CEPAL

REVIEW

NUMBER 64
APRIL 1998
SANTIAGO, CHILE

OSCAR ALTIMIR
Director of the Review

EUGENIO LAHERA
Technical Secretary

UNITED NATIONS

CONTENTS

Integrated water *management from the* perspective of *the Dublin Principles*

Miguel Solanes

Regional Advisor on Water Law and Public Services Regulation, ECLAC.

This article analyses the relationship between the Dublin Principles of 1992, integrated water planning and water law. The Dublin Principles were an attempt to concisely state the main issues and thrust of water management: 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, and water has an economic value in all its competing uses, and should be recognized as an economic good. This report does not aim to endorse any single given model or solution, but to provide a set of alternatives and experiences which may be useful to readers seeking information about institutional issues affecting water management. Globally, water law provides examples of systemic approaches to water resources management including, with varying degrees of completeness, principles and norms relevant to integrated water management and planning. However, manners of approach and degrees of development differ. Among these differences are those relating to ethics in integrated water management, the capabilities of the responsible agencies, the generally scant public participation, information, water rights and planning, water pricing and the limits of planning.

I

Introduction [1]

In this paper policies, planning and integrated management are considered as steps within a unitary –albeit not always harmonious– process. The purpose of this article is to identify subjects, topics and elements relevant to planning and to suggest areas where the law may need to be further developed in order to improve decision making. It is assumed that the final objective of a planning process is the best possible consideration and integration of environmental, economic and social elements in sustainable water resources management.

Water is not an ordinary commodity. It is a natural element crucial to environmental processes, social well- being and economic viability and development. It has special economic characteristics which include, inter alia, public good aspects; externalities; imperfect competition; risk, uncertainty, and imperfect information; potential for social and environmental inefficiencies and inequity, and vulnerability to monopolization.[2] This is why the American Society of Civil Engineers endorses legislation recognizing that water by its very nature requires integrated management and can benefit from comprehensive planning (Matthews, 1994).

In operational terms, integrated water management can be understood in at least three ways: integration of the different water components; integration of water, land and environmental concerns and resources; and integration of water within social and economic development (Mitchel (ed.), 1989, p. 203.

The concept of planning is bivalent. It can be understood as a set of arrangements, or as a method for doing things. While the present article refers to technical concepts and ultimate goals, such as sustainability, efficiency and equity, it also attempts to bring to the discussions some concepts of strategic management borrowed from the private sector. Such transplantation of concepts has been prompted by a perception of the need to avoid the rigidity, determinism and lack of rational assessment of projects observed in some national systems for water management. Additional reasons include the fact that several exercises in water management in developing countries –particularly those related to water as an input or intermediate good– seem to assume that water-related products are isolated from global competition. On the contrary, however, private strategic water management is keenly aware of the dynamics of the markets in all their branches.

In some developing countries water management includes public policies to simultaneously achieve multiple policy goals relating to development, decentralization and environmental protection, without allowing for enough time or resources for collecting data, establishing capabilities and determining implementable strategies. While the substantive aims of these policies are legitimate, their practical implementation would benefit from the experience of the private sector in phasing activities according to substantive priorities and capabilities, within a comprehensive strategy.

Some recent experiences and decisions in Latin America, such as dam construction in Western Argentina, raise the question of ethical considerations in water policy and planning: a subject not always considered in water planning, but one which seems to be standard content in modern private strategic management.

In the context of water resources, ethical notions are closely related to efficiency and equity. Efficiency in the use of scarce water resources is a requirement of sustainability. However, few legal systems have legally binding rules, laying down standards and thresholds, for the economic and social evaluation of projects, and almost none include procedural rules allowing the public to effectively object to programmes on grounds of economic inefficiency or social inequity.

[1] The Dublin Principles were adopted at the International Conference on Water and the Environment, held in Dublin, Ireland, from 26 to 31 January 1992. They consist of four main statements laid down at the Conference, on which the present article comments in order to relate them to integrated water management and water law. These principles are: i) fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; ii) water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels; iii) women play a central part in the provision, management and safeguarding of water; and iv) water has an economic value in all its competing uses and should be recognized as an economic good.

[2] For a general description, see Colby-Saliba and Bush, 1987.

Equity is in many respects closely related to efficiency, since the impact of inefficient public decisions, usually embodied in subsidies burdening the taxpayer, is borne by the public through higher taxes and diminished funds for public services. Another dimension of equity is the possibility of access to water resources and to water-related products at reasonable prices. Systems that facilitate monopolization do not favour equity. Access and competition are thwarted and prices are higher than they would have been in a competitive system.

In operational legal terms, norms intended to protect environmental values –both substantively and procedurally– appear to be more evolved than those providing substantive and procedural protection against economically inefficient decision-making, despite the fact that economic analysis has well-established methods for the assessment of this aspect.

As a result, relatively better placed special interest groups are sometimes able to obtain specific economic benefits, through subsidies resulting from inadequate economic assessments. In this latter respect there seems to be a parallel between the co-opting by private interests of those responsible for regulating public utilities –a well-known subject– and the co-opting of decision-makers responsible for water resources management and water development projects

The issue of leadership is also relevant. In some cases, good technicians prepare well-thought-out proposals, only to find later on that they are systematically disregarded by policy levels sensitive to vested interests.

This article, which covers legislation, planning, organization, participation, financing and capabilities, has been organized according to the headings of the Dublin Principles.

II

Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment

1. Policies

An important preliminary task is to identify the overall purposes of water resources management. Howe and Da Cunha state that the guiding principle should be the achievement of equity and efficiency, to which it seems appropriate to add "within a context of sustainable development" (Howe, 1996a, p. 30; Da Cunha, 1989, pp. 57-69, and Howe, 1996b).

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 on integrated water management.

The recent Brazilian Law on Water Policies and the National System for Water Management are good examples of this trend: water is a public good which has an economic value, is capable of multiple uses, and should be managed at the river basin level, according to principles of decentralization and participation (Water Law (No. 9433) of 8 January 1997). The Law pursues multiple objectives: protection of the interests of future generations, integrated and rational utilization, sustainable development, and prevention of, and protection from, natural disasters (art. 2). It lays down legal principles for the implementation of the National Water Policy, namely: a systemic approach, integrating considerations of both water quality and quantity; adjustment of management principles to specific regional situations; integration between water management and environmental objectives; integration of users, regions, states and the National Government into the planning process; integration between water and soil management; and integration of river basins, estuaries and coastal areas.

Several laws include policy principles where the multiple roles of water are recognized.

The Canadian Water Act of 1970 encourages optimum use of water resources for the benefit of all Canadians (art.1). The Environmental Assessment Act of 1992 aims to ensure that environmental effects of projects are carefully considered; to promote sus-

tainable development for a healthy environment and a healthy economy; to make sure that projects do not cause significant adverse environmental effects, and to assure public participation. The Act applies to projects where the Federal Government has decision-making authority.

The aim of the 1988 Water Law of China is to ensure the rational development, utilization and protection of water resources, fully realizing the benefits of water for economic development and the livelihood of the population.

The Water Law of Germany (as amended on 23 September 1986) provides that water (both surface and ground water) must be managed in a manner that serves the common interest, benefitting individual users while preventing avoidable harmful impacts (art. 1a).

New Zealand's Resource Management Act of 1991 (which includes water) defines the legal meaning of sustainability (meeting the reasonably foreseeable needs of future generations; safeguarding the life-supporting capacity of water, soil, air and ecosystems; avoiding, mitigating and remedying adverse effects on the environment). Criteria and standards for the measurement of sustainability are provided. They are divided into two hierarchical groups: "Matters of National Importance" and "Other Matters", which must be taken into account in decision-making and which include environmental, social, and economic issues.

