Management Plan is focused in the EUWFD, therefore it considers: characterization of the river basin; analysis of significant pressures and impacts of human activities; and, economic analysis of water use.

With pilot studies, the Büyük Menderes was characterized, it was identified as a heavily modified water body and then categorized as a river; and finally the typology was done, where different types of water bodies were identified.

The pressure and impact analysis is performed to investigate the possibilities and causes of not meeting the environmental objectives. Prioritizing these threats and problems, the most effective measures can be chosen, therefore, all types of pressures and their impacts on water bodies were analyzed and identified.

In the basin the economical analysis of water use was made, it was found that these are: industrial water use (process, cooling, and cleaning); tourism (hot-springs, swimming, and recreation); agriculture (irrigation, washing of salty soil, aqua products); domestic water use (drinking, usage); energy use; and, commercial (bottling, aqua parks).

Finally, based on the objectives, monitoring results, pressure and impact analysis and economic analysis, the Group proposed some possible measures to be taken, including proposals for planning and organization, monitoring and evaluation, removal of wastes, agricultural measures, erosion and flood control, geothermal waters, coastal and transitional waters, pricing of water, educational and publication works, and institutional and legal arrangements.

This project helped to let organizations making studies about water resources work in cooperation; it also showed that there is a necessity to overview Turkish legislation on water management. Turkey is still developing its water resources and activities are needed to increase supply of drinkable water and energy, as well as to attend to the water needs of irrigation, in parallel with macro objectives for the socioeconomic development.

6. Conclusions

Turkey has developed just about 40% of its economically and technically utilizable water potential, and needs to develop the remaining portion for its sustainable development with

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integrated and sustainable policies. One of the main issues to be done during the transposition of EUWFD is to overview Turkish legislation on water management, to define coinciding points and to make necessary legal arrangements to overcome these coinciding points. These legal arrangements can be made both by rearranging the duty and responsibilities of institutions defined in their establishment laws and by preparing a "Framework Water Law".

In the accession period to EU, the first issue is to define river basins in technical basis and establish River Basin Districts for each river basin according to Water Framework Directive. The most appropriate approach is that DSI having the strongest administrative structure in the regional scale should be reorganized in line with the requirements of the Directive and development targets of the country. Regional Directorates of DSI has the sufficient administrative and technical capacity in order to prepare and implement the integrated river basin management plans in basins; they have the necessary experience and technical infrastructure which is essential for implementation of all elements of an integrated river basin management plan and are most appropriate regional administrative structure in terms of their tasks and responsibilities. In addition, they have enough capability to take responsibility and chair the river basin committees that will be composed of members of all governmental and nongovernmental organizations related with the water resources.

Subsidiarity is one of the main principles of Water framework Directive. In that sense, integrated river basin management plans should be prepared under the responsibility and authorization of Regional Directorates of DSI; these plans must be assessed and approved by a higher level authority in the national level in order to control the compatibility of them with the national policies, strategies and plans in Turkey.

ISRAEL AGRICULTURAL WATER MANAGEMENT IN ISRAEL

Alberto Aiziczon Attila

Introduction

Israel is a country so small that when seeing it on a map, his name always appears on any neighbour nation. It is a country with limited water resources and a long, dry summer, in which agricultural crops are given only with contribution of intentional and planned irrigation. Currently, water for agriculture is 58% of the total used in the country; almost half of that amount corresponds to the marginal water category (treated water and recycled water with high salt content). Water is a national security and survival strategic issue, so its management is completely in charge of the State, protected by its respective laws.

1. Agricultural Water Management in Israel - Highlights

Through the Water Agency and Mekorot (the State company in charge of the work), the State is the main protagonist in all matters related to water, regulating and making global decisions: decide the annual amount per farmer, according to a crops program; press for continued water savings, through progressive consumer prices; issue decrees and executes its application, to receive an irrigation permit for any use, a compulsory plan for efficient irrigation must submitted; limits disturbance of water meters and other violations through threats or application of sanctions; serves particular cases, use of water with high salt content (cotton) and local recycling, among others; supports financially and promotes purchase of modern irrigation systems, oriented to proven long-term and efficient system, to ensure the State investment profitability in the national economy; gives gratuity advise to farmers, with extensionists in technology and crops management; invests in continuous advisers training; invests and promotes continuous development of technology through field tests; and, promotes "Irrigation Modules", agricultural groups with collective responsibility on water use and management in different regions or farmer groups.

