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OSCAR ALTIMIR
Director of the Review

EUGENIO LAHERA
Technical Secretary



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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.

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).

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.

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). Hydro-power 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

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 dis-

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