The Netherlands' "Policy Document on Water Management" (1991) establishes a policy of integrated water resources management which includes both quantitative and the qualitative aspects.

Some systems, such as that for the Mississippi in the United States, include details of goals, objectives, means and tools: maximum beneficial use; no waste; maximum economic development compatible with other uses; environmental protection; drainage and flood control; water storage; the issue of permits; water quality preservation and enhancement; water policies; and emergency situations.

The connections between general socio-economic conditions (and plans or programmes) and the use and protection of natural systems have been specifically pointed out in the Brundtland Report. Japan, Poland and Nigeria, as well as France, seek to integrate water management within national economic and social policies and plans (Mitchel (ed.), 1989, pp. 203-204).

The concept of integrated water management is not only a concern of individual countries. In Europe, the Single European Act of 1986 has adopted the principle of a Community Environmental Policy which makes it possible to consider the implementation of integrated water resources management policies, with special attention to non-structural water management measures (Da Cunha, 1989, pp. 57-69).

2. Integrating environmental elements into water law

The environmental dimension of water is a major component of water legislation. Permits, prohibitions and charges are used to curb the deterioration of water and related natural resources and environmental assets.

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

The Water Law of China makes it the duty of the State to protect and improve the environment. Agriculture must be practiced with a view to promoting high but stable agricultural yields (art. 15). Hydropower development must be carried out in accordance with protection of the ecological environment (art. 16). Adverse environmental impacts in the implementation of inter-basin transfers must be prevented (art. 21). Additional rules control waste disposal, mining activities, land reclamation, construction of projects, and creation of management and safeguard zones (arts. 24 to 29).

The German Water Law imposes a general duty to prevent water contamination and detrimental changes in its properties, requiring "economical use of water in the interest of natural water resources" (art. 1a). Waters can be subject to characterization parameters issued by the Federal Government. (art. 36b). The Law also provides for the maintenance of proper flow conditions, maintenance of navigation, ecological requirements, landscape features, protection of banks, and self-purification (art. 27).

The policies of the Netherlands on the environment and water aim primarily at securing and maintaining a safe and habitable country and developing and maintaining healthy water systems which guarantee their sustained use (Mitchel (ed.), 1989, pp. 203-204). The "screens" or criteria for their implementation include rational or "guided" use of water resources, especially groundwater. There is a

requirement that action plans must be prepared every five years to combat water pollution (Mitchel (ed.), 1989, pp. 8-9).

In some systems environmental concerns are the basis on which existing water rights can be amended, restricted, prorated or cancelled. The French Water Law of 1992 authorizes changes in water rights when public health or safety so require, or when water environments are threatened (art. 10.iv). In the United States, the public trust doctrine has been utilized to limit prior appropriation rights when the full exercise of such rights would result in drying up a lake.[3]

3. Integrating surface and groundwater and land resources

The protection of water sources through the control of land use and development has been a traditional concern of water law. Increasing demand and externalities have strengthened this concern.

Regulation of land and water use may be traced back to Roman Law. *Actio aquae fluviae arcendae* was a judicial means of protecting downstream owners from man-made changes in the drainage of rainwater. Modern land regulation is based on the police power of the State and is intended to protect the public. It includes regulation of urban growth, subdivisions and the use of flood plains and open lands. Regulation of the latter areas is intended on the one hand to prevent harm, and on the other to save surrounding areas from flooding and also protect flora and fauna.

Land regulation has also included restrictions on land fills in order to protect water flows and prevent water pollution, protect wetlands and control coastal areas and dredging. Other controlled land activities include mining, quarrying, use of agricultural lands, forestry, coastlines and beaches, conservancy districts and control of land use to protect water supplies (Wright and others, 1978, pp. 172-175).

The German Water Law provides for the creation of water protection areas within which certain activities cannot be carried on or certain restrictions must be observed (art. 19). New Zealand's 1991 Resource Management Act, and the 1997 Water Act in Brazil, require joint consideration of water, land, and soil management.

In England, the 1989 Water Act and the 1991 Water Resources Act provide for protection from sedimentation, creation of water protection zones, nitrate-sensitive areas, good agricultural practices and business management of land and water. The National Rivers Authority has a general mandate to ensure 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 established for this purpose.

It is now a generally accepted fact that groundwater must be controlled and protected. A number of countries have enacted legislation protecting recharge areas, creating special management zones, and fostering conjunctive use of surface and groundwater.[4]

4. Water planning

Integrated management began as a result of specific concerns relating water to other environmental resources. Early efforts at integration therefore related water management to land degradation and soil erosion, but subsequent evolution led to the consideration of broader objectives such as flood control, hydropower and river basin transportation (Mitchel (ed.), 1989, p. 203).

The government's legal attributions to plan and regulate the use of water and other resources have seven main sources:

i) ownership of the resource, because water is generally publicly owned;
ii) public trust;
iii) spending power, when dealing with publicly funded projects;
iv) promotion of well-being, which is an attribution of government found in some national constitutions;
v) regulation of commerce and navigation;
vi) police power resulting from the sovereign condition of States, which entitles them to exercise reasonable regulation of private goods and conduct; and
vii) prevention, mitigation, and reparation of harm.

Water rights are privately owned, and as private property they are subject to regulation. Such regulation resulting from the State's police power should

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

[4] More detailed information about current practices in groundwater management can be found in Beck and Goplerud (eds.), 1991.

not be arbitrary, capricious, unreasonable, unduly discriminatory, or tantamount to a taking of private property. What is "taking" is a debated legal subject. As long as property yields a reasonable return and a reasonable spectrum of possible uses is left open to the owner, regulation has been found reasonable. Regulation is also accepted when needed to prevent harm.

Countries usually rely on a mix of legislation, political commitment and administrative decisions to foster integrated water management.

The Water Law of China requires that the development and utilization of water and the prevention of disasters must be planned in a comprehensive and systematic manner, with all relevant aspects taken into account, for multi-purpose development and maximum benefits, with full consideration of the multiple functions of water (art. 4). There are comprehensive plans for the basins of major rivers and special plans for sectors. Comprehensive plans –prepared by the Departments of Water Resources of the different levels of government– must be coordinated with the National Land Plan in the light of the demands of the different regions and sectors. Special plans for sectors are prepared by the relevant departments (art. 11). Remedial measures or, alternatively, compensation are required when such plans interfere with existing projects (art. 20).

The French system centers around two basic elements: hydrographic basins (all waters flowing into a common terminus (river, lake or sea) and hydrographic units (specific rivers or aquifers).

Hydrographic basins or groups of basins are covered by Water Development and Management Master Plans. They determine general objectives of water quality and quantity and the works to be carried out in their pursuance. The Prefects of the corresponding regions initiate the process, which is carried out by River Basin Committees. Water-related interests within the basin participate in the process. The plans, which cover five-year periods, must be approved by the administrative authorities, after which they are made available for examination by the general public.

Individual rivers and systems of aquifers or groups of sub-basins are regulated by Water Resources Development and Management Plans, which are given coherence by the Master Plans. They define general objectives for the use, development, and qualitative and quantitative protection of surface and groundwater, wetlands and aquatic ecosystems. Management Plans are prepared, reviewed and monitored by special commissions made up of representatives of local communities, users, owners, riparian dwellers, professional organizations, the central government and its public bodies. Participation is therefore a specific aim of the system. Both before and after they receive administrative approval, management plans are open to the general public for comments and observations. Local Water Communities can be established to own works, facilities and structures developed under such plans.

German Water Law requires the fulfillment of a prior plan approval procedure before approving any substantial modifications of water bodies and their banks (art. 31). River basins and economic regions must be subject to such 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 and are implemented through a variety of means which provide, *inter alia,* for administrative requirements, revocation of permits and licenses (art. 36b).