In the field, Mekorot delivers to farmers agreed clean and pressurized water (4atm), at the expense of State and assuming all the costs that it implies; the farmer total amount of water used is

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limited and for the water consumed it pays a price between 30 and 50 dollar cents per cubic meter. In Israel there are no irrigated lands by flooding or furrows, because as well as the obvious irrigation inequity and low economic value of those irrigation crops, that waste is not possible.

The principle that sustains the basic agronomic drip irrigation method is the possibility of addressing roots and to develop it in the place and direction where water is provided. This principle, which some see as obvious, is not, when a farmer decides to adopt this form of irrigation, as only one part of the soil will be responsible for the development of root system; here is where support, training and consultancy are needed.

Since drip irrigation exists (more or less 40 years), it has evolved rapidly, it has been improved and includes new crops. An example is the sugar cane, a crop that did not exist in Israel and that has been developed in a limit to allow the existence of fields in sandy soil and completely dry climates, as in Peru.

The first semi-commercial drip (1965) was simply a long passage of water, thin and with laminar flow, where water inside a hose loses its pressure before getting out in a weak flow, which was considered since then as a "drop". This allowed a first advance to demonstrate that plants were able to adapt to this irrigation mode and produce good crops with a surprisingly low supplied amount of water; however, the dramatic breakthrough was achieved only when the way water travelled to get out of the irrigation hose was changed, the method was a path (labyrinth) of turbulent regime.

Geometry of water passage droppers is what different companies patent today; existing droppers have very different capacities and they suit different situations and types of water. In principle, there are two classes: those whose flow or current is fixed at different pressure conditions (self-compensated) and those whose flow depend on the pressure and therefore require a more specialized irrigation design to achieve a uniform acceptable irrigation. The droppers can be of low or very long-term durability, according to the chosen model: the first are an example of drip tapes per year, used mainly in vegetables, while the long-term durability are frequently used in fruit trees (among others, walnut, citrus and avocados).

Drip irrigation, an Israeli invention, has been spread around the world to irrigate crops such as cocoa, coffee and bananas in Brazil, walnut trees in Mexico and cotton in the United States. Banana is particularly interesting since it breaks a paradigm regarding crops and regions in which drip irrigation is associated. Banana, usually a crop in rainy growing areas that require significant amounts of nutrients, is benefited by drip when it is used as an effective and rapid nutrition and irrigation method, it allows maintaining a constant level of soil fertilization, even in constant rain situations; also ensuring that fertilizers do not contaminate other water sources. Therefore, it has enabled to spread its cultivation to other not typical regions, where dry weather may be important to prevent fungi development in the crop leaves (Sigatoca).

The self-compensated drip has allowed incorporation of marginal agricultural land, with strong slopes or low natural fertility, such as the cultivation of sugarcane in Brazil, Mexico has also such cases in states as Veracruz and Jalisco.

The currently benefited variety of crops by drip irrigation methods includes, among others, citric, potatoes and pecan walnut. The latter is particularly interesting because it is an adaptation made by Israeli companies in Mexico, where all dripping is underground, avoiding evaporation problems of surface water and the possibility of vandalism; according to the latest report, to date there are around 10,000 hectares with this irrigation system, which has been introduced into the market only 10 years ago.

Faithful to Israelis eager tradition, the improvement and advance has not stopped in the field of drip irrigation, where new developments are being proposed. In family drip irrigation or small parcels, with limited and economic technology and irrigation drip for extensive crops such as maize, chickpeas and beans, new methods have been developed, different from those for traditional vegetables drip. Furthermore, world change is attended, regarding rational energy use and ecology,

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so now the drip irrigation systems are modified and upgraded to provide very low energy consumption equipment, utilizing recent technological and agronomic developments.

