

# Workshop on Strategies for Integrated Water Resources Management In Latin America and the Caribbean

San José, Costa Rica  
May 6-7, 1996

PROCEEDINGS

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*Appreciation is expressed to appropriate Administrative Bank Headquarters Units and Personnel, to IDB Representatives, Administrative Offices and International and Local Sector Specialists in the Field Offices, especially COF/CCR, and to the host country, Costa Rica, for the valuable assistance and support provided.*

*The opinions, concepts and recommendations included in this report and its annexes are those of the participants and consultants and do not necessarily represent the official position of the governments, the Inter-American Development Bank, the World Meteorological Organization, or any of the participatory agencies.*

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# Background and Organization

This report summarizes the results of the two-day Consultation Workshop on Strategies for Integrated Water Resources Management in Latin America and the Caribbean (LAC) financed through a Bank technical cooperation (ATN/SF-5194-RG). The Workshop was held in San José, Costa Rica, on May 6-7, 1996, in conjunction with the Conference on Water Resources Assessment and Management Strategies in Latin America and the Caribbean sponsored by the World Meteorological Organization (WMO) and the Inter-American Development Bank (the Bank). The Workshop is part of a multi-step action plan developed by the Bank to prepare its strategy for integrated water resources management in Latin America and the Caribbean. This strategy will be based, to the greatest extent possible, on current conditions in the region, and directly incorporate the major concerns of LAC water managers.

To this end, a Strategy Profile was prepared in July 1995 and submitted to the Policy Committee of the Bank's Board of Directors on February 22, 1996. The report *A Proposed Strategy to Encourage and Facilitate Improved Water Resources Management in Latin America and the Caribbean*, by William B. Lord and Morris Israel, was commissioned to assess current water resources management conditions in LAC and propose a conceptual analytical framework for addressing water resources management issues. Findings of the report were presented to Bank staff and invited guests from other international lending institutions at a one-day seminar on November 15, 1995, in Washington, D.C. Comments and recommendations from the seminar were incorporated into the final report and were used to prepare the working document which served as the focus of the Costa Rica Workshop.

The primary objectives of the Workshop were threefold. First, to consult with LAC authorities responsible for water resources management on proposed strategic approaches for water management in the region (i.e., to solicit comments on the Bank's document). Second, to identify special issues that need to be further researched prior to developing an overall strategy. Finally, to identify priority issues where the Bank's involvement can make important contributions to bettering water resources management in the region. Conclusions and recommendations from this Workshop will be used as inputs to prepare a first draft of the proposed strategy, which will be submitted to the proper Bank authorities. It is expected that other fora, such as the conference of the Inter-American Dialogue on Water Resources in September, 1996, in Buenos Aires, Argentina, will provide additional inputs from a broader range of stakeholders.

The Workshop included six presentations by consultants on various aspects of water resources management. The consultants' presentations dealt with the following topics:

- I. Proposed Elements for a Bank Strategy on Water Resources Management
- II. Planning for the Integrated Management of Water Resources
- III. Institutional Innovation for the Integrated Management of Water Resources
- IV. Community Participation in Watershed Management
- V. Water Markets, Monopolies and Rights: Institutional Elements

## VI. Economic Instruments in Integrated Water Resources Management: Advantages and Constraints

Following the presentations, the participants were organized into working groups to discuss the papers presented by the consultants. The consultants were asked to prepare a series of questions to help focus group discussions. The working groups were organized according to the Bank's three operative regions:

### **Working Group 1**

Argentina, Bolivia, Brazil, Chile, Paraguay, Uruguay

### **Working Group 2**

Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama

### **Working Group 3**

Bahamas, Barbados, Colombia, Ecuador, Guyana, Jamaica, Peru, Suriname, Trinidad and Tobago, Venezuela

A total of 81 participants attended the Workshop: 42 water resources functionaries from 25 LAC countries; 4 NGO representatives; 8 consultants; 12 functionaries from UN and other regional and subregional organizations; and 15 Bank staff.

The participants stated that the Workshop was a valuable process of information exchange and noted that similar activities should be undertaken. It was suggested that this type of workshop be held at the national level in the member countries and attended by a broader group of professionals, including wider participation by nongovernmental organizations (NGOs).

Part I of this report presents the major findings of the Workshop. These are followed by some additional considerations for Bank action. A brief summary of the presentations is then provided. The conclusions and findings of the individual working groups are included in Annex I. The Workshop Program is included in Annex II, and Workshop participants are listed in Annex III. Full versions of the papers presented by the consultants are included in Part II.

Part I  
Conclusions and Findings

Workshop on Strategies for  
Integrated Water Resources Management  
In Latin America and the Caribbean

*San José, Costa Rica  
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# Major Findings of the Workshop

Generally, working group discussions supported the principal findings of the report, *A Proposed Strategy to Encourage and Facilitate Improved Water Resources Management in Latin America and the Caribbean*, regarding the major shortcomings of current water resources management practices in LAC and the efforts underway to overcome these difficulties. Country representatives stressed the urgent need to address these problems in a coordinated and sustainable manner. Discussion of the six topics presented by the consultants focused on the experiences of the various countries, from which the following general conclusions were drawn.

The Workshop consisted of three plenary sessions, during which the six specialists presented their subject, and two sessions held by each of the three regional working groups listed above. The three regional working groups were asked to present their conclusions and list of outstanding issues to the entire group in the fourth and concluding plenary session. Some issues appeared on the list of all three groups (consensus), others appeared on the list of only two of the three groups, and yet other issues appeared on the list of only one group. This does not necessarily imply that these were the only subjects discussed in the different working groups, as conversations covered a very broad range of topics. It only means that the members of the groups did not consider the other issues discussed to be of priority in reporting back to the main group. This section summarizes the findings of the three working groups. Responses of the individual working groups are provided in Annex I.

## Consensus Issues

The three working groups agreed that Bank financial and technical support was needed in the following areas:

- C *Developing country-specific, integrated water resources management strategies.* It was noted that the strategy and proposed institutional changes should not be isolated from the economic, political, and social reality of the country. The problem and the context in which it occurs should drive the search for solutions.
- C *Strengthening of institutions associated with water resources management.* It was suggested that a thorough diagnosis and evaluation of existing legal and institutional systems and frameworks, and an evaluation of water supplies and demands, be undertaken as a precursor to institutional strengthening or innovation. Policy and regulatory impediments to improved water resources management need to be identified.
- C *Training and education of personnel at all levels.* The need for capacity building is not a one-time affair. The process must be sustainable, and thus, it needs to be systematic and continuous. Special attention should be given to training those persons who, because of decentralization, will be assuming water management responsibilities.
- C *Strengthening the mechanisms for stakeholder participation and decision-making at the local level.* Capacity building alone is insufficient to foster stakeholder participation. It must be accompanied by legal reforms at the national and regional levels to permit “bottom-up” management.
- C *Facilitating and encouraging the exchange of information among countries.* The countries of LAC are short on experience with the use of economic and other innovative instruments for water resources management. The experiences and lessons

learned need to be disseminated to all interested countries.