When considering the establishment of objectives, policies and rules under Part V of the Resource Management Act of New Zealand, local authorities are obliged to consider the relevance and instrumentality of their decisions in relation to the objectives of the law; alternative means of achieving the objectives pursued by the decision; reasons for and against a decision (including the possibility of taking no action), and assessments of benefits and costs. They must be satisfied that the decision is the most efficient and efficacious means of fulfilling the objectives of the law.

The approach is performance-based and not prescriptive. Accordingly, the use of river and lake beds and water resources, including abstraction or discharge, must be allowed subject to the rules of regional plans or resource use authorizations (Resource Management Act, sections 13 and 14).

Regional plans must cover, among other aspects, conflicts between use and development and conservation and means of mitigating or avoiding such conflicts; needs and demands for special protection; natural or man-made hazards that may be avoided or mitigated; demands on natural resources; native interests; reparation, avoidance and mitigation of harm; uses of land and water with adverse effects on land conservation and air and water quality; and other is-

sues. Plans must be justified, their effects anticipated, and the means of implementation identified. Plans must not be inconsistent with water conservation orders or national policy statements (Natural Resources Management Act, sections 63/67).

In Spain, hydrological plans aim at satisfying water demands, harmonizing regional and sectoral development, increasing resource availability, protecting water quality, and conserving and rationalizing water use in harmony with the environment and other natural resources. The plans are legally binding. The law also contains detailed provisions about the contents of plans. (Spanish Water Law, 29/1985, arts. 35-44).

In the United States, a number of laws include provisions relating to integrated water management. Planning is an important element in water-related interstate litigation, as well as in the acceptability of limitations on interstate water transfers.

Land and water planning are important elements of the Clean Water Act and the Safe Drinking Water Act. The National Environment Policy Act (NEPA) includes a number of procedural requirements to ensure consideration of environmental issues, and has been applied to water projects. It has been used to bring water-related cases to the courts (dam and reservoir construction, dredging and filling, flood control, dumping at sea, river and harbour projects, and wetlands and water pollution).

Additional planning requirements, imposed in accordance with other Acts, are intended to protect endangered species, fish and wildlife, and historic and archeological values. Cost sharing, recreation, and water resources affected by mining operations are included in other enactments. One important principle is that benefits must at least equal the costs of projects, if projects are to be allowed to go forward (Reclamation Act, 1902, amended 1939).

Although NEPA does not require cost-benefit analysis, this typically forms part of the environmental impact survey because one of the purposes of the Act is to consider environmental amenities and values in line with economic considerations. Courts have requested such surveys to be revised because of unrealistic cost-benefit considerations. Other statutes requiring a cost-benefit equation are the Flood Control Act of 1936 and the Watershed Protection Act of 1954.

More than twenty years ago, the United States National Water Resources Council 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 must be assessed according to the effects that alternative plans would have on objectives of national economic development, environmental quality, regional development and social factors (United States, Water Resources Council, 1971, pp. 24145-24146).

Until they were changed in 1983, regulations required a cost/benefit analysis. They were then changed to non-binding principles and guidelines, which still emphasize economic analysis. The guidelines do not give any procedural or substantive right to any party (Kelley-Pittman, 1991, pp. 299 et seq.). Therefore, the controversial issue of cost/benefit is "almost totally isolated from judicial review"

Writing about Latin America, Axel Dourojeanni notes the dearth of criteria, principles and standards for assessment in the region, which results in the approval of projects on the basis of scant relevant multidimensional analysis (ECLAC, Natural Resources and Energy Division, 1995). It is therefore not unusual to find projects that do not justify, in actual operation or economic performance, the expectations of designers, evaluators and financiers.

Judicial decisions also provide important planning inputs for water law. It has been possible to identify at least one court case where an environmental impact assessment was requested for the granting of irrigation subsidies.[5]

5. Capabilities of water management agencies

Water and environmental agencies must compete for personnel with the private sector and other better-paid agencies. They are normally understaffed, mostly by engineers concentrating on structural solutions and by lawyers without too much knowledge of water and its dimensions, outside the literal interpretation of the law (Howe, 1996a).

As a result they are prone to inertia, which is a serious problem in a changing world. Social, economic and environmental considerations are sometimes seen as hurdles to be overcome rather than as valuable elements of judgement.

[5] *Natural Resources Defense Council v. Duvall, United States District Court, E.D. California,* (777 F.Supp. 1533 E. D. Cal 1991). See also *New York Times,* 1991.

There are some concepts of modern strategic management in the private sector which should be increasingly considered in the water management sector. Their inclusion in this article is intended to facilitate initial assessments of capabilities, constraints and opportunities, with a view to implementing sequential, staged processes of improvement of integrated water management.

The private sector pays special attention to three main elements in designing and implementing a business strategy: i) the industry (or activity) concerned; ii) the country; and iii) the available resources, capabilities and strategies affecting the performance of a business unit or corporation.

In order to bring this approach to water management, it would be necessary:

a) That the activity, (in this case integrated water management) and its relative maturity and consolidation in a country should be evaluated with particular care when beginning or improving a process of integrated water management. The objective of this evaluation is not to raise unrealistic expectations at the onset of programmes and projects, but to establish appropriate benchmarks and stages in the development of an integrated management programme.

b) That the country where a process is started or improvement programmes are begun should also be subjected to evaluation. If national capabilities are generally low, it may be over-optimistic to assume that the water sector would be able to perform at a pace different from the rest of the economic and social environment. Once again, it is important to establish realistic objectives and time frameworks and also to identify areas where the implementation of processes requires special support and enhancement.

c) Closely connected with the above consideration is a fact noticed in a number of countries: water resources development programmes started mainly on the basis of the locally available land and water resources, with scant regard for the effective existence and sustainability of demand for the local products and goods for which water is an intermediate good. Thus, costly and rigid structural investments are undertaken, without a clear understanding of the situation with regard to global demand and competition, only to realize later that the investments were not as productive as estimated. Successful private sector strategies are at present particularly concerned with global opportunities and threats. Economically sustainable water development (integration between water and economics) should incorporate these private sector concerns.

d) The third important element concerns the resources, capabilities and strategies available for the activity. In many developing countries, water institutions are expected to perform adequately with scant funds and poorly defined strategies and without qualified human resources.

Strategies are the pivotal tool for water management organizations to reach out to the community, obtain political legitimacy and support, and effectively fulfill their roles. Defining an adequate strategy is not an easy task. In addition to the predetermined –although manageable– factors of activity, country, resources and capabilities, the definition of a successful strategy is conditioned by and requires technical knowledge, foresight, political savvy and leadership, and the ethical conviction that efficiency and equity in the use and allocation of water resources are crucial to sustainability. The ethical requirement is not always mentioned in the water management literature, yet it is given special consideration in modern private sector management (Hill and others, 1996, p. 57).

Strategies require the setting of basic long-term goals, the charting of courses of action for their achievement, and the procurement and allocation of resources for the implementation processes. While this is the rational approach to planning, strategies also include spontaneous responses to unexpected situations, to risk and to uncertainty. The interface between predetermined plans and the unexpected is a difficult matter. The ultimate, and unfortunately rather glib, answer to this question would be that planning must preserve flexibility.

Referring specifically to water resources planning, Dourojeanni states that planning should preferably concentrate on what is possible and necessary (ECLAC, Natural Resources and Energy Division, 1995, p. 8). Translated into operational terms, this means that water planning requires measures to preserve sustainability and to satisfy basic human needs. Furthermore, planning needs to be cautious about irreversibly committing resources (financial, natural and human), giving rise to rigid structural investments to meet poorly estimated or volatile demands, and approaching management purely in terms of structural investments, while disregarding non-structural measures such as demand management and the integration of water quality and quantity, surface and groundwater, and land and water resources.