Finally, it should be noted that Israeli companies work today in Latin American countries, developing specific solutions and addressing needs of agricultural producers according to the natural conditions of each region.

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Roundtable 7: Social Participation in Water Management

FRANCE

PECULIARITIES OF THE FRENCH EXPERIENCE IN THE FRAME OF THE WATER POLICY

Julien Martinez

1. Memories and Generalities

The legal regime of water in France goes from the "res nullius" to the "res communis" or "res omnium"; water is not susceptible of appropriation (surface waters and groundwater), except for access (works and water inlet facilities) to sources/springs and groundwater, lakes or reservoirs. In the regulation of uses (control or "water police") are: obligations, requirements, prohibitions and corresponding penalties. Unification is under the Ministry of the Environment (from the eighties decade) and there is a regulation of conflicts between users, arbitration among needs and demands or conflicting interests. Public interest (for example drinking water supply) and the environment are respected. Since the January 2 1992 law, in France "water is part of the common patrimony of the Nation".

In addition to "classic" legal and administrative procedures and to reinforce their effects, three water laws (1964, 1992 and 2006) have established the principles, objectives (including the philosophy), management agencies and very innovative specific tools, for a an integrated vision and action on water issues, including governance. It can be talked of "paralegal with legal basis" instruments: Incitement (economic incentives) by two levers, subsidies and fees; and concertation (social participation) among actors, to develop, decide and implement plans, programs and works.

Philosophy or rationale should also need to be considered: from hydrological solidarity to the performance and financial solidarity ("We are one"), where the ideal and humanist objective would be to promote and uphold the "right of access to water" and basic to sanitation, as raised in the Millennium Goals. Additionally it should be taken into account the concertation issue; social participation in water policy in France is a "conquest", an essential innovation provided (after a law in 1898) by the first great water law of December 16, 1964 "on the regime, water distribution and the fight against pollution". Participation concretize commitment of users and their responsibility, in compensation of their needs and demands, so works and investment in the water domain are appropriate to them: it is a requirement of realism and technical effectiveness, both economically and socially.

2. History Review

In 1968, six Basin Committees were formed (four basin groups around large rivers plus two transboundary basins, heavily polluted); also the National Water Council was created. The 1964 Act instituted an "equal tripartidism": 1/3 of representatives for each type of members (local governments, users' representatives and from central services as local States); appointment of the first two groups ("colleges") should be operated in second or third degree; this is through local assemblies, professional bodies and other groupings.

The Ministry of Environment (created in 1971) appointed members of Basin Committees, as well as representatives of State services, and afterwards each assembly elected its President (beyond of the officials' college) and the Bureau. The Committee role was primarily advisory, but it approved (by the need of its "compliance notice") the rates charged by the Basin Financial Agency (original designation of the Water Agencies). That and some geographically, administrative, social and economic representativeness of policy players on water, were reasons that did qualify the Basin Committee as "water regional parliament". It was, despite the imperfections of reality, a way forward for public participation in water management. It should be emphasized that in the Basin Committee, the participation of local representatives and users has been increasing gradually (40% each) and that the government is not a majority (20%), although it appoints the Board of Directors.

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Since the 1992 Water Act, the Basin Committee has the very important role to undertake, conduct and conclude the preparation of the Basin Master Plan (Master Scheme for Water Use and Management) of its entire territory. This event receives regulatory value by the signature of the Basin Coordinator Prefect and is imposed as a conformity frame (or at least of "compatibility") for all acts of the public authorities, with respect to water. In this case, social participation leads to a regulatory act. For its part, territories included in the large basin, that can be called the primary or sub-basins, adopt a Water Use Scheme (SAGE), for work programming and water management processes in a delimited territory, which must comply with long-term prescriptions of the Basin Master Plan. Therefore the sub-basin is endowed with a sub- Local Water Committee (also composed of three kinds of members), whose mandate is to develop and decide the scheme, submit it to the Basin Committee before being proposed for the territory Prefect signature. Here we see how, for more than 20 years, social participation in water management is "rooted".