- C *Providing special support for the evaluation of economic instruments, such as water markets and privatization, for water resources management.* These instruments can conjure up fairly divergent views and opinions. Thus, their advantages and disadvantages, as well as their limitations and conditions for implementation, need to be further addressed.

A significant consensus was the recognition of the need to consider not only the beneficial uses of water, but also the economic, social, legal, political and environmental aspects. In other words to **manage** the resource, which includes the approach of water resources from the standpoint of increasing the supply of water, and also from the standpoint of demand. It was agreed that management should be **integrated** and not performed by sectors. The participants also recognized that an analytical framework dividing actions into three levels—constitutional, national, and local—was a useful tool. There was some confusion regarding the interpretation and actual implementation of the three action levels, but there were no major objections to its use by the Bank to help focus its activities. The groups concluded that diverging opinions on privatization and water markets called for greater understanding of their related advantages and drawbacks. Although it was not specifically noted in the presentations, *the conceptual framework for analyzing water resources management problems was viewed as a valuable tool.*

### Other Issues

Several issues raised by some of the working groups, but not by all, are discussed below. As noted above, Annex I contains all conclusions of the three working groups.

- C The development of basic infrastructure projects, including those for water supply, sanitation, irrigation, and storm water drainage, should continue. The expansion and maintenance of data collection and monitoring systems (e.g., water quality) should be supported in order to encourage wider use of collected data, to increase its dissemination, and to use the information for purposes of forecasting and real-time operation.
- C Inclusion of a beneficial and effective use clause for water rights was viewed as an important component of legal reform projects. The primary purpose of such a clause would be to prevent speculation and the monopolization of water rights were these to be privatized. The requirements of beneficial and effective use of water also encourage efficient water use and resource conservation. Not all working groups specifically noted this item. However, it was discussed in each of the working sessions.
- C Although the need for capacity building was identified by the three groups, there were numerous issues related to education and training that emerged from the individual group discussions. There was a call for programs to increase awareness of water resource issues among the young to motivate their interest in pursuing careers in this area, and for programs to update university curricula to reflect the changing needs of water resources management. It was also noted that training programs should be aimed at extension workers, farmers, and the population in general to promote resource conservation. Educating and raising the awareness of the public at large is a precursor to public participation. Ultimately, improved water resources management must rely on local capabilities. International lending agencies can help, but the burden rests with the people and their institutions.
- C The Bank and other international donor

agencies must make the best use possible of in-country human resources, and use external consultants only when qualified local consultants are not available. In the event that external consultants are needed, conditions for technology transfer and training of local professionals should be firmly established. Use of external consultants looks particularly out of place when the international donor agencies urge staff reductions for efficiency reasons and then use outside consultants to do the work.

- C Increased coordination with universities, research institutes, and NGOs should be sought in developing programs to encourage stakeholder participation. These groups can help strengthen education programs and disseminate information at the local and regional levels.
- C Noting that water resources management is an increasingly political activity, a concern of many participants was how to increase awareness among politicians and legislators of existing and potential problems stemming from inadequate water resources management. This is particularly vexing for countries in which water-related problems are not major (i.e., there is no crisis, no extensive water scarcity or water quality problems), but exist nonetheless, potentially in the form of weak legislation or lack of enforcement.
- C There was concern about integrated water resources management being left out of the process of strengthening or reinforcing decentralization and privatization, both of which are being implemented in an *ad hoc* manner in many countries as part of national structural reform programs.
- C It was suggested that to streamline communications with the Bank, and presumably with other international donor agencies as well, one national-level agency or institution per country should be designated

as the primary contact agency. The Bank should provide support for the organization that will assume the role of primary contact.

- C It was apparent from the working group discussions that the member countries are at very different levels of water resources development, and that the type of assistance that each requires or would like to receive from the Bank is also very different. Representatives of several countries voiced concern about the “equality” of the proposed strategy with respect to the unbalanced nature of water management conditions in LAC. There was some concern about funding for water resources management activities in the poorer countries of the region.
- C The Bank should provide special support for evaluation and management programs undertaken by countries sharing transboundary water resources.
- C One of the working groups recommended that encouraging public participation in water resources management activities and implementing cost recovery criteria should be considered as guiding principles of the Bank’s strategy.
- C There was a perceived need for the external, independent evaluation of water projects.

### **Further Considerations For Bank Action**

The previous sections provided a listing of the plenary sessions and the working group findings. This section provides further discussion of some of the major points, and touches on others that emerged from formal and informal discussions during the Workshop.

Recent international conferences, workshops, and fora have stressed the need for water resources management activities to focus on supply augmentation *and* demand management; to

incorporate economic, political, social, legal, and environmental considerations; and to be integrated across water using sectors, such as potable water supply, industry, agriculture, hydroelectric, and navigation. This characterization of water resources management was endorsed by Workshop participants. These activities need to be coordinated not only within the member countries, but also in the Bank's lending policies and internal operations.

Four principal topics emerged from the Workshop which are fundamental to the Bank's water resources management strategy. They are the following:

- C Country-level analysis is of primary importance and should form the basis for any lending program.
- C The Bank's strategy should not encourage the use or non-use of any specific water resources management instrument, such as privatization, river basin management, water markets, or institutional innovation. Rather, all these instruments should be viewed as potentially useful for resolving specific water management problems. The Bank should assist countries in the evaluation of problems and potential solutions.
- C A "critical mass" of trained in-country personnel is needed to successfully implement the sustainable institutional change required for improving water resources management in LAC.
- C External donor agencies need to coordinate their joint activities and also be internally consistent in their lending and consultation practices.

The notion that "the problem must drive the solution" was strongly emphasized by all working groups. The focus must be on the problem at hand and the context in which it occurs, not on the implementation of certain

instruments based on preconceived notions of their utility. Even river basin management organizations, which have been strongly encouraged as the basic unit for water resources management, are useful only for resolving certain types of problems, and therefore are not a panacea for all problems in all situations.

Privatization and water markets attracted much attention, and, in fact, the discussions surrounding these instruments, more than any others, highlight the need to implement many of the conclusions cited above. First, there are strongly divergent views and opinions regarding the uses and advantages of these instruments. There is also much misunderstanding. There is limited experience in LAC with the use of these instruments, especially water markets. The positive and negative experiences of member countries need to be disseminated to other countries expressing interest in their use. It is easy to lose sight of the fact that privatization and water markets, in whatever form they take, are just two of many potential instruments available to resolve the problem at hand. And, in fact, these two may be inadequate alternatives.

Privatization raises additional concerns with respect to the integrated management of water resources. It was pointed out in one of the working groups that privatization has the effect of reducing state power and influence in the privatized sector. Depending on the sectors privatized, coordination in planning and management of resources can become more complicated, because now the necessary coordination must occur between state, private, autonomous or semi-autonomous entities (depending on the mode of privatization), and the regulatory agencies.