III

Water development and management should be based on a participatory approach involving users, planners and policy-makers at all levels

1. Assigning responsibility for overall water management

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

Another limiting factor is the separation of planning and allocation responsibilities among different agencies, therefore separating regulation from planning and disengaging permits from plans (Dellapenna, 1991, p. 413 et seq.).

To avoid such problems, a number of jurisdictions allocate responsibility for policy-making, water allocation and programme and project evaluation to a non-user agency or ministry independent of the traditional sectors. A number of countries seek to improve the quality of decision-making through delegation of such duties to appropriate local levels and through the creation of coordinating arrangements between different levels of government and also with the private sector. In some cases coordination takes place through the creation of river-basin organizations made up of the different stakeholders. However, the most sophisticated systems preserve coherence through a system of approval and consultation for decentralized plans produced by river-basin and regional authorities.

Another means of securing coherence is the retention by the central government of residual authority to apply legislation not properly implemented by local, regional or river-basin organizations.

Brazil has set up a national water resources management system to ensure: a) coordination of integrated management; b) administrative arbitration of conflicts; c) implementation of the National Water Policy, and d) promotion of systems of water charges. The management system consists of: a) a national council; b) state councils; c) river-basin committees; d) water-related organizations at all levels of government, and e) water agencies (Water Policy Law, 1997, arts. 32 et seq.). The Secretariat of the National Water Council comes under the Ministry of the Environment and Water Resources (art. 45).

France has set up a Water Directorate within the Ministry of the Environment, which receives guidance from the Interministerial Water Commission and from the National Water Commission, made up of users, river-basin authorities and the government, which expresses its opinion on matters of national water management. Its activities are decentralized and are carried out through National Environmental Directorates. The Ministry oversees the water boards of the river-basin agencies in technical aspects of water management. The boards are also accountable to the Ministry of Finance regarding financial matters. The Coordinating Prefect for a river basin takes the initiative in preparing the basin water plan, and is responsible for the implementation and coordination of State policies on water management and policing. He is assisted by the Environmental Directorate. The Prefects of the *Départements* are the basic administrative level for State intervention in water management, policing, and the preparation and follow-up of planning documents. They also have emergency powers. At the lowest political level, the communes have a legal monopoly of drinking water supply and sanitation services, are represented on the river-basin

committees and their Boards of Directors, and play an important role in water planning, through the preparation of water management and development plans.

In New Zealand, all levels of government are obliged to consider the effects of proposed actions regarding the environment, with the Minister for the Environment having residual authority to apply every provision of the relevant Act not properly applied by the corresponding local authorities (Furuseth and Cocklin, 1995, pp. 243-272). Regional Councils prepare regional policy statements and plans. In this respect, district and city councils and governments of local territories have lost independence on strategic planning and environmental management issues, and regional planning has been strengthened in relation to city planning (Furuseth and Cocklin, 1995, p. 263). In order to ensure coherency and coordination, regional policy statements and plans must be consulted with the Ministry of the Environment, local and national authorities and Maori organizations (First Schedule, sect. 3). Despite the trend towards devolution to the intermediate level (the regions) the system has built-in precautions to safeguard the national interest. The Ministry of the Environment can set environmental standards, stop controversial developments, approve regional policy statements, and bring decisions before the Planning Tribunal for appeal, while the system as a whole is continuously monitored by the Parliamentary Commissioner for the Environment (Furuseth and Cocklin, 1995, p. 266).

In Spain, the highest authority is the Ministry of Public Works and Urbanism. The National Water Resources Council, consisting of all sectors interested in water, has a consultative role, its main function being to give its views on the National Hydrological Plan and the River-Basin Hydrological Plans, which are approved respectively by the Legislature and the Government.

River basins are managed by hydrographic confederations, regulated and organized under public law, which have a legal standing different from that of the Government. These confederations propose the river-basin plan; administer and control public water resources; design, control and administer public works; grant water rights and concessions; inspect and monitor water resources, uses thereof, and water-related works; gauge water resources; study the situation of water resources; keep records on and provide information about floods; control water quality, and provide technical services (Cubillos, 1994, p. 28).

Despite these signs of greater coherence and independence in water management, in a number of countries or provinces or states within countries water components are fragmented between management agencies dealing with problems of water quality and water quantity, or surface and groundwater (Mitchel (ed.), 1989, p. 203).

2. Stakeholder participation and protection of public interests

A process of democratizing and balancing water decision-making and water-related activities is under way. In water planning, balanced, informed and pluralistic participation is important because it fosters the consideration of wide ranges of issues and in so doing takes into account different dimensions of the resource. This is achieved through public hearings, stakeholder involvement in administrative bodies, organization of users' associations and –for general environmental concerns– greater flexibility of the rules governing the right to act in either administrative or judicial fora. Thus, stakeholders may participate in policy-making, legislative discussion, general water administration, and field level activities.

New Zealand's Resource Management Act requires that public hearings must be held to discuss, inter alia, resource management plans and resource authorizations. Such hearings must not be burdened with unnecessary formalities (sect. 39). The right to be heard and submit evidence is based on the broad standing of concerned parties, with the proviso that parties with the same interest may be limited in their participation (sect. 40).

It is worth noting that some countries have made particularly strong commitments to the consideration of the water interests and rights of native communities and customary uses. New Zealand, Canada, the United States and some countries in the South Pacific (Fiji, Papua-New Guinea) offer particularly worthy examples in this respect. In New Zealand, consideration of Maori interests is a main tenet of the planning process.

There are, however, cases where the interests and concerns of local populations have not been a main issue when planning water development. Disregard for traditional rights has been identified as a major factor in the conflicts associated with, and the relative lack of success of, development efforts in some parts of the world. Concerns relating to the

disregard of social values and interests related to water have also been voiced.[6]

Stakeholders and water users can participate in public hearings or consultations intended to discuss policies, programmes, projects or legislation. While the mechanism is fundamentally designed to open avenues for participation, the mere fact of its creation does not necessarily mean that every stakeholder will participate and thus ensure a balance of interests or more rational decisions. Thus, when the United Kingdom regionalized water management in 1974, certain influential lobbies received more favourable treatment, to the detriment of openness to the general public and –according to some– of economic efficiency (Barraqué, 1992, p. 9). This perception is shared by Mitchel, who points out that "there has been a shift away from involving the public in actual decisions, as regional water authorities have been streamlined to make them more businesslike" (Mitchel (ed.), 1989, p. 215).

Kemper, in her excellent discussion of the Curú Valley, in the state of Ceará, Brazil, notes that privileged user groups have strong standing in the valley, are comparatively well-educated and organized, and would be strong in collective negotiations aimed, for example, at keeping water tariffs low. These groups have more leverage than poorer farmers, including as they do the large agro-industrial complexes and farms. In contrast, poorer users have to live according to the rules of political clientage (Kemper, 1996, pp. 195-200). She also quotes Hearne and Ester, concluding that the legal design of water markets in Chile has resulted in concentration of forfeited land and water rights in the hands of the big fruit-exporting companies, and that although economic efficiency was increased, overall welfare might not have been improved (Kemper, 1996, p. 193 and Hearne and others (undated)).

Examples of similar situations, where the outcome of decision-making processes may have been dictated by construction, land development and farming lobbies, rather than by economic soundness or general economic well-being, are to be found elsewhere in Latin America. Recently, a report found that the economic feasibility of a dam in Western Argentina was "extremely compromised" and that in most cases the Government would have "a negative net benefit"; "the project is not economically attractive, neither in terms of global feasibility, nor in terms of the gains resulting from public investment". Special interests had actively campaigned for the project. The report quoted above has not been disseminated. The implications that non-profitable public investment (and previous public indebtedness) can have in relation to taxes on, and expenditures on behalf of, the general public, are not well understood by the latter. It would appear that the project will nevertheless be built, in line with a recent political decision (Argentina, Ministry of the Economy and Public Works and Services, Energy Department, 1997, p. 5 and cover).

