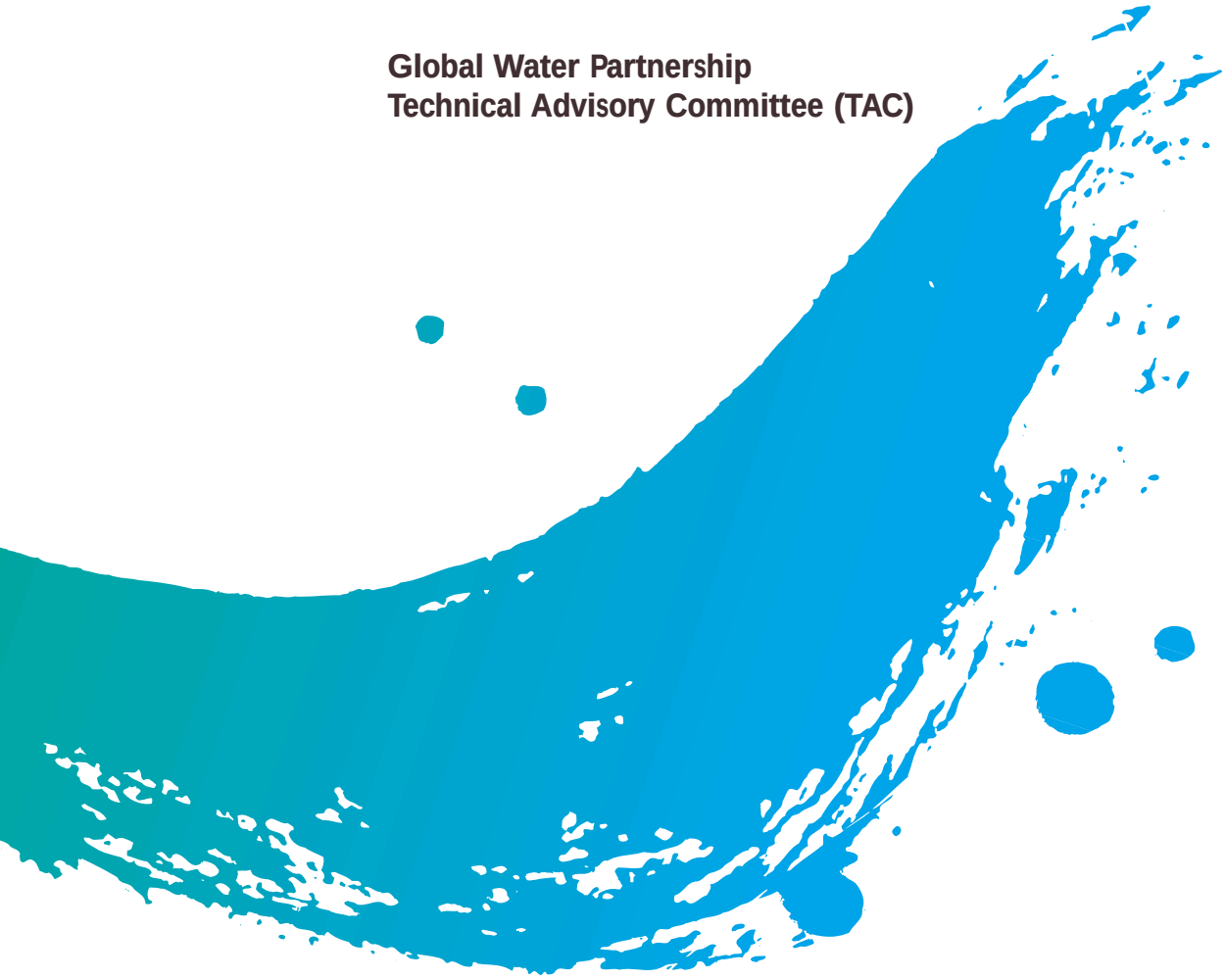
TAC BACKGROUND PAPERS NO. 3

The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management

By MIGUEL SOLANES and
FERNANDO GONZALEZ-VILLARREAL

Global Water Partnership
Technical Advisory Committee (TAC)



Global Water Partnership (GWP), formally established in 1996, is an international network open to all organisations involved in water resources management: developed and developing country government institutions, agencies of the United Nations, bi- and multilateral development banks, professional associations, research institutions, nongovernmental organisations, and the private sector. GWP was created to foster Integrated Water Resources Management (IWRM), which aims to ensure the coordinated development and management of water, land, and related resources by maximising economic and social welfare without compromising the sustainability of vital environmental systems.

GWP promotes IWRM by creating fora at global, regional, and national levels. The Partnership's governance includes the Technical Advisory Committee (TAC), a group of 12 internationally recognised professionals and scientists skilled in the different disciplines of water management. This committee, whose members come from different regions of the world, provides technical support and advice to the other governance arms and the Partnership as a whole. The TAC has been charged with developing an analytical framework of the water sector and proposing actions that will promote sustainable water resources management. The TAC maintains an open channel with its mirror bodies, the GWP regional TACs, currently being established around the world to facilitate application of IWRM regionally and nationally.

Worldwide adoption and application of IWRM requires changing the way business is conducted by the international water resources community, particularly the way investments are made. To effect changes of this nature and scope, a strategy that addresses the global, regional, and conceptual aspects and agendas of implementing actions is being employed. This series, published by GWP via its host institution – the Swedish International Development Cooperation Agency (Sida) – was created to disseminate the papers written and commissioned by the TAC to address the conceptual agenda. Issues and sub-issues within them, such as water for food security, privatisation, and the role of women in water management are addressed in the papers.

The findings, interpretations, and conclusions expressed within this series are entirely those of the authors and should not be attributed in any manner to GWP, Sida, nor as official expressions of the Global Water Partnership Technical Advisory Committee. This particular paper, *The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management,* was prepared by TAC members Miguel Solanes and Fernando Gonzalez-Villarreal, for a November 1996 meeting of the TAC in Windhoek, Namibia.

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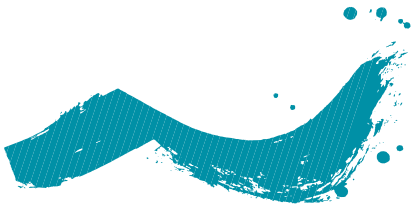

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The original version of this report has been presented and discussed at the Namibia Meeting (November 1996) of the Technical Advisory Committee of the Global Water Partnership. The present version includes the contents of the report presented in Namibia and, in addition, relevant recommendations of the Technical Advisory Committee, recent decisions of the Antimonopoly Authorities of Chile (impact of water law in facilitating monopolies), expanded references to stakeholders participation and indigenous water rights and interests, and broader development of subjects related to water utilities.

CONTENTS

OVERVIEW

The purpose of this report is to analyse the relationship between the 1992 Dublin Principles, integrated water management and water law. The Dublin principles were an attempt to concisely state the main issues and thrust of water management:

> *Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;*
>
> *Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;*
>
> *Women play a central part in the provision, management, and safeguarding of water;*
>
> *Water has an economic value in all its competing uses, and should be recognised as an economic good.*

This report does not pursue to endorse a single given model or solution, but to provide a set of alternatives and experiences to readers seeking information about institutional issues affecting water management. In so doing the report assesses existing relationships between the Dublin Principles and national water law systems.

Water is a Finite and Vulnerable Resource

The principle has been interpreted as a requirement for integrated management, responsive to the characteristics of water resources. Integrated includes technically appropriate water management (surface and groundwater, quality and quantity, water and soil, etcetera). Consideration of social needs, economic soundness and environmental requirements are implied. The ultimate goal is sustainable use and development of water resources.

The review shows there are water policies and legislation concerned with integrated water management; water quality protection; flow and landscape considerations; ecological requirements; rational and guided water use; integration among soil, water, and other natural resources; protection of water supplies; water planning; recognition of the river basin; groundwater protection; mandatory assessment of water policies, plans, programmes and projects; and mandatory assessment of water related subsidies.

There are also examples of legislation specifically concerned with the needs of all citizens, the common interest, benefits of individual users and the livelihood of population. Concrete examples of social concerns in water legislation are the preference often found for drinking water supply and sanitation, as well as the requirement of public access of British law.

The link with development is also a tenet of water law. Legislative requirements for optimal use and full realisation of the economic benefits of water have been found. Some systems relate water planning to economic improvement and economic regions. Economic considerations are, in some countries, important normative criteria for decision making and program and project evaluation.