Conversely, privatization has deprived certain sectors previously under state control of the power and influence necessary to dominate the development and/or management of water resources (e.g., the energy sector in many countries). With the loss in dominance of one

sector, it may be possible to better coordinate multi-sectoral projects, provided that how to coordinate the activities and involvement of the private sector in water resources management can be determined.

In countries where privatization is under way, it was suggested that the Bank support in-country private sector initiatives so that the private sector has a larger role in the process and can better compete with multinational private firms.

Although the top-down management approach that has existed in most countries is considered deficient for a variety of reasons, a complete switch to bottom-up management is not a feasible or productive alternative. Neither top-down nor bottom-up management alone is adequate; the balance lies somewhere in between the two. The term “co-management” of resources was used to characterize this condition. The top-down approach can incorporate national objectives and broader financial, social, and legal issues, whereas the bottom-up approach assures that local concerns are represented.

“Integrated management” can be a vague term that in practice entails a very long lead time for action. Strategies and plans should be more pragmatic and recognize that integrated management in the full sense of the term is more an ideal than a reality. Plans need to address current problems, with an eye for eventual integration of sectors and uses. Furthermore, the Bank needs to be mindful of the specific near- and long-term objectives of the various countries and recognize that they are at different levels of

development. The Bank should be consistent in the application of the strategy and its guidelines.

Though it did not appear in writing, numerous participants were concerned with the issue of adequately defining terms and their use. The strategy document must have a glossary to clearly define the intended meaning of all terminology that could be misinterpreted or be misleading.

Several additional points were raised in the Workshop which may be too broad or general to constitute specific elements of the Bank’s proposed strategy, yet they help determine the context in which water resources management must occur. These issues include the integration of environmental issues related to water resources management and other environmental concerns; the integration and relation between water-related legislation and associated legislation and standards for public health, environmental protection, and other connected fields; and institutional innovation in the water sector as part of institutional innovation in a broader, national level context.

Finally, it should be pointed out that some participants felt that two topics should be the subject of more in-depth discussion: one topic was economic instruments such as privatization, tradable water rights, and water markets from an economic point of view; the other was the consideration of aquatic bio-systems in water resources planning. As a result, follow up activities will be organized to address these topics.

# Summary of Presentations

Six presentations on various aspects of water resources management, including elements for a proposed Bank strategy, were made on the first day of the Workshop. The material presented served as the focal point for the working group discussions that followed. The presentations are summarized below.

## **Proposed Elements for a Bank Strategy on Water Resources Management**

*Presented by Morris Israel*

Basic elements for a water resources management strategy for the Inter-American Development Bank were proposed. This strategy is to serve as a guide for Bank efforts to improve water resources management in the countries of Latin America and the Caribbean. The Bank has numerous instruments at its disposal, such as technical cooperations and loans, with which it can assist countries in furthering the development of water resources management. How the Bank chooses to use these instruments and the objectives it chooses to pursue need to be clearly identified. While the proposed strategic elements establish a “philosophy” for water resources management that could be applicable throughout the region, they do not provide specific recommendations for when, where, or how to use the various water resources management measures. Privatization or decentralization of water services, for instance, are specific water resources management measures and not central tenets of the proposed strategic elements. The focus of the proposal is clearly on the principles, not the measures of water resources management.

The proposed strategic elements consist of several objectives and guiding principles. The overarching objectives of poverty alleviation, sustainability, and environmental protection were

set forth by the Bank’s Eighth Replenishment. More specific objectives dealing with water resources management are the following:

- C Improving access, affordability and quality of water supply and sanitation services.
- C Creating an institutional atmosphere that is conducive to improving water resources management.
- C Building in-country capacity to plan and manage the development and use of water resources.
- C Incorporating adequate consideration of environmental uses of water.

The guiding principles proposed recommend that the Bank:

- C Focus on institutional innovation and capacity building, towards the broader concept of water resources *management* and away from the narrower water resources *development scope*.
- C Experiment with new kinds of incentives to encourage countries to seek improved water resources management.
- C Distinguish between short- and long-term efforts, between issues and needs that require immediate attention, such as basic water and sanitation services, and those that are more far-reaching, such as legal or institutional reform.
- C Develop comprehensive national water resource management strategies.
- C Seek cooperation and coordination among international financial institutions.

## **Planning for the Integrated Management of Water Resources**

*Presented by Enrique Aguilar Amilpa*

The strategy must be flexible, and thus it cannot be a “cookbook.” Different countries and regions within countries may be at significantly different levels of development with respect to water resources. They may have very different needs, and very different resources available to address water problems. The Bank must strive to work within the existing political, legal, economic, and sociocultural frameworks and management practices to the greatest extent possible. The resulting strategy should be adaptive and must recognize that water use problems can be structurally different, each type requiring drastically different approaches. This is a problem solving strategy that recognizes the substantial, if limited, leverage which the Bank can and should exert over decision-making in LAC countries.

The suggested elements are based upon an explicit conceptual framework that distinguishes among levels of decision-making: the water use level (operational), the water management level (institutional), and the water law and policy level (constitutional). Bank involvement can be directed at the national level where policies and laws are formed; at the institutional level where rules are formed for the integrated management of water resources; and at the local, water use level, where the needs of the various stakeholders are met. It is anticipated that the main thrust of Bank activity will be directed to the institutional level, while maintaining the necessary linkages to the national level and taking account of needs and problems at the local level.

Bank action in the long and medium term would be targeted at the institutional (water management) and national levels primarily through country dialogues, technical cooperations, and sectoral and hybrid loans. Bank action in the near term would be targeted at the institutional and local (water use) levels by lending for specific projects, providing technical cooperations, and granting loans to the private sector.

Planning activities in LAC are occurring in a new context, one in which countries are rapidly undergoing fundamental structural changes. Planning in this context can help establish a long-term vision for the proposed changes; it can help unite and coordinate the fulfillment of diverse objectives; it helps create conditions for decentralization and stakeholder participation; and it helps to organize diverse information and data. Planning can be a useful mechanism to establish a balance between the functions and responsibilities of the public sector and the private sector, whose involvement in the management of water resources is increasing rapidly in many countries.

However, to not repeat the problems of the past, planning activities must be accompanied by legal and institutional reforms that will permit implementation. Also, planning activities need to focus less on individual projects and single sector issues and more on multisectoral issues. Basin planning and management must turn from the management of resources to the management of problems and conflicts in the basin. There is a need to consider linkages to other natural resources and to consider quality and quantity issues together, not independently, as has typically been done to date.

Planning was discussed on two levels, national and regional. At the national level, the focus of planning is on multisectoral and long-term issues and needs. At this level, planning helps facilitate change, optimizes human and financial resources, and provides a point of focus for regional and local conflict resolution. At the regional level, the focus of planning is on medium- and near-term activities. Planning can encourage local participation and be a force in regional development and self-sufficiency. It also reinforces local decision-making. In this manner,

it encourages “bottom-up” management and planning.

