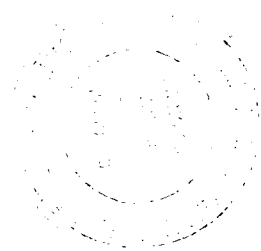


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**ENVIRONMENTAL MANAGEMENT
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SHARING RESPONSIBILITY FOR RIVER BASIN MANAGEMENT

by

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SUMMARY

This paper discusses the possibilities and alternatives for the shared responsibility for the management of river basins in Latin America and the Caribbean. Particular consideration is given to the formation of institutions based on the partnership of all users as a means of affecting the decentralization of management responsibilities away from central governments.

In the discussion, existing experience of user participation in river basin management in the region is evaluated as well as the current attempts in many countries to decentralize water management responsibilities, in the light of the growing concern for the environmental aspects of water management.

Conclusions are drawn as to the most appropriate policy paths for the achievement of greater public involvement and for the development of partnership institutions for river basin management.

INTRODUCTION

Most countries in Latin America and the Caribbean have introduced major reforms within their public sector institutions over the last few years. In many countries, these reforms are not yet complete, but in general the tendencies within this reform process can clearly be seen. First, there is an overall reduction in the part played by the state in managing the economy and, second, within the restructured public sector there is a transfer of responsibilities to lower levels of governments, the states or provinces in the federal states and to the municipalities in unitary states. Naturally, the water related activities of the state have not been immune to these changes and a virtual revolution has occurred in water management practice in most countries of Latin America.

Prior to the recent changes, water management was largely in the hands of central government agencies responsible both for the water resource or the supply of water in nature and for the management of the use of water. In general, the private sector was excluded from participation in management. There were some significant exceptions, however, particularly in irrigated agriculture. In a few countries management was concentrated in one agency, but more commonly a plethora of agencies existed distributed over a large number of ministries. In such an institutional environment any real participation by water users in the management and decision making process could only be marginal, at best, and was only to be found under very special circumstances.

The rationalization, decentralization and privatization of management responsibilities has brought about an unprecedented change in the institutional environment for water management as many new actors enter into the management and decision making process. Where this process was closed it is now open and public discussion of water management decisions is increasingly common along with the questioning of the traditional centralized approach to decision making.

One important aspect of the criticisms made of the traditional approach to decision making turns on the lack of consideration of the environmental consequences of water management decisions and the consequent damaging environmental effects of many decisions to construct works and assign water use. It is arguable that the over-centralization of any activity is likely to lead to sub-optimum decisions and, especially, a failure to consider their wider implications. A consequence is the ignoring of the environmental effects or impact of decisions. The more open and participatory the process of decision-making is, the more probable it is that all aspects of the decision will receive consideration. Obviously, this does not mean that perfection can be achieved, but only that better decisions will result.

Examples of user participation in management

Traditionally, user participation in the management of water resources has been restricted almost entirely to irrigation and only found in some countries (Table 1). The examples given in the table are of more highly developed systems of user involvement in water management. In many other countries, such as Colombia, Mexico and Peru, users also participate in the management of some kinds of irrigation system. This is usually, as in Ecuador, in smaller or privately constructed canal systems. In public or state financed schemes, user participation in management has been much more restricted or indeed absent often at the cost of a high degree of inefficiency (Lee, 1990). In contrast, in Chile and in the province of Mendoza, Argentina, user participation has a long and successful history. The water law of Mendoza establishing the present institutional regime was adopted in 1884 while in Chile the origins of the present system pre-date independence, although the foundation of the present institutional system dates from the promulgation of the Civil Code in 1857 (Reyes, 1990). The legislation has been modified on various occasions, ultimately in 1981. From the beginning, the institutional system included strong user participation in water management and this was strengthened with the most recent reforms.

In Chile, in particular, in recent years there has been considerable private investment in irrigation infrastructure both on and off the farm. Moreover, the increasing efficiency in water use due to this investment has contributed to a transition since the early 1970's from a situation of an agricultural trade deficit to a large surplus (Altieri, 1993). In the years between 1979 and 1988, wheat production doubled and fruit production increased by more than two and one half times. These increases in production were achieved with no change in planted areas in the case of wheat and less than proportionate increases in the area planted to fruit. For some fruits, even greater increases were obtained, for example, the production of table grapes increased 6 times while the planted area increased less than 4 times (Chile, 1991).