In a presentation made by a senior UNICEF official it was pointed out that "...the danger is that vested interests groups will corner the resource in the name of growth, and inequality will increase further...".[7]

There are, however positive cases of participation by stakeholders. In the Yahagi river basin, in Japan, a Water Quality Protection Association has shown how interest groups from the private sector can combine their interests and talents to tackle problems that in many countries are left to the public sector (Mitchel (ed.), 1989, p. 305).

Other examples of positive participation are provided by professional associations. Thus, the American Society of Civil Engineers is actively involved in the proposal of legal principles for the promotion of integrated management and planning. Starting with the premise that water benefits from management and planning, it has sketched a set of basic principles which water law should include in order to promote improved management: a) with some exceptions, all water is public; b) water quality and water quantity cannot be separated; surface, ground and atmospheric waters should be integrated; c) public attributions required for appropriate management include multifaceted evaluations of water allocations and water transfers; d) rights can be forfeited for waste ; e) water rights can be periodically re-evaluated and the function of water can be varied according to technological changes; f) comprehensive planning requires a balancing act between

[6] See, in general terms, Conac (1989) and the statements by Barraqué (1997).

[7] Gourisankar Ghosh, Chief, Water Environment and Sanitation Cluster, UNICEF, New York. Keynote Address at 22nd WEDC Conference, New Delhi, 9-13 September 1996.

public and private interests; g) safe yields and minimum flows required to maintain water quality and to protect biological diversity must be estimated, after identifying existing uses; h) drought strategies must be developed and special water management areas may be created; i) dispute settlement and arbitration procedures should be established; j) appropriate enforcement and implementation powers should be granted to the relevant water agencies; k) there should be recognition of the need to pursue economic development through the promotion of economic efficiency, by requiring reasonable appropriations and recognizing existing rights; l) environmental values must be protected by expanding the concept of beneficial use; m) conservation and augmentation of the resource should be fostered by granting permits in respect of conserved waters; and n) the transaction costs of temporary transfers should be reduced (Matthews, 1994).

It is argued that governments can further the empowerment of interested parties by providing access to data, giving them recognized status in meetings and, generally, providing opportunities for interested parties to express opinions and positions (Haddad, 1996, p. 392).

The desirability of active government measures to promote participation seems to be confirmed in practice by a recent experience in South Africa: in a public consultation on forthcoming water legislation, industries submitted comprehensive responses, while a number of organizations and individuals also responded in a positive manner, yet it was noticed that no comments were submitted by community-based organizations, rural communities or village-level water committees. Very few submissions came from NGOs either.

The issue of participation is closely related to the development of laws, their enforcement, and accountability under them. While the government is the traditional body responsible for the creation and application of the law, a major current issue is government inertia in this respect. This inertia may stem from inability to act due to lack of resources, or unwillingness to decide in the face of competing pressures.

A good example of creative legal development is the environmental field, where there has been a broadening of the opportunities for citizens' suits and a parallel flexibilization of the rules governing the right to take legal action on the part of groups or individuals having interests other than traditional individual economic interests.

However, citizens' suits are limited when there are no legal frameworks setting the conditions for public action. In turn, the availability of suitable legal frameworks is affected by differences in the opportunities of access to political decision-makers and the lobbying capabilities of interest groups with different interests. While a number of countries have enacted rules on the environment and environmental impacts, binding normative rules on the economic evaluation and conditioning of projects on economic grounds, actionable by the public or by third parties, are scant or nil. Therefore, even the most deficient projects cannot be challenged by members of the public on economic grounds. In this respect, the public in most countries is limited by two factors: the lack of compulsory substantive rules for evaluation of the economic efficiency of public investment and related standards and thresholds, and the existence of rigid rules which grant legal standing only on the basis of traditional individual economic rights.[8] A similar situation exists regarding social interests. The case of the dam in Western Argentina cited earlier in this article is a good example of such a state of affairs. A further consideration is that successful lobbying groups are not accountable.

The imbalance in stakeholder participation and access seems to be an international concern. A project in Latin America, executed by Consumers International and financed by the United Kingdom Overseas Development Administration, starts with the premise that: "Consumer interests are not adequately represented in the policy-making processes that regulate water, electricity and telephone utilities in Latin America. This is due to institutional barriers created by governments as well as lack of information and expertise among consumers' organizations...".

3. Information

The need for data and public information is not only a conditioning factor for appropriate decision-making but also an effective means of curbing imbalances.

[8] "Standing" is the legal technical term denoting the right to pursue an interest in court. Traditionally, standing was only granted on the basis of individual –i.e., not widely shared– economic interests and excluded other interests such as recreational amenities. While this conception is rapidly changing, in most countries citizens still do not have a right to standing on the grounds of bad or inadequate economic decision-making by governments. This would be a very widespread interest, and therefore not strong enough, in the absence of specific legislation, to grant a right to act in court.

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 who is using the water and for what purposes. Therefore, effective water management systems require adequate official surveys, inventories and cadasters of water sources and water supplies, as well as up-to-date registers and records of water uses, discharges into waters, water rights, and beneficiaries of such rights, with their respective water allocations. This is the reason why well-developed water management systems usually charge fees for water rights, in order to finance administrative management and information expenses.

The objective of information is to make possible appropriate decisions by policy-makers, administrators, managers, users and the public.

The Brazilian Water Law of 1997 specifically includes information among the instruments for implementing the national water resources policy (art. 5). The system operates on the basis of decentralization, unified coordination and free access to data (art. 26).

The British Water Resources Act of 1991 requires the National Rivers Authority to provide information to policy-makers and entrepreneurs and also to the public (sections 196-197). For its part, the Authority has powers to obtain information about surface and groundwater. The information must be timely and adequate, and there are provisions on the kind of information to be collected and the manner in which it must be organized (sections 197-203). The British system is complemented with norms on confidential and reserved information and penalties for false statements (sections 205-206). Public participation is sought through a system of inquiries (sections 213-215).

Canada's Water Act provides for the establishment of public information programmes through which the public is informed about water conservation, development and utilization (art. 27). The Act also requires that the Minister responsible for water must report to Parliament each fiscal year on the operations carried out under the Act (art. 36).

The Resource Management Act of New Zealand requires local authorities and public utility networks to supply information to the Minister for the Environment (section 27). Local authorities are required to collect information and keep records on a number of subjects, including, inter alia, plans, resource authorizations and complaints (section 35). National standards on water quality, levels or flows cannot be submitted for approval without first giving the public an opportunity to comment, including such comments in the submissions, and publishing a report and recommendations (section 44).

Proposed amendments to the 1985 Spanish Water Law include establishment of the public's right to have access to water-related information (art. 13 bis)

The 1964 Water Resources Research Act in the United States established Water Resources Research Institutes in each state. Their work, according to Beck and Goplerud (eds.) (1991), has significantly contributed to the data base available for federal and state planning.

4. The lowest appropriate administrative level

It is widely acknowledged that the river basin would be the most sensible unit for the implementation of water strategies. However, arbitrary borders are usually drawn around water projects, disregarding outside impacts. Jurisdictional boundaries not corresponding to the river or other natural systems are one of the greatest causes of inefficiency in the design and operation of water systems. Impacts outside the area of jurisdiction are usually ignored (Howe, 1996a, pp. 31-32).