The integrated management of water resources requires a balance between top-down and bottom-up management. Neither alone is sufficient. To be successful, however, top-down management must open the way for the inclusion of participatory methods, and bottom-up management must stem from well-organized, autonomous entities capable of making themselves heard.

A necessary condition for the successful implementation of planning activities is the existence of a *critical mass* of trained personnel to perform the necessary functions. The question is how to create a critical mass through training and education programs at all levels of decision-making. A special focus of these training and education programs should be those individuals and local institutions that will assume responsibility for water resources management as a consequence of decentralization.

### **Institutional Innovation for the Integrated Management of Water Resources**

*Presented by Armando Llop*

Improving water resources management requires increased institutional and legal support, which in turn requires a change in the institutions involved in this activity. Whether this process is called institutional innovation, modernization, or strengthening is immaterial; it implies change. The challenge is to identify what needs to change and how to best go about designing and implementing the necessary modifications. A major step in this process is to identify constitutional level constraints and impediments to institutional change.

Resolving existing problems in water resources management will necessitate change in existing

organizations, entities, and institutions, not the creation of new ones. It is crucial to understand well the existing framework, the existing structures and organizations and their functions, responsibilities, characteristics and idiosyncrasies. It is equally important to have a clear vision and understanding of what the “new” institution will be like. As an example, consider the difference between the underlying nature of public and private institutions with regards to institutional life. Private institutions, which function at the whim of economic markets, cease to exist when the market disappears. Whereas public institutions, once created, seem to exist independently of their effectiveness or efficiency. This can result in a loss of public confidence and leads to institutional crisis. These differences ought to be considered in evaluating alternatives.

Water management entities are subject to the tendencies of national governments, including recent trends towards privatization, decentralization, regionalization, deregulation, etc. They must respond in the best way possible. As with other instruments for water resources management, neither top-down nor bottom-up management is a rule. The actual managerial form should be dictated by the situation. In reality, there should be a bit of both.

There is a need to focus efforts at all levels of decision-making and on existing regulatory and legislative frameworks. To broaden the level and types of alternatives for implementing change, there needs to be a concerted effort to provide intersectoral and interdisciplinary workshops.

### **Community Participation in Watershed Management**

*Presented by Lori Barg*

Water resources management is ultimately about resolving water use problems at the local level (at the water use level according to the analytical framework). It is also about securing supplies,

protecting water quality and resolving disputes as they arise. Community participation in resource management works because people know their community and are in the best position to identify problems and their causes, and to determine the best way to resolve those problems, given the available, usually limited, economic and human resources. Several approaches were presented for incorporating public participation in water resources management, including Participatory Rural Appraisals and Citizen Monitoring Networks.

The success of these programs relies on full local participation, legal authority to enforce decisions, and national laws that support local decision-making bodies. This involves education at all levels of decision-making. At the community level, this means outreach to and inclusion of previously marginalized members of the community. At the government level, workers who are accustomed to top-down decision-making must be taught networking, organizing and outreach skills. There must be a collaborative relationship at the local, regional and national levels. There is a need for co-management of resources.

The national government's role should include setting standards and regulatory practices, oversight management, and consultative services with a clear legal transfer of authority to the community level. Community participation could be facilitated by training community outreach workers/mobilizers, agriculture extension agents, health care promoters, and others. These workers would, in turn, train their constituencies in practical methods such as conducting physical surveys of land uses, biological monitoring of indicator organisms, coliform testing in surface water, and conducting wellhead protection planning. Communities must have primary responsibility and input into regional and national organizations for all phases of the project, from planning, to policy-making, decision-making, project implementation and evaluation.

Conflict is inherent in the management of resources. For this reason, competing interests should be acknowledged from the very beginning. Mediation, binding arbitration or other conflict resolution methods should be built into the process. Community, regional and national organizations must be linked, be nonpartisan, and have the legal authority to enforce their decisions. Economic development and wise resource use go hand in hand. Short-sighted policies must be replaced with long-term planning to protect the resource base and promote sustainable development.

### **WATER MARKETS, MONOPOLIES AND RIGHTS: INSTITUTIONAL ELEMENTS**

*Presented by Miguel Solanes*

Innovations, improvements, or changes in water resources management require a sound legal and institutional framework. Three characteristics of water that make it a particularly challenging resource for which to establish sound legal principles are 1) the fugitive nature of the resource; 2) the multiplier effect associated with water resources in a given basin; and 3) the transaction costs and externalities associated with changes in water right ownership. These ought to be considered carefully in legal reform projects to encourage the integrated management of water resources.

Several issues must be addressed in developing a legal framework for the privatization of water rights and the establishment of water markets. These are: protection against the monopolization of water rights; consideration and incorporation of indigenous water rights; and integration of water rights with environmental concerns.

A policy of beneficial and effective use of water resources should be an essential component of water legislation. The major purpose of such a requirement is to protect against speculation and monopolization. Where water rights transfers

were permitted and this condition was not imposed, as in Chile, monopolistic situations have arisen. The government of Chile is trying to correct this problem by reforming the nation's Water Code.

Water legislation includes both normative and institutional elements. The normative elements can be further divided into structural and regulatory. The purpose of the structural elements is to maintain stability and flexibility in the water rights system to ensure, or at least encourage, economic activity. Structural elements include, for instance, the determination of public or private dominion over water rights, the definition of water rights, and conditions imposed on water rights and their transfer. Regulatory elements protect water quality, ensure its efficient and beneficial use, and so forth. The challenge for water legislation, then, is to strike a balance between the structural and regulatory components, such that the structural ones don't result in monopolistic action or environmental deterioration, and the regulatory ones don't stifle economic activity.

The institutional elements describe the organizational forms for managing the resources. They can include public or private entities, typically organized by production sector, but not necessarily so, such as river basin organizations, public participation, and users groups.

## **ECONOMIC INSTRUMENTS IN INTEGRATED WATER RESOURCES MANAGEMENT: ADVANTAGES AND CONSTRAINTS**

*Presented by Carl J. Bauer*

As many Latin American countries try to reduce and restructure state activities, economic instruments (such as privatization of water and sanitation systems or parts thereof, pricing and taxation mechanisms, privatization of water rights, and creation of water markets), are

becoming increasingly popular in integrated water resources management. However, these are complicated instruments to implement properly and one must understand well when and under what circumstances each is appropriate. Furthermore, this process involves replacing some legal regulations with a more decentralized approach which, in turn, requires stronger institutional capacity in the private sector and civil society. It requires the reinforcement of legal, institutional, and judicial systems. This presentation dealt primarily with the privatization of water rights and the creation of water markets.

The main benefits of economic instruments are increased flexibility and efficiency of water use and allocation. In practice, these instruments are most likely to be realized at the local level and among the same type of users, or in certain cases of urban expansion into rural areas. For example, water markets may be better suited to intrasectoral transfers, i.e., within the agricultural sector, than intersectoral transfers from agricultural to urban areas, though the latter are the more interesting and potentially the most beneficial uses of markets.