The water management institutions in Chile which are active in the decision-making process are all autonomous user institutions. Overall water policies are affected by decisions taken by government institutions for agriculture and for the supervision of activities in related areas such as water supply and sanitation and energy. More recently, water management decisions have also begun to be influenced by specific environmental policies. The absence of any central water management agency other than the Dirección-General de Aguas (DGA) responsible for the issuing of water rights, which once issued become private property, and their registration

is most unusual. The DGA has no direct responsibility for water policy. In fact, the water policy is to leave all decisions in the hands of the user bodies, unless they are not capable of reaching an agreed result.

The user managed institutions in Chile, however, only act on matters relating to water quantity, that is in relation to the distribution of water between persons holding water rights – principally, farmers, but also including municipalities, industries drawing water directly from rivers and the hydro-electric power companies. These institutions have no corresponding authority over water quality or over the environmental impact of any water withdrawal or any other use of water and river basins are not used as administrative units (ECLAC, 1991). Recently, there has been considerable discussion in Chile on the need for changes in the institutional structure and modifications in the water law and a proposal is currently before parliament.

None of these user bodies are engaged in river basin management. River basin management institutions are scarce in Latin America despite several attempts in different countries to establish them (ECLAC, 1985). For example, Mexico established a number of river basin agencies, but these have operated within a highly centralized institutional system for water management and did not provide for participation by the local institutions and the population of the basin.

The most successful river basin agencies are those found in Colombia. Colombia, with its tradition of decentralized administration and consequent strong local institutions, has a system of regional development agencies which are organized around river basins and have considerable water management and even environmental management responsibilities. The institutional structure, although these are local institutions, does not provide for direct public participation. The oldest of these agencies are the Corporación Autónoma del Valle del Cauca, in Cali and the Corporación Autónoma Regional de la Sabana de Bogotá. Over time the attributes of these agencies have changed, but both possess authority to plan and develop the water resources of the river basins under their jurisdiction and to operate and maintain the works required to achieve that development. They are also the executing authorities for the Colombian environmental code within their area of operation.