For this reason, Professor Howe states that the subsidiarity concept (the lowest appropriate level for policy implementation and enforcement) may increase the likelihood of significant externalities, the reason being that the lowest appropriate political level does not necessarily coincide with natural limits. The tension between "subsidiarity" and externalities is one of the biggest outstanding problems in policy design (Howe, 1996a, p. 32). Appropriate organization at the river basin level allows transaction costs to be reduced or minimized. A few countries have therefore heightened the political importance of river basins. In New Zealand the basin is not only the unit for water planning and management but also the main focus of the Regional Councils which have the greatest responsibilities for the implementation of sustainable management. The Councils are responsible for water development, water and soil conservation, geothermal resources, pollution control and the mitigation of hazards in the region (Furuseth and Cocklin, 1995, pp. 243-272). More specifically, they control water use, development, damming and discharges in their area (section 30, Resource Management Act).

The Act has built-in flexibility, since it authorizes the transfer and delegation of functions from local authorities to other authorities. However, such transfers and delegations are subject to approval and must have solid grounds of efficiency, expertise, and representativeness at the community level (sections 33-34).

Along similar lines, according to Barraqué, the Netherlands have turned basin organizations into local authorities (Barraqué, 1992, p. 21).

Nevertheless, the need to ensure that basin organizations realize their full potential in technical terms in reducing transaction costs has not blinded countries to the need for public and stakeholder participation. Therefore the river basin organizations in France, for example, strive to ensure adequate participation of affected and interested parties.

Moreover, by creating the figure of the Coordinating Prefect, recent reforms in French water law seem to be evolving towards closing the gap between administrative authorities and basin organizations. French river basin agencies are based on the geographical scope of the watershed, rather than the political divisions, in an effort to get away from political struggles. The management approach is based on a contract established among the various interest groups, on a decentralized basis. Specific goals include increasing water quality and quantity, and the system integrates water management and private water services. Pollution and sewerage charges are imposed on water users. The Boards of the respective agencies have a system of tripartite representation (the central government, local governments and other users), and the Agencies are (now) fully legitimized in the eyes of public opinion (Barraqué, 1992, p. 21).

On the other hand, the French river basin agencies have drawn some criticisms on the grounds of their excessive reliance on a "give and take" approach and alleged shortcomings in integrated water resources planning and lack of clearly defined police powers (Barraqué, 1992, pp. 13, 20 and 21). Interestingly, this is the same kind of criticism that could be levelled at attempts to introduce river basin institutions in Latin America.

The 1991 Agrarian Reform Law of Peru provides for the creation of independent river basin authorities to promote the formulation of master plans and to encourage their implementation within their area of jurisdiction. They have had only a relative degree of success, due to the lack of clearly defined powers, resources and organizational arrangements.

The river basin has also been the focus of a number of national and internationally sponsored activities at the country and inter-country level in Africa, Asia and Latin America. A number of these programmes have faced constraints and attracted criticisms, including inter alia their lack of correspondence with the capabilities of the area of location, extremely broad –and at the same time weak– mandates, inability to deal with traditional political jurisdictions, unawareness of environmental issues, disruption of local patterns of production, insensibility towards social realities and conditions in the place of implementation, lack of resources, and inability to provide for long-term effects.

A fundamental limitation of these projects has been the lack of local ownership, and as a result tenuous political and electoral support, which in fact may be the key issue for the success (or lack of it) of basin organizations.

IV

Water has an economic value in all its competing uses, and should be recognized as an economic good

1. Water rights

Although water has an economic value and water rights should provide security of tenure to water users, there is a general tendency to condition its use. The conditions imposed include formal requirements (the need to obtain a permit) and those of a substantive nature (i.e., no uncompensated harm to third parties, environmental protection, efficiency).

According to the Brazilian Water Law, the system of water rights is one of the instruments for the implementation of the national water resources policy (Brazilian Water Law of 1997, art. 5).

In New Zealand, authorizations for water use are regulated by the Resource Management Act. Authorizations ("resource consents") cannot infringe the terms of resource management plans. A description of the activity in question and its location are required, as well as assessment of the impacts on the environment (section 88). Consents are issued taking into consideration, inter alia, policies and plans (sect. 104). They may be subject to charges, bonds, covenants, financial contributions, information obligations and liability for environmental damage (even after their expiration), etc. (section 108). Consents are subject to review due to adverse environmental impacts or the establishment of new plans (section 128). In addition, the Planning Tribunal can change or cancel a resource consent by enforcement order (section 133).

It is interesting to compare New Zealand with Chile, where almost all water resources are officially public property, but the system of water rights has resulted in a kind of functional privatization.

In Chile, water allocation is not related to any specific use or price. If water is available, the water law stipulates that the Government cannot reject an application (Peña, 1996, p. 7). After allocation, the only possible regulation is that exercised by the water market. A recent report states that the results of this system include: a) a free transfer of public wealth (Peña, 1996, p. 10); b) present applications for water amount to 50,000 m3/s: four times the total exploitable volume available in the country and out of all proportion to reasonable foreseeable national development during the next 50 years (Peña, 1996, p. 10); c) the situation distorts the operation of the water and other markets, since water rights can be used as a deterrent to entry into some industries;[9] d) the results can include under-investment and increases in the prices of products such as electricity; e) in addition, the individualistic structure of the water rights system leaves no room for planning for the medium and long term (Peña, 1996, p. 12); f) long-term externalities are difficult if not impossible to control; g) integrated basin management is limited, since rivers are divided, for administrative purposes, into sections that do not represent hydrological units; h) ground and surface water are independently managed; and i) quality and quantity are not integrated, and water development is not planned according to multiple-use objectives, but sectorally (Peña, 1996, p. 15).

The German Water Law, which provides a good example of current trends, attaches a number of conditions to water use, permits and licenses. They include, inter alia, the possibility of imposing new conditions *after* a permit or license has been granted. These ex-post conditions may refer to environmental or economic requirements of water resources management (art. 5). Use of water by property owners and riparian dwellers must not adversely affect other persons, cause detrimental change to water, adversely alter the water balance, or substantially reduce water flows (art. 24).

[9] Three decisions have considered the relationship between water rights and monopolization: 1) Court of Appeals, Puerto Montt, *Endesa vs. Dirección General de Aguas*, 31 January 1997; 2) Comisión Preventiva Central: Consultation by the President of the National Energy Commission, Res. CPC 992/636/25/11/96; and 3) Comisión Resolutiva, *Resolución No. 480*, 7 January 1997.

The Spanish Water Law requires that water rights be granted in accordance with the provisions of hydrological plans (art. 57, Law 29/85). Water rights shall be adjusted and reviewed as required by changes in hydrological plans (art. 63, Law 29/85).

2. Water markets

Increasing attention is being paid to the marketing of water rights as a useful and economically efficient alternative for the improvement of water allocations.

However, countries such as China, while acknowledging the need to develop water markets, emphasize the need for macro-management of water resources, to avoid harmful impacts on the environment and social development.

One 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 in general (Anderson and others, 1991, pp. 234 et seq.).

There are also considerations of public interest which apply to the review of applications to transfer water rights. They concern public value externalities and include: a) the 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) the opportunity cost of the use; e) possible harm to other persons; f) intention and ability to use; g) effects on access to public and navigable waters; h) water conservation needs; and i) factors of local importance.

Thus, a reallocation would not be allowed if it resulted in the violation of minimum health, environmental or safety standards. However, the public interest element can be accommodated by making an application for reallocation conditional on measures to mitigate public interest concerns.

Although the substantive legitimacy of public interest concerns is fully recognized, questions have been raised about the most appropriate fora and means for their consideration. While there are always administrative and judicial functions to be fulfilled, for some authorities such fora and means should include water planning and public participation.[10]

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

[10] See Dumars and Minnis, as quoted by Anderson, 1991, p. 298, and also New Mexico Statutes, Ann.: 72-14-1; 72-14-22.