In France other "concerted action" exist in the tripartite model, they are called "rivers contracts", bays or other aquatic bodies, and they focus on a problem or a delimited work. 35 years ago a major step in improving the effectiveness of concertation was the establishment in the Adour-Garonne Basin, of one of the first "Geographical Commissions" and "Thematic Commissions". The Basin Committee wanted to increase and intensify its discussions, based on the diversity of water problems, among others consumption, savings, protection and valuation; therefore the Committee created working groups, also tripartite, closer to the river, its users and the problems, to study and discuss more specific data to make more precise and realistic proposals, and then improve social acceptance, even regarding to its funding.

With support from the Water Agency and, increasingly, the State services, represented by the Regional Directorate of Environment (Basin DIREN), the Basin Committee maintains a foster social activity to promote the beginning and development of basin conscience and solidarity in different parts of its vast territory.

This initiative in the Adour-Garonne Basin found interest in other basins and the experience was generalized and formalized by the 2006 recent law on water and aquatic environments, under the institution of Regional Committees in each Basin Committee.

The essential act of the water agencies and committees' performance is the adoption of multiannual programs of action, which since 1968 serve as the technical and financial frame for all its interventions. The document presents a qualitative and quantitative verification of basin resources, to face the needs and demands of water users; as well as the ecological status of rivers, taking into account the long-term priorities prescribed by the Basin Master Plan setting short-term goals. It also includes financial estimates of technical solutions for compliance and assistance that the Agency will have to provide, charging fees to users and the multi-year action program with the types of works to support and their quotas. At first the program was developed by the Agency and adopted by its Governing Council; after the Basin Committee was formed, origin of the geographical and thematic commissions' establishment above mentioned, gradually an increased cooperation between the two institutions was strengthened on the development, monitoring, updating and assessing results of the Water Agency action program. The 2006 Water Law prescribed that the Basin Committee must approve this document before the government, responsible for financial and administrative supervision over the agencies, approves it. Moreover, the same law stipulates that the Parliament should set financial limits on the programs content, as an exigency that results from the nature of taxes that fees charged by the agencies have.

Summarizing, the Water Agency action program, which structures and fit up all its activities, is the consequence of impregnated social participation procedures at each stage. Public authorities contribute with their representatives and at the end, provide an executive value. This brief presentation highlights the very pragmatic nature of this proceeding. Nevertheless, it is not a ideal view, perfect, of the French water participatory management system, that found and stills has difficulties and fails, even failures; for example, the application of "polluter pays" principle that in the sociological and economic world of agriculture needed many years of discussion and

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adaptation, as well as concessions on both sides. Environmental NGOs, which appearance and development is later to those of the basin agencies, in spite results of their insertion are not satisfied by the acts, works and handled programs, but they follow the dialog and the concertation.

3. Financial Incitement and “Mutualism”

This is the first existing reason of the French Water Agencies, another form of social participation in water and basin management is the financial participation, by applying the "polluter pays" principle, inspired by the “internalization of external costs” economic theory, included in the French water law of 1964.

The mentioned law established the Financial Basin Agencies, so called because its task was to charge water users, to fund and provide grants and loans when for actions and prevention works, or purification to improve water quality, or for works focused on savings, storage or use of water. In both cases, considering basin users and the environment “common interest”, that is to say not only individuals, groups and businesses owners the works. For example, a treatment plant should protect downstream residents, contamination of a city or an industry located upstream, while building a water ark only benefit supplied communities.

It is possible to summarize saying that incitement acts by two levers. Incitement in a negative way, by deterrence, due to contamination of water or consuming it uselessly, by means of fees collection as high as the damage caused to the resource, with economic and countable criteria, though one never manages to do it for economic and social approaches. Incitement used as a positive stimulus, by providing assistance (subsidies and loans) to the users, businessmen and communities, when they act to preserve, storage or save water.

It should be noted that all water users contributions to finance common interest works, of course, is a highly effective and productive participation scheme in the management and protection of common resources.