Water Development and Management Should be Based on a Participatory Approach

Legislation relating to this principle was analysed under the assumption that water related activities are not confined to the interests of limited groups of users, geographical boundaries, sectoral institutions, or national jurisdictions. Participation, (and venues and opportunities thereof), was the criterium informing the analysis.

Generally, meaningful participation is associated to well defined national policies for which water is either a main component or a relevant input. Policy implementation is usually associated with socially acknowledged, relatively well informed, government organisations with adequate capabilities and appropriate legal mandates. These institutions have evolved from sector oriented to resource oriented, with strong indications that the concept of the river basin is steadily, albeit laboriously, coming into the institutional scene.

The review of experiences strongly suggest that the institutional dimension of water management is a system, where relatively successful water management experiences (success in this context is contingent to what a system knew and sought at specific times) have included a balance of government institutions and policies and stakeholders participation.

Such experiences, drawing from places as far apart as California and South Africa, indicate that meaningful stakeholder participation requires, at the least, a certain degree of government overseeing, and, ocaisionally, support. Such support may consist of promotion and encouragement of involvement and dissemination of information. Otherwise there is an ever present risk of participation becoming coopted by well informed, intent-specific, special interests groups.

Conciliation of interests, public consultations, and hearings are some of the manners in which interested parties and stakeholders, not necessarily having a conventional (in the typical sense) proprietary interest in water, are able to participate. More formal structures include advisory boards, integration within government bodies and associations and districts with field goals and responsibilities.

Interestingly, some legislations acknowledge the globability of water issues and acknowledge transnational interests through references to international treaties and obligations.

Some laws recognise the intimate connection existing between participation and information at all levels.

Some systems, where agricultural and other subsidies have traditionally coexisted with relatively strong participation, seem to indicate that a main, although not necessarily exclusive, prompt to participate is economic self-interest.

Finally, on account of Mexican experiences, it seems relevant to notice that technical needs, opportunities for economies of scale and scope, and other factors need to be taken into account when applying the concept of the lowest appropriate level. Also, the lowest appropriate level and the private sector are not synonymous: water corporations purveying water services are private, but many are global.

Water as an Economic Good

In Western, Roman-based legislation, the economic aspects of water resources were relevant enough for them to be included within public or private ownership. Systems of rights on water have existed since Roman times. However, a full "econominisation" of water resources may be a complex task in countries with a Muslim, Hindu, or traditional Chinese background.

At present most legislations recognise, and protect the property aspects of rights to use water, which is the manner in which law reacts to the economic concept of scarcity.

At the same time, water law systems acknowledge the social and environmental dimensions of water through norms intended to protect third parties, the environment, and the resource base.

An important social dimension of water rights, closely associated to the economic dimension of the resource, is a definite intent in most legislations to prevent water hoarding, speculation, monopolies and waste. With worldwide privatisation of water related services, monopolistic control of water rights configures a typical case of barrier to entry. Therefore, the requirement of effective and beneficial use of water rights as a universal principle of water law – at both national and international levels.

In the single known case of non-existence of this provision, Chile, the system has resulted in speculation, hoarding, and impaired water management to the detriment of water sources. Proposals to amend the system are presently before Congress. However, the manner in which the rights were granted may make legal change extremely laborious. Proposals to tax water rights in order to promote their more efficient and equitable use by holders, have been attacked on Constitutional grounds. Private electrical utilities, argue that since original water rights were not conditioned to effective and beneficial use, the use of taxes to induce behavior other than the one unilaterally fitting the company would be an infringement of its property rights, which are constitutionally protected as granted.

A corollary of the economic character of water is the existence of water markets. They are a useful tool to optimise the use of the resource. However, since the many roles of water and its peculiar features make it a very special commodity, mature systems of water marketing regulate market performance in light of social, economic, and environmental considerations.

Finally, there are proposals to charge for water according to its opportunity cost. Examples of this approach are not abundant. However there are examples of charges intended to recover costs, pay for treatment of wastes, cover administrative expenses and induce environmentally sound behavior. Two examples relating to charges and value are discussed: Mexico and Spain. However, more analytical work seems to be required in order to refine criteria for inception, procedures for application, and consideration of issues of opportunity and equity.

INTRODUCTION

The present report on water legislation and institutional arrangements submitted in compliance with agreements reached during the June 10-13, 1996 Copenhagen meeting of the Technical Advisory Group (TAC) of the Global Water Partnership (GWP), identifies manners in which the Dublin Principles about water reflect, coincide, or agree with practices and principles accepted by water legislation and institutions in a number of countries.

Although the report covers a wide range of issues, it does not purport to be exhaustive. There are important subjects that have not been dealt with due to limitations of time and space.

The Report is organised according to the four guiding principles for water resulting from the Dublin Statement. It is based on the review of a number of systems of national water law and on experiences provided by ongoing processes in countries such as Chile, Mexico, South Africa, and Zimbabwe. Cases selected were generally chosen as representative of trends or situations, and not necessarily as models to be followed.

The Dublin Statement and Conference Report express a holistic, comprehensive, multi-disciplinary approach to water resource problems worldwide. It is based on four "guiding principles" which cover environmental, social, political, and economic issues:

> "Fresh water is a finite and vulnerable resource, essential to *sustain* life, development, and the environment. . ."
>
> "Water development and management should be based on a *participatory* approach, involving users, planners, and policy-makers at all levels. . ."
>
> "*Women* play a *central* part in the provision, management, and safeguarding of water. . ."
>
> "Water has an *economic* value in all its competing uses and should be recognised as an economic good. . . ."

The Report relates each principle to actual law. Four main themes inform the principles: environment, economics, social needs, and the role of women, under a paramount goal of sustainability.

Data are organised according to information found on the principles in different national systems.

I. FRESH WATER IS A FINATE AND VULNERABLE RESOURCE, ESSENTIAL TO SUSTAIN LIFE, DEVELOPMENT, AND THE ENVIRONMENT

Water Policies

Several countries state the purposes and objectives of their water policies in their water legislation. The statement of policies is relevant to the interpretation, application and enforcement of legislation. Several of the statements reflect awareness of the interrelationships resulting from the principle.

Several laws include policy principles where the multiple roles of water are recognised. Thus, the 1970 Canadian Water Act encourages optimum use of water resources for the benefit of all Canadians (art.1). The Water Law of Germany (as amended on 23 September 1986) requests that water (both, surface and groundwater) be managed in a manner that serves the common interest, benefiting individual users, while preventing avoidable harmful impacts (art. 1a). The Netherlands' "Policy Document on Water Management" sets up a policy of integrated water resources management which includes the quantitative and the qualitative aspects of water management.[1] The 1988 Water Law of China policy is to ensure the rational development, utilisation, and protection of water resources, fully realising the benefits of water, for economic development, and the livelihood of the population. The policies of the 1992 Mexican Water Law include the preservation of water quality and the promotion of sustainable development.

Quality Controls and Environmental Concerns

The environmental dimension of water is rapidly becoming a major component of water legislation. As water becomes scarcer, relative to demand; as externalities increase, and as knowledge improves, the need to control the deterioration of water quality is translated into more detailed and demanding legislation. Permits, prohibitions, and charges are used to curb the deterioration of water and related natural resources and environmental assets.

1. *Water Management in the Netherlands: Policy, Measures, Funding*, (author or place of publication not available November 1991) 4.

The Canadian Water Act provides for the designation of water quality management areas and the implementation of water quality management programs (art. 11). Water quality management agencies shall plan, initiate and carry out programs to restore, preserve and enhance the quality of the waters within the water quality management area (art 13).

The German Water Law imposes a general duty to prevent water contamination and detrimental changes of its properties, requiring "an economical use of water in the interest of natural water resources" (art. 1a). Discharges into water are subject to maximum loads and technological requirements. Hazardous wastes must be treated using the best available technology (art. 7). Article 22 provides for strict, joint and several liability resulting from damages caused by introducing or throwing any substances into water. Discharges causing not merely insignificant detrimental changes, shall only be allowed when overriding public interest thus requires. Waters can be subject to characterisation parameters issued by the Federal Government (art. 36b). The law also provides for proper flow conditions, maintenance of navigation, ecological requirements, landscape features, protection of banks, and self purification (art. 27) .