Table 1

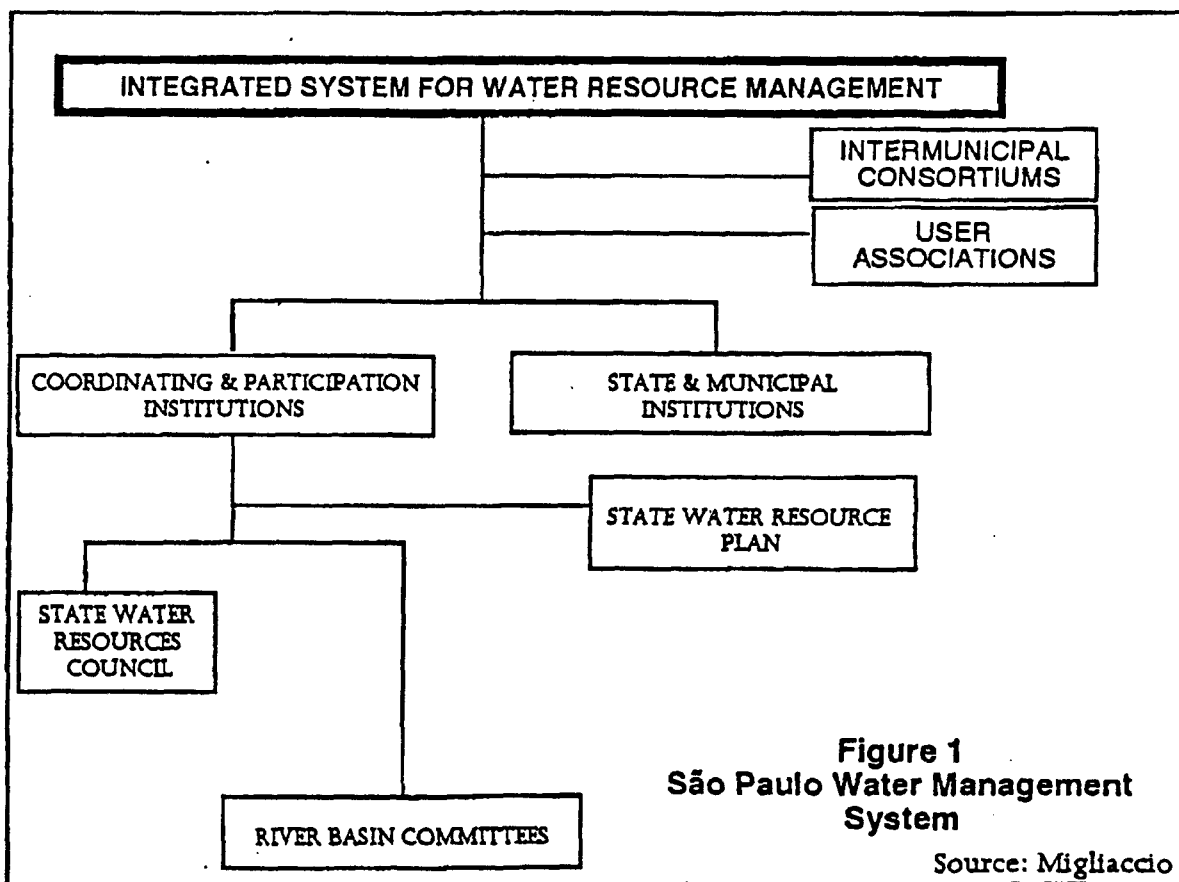
TRADITIONAL PATTERNS OF PARTICIPATION IN WATER MANAGEMENT

Country	Institution	Faculties and Responsibilities
ARGENTINA, Province of Mendoza	General Department of Irrigation (DGI)	The central water administration agency with responsibility for rivers, diversion structures and the main canals. The DGI is an autonomous public agency, financially independent and establishes its own budget. The chief officer or superintendent is appointed by the governor of the province, the remaining directors are elected by the users and ratified by the governor.
	Waterway Inspection Offices	These offices are responsible for the administration of the distribution of the water used for irrigation. They are public bodies representative of the irrigation users and the officers are elected. There were 720 Waterway Inspection Offices in 1989.
CHILE	Watch Committees (Juntas de Vigilancia)	The Watch Committee is formed from representatives from each canal association and other major water users, such as municipalities and hydroelectric power companies. The committee is responsible for the assignment from the river or river section under its jurisdiction to each association or user according to the rights they each possess. In moments of water shortage the committee has the power to redistribute the water among the users.
	Canal Associations (Asociaciones de Canalistas o Comunidades de Aguas)	The owners of water rights are obliged to form user associations to manage water they use. The associations elect a directorate, appoint staff and have the right to charge a tariff to cover the costs of the operation of the water control systems under their jurisdiction.
ECUADOR	Water Directorates (El Directorio de Aguas)	The Water Directorates are user associations responsible for the distribution of water, the operation of control structures and conservation of water within canals built privately. They are self-financing. The officers are elected by the owners of water rights.
	Irrigation and drainage commissions	User organizations within public irrigation schemes. They are advisory to the National Electricity and Water Institute (INERHI) on the operation of the canal systems and crop production activities

Source: Author, based on national reports.

In the state of São Paulo, Brazil, the Water Law of 30 December, 1991 established a new system for water management which provides for the management of the water resources of the state on the basis of integrated river basin management with considerable public participation through consortiums of municipalities and user associations (Migliaccio, 1992). The basis of this new institutional system is the Integrated Water Management System of the State of São Paulo which is constituted by a variety of coordinating mechanisms, but which basically operates through River Basin Committees in each major river basin of the state (Figure 1).

The river basin committees consist of representatives of the municipalities in each basin, of the users and of the universities and research institutes. If the conditions of the water resources of the basin justify it, the River Basin Committee may create a River Basin Agency to manage the use of water and to finance the required works. The necessary funds are to be obtained from water use charges leveled on all users both for the use of water and for the benefits received from flood protection and drainage works etc. It is too early as yet, however, to know whether the system in São Paulo functions well and if significant public participation in water management is being achieved.