4. Conclusions

Social participation can be conceived as a concession granted by public authorities to “achieve or safeguard social peace” and to facilitate the outcome of their projects. This is a “minimalist or defensive” vision, but is more acceptable than a totally centralized or authoritarian procedure. A more modern and progressive attitude, takes into account that social participation offers advantages and disadvantages, like any democratization process.

We can consider “three floors of the participation rocket”: the “passive” information, “descendant”, on planned projects and measures; consulting users or citizens on the options of a program; and, participation in formulation and decision making. These are obligation three levels with very different outcomes for the public authority.

- The minimalist participation consists in providing information to citizens about the projects, data in which they are outlined and, sometimes, the decisions already taken; it is impersonal without a message focusing on each type of problem or solution, by the general means or events with similar content. It reaches a higher degree of participation when to receive information an assembly of notable persons is constituted, sometimes followed by a debate, but without vote or decision privileges; is “passive information”, without responsibility for those involved. French Basin Committees of the 60s seemed to be that, because it was a departure phase, there was no public or the politicians’ awareness and yet the “crusade for the environment” did not exist.
- The second level to social participation is consultation with representatives of the population and actors in water policy: is a more active and constructive attitude, even more “responsible”. Consists in the existence and performance of assemblies; which debate and discuss on highly specialized technical and financial documents, supported in structured principles and rules, based on a long-term planning. Assemblies issue reasoned and well argued warnings, that the consultant authority has to request and take into account (or apply) on previous projects or choices, they can make comments and alternative or complementary proposals to enrich the

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final decision. There is another type of consultation, more widespread or generalized, when it is open to the entire population, that is the “big public” consultation, as required by the Framework Directive of October 22, 2000 on water policy in the European Union, that has to be organized prior to each decision stage. In October 2008, in France ended the second public consultation of this type, it cannot be said that this process is relevant, but it is clear that more and more people will be touched in the coming years and that it will contribute to public awareness on water problems.

- The third floor of participation is obeyed (except in the “direct democracy” processes) when specialized assemblies act, composed of members chosen according to compulsory and representative procedures, committed to give a opinion and participate in decisions about programs, projects and implementation of legislative requirements (waters law). An example is the preparation and adoption of the Basin Master Plan by the Basin Committee, already mentioned. Moreover, so that these assemblies can fulfill their tasks, the public authority has to lay them goals and must provide adequate means and tools; in this manner, the Water Agency acts on behalf of the Basin Committee and made available his staff, data and expenses. The Assembly should organize its discussions and reports, is a way to specifically associate citizens in decision making. Basin organisms are becoming more widespread and extended as a “web” in basins and sub-basins territories. Success and progress of social participation in water management are influenced by: quality of people involved in it and their motivation based on their experience or expertise; account of their activities, both to rulers and other water stakeholders and citizens; and, by evaluation and assess of results through clear communication.

Regardless of considering the French experience as ideal or perfect, it can be said that participation requires the presence, along with an assembly for discussion, study and a “parliamentary” decision, of an “executive” organism, endowed with autonomy, with legal and intellectual, even policy, liability.

Concertation is part of a functional framework for decentralization: is a dual need for water management in each basin.

HOLANDA FLOOD RISK PLANNING AND IMPLEMENTATION IN THE NETHERLANDS, LEGAL INSTRUMENTS AND SOCIAL PARTICIPATION

Paul Van Meel

Abstract

In order to maintain existing levels of flood protection in densely populated areas in the Netherlands, the Rhine Delta river branches have to accommodate ever-higher discharges. The centuries-old policy to increase dike levels was replaced in 2000 by *Room for the River*, which aims to enlarge the river cross-section by situating the dikes further away from the river or by lowering the flood plains.

A Spatial Planning Key Decision (SPKD), which laid out spatial planning for the entire Rhine delta area, was approved by Dutch Parliament in 2006, and considers three objectives: flood protection, master landscaping and the improvement of overall environmental conditions. Completion of the projects is planned for 2015 with a long-term outlook and within a € 2.2 billion budget; a package of measures has been chosen to achieve short-term objectives, for the long-term, various available options provide extra opportunities for regional development.