The policies on environment and water of the Netherlands aim primarily at having and maintaining a safe and habitable country and to develop and maintain healthy water systems which guarantee sustained use.[2] Three "screens" are established: 1) Reduction of pollution at the source; 2) Hydraulic design; 3) Rational or "guided" use of water resources, in particular groundwater. Quality objectives and monitoring methods and procedures have been established. The system includes licensing of discharges into water and, for specific industrial sectors, into sewers; payment of pollution charges and the preparation, every five years, of action plans to combat water pollution.[3] The policies also address diffuse pollution, like atmospheric deposition, tars (utilised on protection materials for wooden shore and bank facilities), and agricultural run-off and leachates. Some pesticides have been absolutely prohibited, others are restricted, and some are subject to application according to best environmental practices. Additional measures,

2. Ibid.
3. Ibid., 8-9.

intended to control environmentally negative effects, include friendly environmental design and sedimentation and eutrophication control.

The 1989 Water Act of England provides for the classification of water quality in relation to controlled waters (sect. 104), the establishment of water quality objectives (sect. 105), controlling and remedying pollution (sect. 107), protection from sedimentation and refuse or waste vegetation (sect. 109), protection against pollution (sect. 110), creation of water protection zones (sect. 111), establishment of nitrate sensitive areas (sect. 112), establishment of minimum acceptable river flows (sect. 127), and enactment of codes of good agricultural practices, with a view to protect water resources (sect. 116). The 1991 Water Resources Act imposes conservation and enhancement duties on ministers and the National Rivers Authority, with a view to protect amenities, flora, fauna, historical places and other environmental interests. Public access and public availability are also taken into account. These duties are likewise to be considered when dealing with undertakers and their proposals for the management of waters and lands (sect. 16). Additional duties refer to environmental concerns for sites of special interest and for the enactment of codes of practice with respect to environmental and recreational duties (sects. 17-18).

The Water Law of China creates a state duty to protect water resources and adopt effective measures to protect flora, conserve water sources, control soil and water losses and improve the ecological environment. Water pollution is to be prevented and controlled, with a view to protect and improve water quality. Supervision and management of prevention and control of water pollution is to be strengthened (arts. 5-7). Agriculture must be practiced with a view to promote stable and high agricultural yield (art. 15). Hydropower development is to be done in accordance with protection of the ecological environment (art. 16). Fish ladders must be constructed when needed (art. 18). Adverse environmental impacts in the implementation of interbasin transfers (art. 21) must be prevented. Additional rules control disposal of refuse, mining activities, land reclamation, construction of projects, and creation of management and safeguard zones (arts. 24-29).

In some systems environmental concerns are the basis on which existing water rights can be amended, restricted, subjected to prorata, or cancelled. The 1992 French Water Law authorises changes in water rights when public health or safety so requires, or when water environ-

ments are threatened (art. 10iv). In the United States the public trust doctrine has been utilised to limit prior appropriation rights when the full exercise of such rights would have affected the environmental functions of a lake.[4]

Protection and Management of Water Supplies

The protection of water sources has been a traditional concern of water law. Increasing demand and externalities have strengthened this concern. The Mexican Water Law reflects this dimension of water legislation through the regulation of the use and development of national water resources.

The German Water Law provides for the creation of water protection areas, within which certain activities cannot take place, or certain measures have to be tolerated (art. 19). The law requires the licensing of pipeline systems conveying substances constituting a hazard to water. These licenses are subject to conditions that can be changed even after a license has been issued (art. 19). Use of, and discharges into, groundwater are subject to permit and licensing (arts. 32-34).

Groundwater is increasingly controlled and protected. A number of countries have enacted legislation requiring permits, creating administrative devices to control the use of groundwater in special management areas and restricting the expansion of high consumption activities like irrigation. Management measures include issuing certifications of assured water supplies, required for the approval of subdivision plats, registration and recording of wells, control of water storage and recovery, control of well drillers, protection of preexisting uses, use of groundwater charges, measurement of withdrawals, estimations of supply and demand, stopping and reducing withdrawals in order to allow replenishment, granting emergency powers in case of drought, granting of permits at the discretion of water administrators (except in cases of clear abuse of discretion), deadlines for waterworks and activities, monitoring, possibility to amend and forfeit water rights (previous hearing), conjunctive use of surface and groundwater, control of discharges into groundwater and allocation of groundwater to

4. Mono Lake. "National Audubon Society vs. Superior Court of Alpine County", 33 Cal.3d 419, 189 Cal. Rptr. 346, 658 P.2d 709 (1983).

preferred uses like drinking water supply.[5]

The 1991 Water Resources Act of England provides for the National Rivers Authority to have a general mandate of proper management, which includes conserving, redistributing, augmenting, and securing the proper use of the water supplies of England and Wales. Water resources management schemes can be entered into for this purpose.

Water Planning and River Basins

The development of water resources is no longer amenable to isolated action. Water legislation is rapidly evolving towards integrated water planning to satisfy environmental objectives, economic requirements and social concerns.

The German water legislation requires a prior plan approval procedure before approving any substantial modifications of water bodies and their banks (art. 31). River basins and economic regions shall be subject to water plans, in order to safeguard the water resources needed for economic improvement and protection of the quality of life. Plans must consider available water resources, flood control, and protection from pollution, integrating water planning with regional planning. Plans are subject to adjustment and updating. They are implemented through a variety of means including, inter alia, administrative requirements, revocation of permits and licenses (art. 36b).

In Europe, there is trend to implement a double level of water resources management: a regional level for water basin plans, legal enforcement and incentive policies, and a local level for operation of services, and for implementation of innovative policies, like urban hydrology. The German (Ruhr) organisations and the French model are known worldwide. However, the Ruhr system seems to be strictly related to the socio-economic characteristics of its area of origin, and therefore non-replicable. On the other hand, the performance of the French river basin agencies has drawn some criticisms, resulting from excessive reliance on a “give and take” approach and also from argued shortcomings in integrated water resources planning and lack of clearly

5. Space limitations prevent a full listing of laws and countries in the text. However, more detailed information about current practices in groundwater management can be found in Robert E. Beck, Ed., *Water and Water Rights* (Charlottesville, The Michie Company, 1991); and in *Groundwater Legislation in the ECE Region*, (Economic Commission for Europe, ECE/WATER/44).

defined police powers.[6] Interestingly, this kind of criticism is the same that could be leveled out at attempts to incept river basin institutions in Latin America.

Another well known international example is the Tennessee Valley Authority in the United States. However, its unique policy foundations, political support at the time of inception, and complex gamut of economic, social and managerial objectives would be very difficult to successfully replicate elsewhere.

While the role of regional and basin planning, control and management has been strengthened in Europe, the lack of adequate mechanisms for intersectoral planning and coordination at basin level seems to be negatively affecting water management in some countries. According to Dellapenna a constraint to water planning stems from the split between planning and regulation.[7]

The Water Law of China requires that the development and utilisation of water and the prevention of disaster be planned in a comprehensive and systematic manner, with all the aspects taken into account, for multipurpose development and maximum benefits, allowing full consideration of the multifunctions of water (art. 4). There are comprehensive plans for the basins of major rivers and specialty plans for sectors. Comprehensive plans shall be coordinated with the National Land Plan considering the demands of different regions and sectors. They are prepared by the Department of Water Resources at different levels of government. Specialty plans are sectoral, to be prepared by the concerned departments (art. 11). Remedial measures or, alternatively, compensation are required in cases of interference with existing developments (art. 20).

According to recent research the river basin would be the most sensible unit within which to implement water transfer-strategies.[8]

Assessment of Water Projects and Programs

Water related programs and policies are, in some countries assessed

6. Bernard Barraqué, "Water Management in Europe: Beyond the Privatisation Debate", *Flux* Paris (No. 7, 1 March, 1992) 13, 20, 21.
7. Carl J. Bauer, "Derechos de Propiedad y el Mercado en una Institucionalidad Neoliberal: Efectos e Implicancias del Codigo Chileno de Aguas de 1981", *Documento para Discusion* (Santiago, August 1993) 3-4; Joseph Dellapenna, "Regulated Riparianism" in Beck (Vol. 1, 1991) 413-579.
8. Brent Michel Haddad, "Evaluating the Market Niche: Why Long Term Rural-to-Urban Inter-regional Markets for Water Have not Formed in California", *Ph.D Dissertation in Energy and Resources* (University of California, Berkeley, 1996) 383.

according to their impact on the environment and other national concerns.

Decision making in Australia, as required by the Intergovernmental Agreement on the Environment, must include economic and environmental considerations; considering that strong, growing and diversified economies enhance the capacity for environmental protection; applying the precautionary principle; looking for intergenerational equity; conserving biological diversity and ecological integrity.