It has been suggested that the marketing of water resources should be subjected to a programme: i.e. active management, with measurable goals and timed benchmarks and performance incentives (Haddad, 1996, p. 392).

3. Integrated water management, economic incentives, and charges

It is widely accepted that pricing is an appropriate water management instrument.

At least one law (Brazil, 1997) identifies water charges as one of the instruments for the implementation of the national water policy (art. 5). Water charges acknowledge the economic dimension of water resources, signalling to the user the actual value of the resource, promote the rationalization of water use, and secure financial resources to meet the costs of the programmes and projects included in water resources plans (art. 19). Funds collected through water charges are primarily for allocation to the basin where they were generated. They are intended to pay for the costs of implementation of basin plans, and to cover the expenses of the administration system. Such expenses cannot exceed 7.5% of the total funds collected.

In France, Water Agencies (Agences de l'Eau) provide financial incentives for the improvement and preservation of water resources. Users pay a fee based on the volume of water consumed or the volume of pollution caused. Such fees are then reinjected into the water sector to help the public and private sector to pay for water conservation and antipollution facilities, equipment and technologies.

Financial actions are implemented through pluriannual programmes (generally for five years) presented to the Basin Committees and approved by the Prime Minister on the recommendation of the Interministerial Water Commission. Action programmes are voted by the users who have to pay the fees, who make up the Basin Committees.

Action programmes must fit in with national economic and social policies and general water policy. They comprise three sections: identification and analysis of problems; actions, costs, and estimates of the assistance expected to be provided by the Water Boards; and systems of fees (expected revenues) for ensuring the financial equilibrium of the system.

Fees are charged to all public or private persons abstracting water, polluting it or altering its regime,

and benefiting from works constructed with the assistance of the Water Boards. Towns, industries, farmers and electricity generation all pay fees.

The New Zealand Resource Management Act requires the corresponding Minister to consider and investigate the use of economic instruments to achieve the purposes of the Act (1991 Act, section 24h). The Minister can also make grants and loans to foster the purposes of the Act (section 27). Local authorities are authorized to fix charges, which can be adjusted according to the actual cost and recovered from the beneficiary of the activity, which the authorities are not obliged to complete until the charge has been paid in full (section 36). The connection between ways and means is clearly expressed in the law, which in section 38 relates the actions of enforcement officers with the payment of salaries and expenses. Further revenue concerns are covered in section 112, which requires the payment of royalties and rents to regional councils.

Drinking water supply and sanitation utilities in the United Kingdom are required to pay financial charges as a contribution to the costs of the Rivers Authority. The powers of the United States Federal Energy Regulatory Commission include the levying of charges for use of public domain facilities.

The question of charging for water is by no means free from controversy. Proposals to charge for water have been objected by Chilean utilities, on the grounds that the original water rights were granted without charges and any subsequent charges would affect their property rights. In Switzerland, the Water Service of the Industrial Services of Geneva is resisting an attempt by the cantonal government to introduce a water tax to pay for restoration of the canton's rivers (*Financial Times*, 1996, pp. 3-4).

V

Conclusions

1. Ethics in integrated water management

Sustainable integrated water management is contingent upon efficiency and equity, among other factors. Inefficient management and allocation of resources have negative consequences on equity (apart from the need to make allowances for targeted disadvantaged groups), since they limit total benefits and access.

Efficiency and equity in integrated water management are closely related to governance, and ultimately to ethics. The concept of ethics in this context implies at least the following main elements: i) not to fund public projects with a negative rate of return, unless justified by overwhelming social considerations, duly stated and proven; ii) to provide the public with accurate, precise and transparent information; iii) not to undertake public projects without careful assessment of their economic, social and environmental impacts; and iv) not to allow the manipulation and monopolization of the resource by special interests.

2. Capabilities of water management agencies

There are systems where planning is mostly understood as the orderly development of water-related works, but there are also others which include explicit considerations of social well-being, economic efficiency, assessment of alternatives, including non-structural and do-not options, social impacts, and detailed considerations of environmental effects. Although the first approach may ensure order, precision and engineering correctness, it needs to be complemented by the second in order to have a correct understanding of macrosituations and ensure sound decision-making.

While some of the national examples discussed in this article show that the state of the art in integrated water management and planning is relatively well developed, the translation of technical norms into binding legal arrangements is uneven, if considered at the world level.

The extent to which countries lagging behind can improve their resource management is related to national capabilities. Capacity-building programmes may help to remedy particular situations, but their ultimate success depends on national commitment and resource ownership.

In this context, "capacity" includes not only appropriate staff, financial resources and adequate organization, but also "software tools", for good project evaluation.

Some national water management systems include principles for the assessment of projects, programmes, or even legislation and policies. While the state of the art on assessment includes well-developed principles on environmental, economic and social issues, legally binding substantive and procedural rules are comparatively more strict on environmental issues than on economic and social issues. The result is that in some countries there is a relatively higher degree of flexibility and opportunities for action by public and private parties concerning environmental issues than concerning issues related to the economic efficiency, social equity and soundness of public actions related to water.

Most developing countries lack appropriate normative standards for the compulsory evaluation of the economic, social and environmental effects of water projects.

Integrated water management and planning is supported by a wide range of public legal attributions and technical knowledge, but its implementation in developing countries is hindered by limited national capabilities and legal development, scant information and understanding of the dynamics of the resource, and unbalanced access and influence of special interest groups.

An area of concern, regarding the ability to implement integrated water planning, is the separation between planning and regulation. Countries are taking action in this regard, however. Some countries are concentrating planning and regulatory capabilities in non-sectoral institutions, others are at the same time creating new mechanisms for institutional coordination and integration, and there is a group where integration of management at the basin level is taking place, through the devolution of functions to regional or basin authorities. Such devolution is accompanied, however, by processes of scrutiny and consultation of regional and river-basin plans at the national level, as well as by the reservation of residual powers by central government ministries in order to remedy the lax or non-existent application of laws and policies and to ensure consistency.

Mechanisms for conciliating and harmonizing different institutions through national councils are gaining support. However, some experiences indicate that the process may be hindered by political feuds, deficient procedural norms, and the need to gain legitimacy.

There is explicit agreement that the basin is the most suitable unit for integrated water management. At the same time, there is concern that this notion should be spelled out clearly when applying the principle of the lowest possible level. A further concern relates to the implementation of the basin concept in the face of jurisdictional boundaries. Further research and dissemination may therefore be required in respect of alternatives involving the use of the existing models, legal principles and organizational arrangements to cope with problems of political boundaries (such as equitable utilization or prohibition of significant harm) and of the powers of national governments in federal countries. All in all, the technical relevance of the basin, and the ability of basin organizations to reduce externalities and transaction costs, seem to indicate that their institutional acceptance will increase. However, basin organizations need to be specially aware of the importance of broad and adequate stakeholder participation.

Experiences of basin-level management bodies in developing countries indicate that for these organizations to be successful they should take into consideration national capabilities and circumstances, be granted adequate resources –including autonomous revenue sources– and have clear mandates and sufficient legal powers. Capacity-building processes and understanding of macro-factors (economic, social, environmental, cultural) are important pre-requisites for the establishment and consolidation of basin-level organizations.