The SPKD will be based on a flexible, programmatic approach for integrated regional development, rather than a rigid set of pre-defined projects. Being approved by Dutch parliament is similar to a law and implementation of the various projects is facilitated by supra-regional powers. The success of such a complex process depends on carefully construed public-public and public-

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private partnerships. The Decision fosters confidence with local administrations, public and private parties and social participation is a key factor to success.

1. Introduction

To maintain the level of flood protection of the most densely populated areas, the Rhine Delta river branches have to accommodate ever-higher discharge; until recently, it was standard policy to increase the dike levels. In 2000 this centuries-old policy has been changed in favour of *Room for the River* (Ministry of Transport), in which the aim is to enlarge the river cross-section in order to lower flood levels. At the same time ordered the preparation of a Spatial Planning Key Decision (SKPD) was ordered, which comprise completely the Rhine Delta and was approved by the Dutch Parliament in 2006 to give flood and master landscaping protection, and to improve overall environmental conditions.

Within the budgetary constraints, a package of measures has been chosen, with which the short-term objective can be realized. With the long-term vision in mind, various options are available, which will also attend regional developments, such as waterfront housing as well as recreational and nature developments. Co-operation and co-financing in public-public or public-private partnerships will be required.

The Decision was approved by the Dutch parliament and has a status similar to a law and is the basis for urban and rural planning. There are three administrative layers in the Netherlands (municipality, province and state); sites can be utilized or built-up only in accordance with a local zoning plan decided upon by the town council. Once all parties accept the plan, any construction that is not in agreement with the zoning plan will be denied a building permit by the local authorities. Provinces draw up a regional zoning plan against which to test the local plans; this means that town and country planning is first and foremost determined by the local authorities.

A SKPD, that considers environmental planning on a national scale is draw up at the ministerial level and have to be approved by parliament, it describes a general or specific spatial planning policy and among other aspects attends the principal functions of town and country planning, agricultural and nature areas, transportation and the supply of electricity. It also can focus on specific projects such as building a railroad for a high-speed train or the construction of harbour facilities. Prior to its publication, its effects on nature and the environment have to be studied. In the SPKD Room for the River the measures for flood control of the major rivers are outlined; they include the creation of additional space for rivers, rather than merely reinforcing their dikes. For each location, the plans describe, among other aspects, the construction of secondary channels in the river foreland or the displacement of a dike further inland.

This paper gives the main considerations which sustains the national and regional governments long-term view; the policy of a programmatic approach is explained; available legal instruments, required to actually realise the physical works within the sometimes complex judiciary environment, are being highlighted as well as the formal and informal social-participation process, key for a successful planning and implementation of any larger infrastructural project.

2. The Dutch Rhine Delta

The Rhine River enters the Netherlands from Germany at a point that is also the apex of its delta; the water flows through various routes to the North Sea. One is IJssel River and Lake and the sluices in the Afsluitdijk, another is that of the Lower-Rhine and Lek Rivers, this water passes through the area of Rotterdam and finally the storm surge barrier Maeslant before debouching into the sea. The majority of the water, flows through the Waal River to enter the estuaries in the southern part of the delta and reaches the North Sea; in its most downstream stretch, the Waal is joined by the Meuse River that enters the Netherlands at the city of Maastricht.

The Waal River is of crucial economic importance since it forms the main water transportation route between the major German industrialized areas and the world's oceans. The delta has a population of about four million, which is a quarter of the total population of the

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Netherlands; the major industrial complexes are also located in it; therefore the government is responsible to guarantee smooth operation of water-transport, as well as safety of the inhabitants and commercial enterprises against flooding.

The safety against flooding is stipulated by law as a safety against river discharges, with a recurrence interval of 1/1250 per year for the upper reaches of the delta to 1/4000 for those parts which are also affected by storm surges from the sea with a recurrence interval of 1/10,000 per year. This means that under present conditions flood discharges in the Rhine River (16,000 m³/sec) and in the Meuse River (3,800 m³/s) are to be accommodated. In the future, it is expected that due to climate changes, even higher river discharges may occur; by the turn of this century, flood defence plans are to be able to cope with discharges of 18,000 m³/sec for the Rhine and 4,600 m³/s for the Meuse.