More than twenty years ago the National Water Resources Council of the United States prepared a set of "Proposed Principles and Standards for Planning Water and Related Land Resources" which are a good example of multidisciplinary assessment of water plans. The principles call for the implementation of a system to display the relevant beneficial or adverse effects of water plans. Consequently, water development was to be assessed according to the effects that alternative plans would have on objectives of national economic development, environmental quality, regional development and social factors.[9]

The 1969 United States National Environmental Protection Act (NEPA) requires that federal agencies include an Environmental Impact Statement for every major federal action significantly affecting the quality of the human environment. NEPA has been used to bring water related cases to the courts (dam and reservoir construction, dredge and fill, flood control, ocean dumping, rivers and harbors projects, and wetlands and water pollution).

In the Netherlands activities requiring environmental impact statements include, inter alia, discharges into surface and groundwater; or interfering with the groundwater table; construction of navigable waterways or widening or deepening them; diverting navigable waterways when it is a river; construction of naval ports; construction of main water pipelines; construction of marinas, dikes, dams; land reclamation; and construction of water reservoirs.[10]

Norway has environmental impact statements proceedures requiring that possible impacts on the environment, natural resources, and

9. *Proposed Principles and Standards for Planning Water Management and Related Natural Resources*, (Water Resources Council, Washington, D.C., December 21, 1971, Vol. 36, No. 245) 24145-24146.
10. *Policies and Systems of Environmental Impact Assessment* (Economic Commission for Europe, ECE/ENVWA/15, Environmental Series No. 4) 39.
11. Ibid, 9.

society of all major physical developments be assessed.[11] Some countries have established areas within which projects or programmes are presumed to have significant environmental effects. In Finland they include a number of areas in the Wild and Scenic Rivers Conservation Act; groundwater protection areas; the criteria of sensitive areas is also utilised in land planning. Poland lists the disturbance of water regime and intakes as one of the factors likely to produce environmental alterations.[12]

The 1992 Canadian Environmental Assessment Act aims to assure that environmental effects of projects are carefully considered; that sustainable development is promoted for a healthy environment and a healthy economy; to ensure that projects do not cause significant adverse environmental effects and to ensure public participation. The Act applies to projects where the Federal Government has decision making authority. Assessments are to be carried out as early as possible (art. 11). The Act is to be implemented through four regulations: Inclusion List, (physical activities); Exclusion List (insignificant environmental effects); Law list (functions, powers and duties whose exercise requires assessment); and the Comprehensive Study List (significant environmental effects). The Law List includes several water related enactments, like the Navigable Waters Protection Act; the International Rivers Improvement Regulations, and so forth.

The Comprehensive Study List includes, inter alia, water related activities like dams in national parks and protected areas; hydroelectric generating stations with more than 300 MW of production capacity; certain categories of water projects; off-shore oil, gas and minerals projects; and certain transportation facilities.

It has been possible to identify at least one court case where an environmental impact assessment was requested for irrigation subsidies. A federal judge in California, USA, ordered an environmental review of rules setting up how many acres farmers in the West can irrigate using subsidised federal water. The Bureau of Reclamation must study the effects of a set of rules and regulations that it enacted in 1987 to put into effect the 1982 Reclamation Reform Act. The rules were

12. Ibid., 28.
13. "Natural Resources Defense Council vs. Duvall", United States District Court, E.D. California, (777 F. Supp. 1533 E.D.Cal 1991). Also "Federal Judge Orders Review of Rules on Irrigation Water", *The New York Times*, New York (1 August 1991) A14.

challenged by environmental groups which argued that they allow large farms to continue using subsidised water, defeating the purposes of the reclamation project to provide cheap waters to family farms, and not properly assessing their environmental impact. The 1902 Reclamation Policy provided water, below market prices, with a view to increase agricultural output and encourage the creation of family farms. Leasing arrangements and other devices were used to escape the limitations on acreage intended to promote family farming. Subsidies were in fact granted to very large farming operations. The 1992 Act required that water provided to agricultural holdings exceeding the legal limit pay the full cost for water. The Bureau of Reclamation enacted regulations to implement the Act. These regulations were found to have no significant impact, and were, therefore, not subjected to Environmental Impact Statement. This finding was challenged in court, which found that the regulations were a major federal action with a potential to significantly affect the human environment. The court objected the use of purely economic notions like "rational utility maximiser", which it found theoretical, far from reality and in violation of the regulations, which require an interdisciplinary approach. An environmental impact review was therefore requested.[13]

It has been found that subsidising water for some activities and uses cause "an unnatural excess of demand", with impacts on water uses, the environment and water reserves. Some countries are considering, and implementing, legislation to lower subsidies to irrigation water.[14]

II. WATER DEVELOPMENT AND MANAGEMENT SHOULD BE BASED ON A PARTICIPATORY APPROACH, INVOLVING USERS,

14. Ilter Turan, "Politics of Water and the Role of International Organisations: The Middle East", *Proceedings of the International Symposium on Water Resources in the Middle East: Policy and Institutional Aspects* (Urbana, October 1993) 152; Henry Kamm "Israel's Farming Success Drains it of Water", *The New York Times*, New York (21 April 1991) Y7; Robert Rehinhold, "New Age for Western Water Policy: Less for the Farm, More for the City", *The New York Times*, New York (11 October 1992).

PLANNERS, AND POLICY MAKERS AT ALL LEVELS

Vesting Responsibility for Overall Water Management

The functional organisation for policy making, water allocation, water management, and monitoring of users plays an important role in the implementation of a sustainable water development system. Where these functions are vested in institutions with functional responsibilities for specific water uses, or for discrete economic activities, water planning and management might not be objective. In these cases each concerned party may tend to support projects or allocations of waters according to vested functional interests, without regard to the source of supply or the soundness of investments and projects.

To avoid such problems, many jurisdictions allocate responsibility for policy making, water allocation, and programme and project evaluation to a non-user agency or ministry. A recent publication of the World Bank emphasises the need to separate policy, planning, and regulatory functions from operational functions at each level of government. In so doing the Bank agrees with the United States National Water Commission, which in 1972 was already recommending that "Policy planning and sectorial planning must be separated from functional planning, design and construction, and operation by action agencies".[15] Other important consideration is that, due to the complexities of water management, a number of countries tend to defer to administrative judgement on technical issues: "Findings of fact must be determined in the first instance by the officers charged with the administration of the stream...this finding of fact is final. . .unless it appears unreasonable or arbitrary. . ."[16]

Yet, other systems, like Chile, have chosen to limit administrative roles in water related matters. As a result, Bauer argues that many water conflicts have gone to higher courts, whose performances have been quite uneven.[17] At least one working paper has suggested that the

15. *Water Resources Management* (The World Bank, Washington, D.C., 1993) 45; see also PB-211921 *Water Resources Planning* (National Water Commission, Springfield, June 1972) 46.
16. Supreme Court of Nebraska, "Water Law, Resource Use and Environmental Protection" as quoted by Frank Trelease (West Publishing Corporation, Minneappolis, 1974) 97.

administrative set up in Chile be given greater powers, as exemplified by the case of Mendoza in Argentina.[18] In California, it has been suggested that increases in the effectiveness and neutrality of overseeing institutions is one of the conditions leading to the formation of water markets.[19]

In a majority of the American states water planning and allocation are separate from functional, discrete, sectoral activities.[20] A similar pattern is found in Canada and its provinces.[21]

Some Middle East countries, like Oman, have created ministries of water resources, in an effort to improve the management of scarce and imperiled water resources. The Ministry is separate from functional, sectoral, water activities – its main function being overall water management.[22] Other Middle East Countries, like Yemen, have followed a similar pattern. A Yemeni authority states: "Responsibility for water management at national level is not to be delegated to a water using sector, but to an independent authority".[23]

The Chinese water law entrusts national long-term water planning to the Ministry of Water Resources. The Ministry was created as a response to the problems created by a fragmented institutional system, where water was managed by sectoral ministries, including, inter alia, agriculture, industry, communication, and construction. This fragmented use-oriented institutional system resulted in imbalances between supply and demand, water pollution, reduced flood discharging capacities, overdraft of groundwater, intractable and protracted water disputes, and ecological deterioration. Water resources units have also been created at the local level.[24]

In the Netherlands the central government manages the most important surface waters (state-waters) and determines the general