The Environmental Imperative in River Basin Management

One of the most important forces behind the adoption of the new water resource institutional system in the state of São Paulo, as well as behind the reconsideration of policy in many other countries of the region, is the growing concern with water pollution. The decline in the quality of water due to gross domestic and industrial pollution is the major contemporary challenge facing water management in Latin America (ECLAC, 1992).

Three important changes, the concentration of population in major metropolitan centres, the increasing interference in the hydrologic cycle due to the intensification of agricultural land use and the growing regulation of stream flow, have had serious repercussions on the management both of flow regimes and of water quality in the countries of Latin America. The new demands on the water resources associated with these changes have caused considerable stress on existing management systems. Despite the differences among countries, there is a common pattern of increasing demands for domestic and industrial water supply, increases in municipal and industrial waste loads, expanding occupation of flood plains and increasing use of water bodies for recreation.

An important component of the challenge presented by the growth of demand is the increasing frequency of multiple and successive use of the water courses. The control and regulation of river flow expands with industrial and urban growth, due to the increased demand for hydroelectric power. This means the regulation of flow regimes through the construction of dams, reservoirs and levees, the canalization of streams and other protective works, all of which results in changes in the spatial or temporal patterns of flow. The impact of hydroelectricity works on patterns of streamflow is increasing in the region. On the Parana River and its tributaries a chain of dams and reservoirs has been built, accounting for almost all the storage capacity created in Latin America since 1976. In Chile, the flow regimes of most of the rivers between Santiago and Puerto Montt are affected by the existing and proposed construction of dams for hydroelectric power generation. In the region, as a whole, more than ninety percent of reservoir capacity has been constructed since 1950. A further important factor is, one often-forgotten aspect of demand for water services, the large demand generated for water-related recreation. Recreation requires high water quality and, therefore, the protection of water bodies from contamination. At the same time, the recreational use of water bodies may threaten the more fragile elements of aquatic ecosystems.

The increase in the intensity of demand, in most countries of the region, is led by the demand from large metropolitan urban complexes, some of which are already among the world's largest agglomerations of both population and economic activity. The development of such large urban areas has had severe repercussions on the water resource. Their demands have not been reflected in the development of management institutions. In most metropolitan areas, there is only one local water management institution, the water supply and sanitation company. These companies whether municipal as in Colombia and much of Mexico, regional as in Chile, state or provincial as in Argentina and parts of Brazil or national, as is generally the case in Central America are not generally fitted for a wider role in water management. Whatever their affiliation, the water supply and sanitation companies have been, with some significant exceptions, too often financially weak and inefficient in their basic functions (Yepes, 1990). The current trend to privatization may increase the efficiency of water supply and sanitation services, but is not directly aimed at the need for better water management.

If water supply and sanitation companies have often been inefficient, responsibility for other aspects of metropolitan water management is at best diffuse and at worst non-existent. For example, storm drainage is usually left to the municipalities, flood control may be their responsibility or left unassigned until disaster occurs, water quality control will often be the responsibility of the Ministry of Health, irrigation will be the responsibility of the Ministry of Agriculture or perhaps of the private sector. The list of possible institutions which may be involved in water management in any one metropolitan area is very long and very varied. Recently, when in Santiago, Chile a meeting was organized to consider the integrated management of the Mapocho River Basin almost 60 institutions were represented. More importantly, in most metropolitan regions no means exist to coordinate either policies or actions related to water management.

The Institutional Inheritance

Water management in Latin America, in general, not only in metropolitan regions, remains far from optimum despite the progress that has been made in the application of scientific management techniques. This is especially the case in those regions where the use of the water resource is most intensive and conflictive. In these regions the intensive use of water bodies has been difficult to accommodate in the existing management systems as has the increasing urbanization of many river basins.

A recent study by ECLAC shows that many issues inherent to water system operation are being poorly handled and even ignored (Lee, 1990). This is the case almost without exception with respect to the maintenance of infrastructure, but other aspects of system operation and management are woefully disregarded as well. It is also observable that differences in management performance seem to be due not to organizational structure, although having an institutional structure in which water management issues can be publicly discussed helps, but to the degree of dynamism of management in any specific case. There is some evidence, however, that the establishment of a clear distinction between responsibility for the management of the resource and responsibility for the management of the resource's use can be beneficial. Private sector or user participation in management can be a valuable tool towards achieving this distinction.