Market mechanisms tend to fail, however, when faced with more regional and intersectoral issues, such as multiple water uses, river basin management, and environmental protection. In many cases, these market failures are difficult if not impossible to overcome. The proper and adequate definition of water rights is an impossible task given the fugitive nature of water. In addition, market mechanisms are particularly ill-suited to resolve conflicts or distributional questions, which are essentially legal and political functions. In other words, using economic instruments instead of state regulations makes the judicial system more important.

Water markets are neither decentralization or privatization. They are very different instruments and can exist independently of one another. Similarly, the terms water markets,

decentralization, and privatization represent a very broad family of instruments, each of which must be carefully and individually assessed for a given situation. Regardless, it is easy to lose sight of the fact that economic instruments, in whatever form, are just one class of instruments available to water resources planners and managers. They must be used with caution and only when the conditions are right. More care and thought should be given to the kinds of problems economic instruments are expected to help solve, and it should not be imagined that they can substitute for political and social decisions.

The major conclusions of the presentation are the following:

- C Applying these instruments will presumably lead to transfers and reallocation of water rights and changing patterns of water use. Before doing so there should be a reasonable degree of social and political consensus in favor of such changes. This may require some form of substantial compensation to those injured as a result.
- C The new rules and incentives needed to implement these reforms should impose market discipline to raise efficiency rather than simply transfer public resources to private hands. Privatization should define duties together with rights; “property” is made up of both. Market operations depend on price signals, and they are strongly influenced by law.
- C Markets and privatization increase private autonomy while generally reducing the state’s administrative role. This has two major consequences: one is that it makes the conflict resolution function of the court system more important. With fewer state regulations, courts are likely to hear cases involving complicated technical issues and policy implications. However, at present few Latin American judiciaries seem to be capable of taking on this added responsibility without significant reform.
- C The second consequence of a reduction in the administrative role of the state is the heightened need to improve other forms of public institutional capacity in order to supplement or correct the limitations of markets and private initiative. This includes local users’ associations, nongovernmental organizations, and other representatives of civil society as the vital elements in a water management strategy “from the bottom up.” It also includes improving the effectiveness of state agencies, which retain an indispensable role in designing and enforcing rules and incentives. How this is done will depend on the political conditions in different countries.

# Annex I

## Conclusions and Findings of the Individual Working Groups

### Working Group 1

The following conclusions and recommendations for Bank action emerged from discussions by working group 1. The Bank is advised to:

- C Support undertaking diagnostic evaluations of the institutional and legal situations relating to water resources management, and identification of alternatives for improving existing conditions.
- C Collaborate in the search for funding mechanisms for continuous and systematic training and education of personnel involved in the various aspects of water resources management, in particular, in the areas of management and economic and legal issues, such that a “critical mass” of capable people can lead the necessary process of institutional innovation at the national, regional, and river basin levels.
- C Support the development and implementation of country-level integrated water resources management plans which take into account transboundary water resources, as necessary, and give these integrated plans priority over sector specific plans.
- C Support countries in developing water resources management policies and help to increase awareness (at the various government levels and among water users), of the economic, social and ecologic value of water resources and the importance of its sustainable use.
- C Support the national organizations responsible for water resources management, which will assume the role of primary contact with the Bank in these matters.
- C Encourage the exchange of information and experiences in water resources management among the various and diverse countries of the region, thereby helping water managers to convince political leaders of the importance of water resources management.
- C Support institutional strengthening and financing to facilitate and encourage the integral management of water resources, according to the existing institutional organization adopted by the countries.
- C In each country, encourage the establishment of water resources-related technical and socioeconomic information systems that are made readily accessible to the diverse water users, and encourage the international exchange of information and technology through the Inter-American Water Resources Network.
- C Continue with Bank plans to finance water supply augmentation projects, but in keeping with general water resource management plans.
- C Support evaluation and management programs undertaken by countries sharing transboundary water resources.
- C Strengthen the legal framework governing water resources at the various jurisdictional levels (e.g., local, regional, national) in each country, drawing on the experiences of other countries and assuring the stability of individual water rights, but making these

conditional on the effective and beneficial use of the resource.

- C Support programs to evaluate and monitor water quality which could serve as a basis for the sustainable management of water resources.
- C Support the search for financing for the activities and programs of institutions and organizations responsible for water resources management. Support the search for self-financing mechanisms for projects and programs implemented at the basin level.
- C Support the strengthening of associations and user groups working at the local community level in an autonomous manner or with the participation of governmental or nongovernmental organizations.
- C Support programs to increase awareness of water resource issues among youths and motivate their interest in university careers related to water resources.
- C Support updating university curricula in the area of water resources management and adapting them to current conditions and needs.

## **Working Group 2**

The conclusions and recommendations for Bank action that emerged from working group 2 discussions are organized into four sections. Notes added to the group's overall findings by the Haitian delegation are presented separately in a fifth section.

- I. Recommendations to facilitate water resources management. The Bank is advised to:
  - C Encourage interinstitutional or interjurisdictional will to improve water resources management.

- C Channel Bank activity in water resources management through one primary contact in each country.
- C Without overlooking important projects and activities, promote projects that involve water resources management at the basin level or those that are integrated and address multiple objectives.
- II. Recommendations to facilitate organizational and institutional development. The Bank is advised to:
  - C Evaluate the manner in which loans are implemented such that local technical expertise is not reduced for budgetary reasons. Reduce the use of external consultants while maximizing the use of local technical capabilities.
  - C Require that external technical consultants pass along relevant knowledge to local technical personnel.
  - C Strengthen local technical authorities and credibility.
  - C Perform external project evaluations.
- III . Recommendations to improve the technical and administrative capacity to promote community participation. The Bank is advised to:
  - C Reduce the cost of loans for decentralization projects.
  - C Provide technical assistance and training to improve local participation.
  - C Provide training aimed at extension workers, farmers, and the general population to promote resource conservation.
  - C Increase nonrefundable loans for training and strengthening at all management levels.

- C Develop participatory methods for river basin management.
  - C Show flexibility and special consideration for project development for cases in which appropriate cultural conditions, ability to pay, etc., do not exist.
  - C Consider strategies for providing credit to low-income sectors. For example, financing to improve institutional capacity, and financing for training at the community level in river basins with resource conservation problems.
- IV. Recommendations to ascertain the basic structure of water rights and identify economic instruments appropriate to water resources. The Bank is advised to:
- C Incorporate the idea of “effective use” of water into related constitutional elements.
  - C In the development of projects, support national policies for conditioning water rights.
- V. Additional recommendations and observations made by the Haitian delegation to help develop and enhance the strategy paper:

Integrated management of water resources in Haiti calls for the direct and indirect intervention of a wide range of institutions in the sector, including the Ministry of Health, the Water Utilities, the Ministry of Public Works, the Ministry of Agriculture, the Ministry of Environment, the Ministry of Interior and Territorial Affairs, and, most importantly, the communities affected.

As a result, the sharing of core documents prior to the workshop would have assisted in gathering the concerns, recommendations or suggestions of these institutions.