3. Scant public participation

Some countries have well-developed rules for stakeholder participation. In a significant number of developing countries, however, the avenues of participation are not well developed, and when they are developed, tend to allow a higher degree of participation on environmental matters than on economic and social issues. Consequently, well-organized special interests have more opportunities of access than others, and there are few counterbalances other than the judgement of the regulator or the public manager, which in turn may be affected by the phenomenon of "regulatory capture" by powerful interests. Two examples from Latin America, discussed in this article, illustrate this situation. The ultimate result is that, by reflecting only a partial segment of interests, water-related decision-making does not take into account all the relevant factors, therefore hindering integrated management and sustainability. Decisions which are not efficient result in

inequity because limited financial and water resources are allocated on the basis of lobbying capabilities rather than the intrinsic value and merits of competing projects.

4. Information

Information is increasingly being referred to as the basis for sound decision-making and as a means for furthering social control of public water-related processes.

There are some examples of legislation designed to secure integrated land and water management, the integration of surface and groundwater, and control of quality and quantity. However, most cases of integration were to be found in developed and not in developing countries.

5. Water rights and water planning

As water has economic status, water rights and water markets acquire important dimensions. In this regard it has been possible to identify systems covering a wide spectrum of alternatives. Assessment of highly individualistic, unconditioned water rights systems indicates that they do not promote either integrated management, efficiency or equity. At the other end of the spectrum there are systems which subject water rights to planning requirements. Water markets in mature systems take into consideration issues of public interest, which in fact reflect factors relevant to integrated water management. At least two experts endorse the view that planning, programming, benchmarking and participation are important elements in water marketing.

Closely related to the above is the question of what to do when already existing water rights do not fit in with planning decisions. The question is important because if non-conditioned rights are not optimal, legal uncertainty in the face of future conditions may deter investment. Alternative answers to this question could include regulation through police powers and efficiency requirements for water use, or respect for rights effectively and beneficially used, with payment of compensation if they are cancelled.

6. Water pricing

A number of laws refer to, and accept, financial measures and water charges as key tools for water management. There is resistance from vested interests in some countries, however, which shows that there is a need for clearer indication of the relevant conditions when issuing water rights.

7. The limits of planning

While the overall objective of planning is to preserve and make available water of a certain quality at a certain time, for development, sustainability or other purposes, there are some important questions which arise in this connection: a) how much planning is it practical to do, in view of constraints and uncertainties?; and b) to what extent do vested property rights prevent the integration of water resources management, or, at least, how should they be dealt with? (Beck and Goplerud (eds.), 1991, p. 575 et seq.).

In practice, the scope of planning, which was formerly conceived as meaning the orderly and technically correct execution of water-related works, has expanded to include sustainability and social and economic issues.

This is where integrated management must strive to strike a balance between the foresight of planning and the need to keep the strategic ability to adjust to changing conditions, all the more so in a global economy. This is why some experts argue that what should be planned is only what is necessary and what is possible. The relevant question is: what is possible and what is necessary? The answer may be strictly related to local conditions, but overall sustainabilty appears to be a *sine qua non*, except in very specific circumstances, such as the planned depletion of non-rechargeable aquifers.

Also, if sustainability is interpreted as meaning economic, environmental and social sustainability guided by considerations of equity and efficiency, then planning requires a liberal use of economics, sociology and the environmental sciences. In addition, in a changing and globally integrated world, planning for economic purposes should perhaps borrow some concepts and techniques of strategic management from the private sector.

In this context, integration has geographical, environmental and socio-economic implications. It includes a basin-level approach, joint surface and groundwater management, integration of water quality and quantity, and internalization of externalities through "the polluter must pay" and "the user must pay" principles.

(Original: English)

Bibliography

Anderson, L. O. and others (1991): Reallocation, in R. E. Beck and P. C. Goplerud (eds.), *Waters and Water Rights*, vol. 2, Charlottesville, VA, The Michie Company.

Argentina, Ministry of the Economy and Public Works and Services, Energy Department (1997): *Evaluación económica del Proyecto Potrerillos*, Buenos Aires, 27 February.

Barraqué, B. (1992): *Water management in Europe: beyond the privatization debate*, "Flows and Stocks of Fixed Capital" series, No. 7, Paris, OECD (Organization for Economic Cooperation and Development), March.

——(1997): *Integrated water resources management in China: The scope for change*, Nanking International Symposium, 22-25 April.

Beck, R. E. and P. C. Goplerud (eds.) (1991): *Waters and Water Rights*, Charlottesville, VA, The Michie Company.

Colby-Saliba, B. and D. Bush (1987): Water markets in theory and practice: Market transfers, water values and public policy, *Studies in Water Policy and Management*, No. 12, Boulder, CO, Westview Press.

Conac, F. (1989): *Land and water rights issues in irrigated schemes in sub-Saharan Africa and Madagascar - conflicts that might be avoided,* DVWK Bulletin No. 16, Situation-specific Management, International Irrigation Symposium, Berlin, Verlag Paul Parcy.

Cubillos, G. (1994): *Bases para la formulación de leyes referidas a los recursos hídricos*, LC/R.1387, Santiago, Chile, ECLAC, Natural Resources and Energy Division.

Da Cunha, L. V. (1989): Water resources situation and management in the EEC, *Hydrogeology*, No. 2.

Dellapenna, J. (1991): Regulated Riparianism, in R. E. Beck and P. C. Goplerud (eds.), *Waters and Water Rights*, vol. 1, Charlottesville, VA, The Michie Company.

ECLAC (Economic Commission for Latin America and the Caribbean), Natural Resources and Energy Division (1995): *Planes y marcos regulatorios para la gestión integrada de cuencas*, LC/R.1487, Santiago, Chile.

Financial Times (1996): *Water Report,* No. 6, London, 4 September.

Furuseth, O. and C. Cocklin (1995): An institutional framework for sustainable resource management: The New Zealand model, *Natural Resources Journal*, vol. 35, No. 2, University of New Mexico School of Law.

Haddad, B. M. (1996): *Evaluating the market niche: Why long-term rural-to-urban inter-regional markets for water have not formed in California*, Berkeley, CA, University of California, PhD. thesis.

Hearne, R. R. and others (undated): *Water allocations and water markets: an analysis of gains from trade in Chile*, Technical Paper No. 315, World Bank, Washington, D. C.

Hill, C. and others (1996): *Strategic Management: An Integrated Approach*, New York, McGraw-Hill.

Howe, C. (1996a): Water resources planning in a federation of states: Equity vs. efficiency, *Natural Resources Journal,* vol. 36, University of New Mexico School of Law.

——(1996b): *Protecting Public Values under Tradable Water Permit Systems: Efficiency and Equity Considerations*, Boulder, CO, November.

Kelley-Pittman, A. (1991): Planning and authorization of federal water projects, in R. E. Beck and P. C. Goplerud (eds.), *Waters and Water Rights*, vol. 1, Charlottesville, VA, The Michie Company.

Kemper, K. E. (1996): *The cost of free water: Water resources allocation and use in the Curú Valley, Ceará, Northeast Brazil*, Linkoping Studies in Arts and Science, No. 137, Linkoping, Sweden.

Matthews, O. P. (1994): Changing the appropriation doctrine under the model statute water code, *Water Resources Bulletin*, vol. 30, No. 2, Bethesda, MD, American Water Resources Association.

Mitchel, B. (ed.) (1989): *Integrated water management: International experiences and perspectives*, London, Bellhaven Press.

Peña, H. (1996): *Modificaciones al código de aguas y su aporte a la gestión del agua*, Seminario Internacional: Gestión del Recurso Hídrico, Santiago, Chile, FAO (Food and Agriculture Organization of the United Nations), December.

The New York Times (1991): Federal judge orders review of rules on irrigation water, New York, 1 August, p. A 14.

United States, Water Resources Council (1971): *Proposed principles and standards for planning water management and related natural resources*, Office of the Federal Register, vol. 36, No. 245, Washington, D. C., 21 December.

Wright, R. and others (1978): *Land Use*, St. Paul, MN, West Publishing Co.