In the second half of the twentieth century, water management in Latin America has been characteristically highly centralized within the public sector and in the national governments (ECLAC, 1991). The participation of other levels of government has been very limited, even in nominally federal states, and the idea of user participation, with the exceptions discussed above, has only been honoured in the breach. The institutional structures prevalent in the countries of the region varied markedly, but all were unashamedly centralist and with a very high degree of state control. One consequence was the prevalence of national institutions with responsibility for a single water use. These institutions, which were founded mainly in the 1940's and 1950's, often replaced local water institutions which had been run municipally or regionally for centuries. These local institutions had, in many countries, a long history of user participation in their management. This participation disappeared when management was centralized in national institutions.

The trend towards the management of water resources through centralized single-purpose institutions began to change in the 1970's. For example, in Argentina many responsibilities were transferred back to the provinces from the federal government where constitutionally they had always rested. It came, however, to a complete halt with the crisis in the Latin American state which accompanied the debt crisis of the early 1980's. By then, the need to improve water management had become imperative, following Latin America's most serious economic recession since the 1930's, when, in most countries, the rate of expansion in the construction of control works slowed dramatically. There was growing concern that the gains anticipated from the investments that had been made in water control works had not been realized to the extent expected when the projects were originally undertaken (Dourojeanni and Lee, 1989). Moreover, there was criticism that in many water control projects heavy costs had been incurred in

the loss of alternative environmental opportunities, costs not justified by the benefits actually obtained.

As a result of the policies adopted to reduce the role of the state in Latin American societies has been the withdrawal of central governments from water resource management responsibilities. The form of the withdrawal has varied considerably both among and within countries depending on their institutional structures and political traditions. One policy found in many countries has been the privatization of many water related services, particularly hydroelectric power generation, as in Chile and Argentina, and water supply and sanitation, as in Mexico, Argentina and Venezuela. Privatization has even extended to irrigation as schemes have been transferred to user management. Such transfers of management responsibility, which began in Chile in the late 1970's, are now basic policy in many countries, including Argentina, Colombia, Mexico and Peru.

Alternative Futures for Participation and Partnership

The transferring of responsibilities from central government agencies to lower levels of government and to the private sector is producing a need for new institutional structures for water management in the countries of the region. The centralization of water management destroyed the traditions of local and user participation in management nearly everywhere. Even among the federal states, only in Brazil was extreme centralization avoided and the participation of the States maintained. Now the decentralization demands that the idea of user participation, of partnership among the different organizations and the private sector, be recreated through the adoption of institutional structures appropriate to the traditions and idiosyncrasies of the countries of Latin America.

Privatization has meant, by its very nature, an increase in the participation of the private sector in water management. It can also lead to a widening of the purview of traditional institutions, such as the Water Watch Committees (Juntas de Vigilancia) in Chile. When the water law was modified in Chile in 1981 a new class of water rights was created for instream use of water. This has meant the inclusion of the hydroelectric power companies in the membership of the Watch Committees with a consequent modification in the nature of their deliberations.

In itself, however, the transfer of responsibilities to the private sector cannot create a new institutional system for water management. Such a system must be specifically created. The need for innovation is widely recognized, but there has been little progress in the countries of the

region in the construction of a system of water management within river basins with wide social participation where the environmental aspects of water management are given their due weight.

It is undeniable that the creation of such institutions is complex. Simply coordinating the activities of the public sector can be a difficult task. For example in the River Bío Bío basin in Chile 16 public sector institutions from 9 different central government ministries were identified as having responsibilities for aspects of water management. In addition, there are regional governments and municipalities (Larrain, 1988). In many cases, these institutions have jurisdiction in the same area of water policy. For example, 9 institutions share administrative responsibility for water pollution and 8 share responsibility related to physical modification of the river's course. There is no reason to think that the administrative situation in the Bío Bío is any exception either in Chile or in Latin America, as a whole.