While the experience of consultation with the technical bodies of the member states is a positive and commendable step, it is strongly recommended that all future drafts be shared for more thoughtful comments, as the consultative process is just beginning.

Finally, in light of sector constraints and actual Bank policy, Bank specialists are advised to look into the following areas:

- C The share of the water sector in the Bank’s allocation of funds.
- C The way in which the integration of water resources management could become an entry point to strengthen the decentralization process being implemented on an *ad hoc* basis in many countries.
- C The allocation or share of funds available in each project or program for institutional capacity building.
- C Land tenure in vulnerable watersheds and population relocation.
- C The increase in the numbers of poor people living in urban slums. Slum residents currently represent 40% of the total urban population and are without access to basic services.

### Working Group 3

The conclusions and recommendations for Bank action that emerged from the discussions of working group 3 are organized around particular plenary session presentations. Recommendations specifically related to the conditions prevailing in Caribbean nations are noted separately, as are those recommendations for which there was no group consensus.

- I. “Proposed Elements for a Bank Strategy on Water Resources Management.” The Bank is advised to:

- C Support and encourage the development of national water resources strategies (including, for example, identification of problems, available information, etc.), and help identify necessary instruments for resolving the problems identified.
  - C Focus Bank action on the integrated management of water resources.
  - C Begin the process of institutional change by modifying existing regulations. This should be done prior to initiating processes of privatization, decentralization, or commercialization of water resources.
  - C Avoid supporting or encouraging the use of specific instruments in a national strategy. The Bank should provide options for which instruments to use. For example, the Bank can make suggestions on which instruments to use according to the conditions of the specific country (e.g., political, socioeconomic, or regulatory conditions).
  - C Guide the countries in the use of specific instruments, identifying special conditions or recommendations for their use. This process should be accompanied by a multisectoral diagnosis of water resources.
  - C Incorporate some aspects, such as cost recovery and public participation, into the Bank's strategy as part of its guiding principles. With respect to cost recovery, some consideration should be given to incorporating mechanisms for alleviating poverty, developing marginal zones, etc.
- II. "Planning for the Integrated Management of Water Resources." The Bank is advised to:
- C Encourage the integral planning of water resources within a national development framework.
  - C Where the political will is absent, help the process by intervening at the highest (policy) level to show policymakers the benefits of the integral planning approach.
  - C Make sustainability an integral part of these plans, which should also focus on demand management.
  - C Reevaluate the concept of planning, which should be based on knowledge of physical and socioeconomic conditions at the basin and national levels.
  - C Include stakeholder and public participation in planning for the energy, potable water supply, and irrigation sectors.
  - C Further evaluate the recommendations presented in the report, *A Proposed Strategy to Encourage and Facilitate Improved Water Resources Management in Latin America and the Caribbean*, regarding the expansion and modernization of information systems. In addition to expanding data acquisition systems, consideration should be given to the integrated use of these data, not only for ongoing processes, but also to increase knowledge of the systems, (e.g., prediction, variability, etc.).
- IIa. The Caribbean recognizes that in small countries there is little room for error as there are limited choices for water supply sources. Therefore the Bank is advised to:
- C Assist countries in developing integrated water resources plans, if none exist. The specific strategies should be tailored to the local situation.
  - C Help in establishing strong institutions, where none exist, to manage water resources.
  - C Recommend that technology transfer be included as part of the plan.

- C Recognize that these plans must be flexible given the external factors that can have an impact on them.
  - C Where possibilities exist, further cooperation and coordination among agencies and donors in the area of water resources planning.
- III. “Community Participation in Watershed Management” and “Institutional Innovation for the Integrated Management of Water Resources.” The Bank is advised to:
- C Support the creation of new institutions (establish regulations).
  - C Support institutional development, especially with regards to training of personnel and transfer of experiences from other countries.
  - C Ensure that the newly created institutions, not only regulatory bodies but also that the operating bodies (municipalities, electric companies, irrigation districts), be linked to the institution governing water resources.
  - C Coordinate its programs internally, and, to the extent possible, coordinate with other international agencies and organizations.
  - C Use in-country capacity in the process of institutional development.
  - C Recognize communities not only as contributors, but as active participants in the decision-making and planning processes.
  - C Incorporate *espacios de intercambio* and community training.
  - C Support institutional strengthening in the intermediate, institutional level. These efforts should be long term.
  - C Ensure that different agencies are responsible for regulations and operations.
- C Encourage technical personnel and local participants, not just lawyers, to be involved in the in the preparation of regulations.
  - C Strengthen regional training institutions.
  - C Help countries in training water users, regarding them as actors in the decision-making process, not as receivers of policy.
  - C Include improving the performance of water companies in its strategy, thereby providing an alternative to privatization.
  - C Develop a program for institutional evaluation and analysis.
  - C Make Bank support multisectoral, not focused on only one sector.
  - C Include other sectors, such as NGOs, universities, research institutes, etc., in the process of encouraging community participation.
  - C Gear Bank efforts toward passing along the benefits of integrated, multisectoral water resources management at the highest possible levels (ministers, etc.), as well as making known the problems that have arisen because of sector-specific water resources development.
- IIIa. The Caribbean group suggests that the Bank:
- C Encourage the grouping of the various entities associated with water resources management under an umbrella agency to facilitate coordination and action in this area. This does not imply that the individual entities would lose their administrative autonomy.
  - C Increase cooperation with NGOs and local organizations in the strengthening of education programs and the dissemination of

- information at the local and regional levels.
- C Use pilot projects to demonstrate the appropriate management of river basins such that the local population gains an appreciation for living in the basin while being mindful of environmental aspects, and develop economic activities while avoiding environmental deterioration.
- IIIb. The following are recommendations for which there was no group consensus, but which, nonetheless, are important enough to require notice. The Bank is advised to:
- C Sponsor training for water resources management at the user level, as well as at the technical level.
  - C Make an effort, as part of the development of legal frameworks for water resources management, to promote specialization in water resources legislation, so that a cadre of water lawyers is formed.
  - C Regard community members as more than just collaborators. The sustainability of any proposal will rest on the willingness and acceptance of all beneficiaries of natural resources.
  - C Base institutional coordination on common objectives such that the duties and responsibilities can be shared.
- C Grant special treatment to poor Andean communities living at the source of hydrologic basins and microbasins.
- IV. “Water Markets, Monopolies and Rights: Institutional Elements” and “Economic Instruments in Integrated Water Resources Management.” The Bank is advised to:
- C Promote the discussion of water-use rights criteria within the LAC countries. The Bank should also assist the countries in the dissemination and application of these criteria.
  - C Assist the countries in the study and analysis of existing economic alternatives and in the definition of their own water-use regulations.
  - C Provide more information on the implications of the various economic instruments.
  - C Ensure that the consultation not end with this workshop, but be broadened with the participation of more professionals and institutions.
- IVa. The Caribbean group suggests that the Bank:
- C Promote increasing the economic capacity and the self-financing of the agencies that regulate water resources as well as those providing potable water.