17. Carl Bauer, *Water Markets and the Principles of Dublin* (Berkeley, September 1996).
18. John Briscoe, "Water Resources Management in Chile: Lessons from a World Bank Study Tour", *Working Paper* (The World Bank, January 1996) 9.
19. Haddad, 390-91
20. See Beck, (Vol. 6) on State Surveys.
21. Environment Canada, *Major Water Related Legislation and Institutions in Canada* (Prepared for UN Secretariat, Committee on Natural Resources of the ECOSOC, by the Economics and Conservation Branch, Environmental Conservation Service, Otawa, October 1993) 20.
22. *Oman '90*, (Sultanate of Oman Ministry of Information, Oman 1990) 115.
23. Mohammed Al-Eryani, "Policy and Institutional Aspects of Water Resources Management and Development in Yemen", *Water Resources in the Middle East: Policy and Institutional Aspects* (Urbana, October 1993) 159.

policy, while local authorities and public bodies are responsible for regional waters, drinking water supply, sewer systems and municipal waste water treatment. There is a process of transfer of functions to the regional level (police power and planning) as a tool to foster a more integrated approach to water resources management. Therefore, water planning in the Netherlands is a multiparty process which includes the central, regional and local levels of government, both for surface and groundwater and for quantitative and qualitative aspects.[25]

In Mexico, the National Water Commission is the institutional focus for water resources. Guatemala has recently created a Water Resources Secretariat with overall responsibilities for water planning and policy making. Brazil is considering the implementation of a National Water Management System. The system would include, inter alia, a National Water Resources Council, responsible for the national water policy, arbitration of conflicts, national water planning, amendments to water legislation, and other functions. The main purpose of the process is to overcome the traditional conflicts and limitations imposed by a system where main water sectors have so far been entrusted to different functional ministries fragmenting water management. The proposed system strongly relies on the river basin as the appropriate unit for water management.[26]

Conciliation of Interests and Consultations

Governments are resorting to conciliation mechanisms and preventive strategies in order to manage water related differences and coordinate activities, with a view to achieve the several objectives, and satisfy the multi-demands, usually associated to water resources.

The Federal Government and the states of Australia recently signed an "Intergovernmental Agreement on the Environment" (1 May 1992). The Agreement intends to provide a cooperative national approach to the environment, a better definition of the role of the respective governments, a reduction in the number of disputes, greater certainty and better environmental protection. The agreement acknowledges the role of state governments in developing national and international

24. Lidan Ke, *Water Resources Administration in China*; also *Water Law of the People's Republic of China* (21 January 1988).
25. Barraqué, 106; and *Water Management in the Netherlands: Policy, Measures, Funding* (November 1991).
26. *Brazil: Law Proposal No. 2249-A, 1991*, and substitutive (June 1993).

policies; the global character of environmental concerns; the need for ecologically sustainable development; the need to conserve and improve biota, soil and water resources; the relationship between efficiency and clear definition of the roles of different levels of government; the need to have explicit accounts of costs and benefits; the relationship between effectiveness and cooperation and the need for accountability.

The Agreement determines the responsibilities and interests common to all levels of government and those which are the concern of specific levels of government (federal, state and local governments). It also states procedures for the accommodation of interests. 68.
The German Water Law provides for the reconciliation of rights and authorisations to use water when either the qualities or the quantities of existing supplies do not allow the satisfaction of all uses. Compensations can be paid (art. 18).

The Water Law of China provides for the settlement of disputes among districts through consultations, in adherence with a spirit of mutual understanding and mutual accommodation, solidarity and cooperation. Only after consultation fails disputes are referred to the next level of government. Projects cannot be implemented while a dispute is not settled, unless there is an agreement between the parties, or an approval is granted by the next higher level of government (art. 35). Consultations are required for projects with intersectoral or interregional impacts (art. 22). There are provisions for the relocation of populations displaced by water projects (art. 23). Lacking agreement on mediation and consultation, or if they are not successful, the dispute can be referred to adjudication by either the administration or a court. Administrative decisions can be referred to court when a party refuses to accept the administrative decision (art. 36). The water regime cannot be unilaterally altered pending a decision. Temporary measures can be authorised by government.

The Canadian Water Act establishes a system of agreements between the federal government and the provinces for the management of any waters where there are significant national interests. The agreements shall include the responsibilities of the parties; the allocation of costs, and the terms of payment; the provision of labor, land and materials to be done by each party; the proportion of any compensations to be paid by each party; the conditions of loans, if any; the

responsible authorities; and the general terms and conditions of the program. There are also references to the conditions of the boards, commissions or other bodies to be created under the agreement, where applicable (art. 7). Water quality management agreements are also provided for (art. 9). Under special circumstances the federal government can create federal water quality management programmes for interjurisdictional waters (art. 11).

Concern for International Issues

Growing scarcity, competing demands, and transfer of externalities occur not only within national boundaries, but also at an international level. In addition, in common market areas differing regulations might either curb imports or give a competitive advantage to exports. With the worldwide privatisation of water related services there are likewise, worldwide possibilities for advice and provision of services.

Therefore, countries are increasingly referring to extraterritorial factors or elements in their national water legislation.

The German Water Law provides for refusal of pipeline licenses when there are concerns about parts of the pipeline which are constructed or operated outside the area of application of the act (art. 19). Specific water management schemes shall be drawn up in order to fulfil international obligations (art. 36b).

The 1989 Water Act of England authorises the Authority to provide international assistance, training, and advice (sect. 144). The appropriate minister is granted powers to issue regulations to give effect to any community obligation, and to any international agreement to which the United Kingdom is, for the time being, a party (sect. 171). The activities of water service companies are affected by the requirements of the EC directives, such the ones on drinking and bathing waters.

Chinese water legislation anticipates the possibility of conflict between national water law and treaties to which the People's Republic of China is a party. In these cases the provisions of international treaties or agreements shall prevail (art. 51).

Stakeholders Participation

The process to democratise water decision-making and water related

activities takes place through public hearings, stakeholder involvement in administrative bodies, organisation of user associations and, for general environmental concerns, a greater permissiveness in the rules governing standing to act in either administrative or judicial fora. Thus, stakeholders may participate in policy making, legislative discussion, general water administration, and field level activities. In Mexico, participation includes the establishment of formalities for the transfer of water rights within irrigation units and irrigation districts. The system intends to promote participation, while facilitating water transfers.

Stakeholders and water users can participate in public hearings or consultations intended to discuss policies, programs, projects or legislation. While the mechanism is fundamentally apt to open venues for participation, its sole inception does not necessarily mean that every stakeholder will necessarily participate.

In fact, some argue that governments can encourage empowerment of interested parties by providing access to data, standing in meetings and, generally, providing opportunities for interested parties to express opinions and positions.[27] This suggestion of an active government role in promoting participation seems to be confirmed in practice by a recent experience in South Africa. In a public consultation on forth-coming water legislation, industries submitted comprehensive re-sponses, while a number of organisations and individuals also re-sponded in a positive manner. Yet, it was noticed that no comments were submitted by community-based organisations, rural communities or village-level water committees. Very few submissions came from non-governmental organisations.[28]

Representatives of the public and of consumers can integrate advisory bodies, such as the Water Board, which advised the Ministry of Agriculture in Israel. In Mendoza, Argentina, representatives of the different basins and sub-basins of the province integrate the Tribunal and the Council of the Department of Irrigation, with important functions in relation to work plans, budgets, tariffs, and appeals. Representatives of agricultural users sit at the Directive Council of the Ecuatorian Institute of Water Resources. The 1985 Spanish Water Law provides for user participation in basin authorities, and, through them,

27. Haddad, 389.
28. "Fundamental Principles and Objectives for a New Water Law in *South Africa*", *South Africa: Report to the Minister of Water Affairs and Forestry on the Water Law Review Panel*, 3-4.

in the National Water Resources Council. Representatives of users, local communities, and the central administration integrate the river basin committees of France.[29]

Water users also participate at field level. Both, the European and the American experience, coincide in that the most effective institutional manners of users involvement are the ones taking place through some sort of public organisation. They assure economies of scale and mandatory dispute resolution processes, essential were a large number of diverse water users are involved.[30]

In a number of places where public participation is relevant it is associated to institutional environments where water is an important part of national policies and public water related organisations have an established and acknowledged role. In addition, in some countries such as Chile, the United States, Argentina's western provinces, France, and South Korea, where participation is relevant, it has been possible to identify present or historical subsidies to water development and use.

Information

To be effective, a system of participatory planning and management of water resources must be able to provide timely information on what kind and quality of water is available where, and on who is using the water and for what purposes. Therefore, effective water management systems require adequate official surveys, inventories and cadastres of water sources and watersupplies, as well as up to date registers and records of water uses and discharges into waters, water rights, and beneficiaries of such rights, with their respective water allocations.