3. A New View on Flood Defence

The Netherlands has a long history, since the medieval era, on protection against the dangers of high water levels caused by river floods and storm surges; indeed, this is world famous recognized; the main measure against floods was, until now, the building and strengthening of dikes.

In view of the anticipated long term increasing water levels during flood conditions, heightening and strengthening of the dikes faces its limits from an environmental, socio-political technical point of view; therefore, the government has indicated that safety against floods should no longer be sought only in this way and that the focus is to be more on measures that result in lowering of the flood water levels. This can be achieved by giving 'room for the river, that means a major change in the approach; consequently the new and present view is that the normative should be transformed along the main water courses. The space required for additional safety measures can be created by widening the flood plains with areas situated on the land side of the dikes, although care should be taken not to affect valuable landscape, nature and cultural history; more space can also be found by enlarging the river channel within the dikes. In the process, a balance between present and foreseeable future spatial requirements should aim at, keeping present every opportunity to enlarge safety.

Diverse approaches are adopted in the project *Room for the River*, the majority mainly in the flood plains or beyond, in the polders adjacent to the rivers, when complete dike alignments are shifted or by-passes are created. In these areas, unlike the main riverbed, people have built their farms and houses and a multitude of economic activities takes place; this means that the new approach of providing safety against floods also requires a new approach in regional and town planning. At the same time new opportunities can be created, particular in the long term, to improve the overall environmental quality of the Dutch Rhine Delta as a whole.

The new view is the basis for the two main objectives of the project Room for the River: safety against flood water levels by the year 2015 with measures that also give room for the river in anticipation of long term developments; and, improvement of the overall environmental quality in the delta. In order to achieve these objectives, the government has allocated 2.2 billion Euros; from the perspective of the second objective this means that this amount is available to improve the overall environmental quality of the areas along the major Dutch rivers, with the condition that eventually a certain safety against floods is achieved. This is the reason to develop a programmatic approach to give maximum opportunities to regional initiatives to combine both objectives.

4. Long Term Vision and Short Term Package

The stated objectives require flexibility to improve the environmental quality; therefore a long-term vision on flood protection was developed and the short-term goals are to be achieved with no-regret measures in relation to the long-term view that as a reference considers a river discharge of 18,000 m³/sec, the government aims to do this as follows: enlarging the river channel by maximizing the use of the existing floodplains; shifting the dike alignments and introducing flood

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channels or flood by-passes; and, as a last resort, using retention areas in the upstream area of the Rhine delta.

Translated to the various Rhine branches, the package of measures to deal with the expected long-term increase in river discharges consists of lowering the flood plain areas in the upstream region, repositioning of a dozen dikes and four flood channels and one last-resort retention area. In addition, dikes will still have to be fortified in several places, especially in the western part of the downstream river delta. Several of these long-term measures are also included in the basic package of short-term measures.

To facilitate future plans, the land expected to be required in the future for control measures is already designated as such in spatial planning, especially with respect of the IJssel and Waal Rivers near the town of Nijmegen, a potential retention area and several dike relocations. Long-term designation is required only for inner-dike areas, since the outer-dike areas are already included in the policy guideline laid out in Room for the River. To achieve the objective of safety by 2015 in extreme cases, a concrete basic package of some forty works is presently being carried out.

Combining flood protection works with regional development requires flexibility to achieve these goals in time prompted by national and regional authorities, as well as the adoption of the “programmatic approach”.

5. Programmatic Approach

The short-term basic package had to be chosen within given budgetary constraints at national level. An amount of about € 2.2 billion has been earmarked for the project Room for the river till 2015. With the long-term view in mind, various other options and opportunities for regional development along the rivers, such as waterfront housing, and recreational and nature developments, these were not considered because of its higher costs, but can be done through cooperation and co-financing. In public-public or public-private partnerships are required. Giving such initiatives a chance is seen as a positive challenge; therefore the final Key Planning Document is based on a programmatic approach that offers a flexible frame for regional development.