## Annex II Workshop Program

### Workshop on Strategies for Integrated Water Resources Management In Latin American and the Caribbean

*San José, Costa Rica  
May 6-7, 1996*

#### **Monday, May 6, 1996**

8:00 - 9:00 a.m. Registration

#### **Inaugural Plenary Session:**

9:00 - 9:30 a.m.

Welcome and Inauguration.

**Mr. Emil Weinberg**

IDB Representative in Costa Rica.

9:30 - 10:00 a.m.

Workshop Objectives.

**Mr. Luis García**

Environment Division, Social Programs and Sustainable Development Department, IDB.

10:00 - 10:30 a.m.

Elements for a Bank Strategy.

**Mr. Morris Israel**

University of California at Davis.

10:30 - 10:45 a.m. Coffee Break

#### **Plenary Session:**

10:45 - 11:15 a.m.

Water Resources Planning and River Basin Management.

**Mr. Enrique Aguilar Amilpa**

Consultant, Mexico.

11:15 - 11:45 a.m.

Institutional Innovation for Integrated Water

Resources Management.

**Mr. Armando Llop**

Director, Center for Water Economics, Legislation and Administration, Mendoza, Argentina.

11:45 - 12:30 p.m.

Stakeholder Participation: Integration with Environment.

**Ms. Lori Barg**

Step by Step, Plainfield, Vermont.

12:30 - 2:30 p.m. Break for Lunch

#### **Plenary Session:**

2:30 - 3:00 p.m.

Social and Economic Role of Water; Legal Aspects.

**Mr. Miguel Solanes**

ECLAC, Santiago, Chile.

3:00 - 3:30 p.m.

Social and Economic Role of Water; Economic Aspects. Water Markets, Privatization, Cost Recovery.

**Mr. Carl Bauer**

University of California-Berkeley.

3:30 - 3:45 p.m. Coffee Break

#### **Plenary Session:**

3:45 - 4:00 p.m.

Organization of Working Groups.

- I. Argentina, Bolivia, Brazil, Chile, Paraguay, Uruguay.
- II. Belize, Central America, Dominican Republic, Haiti, Mexico, Panama.
- III. Bahamas, Barbados, Colombia, Ecuador, Guyana, Jamaica, Peru, Suriname, Trinidad and Tobago, Venezuela.

**Working Groups:**

4:00 - 6:00 p.m.  
Parallel Working Group Sessions.

**Tuesday, May 7, 1996**

**Working Groups:**

9:00 - 10:30 a.m.  
Parallel Working Group Sessions.

10:30 - 10:45 a.m. Coffee Break

**Working Groups:**

10:45 - 12:30 p.m.  
Parallel Working Group Sessions.

12:30 - 2:30 p.m. Break for Lunch

**Working Groups:**

2:30 - 4:00 p.m.  
Parallel Working Group Sessions.

4:00 - 4:15 p.m. Coffee Break

**Working Groups:**

4:15 - 5:00 p.m.  
Parallel Working Group Sessions.

**Concluding Plenary Session:**

5:00 - 6:00 p.m.  
Presentation and Discussion of Working Group Conclusions and Recommendations. Adoption of General Workshop Conclusions and Recommendations.

6:00 - 6:15 p.m. Workshop Adjourns

Annex III:  
**List of Participants**

Workshop on Strategies for  
Integrated Water Resources Management  
In Latin America and the Caribbean

San José, Costa Rica  
May 6-7, 1996

**Workshop on Strategies for Integrated Water Resources Management in Latin America and the Caribbean  
San José, Costa Rica, May 6-7, 1996**

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**Workshop on Strategies for Integrated Water Resources Management in Latin America and the Caribbean  
San José, Costa Rica, May 6-7, 1996**

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# Part II

## Papers Presented at the Workshop

Workshop on Strategies for  
Integrated Water Resources Management  
In Latin America and the Caribbean

San José, Costa Rica  
May 6-7, 1996

*Proposed Elements for a Bank Strategy on Water Resources Management*

Morris Israel  
University of California at Davis, USA

*Planning for the Integrated Management of Water Resources*

Enrique Aguilar Amilpa  
Consultant, Mexico

*Institutional Innovation for the Integrated Management of Water Resources*

Armando Llop  
Center for Water Economics, Legislation and Administration, Argentina

*Community Participation in Watershed Management*

Lori Barg  
Step by Step, USA

*Water Markets, Monopolies and Rights: Institutional Elements*

Miguel Solanes  
ECLAC, Chile

*Economic Instruments in Integrated Water Resources Management:  
Advantages and Constraints*

Carl J. Bauer  
University of California–Berkeley, USA

# Proposed Elements for a Bank Strategy On Water Resources Management<sup>1</sup>

Morris Israel<sup>2</sup>  
University of California at Davis, USA

## Executive Summary

This document suggests basic elements for a proposed water resources management strategy for the Inter-American Development Bank (the Bank). The strategy that the Bank is developing is intended to serve as a guide for Bank activity in its efforts to improve integrated water resources management in the countries of Latin America and the Caribbean (LAC). The Bank has numerous instruments at its disposal, such as technical cooperations and loans, with which it can assist countries in furthering the state of water resources management. How the Bank chooses to use these instruments and the objectives it chooses to pursue needs to be clearly identified. This document suggests a “philosophy” for water resources management that could be applicable throughout the region. It does not, nor should general strategic principles such as these, provide specific recommendations for when, where, or how to use the various water resources management measures. Privatization or decentralization of water services, for instance, are water resources management measures and not central tenets of the proposed strategy. The focus is clearly on the principles, not the

measures, of water resources management.

The proposal consists of several objectives and guiding principles. The overarching objectives of poverty alleviation, sustainability and environmental protection were set forth by the Bank’s Eighth Replenishment. Specific objectives relating to water resources management are the following:

- C improving the access, affordability and quality of water supply and sanitation services;
- C creating an institutional atmosphere that is conducive to improving water resources management;
- C building in-country capacity to plan and manage water resources development and use; and
- C incorporating adequate consideration of the environmental uses of water.

The six guiding principles proposed are the following:

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<sup>1</sup> This document is based on the report *A Proposed Strategy to Encourage and Facilitate Improved Water Resources Management in Latin America and the Caribbean* by William B. Lord and Morris Israel, prepared for the Environment Division, Social Programs and Sustainable Development Department, Inter-American Development Bank, March 15, 1996, and the integrated water resources management strategy profile presented to the policy Committee of the IDB Board of Directors, February 22, 1996.

<sup>2</sup> Morris Israel (USA) is a candidate for a Ph.D. in Water Resources Planning and Management from the University of California at Davis. Mr. Israel is currently researching alternatives for improving water use and distribution efficiency in Nevada’s Truckee-Carson basin.

- C a focus on institutional innovation and capacity building;
- C experimentation with new kinds of incentives;
- C distinguishing between short- and long-term efforts;
- C developing comprehensive national water resources management strategies;
- C seeking cooperation and coordination among international financial institutions; and
- C conforming to international water resources management goals.