The 1989 Water Law of England provides for registers with information on water quality objectives, applications, consents, certifications, water samples and the like. The registers shall be available for inspection by the public, free of charge. The members of the public can obtain copies of entries paying a reasonable fee (sect. 117). English legislation also requires that the Authority and every

29. Solanes, Miguel, "Descentralization of Water Management: The Case of Water Users' Associations", *14th World Bank Agricultural Symposium Agriculture in Liberalizing Economies: Changing Roles for Governments*, (New York 1993) 4.
30. F. Hellinga, *Local Administration of Water Control in a Number of European Countries* (H. Veenman and Zonen, N. V. Wageningen, 1960) 13, 38; John Davidson, "Distribution and Storage Organizations" in Beck (Vol. 3, 1991) 469.

water undertaker keep records of underground works, maps of water mains and sewers, and that this information be made available to the public free of charge (sect. 165). The 1991 Water Resources Act creates registers of abstraction and impoundment licenses, pollution control, and discharge works; and also mapping systems of freshwater limits, main rivers, and waterworks (sects. 191-195).

The objective of information is to allow appropriate decisions by policy makers, administrators, managers, users and the public. Therefore, legislation requiring the submission of information by managers to policy makers, users and the public at large, and by users and the public to managers is becoming part of modern water law. The 1991 English Water Resources Act requires the National Rivers Authority to provide information to policy makers and undertakers and the public (sects. 196-197). The Authority does, in turn have powers to obtain information about surface and groundwater. Information shall be timely and adequate, and there are provisions on the kind of information to be collected and the manner in which the information must be organised (sects. 197-203). The English system is complemented with norms on confidential and reserved information and penalties for false statements (sects. 205-206). Public participation is sought through a system of enquiries (sects. 213-215).

The Water Act of Canada sets up public information programmes under which the public is informed about water conservation, development and utilisation (art. 27). The Act also requires that the mnister responsible for water informs the Parliament on the operations carried out under the Act, each fiscal year (art. 36).

The Lowest Appropriate Level

In Germany water plans are produced by the Lander, according to federal directives (art. 36). Water management schemes, to be produced by the Lander, shall consider the role of water within ecosystems, the rational use of groundwater, and the requirements of different uses (art. 36 b).

In at least one country, New Zealand, the river basin has become not only the unit for water planning and management, but also the main focus of Regional Councils having the greatest responsibilities for the implementation of sustainable management. They are responsible for water resource development, water and soil conservation, geother-

mal resources, pollution control, and regional hazard mitigation.[31]

Levels lower than provinces, regions, or states, have been the focus of particular water related services, like drinking water and sanitation. However, in countries such as Mexico vesting of these systems on municipal governments have drawn severe criticism: it resulted in a fragmented water industry, unable to take advantage of economies of scale; local governments were afraid of political reactions to raising charges; and financing, management and other skills were in short supply. This prompted a major change in the water industry.[32]

Changes in the European context include the reorganisation of water management in England, separating water services from planning, control, and regulation. Water services are produced by private limited companies, while water management and control are reserved to public organisations like the National Rivers Authority and the Office of Water Services.[33]

III. WATER HAS AN ECONOMIC VALUE IN ALL ITS COMPETING USES AND SHOULD BE RECOGNISED AS AN ECONOMIC GOOD

31. Owen Furuseth and Chris Cocklin, "An Institutional Framework for Sustainable Resource Management: The New Zealand Model", *Natural Resources Journal* (University of New Mexico School of Law, Vol. 35, No. 2, Spring 1995) 243-272.
32. Carlos Casasus, "Privatizing the Mexican Water Industry", *Journal of the American Water Works Association* (March 1994).
33. Bernard Barraqué, "Water Management in Europe: Beyond the Privatisation Debate", *Flux*, Paris (January-March 1992) 7; and *Laws of England* (4th Edn. Supp, Vol. 49) para. 201-218.

n this paper the expression economic value of water refers only and exclusively to water as a natural resource, without addressing the issue of water related services, and connected added value and expenses. This distinction is important to clearly focus the issue of the economic value of water and its legal implications.

Property is to law, what scarcity is to economics. Law and economics are not separate and mutually exclusive, but interdependent regarding form and content and ends and means.[34]

Traditionally, law has not been interested in granting rights to the use of resources plentiful enough not to have any economic value. In European-based western law, as resulting from Roman law, these resources were known as "common resources".[35] The typical examples were the high seas and the atmosphere: of such magnitude that they were deemed nor appropriable, neither vulnerable; of such abundance that they were owned by nobody because no restrictions applied to the use of unlimited supplies, which were free for all.

Apparently, in China water was an element within the concept of universal harmony, subject to public control. Fulfillment of individual duties in relation to water would satisfy the greatest good for the social system.

In earliest Muslim Law water was the common entitlement of all muslims.[36] Similarly, in early Hindu law water had a fluid and purifying nature, and could not became an object of appropriation.[37]

Curiously, in Roman Law, terrestrial waters were not included within the concept of common resources. They were either public or private. The distinction was based on magnitude, perenniality and the opinion of local inhabitants (*existimatio circumcolentium*).[38] However, whatever the categorisation of any specific body of water, the main fact for the purpose of this discussion is that in Roman Law water was

34. Lee Gray and Kenneth Nobe, "Water Resources Economics, Externalities and Institutions in the United States", *Interantional Conference on Global Water Law Systems* (Valencia, 1975) 1.
35. The concepts of common, public and private goods in Law, do not strictly coincide with the concepts of common, public and private in economics.
36. El-Charani le Cheik, *Kitab al Mizan (Balance de la Loi Musulmane)*, (Translation of Perron, Algiers, 1898) 388, quoted by Caponera *Principles of Water Law and Administration*.
37. B. J. Wohlwend, "Hindu Water and Administration in Bali", *International Conference on Global Water Law Systems* (Valencia, 1975).

considered important enough, scarce enough, and useful enough, to be publicly or privately owned. Here we find an early indication that water was granted, albeit implicitly, an economic value.

However, water is not an ordinary commodity. The peculiar characteristics of water resources stem from its polyvalent environmental, economic and social roles. They include, inter alia, public good aspects; external effects; imperfect competition; risk, uncertainty, and imperfect information; potential for social and environmental inefficiencies and inequity, and vulnerability to monopolisation.[39]

These peculiarities have resulted in water rights systems which are hard pressed to strike a balance among the different demands and requirements resulting from polyvalency and unique physical chemical and biological attributes.

Water Rights

While in most countries water belongs to the public domain, water use rights granted to private individuals or corporations are protected under the property provisions of national and, in the case of federal countries, state or provincial constitutions. The 1992 Mexican Water Law has incepted a system of water rights, their registration, and transfer, with a view to promote security and stability in water management and use.

Thus, stability of water rights is an important principle in water law, which some authorities have traced back to Roman law.[40] The impossibility to grant stable water rights negatively affects development. In Zimbabwe, difficulties in acquiring reliable water rights are a main constraint to new viable agricultural investment.[41]

A system of stable water rights is an incentive to invest in the development and conservation of water resources. Stable water rights are useful collaterals, assets, or appurtenances for credit purposes,

38. Pedro Bonfante, *Instituciones de Derecho Romano* (trad. de la 3a ed. ital, de Bacci, Luis y Larrosa, Andres, revisada por Campuzano Horma, Fernando, Madrid, 1929) 313-314.
39. See, generally, Bonnie Colby-Saliba and David Bush, "Water Markets in Theory and Practice: Market Transfers, Water Values and Public Policy", *Studies in Water Policy and Management* (No. 12, Westwiew Press, Boulder, 1987).
40. Lex Coloniae Genetivae Iulae, 43 A.D. according to which waters in public lands open to colonisation were subjected to the same uses and charges existing under previous ownership, according to Costa *Le Acque nel Diritto Romano* (Bologna, Italy, 1918) 16-18; according to quotation by Dante Caponera *Principles of Water Law and Administration* (Balkema, Países Bajos, 1992) 30 and 50.
41. Thomas P. Z. Mpofu, communication to Ms. Beatrice Labonne, UNDDSMS, August 1, 1995.

and also important elements when assessing properties for taxation. Additionally, the stability and certainty of water rights and appurtenant uses provide recognition to existing economies and prevent social unrest.[42]

A water right usually is a right to use, and ownership of a water right does normally mean a usufructuary power, and not ownership of the corpus of water itself. In some legislations the usufructuary power can be traded.