Given that this is the situation, the idea of establishing some form of river basin administrative authority for water management is very attractive and has been proposed for many years (United Nations, 1970). Such authorities have not, however, been adopted in Latin America (Kates and Burton, 1986). Mention has already been made of the recent attempt to introduce river basin authorities in São Paulo, Brazil and the creation of such authorities is also contemplated in the new Mexican water law promulgated in December, 1992.

This law provides in Article 13 that:

"The Commission", with the agreement of the Technical Council, may create river basin councils which will be points of coordination and agreement between "The Commission", federal, state and municipal institutions and representatives of the users of the respective basin with the objective of formulating and executing programmes and activities for improved water management, the development of hydraulic infrastructure and related services and for the conservation of the resources of the basin (Mexico, 1992).

In reforms to the Chilean water law, currently under discussion, the creation of autonomous private, but non-profit, River Basin Administrative Authorities is proposed in which both government and users would be represented.

It would appear, therefore, that there is considerable interest, at least in these three countries, but not limited to them, in river basin based water management through regional authorities based on partnerships between government and citizens. Moreover, there is obvious political will in many countries to introduce the necessary legislation to establish such institutions and even to provide them with their own source of funding.

It would be premature, however, to prophesy at this point a solid future for river basin based water management in Latin America. Autonomous organizations have not prospered in most countries in the past and, although the general perception of the state's role in the economy has changed, their introduction is fraught with potential political competition from other state institutions, both bureaucratic and legislative.

There are strong arguments, therefore, especially in those countries with little experience in user organizations in water management and in those with traditionally weak local government institutions to move gradually in assigning authority to partnership based river basin authorities. An institutional change of this management is a very complex matter. Central agencies may be required to cut staff and change work patterns. It may be necessary for them to become supervisory rather than executive agencies. This may require new training at all levels of staff. At the same time, new local agencies have to be created and staffed. This creation of local executive agencies must be accompanied by the development of local representative bodies which adequately represent all local interests. It is true that a gradual approach to change may give more time for opposition to develop in the existing bureaucracy, but new institutions require time to establish themselves. Studies made of the transfer of irrigation systems from a central agency to decentralized user management show that for success a median way between rapid and gradual change is necessary for success (IIMI, 1993).

Conclusions

In the last half century or more, water management in Latin America has been dominated by large, usually national, institutions responsible for one aspect of water use. The only exceptions were even larger comprehensive institutions such as the Secretaría de Recursos Hidráulicos in Mexico. These institutions did not encourage user participation in decision making and most decisions were taken on the basis of technical considerations. Scant attention was given to environmental concerns and even less to social considerations. These institutions, however, developed a high degree of technical expertise and an impressive expansion in the hydraulic infrastructure resulted. In the last five years, the majority of these institutions have been dismantled, their functions transferred elsewhere in the public sector or privatized. This situation provides, perhaps, a unique opportunity for the construction of a more participatory institutional system.

There is considerable evidence of efforts in a number of countries to take advantage of the opportunity. Legislation in a number of countries proposes the creation of river basin administrations. The specific proposals vary, but all of them contemplate institutions with

representation of all sectors of society with interests in water management. Past experience shows that user controlled water management institutions can successfully manage water resources, but it also shows the difficulties of decentralized autonomous institutions in countries with traditions of centralized government.

The change in attitudes necessary to ensure that river basin administrations based on a partnership between the public sector and the society as a whole is not one that can be brought about solely by the need to improve water management. This does not mean that water management cannot take the lead in developing decentralized and autonomous institutions. It cannot be expected, however, that such institutions can come into being easily or that their development will not produce friction with existing institutions both within central and local government and, perhaps, in other areas of society.

What is abundantly clear, however, is that, unless there is considerable local political support for managing water resources locally and acceptance of the responsibilities that this involves then such initiatives cannot prosper. Earlier attempts to establish river basin administrations failed largely because they were imposed centrally and had no real local roots. They all withered on the vine of bureaucratic competition. There have been examples of river basin agencies imposing their views against the desires of the local population. It is not sufficient that water is found in river basins for river basin management to succeed. River basin management authorities are human institutions not hydraulic systems.

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