Budget is the basic contribution by the national government, who will facilitate or co-finance private or regional governmental initiatives, with the condition that by 2015, the goals are reached. Facilitating means that national procedures may be smoothed for, the often cumbersome path, public decision making and to obtain all required legal permits. The available budget finance the works of the basic package and the flexibility of the programmatic approach lies in the fact that, at all times, different actions can be realized at several locations through promising alternatives (a higher overall quality from an integrated regional planning perspective). Some of these alternatives are already in view and are presented in a formal list within the National Key Planning Document thus obtaining status in the legal procedures; in the coming years when financing is guaranteed the alternative plans can move up to the basic. Promising alternatives could come and materialize in the coming years, regional governments and national departments actively stimulate their identification to have a bottom-up approach to ensure local acceptance of the plans and that they are brought forward.

In the SKPD implementation procedures exists what is known as the governmental project decisions; this allows the Minister for Transport, Public Works and Water Management to adopt decisions not just for major infrastructure, but for all projects of national importance, transcending local or regional dimensions. Since in Netherlands local authorities must be consulted and considering that execution of major projects its voluntary, cooperation is required, the SPKD only includes governmental project decisions for a few large and costly measures. For the remaining measures, local authorities will have to adapt their local zoning plan and, if they should fail to do so, a governmental project decision will be in order.

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6. Social Participation

Social participation in Netherlands is a pre-requisite to successfully plan and implement any large infrastructural project. Apart from the legal requirement for social-participation there are practical and pragmatic reasons for it: foster more public support and thus less legal action; creates politically and administratively sustainable solutions; gives projects with a better cost-socio-economic benefit ratio; and, control on aiming for an optimum value within politically allocated budgets. Besides the formal and legal necessary procedures, an informal participative approach has been adopted to ensure the support of the local administrations, politicians and the general public, which consists on maintaining full and open communication from the start; further an open planning process was adopted by involvement of all stakeholders.

The decision making process to arrive at the SPKD from the first draft to the final document took only about two years; these is a great achievement taking into account the Dutch political context. A clever and innovative planning and process management was of great help. On the project the involved were: at the political/administrative level the Ministry of Transport, Public Works and Water Management, the Ministry of Housing, Spatial Planning and the Environment and the Ministry of Agriculture, Nature and Food Quality; at the regional level five provinces (Overijssel, Utrecht, Gelderland, North-Brabant and South-Holland), as well as many municipalities. At the start, all parties involved were invited to discuss and comment on suggestions for flood control measures, as well as to suggest improvements for spatial and environmental quality. An innovative "tool box" was developed including all possible options and the facility to combine various measures to achieve the required flood protection; this set a common vocabulary and understanding about the feasibility of alternative scenarios.

Finding consensus on a package of measures within the boundary condition of the available budget proved to be a challenge. It was identified that other options were available, in line with the long-term visions and accommodating larger discharges expected due to climate change and that to achieve additional goals, cooperation and co-financing are required, so it was considered that gave them a possibility was a positive challenge. Adoption of the programmatic approach greatly facilitated the enthusiastic social-participation and final acceptance of the project; it should be consider that in this context opportunities can still be taken up and realized, provided the final goal of a safe delta is timely achieved.

7. Legislation and Regulation on Water

In the Netherlands, there are several acts to regulate measures taken in or with impact on the Dutch extensive and intricate water and flood defense system. The main Acts are on: flood control; management of national hydraulic-engineering works; pollution of surface water; water management; groundwater; reclaimed lakes and dike enclosures; hydraulic-engineering works - 1900-; and, pollution of sea water. Mainly the first three apply to the measures in the SPKD and all will be incorporated in one new Water Act, this can be considered as a main juridical achievement.

The European Union legislation becomes more and more important for its member states. The main legislation on protection and management of water there is Water Policy Framework Directive; as daughter, parallel or additional legislations, directives on assessment and management of flood risks, protection of groundwater, environmental quality standards, nitrates, urban waste-water treatment, quality of bathing water, and quality required of shellfish waters exist. For the sea waters there is a separate Marine Strategy Framework Directive.