Effective and Beneficial Use

The relevance of water rights as property assets is related to the availability of the resource. The scarcer resource is the most valuable. Therefore, most water laws have provisions that require the effective use of water entitlements, either for a right to be born and kept, or for the maintenance of a valid water right.

The principle of effective and beneficial use is widespread. While the terminology is not uniform, in the German Law (as amended on 23 September 1986); the 1985 Spanish law; the Mexican water law (art. 27. III); the legislation of most Argentinean Provinces; and the laws of the states of the American West, there is a notion that water rights risk forfeiture if not used, or if not used according to the terms of a license or permit. The legislation of Zimbabwe specifically considers the economic aspects of applications for water rights.[43]

The rationale behind the principle has been precisely and clearly constructed by the authorities, judges, and legislation of the United States. A typical statement of the rule of beneficial use is: "Beneficial use is the basis, the measure, and the limit of all rights to the use of water in this state. . .consistent with the interest of the public in the best utilisation of water supplies".[44]

The tenets of the doctrine of effective and beneficial use are: a) water is not to be obtained for speculation or let run to waste (reality of use); b) the end use must be a generally recognised and socially

42. *Syllabus and Opinions* (United States Supreme Court 1984, No. 80); "La Pampa vs. Mendoza" (Argentinean Supreme Court 1987, L-195-XVIII); Francoise Conac "Land and Water Rights Issues in Irrigated Schemes in Sub-Saharan Africa: Conflicts to be Avoided", *DVWK Bulletin* (No. 16, Paul Parcy Verlag, Hamburgh, Berlin, 1989); Beck (Vol. 1, 1991) 366.
43. Mpofu.
44. Beck (Vol. 2, 1991) 106.

acceptable use; c) water is not to be misused (reasonable efficiency); d) the use must be reasonable as compared against other uses;

A common idea was that the quantity of water was to be no more than needed, the concern being with the possibility of "vesting an absolute monopoly on a single individual".[45] This antimonopoly/ antispeculation concern where claimants do not have an specific use in mind continues today.

For a long time it was difficult to assess what happens in practice when water legislation does not have a requirement of use. The reason being that national systems of water legislation did not normally grant exclusive-non riparian-based water rights, without adding the requirement of effective and beneficial use.

At present, the state of flux of water legislation in general, and legislation related to water-based public services in particular, has prompted specific research on the subject of water rights and on the consequences of creating water rights severed from the requirement of effective and beneficial use. It has helped that assessments of the Chilean experience (where water rights are not conditioned to effective and beneficial use) are becoming widely available.

Natural resources economists notice that non-use, if not penalised with forfeiture may result in "sleeper rights" which increase uncertainty on the quantities of available waters.[46]

The Chilean experience on the issuance of non-conditioned water rights is an apparent validation of the forebodings behind the requirement of effective and beneficial use. A study on the impact of the legal system for water allocation in Chile has found that it is also common for state-owned monopolies that benefitted from exclusive rights to be privatised with them, creating legal barriers to entry that maintain the monopolistic characteristics of the sector. As mentioned above the regulatory framework for electricity is based on the existence of competition in the generation of electricity. However, competition practically does not exist in Chile. The water rights of the main hydroelectrical projects belong mainly to a single corporation. The implication of this is that the largest generator has an incentive to

45. Ibid., 107-108.
46. M. L. Livingston, "Designing Water Institutions: Market Failures and Institutional Responses", originally prepared for the *1993 World Bank Policy Paper* (place and date of printing unavailable) 8-9.

appraise projects considering the effects that they will have on the profitability of its intramarginal capacity. It can obtain the monopoly equilibrium overtime by postponing investments. New entrepreneurs will be unable to enter into the generation market because they do not have the water rights to undertake the more efficient projects. Water rights should have been returned to the state prior to privatisation, which in turn could have granted them subject to the conditionality of their timely development through new projects by existing producers or new comers.[47]

Thus, the actual operation of the Chilean system appears to confirm the rational behind the requirement of effective and beneficial use.

Monopolisation through the creation of barriers to entry resulting from the control of essential production inputs and natural resources, are standard fare in economics literature.[48] The existence of water markets does not alleviate the situation since in fact "crucial inputs of this kind are not usually traded on competitive markets".[49] Also, water markets do not reallocate large quantities of water. To the contrary, the amounts historically traded are limited enough for these markets to have been identified as "thin" markets.

Furthermore, for large institutional users the incentives to sell water rights, absent the penalty of forfeiture for non-use, are minor, if compared against the strategic advantages that control of a key production input represents within the market power policies of corporative practices.

Hence, it appears that the absence of a requirement of effective and beneficial use does have a negative effect on water transactions, on water markets, and on efficient water allocations. Empirical evidence on the actual working of water markets in Chile shows that with a few local exceptions market transactions of water rights in Chile have been limited.[50] As of August 1998 there have been several court decisions on the effects of the Chilean system of water rights. Thus, the Constitutional Court has recognised the right of the Government to regulate the

47. Eduardo Bitran and Raúl Saez, "Privatisation and Regulation in Chile", *Brookings Institution Conference on the Chilean Economy* (Washington, D.C., 22-23 April 1993) 50-55.
48. Lawrence Anthony, Sullivan, *Antitrust* (St. Paul, West Publishing Co., 1977) 25, 31, 77.
49. Mark Armstrong et al, Regulatory Reform: *Economic Analysis and British Experience* (Boston, MIT Press, 1994) 117; and *Oman '90*.

conditionalities of water rights (Rol 60/1997). In addition, the Antimonopoly Comission has recommended that no further water rights be granted until provisions requiring effective use of water are included into the water law (CPC 992/636; CR 480/97).

Conditionalities on Water Uses

In addition to the requirement of effective and beneficial use there is general trend to condition the use of water. This conditioning includes formal (obtaining a permit) and substantive requirements (i.e. no harm to third parties, environmental protection, efficiency).

German Water Law, which provides a good example of trends, attaches a number of conditions to water use, permits and licenses. They include effective use, prevention of detrimental effects, payment of compensations, preventive assessment, appointment of caretakers, remedial measures, and payment of common control costs (art. 4). A particular feature of the German legislation is the possibility to impose new conditions after a permit or license has been granted. Ex-post conditions may refer to the environmental or the economic requirements of water resources management (art. 5). A water right can be revoked for non use, lack of need, change of use by the permittee, use beyond the allocation under the permit, etcetera (art. 15). Permits are required to either withdraw water or to effect discharges into them. However, as far as it regards the relationships between the Administration and a water user, a water right is not an entitlement to any specific water quantity or quality (art. 2). Applications can be rejected and permits and licenses are granted for specific purposes, in a specific manner, and to a specific extent. They are revocable (arts. 6-7). Use of water by property owners and riparians shall not adversely affect other persons, cause detrimental change to water, adversely alter water balance, or substantially reduce water flows (art. 24).

A common feature of water law is to establish preferences among

50. See Carl Bauer, *Against the Current: Privatisation, Markets, and the State in Water Rights, Chile*, 1979-1993 (Berkeley, 1995) p. 2: "Private bargaining and exchange cannot coordinate overlapping resources without continues State intervention, through the courts, if not through other political organs".; p. 57: "These features [of the law] stimulate speculation. . . they have been favored [by supporters of the law] saying that speculation improves market operations and price signals. . . they deny criticisms that speculation might distort prices through unequal bargaining power or monopoly control. . .".; p. 171: "The government virtually guaranteed the under-valuation of water rights [resulting in relatively few transactions] when it privatised them without imposing any taxes, fees, or other obligations to the public interest".

uses in order to allocate water at times of scarcity, or to grant water rights in case of competing applications. An example of this feature, which incidentally is a major element in Muslim law ("right to thirst"), is article 58 of the 1985 Spanish Law granting a preference to drinking purposes.

Water Markets

Marketing of water rights is being paid increased attention as a useful and economically efficient alternative for the improvement of water allocations. As supplies diminish relative to demand markets become not only an efficient alternative, but also a necessary solution to problems of water scarcity. Thus, new legislation, such as the Mexican Water Law, allows water transfers, subject to administrative authorisation, should such transfers affect the rights of third parties, the environment or the regime of water resources. Absent such impacts, or should the transfer not change the conditions of the original title, or existing regional agreements so authorising, water rights may be transferred by registration in the Public Water Rights Registry. Thus, the formalities of water transfers are established by regional regulations established by the National Water Commission according to the requirements of individual regions. However, countries such as the People's Republic of China, while acknowledging the need to develop water markets, emphasises the need for macromanagement of water resources to avoid harmful impacts on the environment and social development.[52]

The American Experience

Water markets are an important feature of the legal system of the states of the American West. A review of their experience is important to the understanding of the subject and its complexities. In the United States reallocation of water rights may be "with the possible exception of water quality. . . the most pressing matter facing the arid west".[52]

For a reallocation to be legally valid some requirements must be fulfilled: a) water must have been beneficially used, and must continue to be beneficially used after the reallocation; b) such reallocation must

51. See China: *Capacity Building on Law and Institutions for Water Management* (note submitted to UNDDSMS, August 23, 1995) 21.
52. Beck (Vol. 2, 1991) 234.

not affect other users and must be in the public interest; c) in many jurisdictions, interbasin transfers or transfer outside the area-of-origin can only take place with due consideration to local interests; b) in some jurisdictions appurtenance statutes prevent water reallocation.[53]

Marketing of water rights is a complex process, which is affected and influenced by several factors, including: a) the priority of the transacted right; b) the profile of the parties; c) geographic flexibility; d) size and economic value of the transaction; e) reliability of the marketed water right; f) buyer characteristics; g) volume of water transferred; h) changes in regional economies; i) system for water administration; j) availability of infrastructure to effect a change; k) environmental impacts.[54]

While water rights markets are strongly advocated by reputable experts, there are also reservations. Conflicts over water transfers occur in the American West as large metropolitan areas look for the water supplies of rural areas. The public values at stake include the economic development of urban areas, culture, way of life, environment and the future of rural communities built around agricultural uses. "It is becoming increasingly apparent that current water law and water market oriented behavior are incapable of solving this conflict in an equitable manner". Therefore, according to some authorities, oversight and regulatory approval for water transfers and markets is required.[55] A result of the complexities of water marketing is that the activity has been subjected to regulations in the interest of third parties and the public.[56]

Broadly stated, regulations include: a) the appurtenacy principle, which prohibits the transfer of water rights if not as an appurtenance to the land where they are used. Its purpose was to prevent land speculation; b) transfers are to be approved by judicial, legislative or administrative authorities (the approving authority varies according to the law of each state); c) public notice of the intent to transfer, with the possibility of filing protests granted to either any interested person or only to holders of water rights (again standing to oppose varies according to

53. Ibid.
54. Bonnie G. Colby, et al., "Water Rights Transactions: Market Values and Price Dispersion", *Water Resources Research* (Vol. 29, No. 6., June 1993) 1565-1572.
55. Helen M. Ingram, et al., "The Trust Doctrine and Community Values in Water", *III World Conference on Water Law and Administration* (Alicante, Valencia, 1989) 10-11.
56. See generally Owen L. Anderson et al., "Reallocation" in Beck (Vol. 2, 1991) 234.

the legislation of each state); d) administrative recording of the transfer and filling with the authority for water management; e) issuance of permits to reallocate and use subject to existing or new conditionalities, including proof of completion of work and beneficial use; f) forfeiture of water right, (and in some states charges for misdemeanor), if prior approval is not obtained; g) limitation of transferable entitlement to historic consumptive use; h) requirement that transfer does not injure other appropriators who, even if junior, have a right to the substantial maintenance of the stream conditions existing at the time of their appropriations. Injury might result from changes in volumes, timing, storage, means of diversion, quality, deprivation of return flows, point of diversion, or a combination thereof; i) accommodation of uses through conditions intended to mitigate or prevent injury; j) compensation and payment of expenses; k) limitations of transfers to historical usage.

In addition to the above mentioned regulatory examples, there are also 'considerations of public interest' which apply to the review of applications to transfer water rights. They apply to the review of 'public value externalities'. They include: a) effects of the economic activity resulting from the application; b) effects on fish and game resources and on public recreation; c) effects on public health; d) opportunity cost of the use; e) harms to other persons; f) intent and ability to use; g) effects on access to public and navigable waters; h) needs for water conservation; i) factors of local relevance.

Accordingly, a reallocation would not be allowed if it results in the violation of minimum health, environmental, or safety standards. However, the public interest element can be accommodated by conditioning a requirement for reallocation to measures to mitigate public interest concerns.

While there are no questions on the substantive legitimacy of public interest concerns questions on the appropriate fora and means for their consideration have been raised. While there is always an administrative and judicial role, for some authorities such means and fora should include water planning and public participation.

Additional considerations may include the assessment of the impacts that a transfer may have on the environment, and the tax base or the local economy of the area of origin of the water allocation to be transferred.

Finally is worth to notice that research on water markets in the American West, California and Chile have concluded that requirements of effective and beneficial use of waters encourage water transfers;[57] that the existence of subsidies to specific activities affects water transfers;[58] and that the absence of requirements of effective and beneficial use negatively affects water markets.[59]

Charging for Water

Charging or pricing water is a vexing problem. For starters there are technical complications about what is the price that would best reflect the value of water. Economists specialising in water resources notice that water has a relatively low economic value at the margin. While the value of the first unit of water to be used by a city may be very high, the value of additional units may be quite low.[60]

Additionally, it seems that by nature water markets are thin markets, with a relatively low number of transactions performed in each one of them. Moreover, water markets are not classical markets in the sense of having quick and clear agreements, anonymity, instant exchange, and no further dealings among the parties.[61]

Therefore, it is argued that water markets are not perfectly competitive, consequently not necessarily reflecting full costs of transactions.[62]

Many systems charge for the cost of administering water resources. There are also charges for water related services, and to protect and recover water when affected by environmental deterioration.

Thus, the German Water Law requires payment of common control costs (art. 4). Also in Germany, the Act on Waste Water Charges of 6 November 1990, provides for water charges to be paid for water pollution. Charges are based on noxiousness levels, which depend on oxidisable substances, phosphorous, nitrogen, mercury, cadmium, chromium, nickel, lead, copper, and their compounds; as well as on toxicity to fish. (arts. 1-3, Act of 6 November 1990). They also consider

57. Colby-Saliba, 81; G. D. Weatherford and S. J. Shupe, "Reallocating Water in the West", *American Water Works Association Journal* (October, 1986) 63-71.
58. Haddad, 393.
59. Bauer, 10-11; Haddad, 389-90.
60. R. A. Young, "Why are There so Few Transactions Between Water Users?", *American Journal of Agricultural Economics*, (Vol. 68, December, 1986) 1143-1151; also Colby-Saliba, 1-6.
61. Haddad, 379.
62. M. L. Livingston, "Normative and Positive Aspects of Institutional Economics: The Implications for Water Policy", *Water Resources Researc*h (Vol. 29, No. 4, April 1993) 815-821; Livingston, "Designing Water Institutions: Market Failures and Institutional Responses".

the classification of particular river basins and the number of units of noxiousness in the water body downstream the river classification basin. Water charges are to be paid by anyone discharging waste water. The revenue resulting from water charges shall be used in measures to improve water quality (arts. 9 and 13 Act of November 6, 1990).

The costs of pollution control and environmental protection in the Netherlands are financed through the general budget (tax payers) or through a special budget financed with specific levies or charges. Pollution levies and charges are raised from polluters.

Examples like these cases, where charges are used to recover costs, or to promote environmental protection are relatively numerous.

However, legislation charging for water as such, is not so abundant. A recent case is the Mexican Water Law of December 1, 1992, which charges for the exploitation, use, and enjoyment of surface and ground waters. Payments are also established for discharges into water bodies (art. 112). Water prices and values are established according to regional water availability. The goals of the system are a) to relate water charges to benefits resulting from services and water works; b) to integrate the financial system within an overall strategy for water resources management, including, the solution of structural problems; c) to promote rational water use and conservation; d) to adjust water price to cost; e) to strengthen the National Water Commission, which collects and manages water related revenues. The system intends to charge according to the opportunity cost of water, allowing adjustements according to regional conditions, and taking into consideration the social and political situation of different groups of users. The charge is a main source of financing for the activities and investments of the National Water Commission.

The 1985 Spanish Water Law provides for the payment of fees for the use or occupation of public waters. The base value to calculate the charge is the value of the capital asset which is utilised by the user. Such value is estimated on the basis of the economic returns generated by the asset. The rate to be collected is four percent of the base value. Revenues are collected and managed by the Water Confederations, which are the water authorities at basin level (arts. 104-105).

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