The strategy to be developed must be flexible, and thus, it cannot be a “cookbook.” Different countries and regions within countries may be at significantly different levels of development with respect to water resources, they may have very different needs, and may have very different resources available to address water problems. The Bank must strive to work within the existing political, legal, economic, and sociocultural frameworks and management practices to the greatest extent possible. The strategy to be developed should be adaptive and must recognize that water use problems can be structurally different, each type requiring drastically different approaches. It should be a problem-solving strategy that recognizes the substantial, if limited, leverage which the Bank can and should exert over water resources decision-making in LAC. The strategy should be based upon an explicit conceptual framework that distinguishes among levels of decision- making and supports institutional classification and analysis.

### **Background**

Traditionally, the focus of water managers has been water resources *development*, which is supply oriented and is concerned primarily with facilitating single purpose water uses, such as irrigation, municipal water supply, or navigation.

Considerable investments have been made in this area. But the increasing demands and scale of developments have raised new concerns about the efficiency and equity of such a narrow approach. Trying to independently maximize the specific benefits in each use creates conflicts in quantity and quality and overlooks potential complementarities between water uses.

Recently, a consensus has developed that current practices are not sustainable from either economic or environmental perspectives. The lessons of the last few decades have compelled international financial institutions to make a decisive break from past policies and to embrace a new comprehensive, market-oriented, participatory, and environmentally conscientious and sustainable approach. Water resources *management* is much more than the physical provision of water services. It is both supply and demand oriented, and recognizes that choices must be made and tradeoffs must be analyzed to achieve the best use of limited resources among competitive uses, users, and generations.

While international consensus for a group of key elements that must be included in a water resources strategy is emerging, the implementation of these elements in LAC must be adapted to suit the region’s unique characteristics and needs. For this reason, the Inter-American Development Bank has started a process of review and analysis of water resources management problems in LAC, and those strategy approaches that are best suited to resolve them. This will help identify priority issues where the Bank’s involvement can make important contributions.

Several characteristics of water resources management in LAC to which the Bank must respond have been identified. Among them are the following:

- C The delivery of water services typically is centralized in government institutions and agencies which are often over-extended,

underfunded, and ill-organized to provide quality services, resulting, for example, in deteriorated infrastructure and low efficiency.

C Traditionally, regulatory approaches have been favored over marketing or other incentive-based approaches. Changes in management have occurred mostly through centralized government and without participation of the stakeholders.

C In many instances, legislation for management of water resources includes provisions which may no longer be relevant and may actually constrain new management initiatives. A more significant concern is the general lack of rules and regulations for monitoring and enforcing existing legislation.

C Water resources management often is hindered by a lack of adequate and reliable hydrologic, meteorologic, and water quality data, as well as information on the socioeconomic parameters of water use.

C Some projections estimate that by 2020 roughly 70% of the population in LAC will live in urban areas. This high rate of urbanization poses unique problems and challenges to water resource managers.

The changes in political and economic policies which have taken hold in many LAC countries in response to the conditions of the “lost decade” of the 1980s have had a noticeable impact on water resources management. The central government’s role is being redefined through a series of structural reforms, such as the expansion of market principles and privatization of state run enterprises, aimed at reducing direct government intervention in the economy. The decentralizing and liberalizing policies have given water managers room to experiment and test new options, including many market-oriented, incentive-based measures. The range of incentive-based instruments available to water managers and policymakers is vast, and many of

these have been contemplated or implemented in LAC. The adoption of these measures is likely to increase in coming years as local experiences accumulate and because these policies are strongly encouraged and supported by international lending institutions.

The next section presents an analytical framework for evaluating water resources management problems and potential solutions, followed by the enumeration of objectives and guiding principles that could form the core of the Bank’s proposed strategy. The role of specific water resources management measures that could be included in the strategy is then briefly discussed, and a list of Bank instruments that could be used for implementing it is presented.

### **Analytical Framework**

The broader range of considerations which are now involved in the move from water resources development to water resources management requires the use of a broader analytical or conceptual framework. Such a framework must be based upon a systems concept which includes institutions as well as infrastructure, and it must recognize environmental and social variables as well as hydrologic and economic ones. It should also focus upon decision-making and action, as well as the more usual scientific cause and effect. In other words, it must encompass far more than the hydrologic system so familiar to water planners. It must include other subsystem models of ecosystems, economies, political organization, and individual behavior. It must also relate these subsystems to each other, into an integrated model (partially and preferably, but not completely, nor necessarily, computerized).

The analytical framework is based on two criteria. The first is the action situation, or the context in which policy is pursued and programs developed. It is composed of *actors*, whose actions are shaped by the *environment*, whether natural or man-made, and by *rules*. The rules define the relationship between actors and the

environment and describe, for example, how costs and benefits are allocated among actors, how authority is distributed, or who has access to what information. The second component of the framework is the level at which actions and decisions take place. The three levels are (see Figure 1): the operation or *water use level*, the institutional or *water resources management level*, and the constitutional or *water policy and law level*.

Actions at the operational or *water use* level are concerned with the environment and are aimed at social well-being and the preservation of ecosystems. The fundamental problems to be solved by improved water management occur at this level. These problems can be classified as scarcity, externality, open access, or public goods. Solving them requires changes in water use rules, which must occur at the *water resources management level*. At this level, plans and programs for utilizing water are designed, adopted, and implemented. It may be impossible, given the water resource management rules now in place, to adopt and implement the operational rules which could effectively address the scarcity, externality, open access, and public goods problems. Presently there are several problems at the water management level which can contribute to this ineffectiveness. Among them are free rider problems, excessive transactions costs, inequity, and uncertainty.

Creating an effective set of water resource management rules requires action at the *water policy and law level*. These higher level actions are important because a resulting ineffective set of water resources management rules virtually assures that basic water use problems cannot be solved. Changing water policies and laws requires country-wide action at the highest political level. Changing water resource management and water use rules, on the other hand, is often best accomplished at the individual basin level, where greater specificity is possible and where stakeholder involvement is more easily gained. Attempts to improve water resources

management at the basin level, however, may be frustrated by inappropriate water laws and policies at the national level. These constraints need to be identified and addressed before major expenditures of scarce resources are allocated to making water resources management and water use changes at the basin level.

The analytical framework is a structured problem solving approach that aims to improve problem identification and avoid the implementation of inappropriate measures.

For instance, when LAC water managers cite inadequate enforcement of legislation, they may mean enforcement of legislation, of taxes and tariffs, or of property rights. Somewhat different enforcement activities may be involved in each case. When they cite inadequate data, they may similarly refer to an array of problems requiring monitoring. When they mention inadequate consideration of environmental impacts they may refer to weak or nonexistent environmental protection regulations, to ineffective incentives to control pollution, or to lack of property rights to a clean environment. Each of these problems may have a different cause and may require a different form of solution.

### **Strategy Objectives**

The principal objectives for a Bank water resources strategy are set forth by the conditions of the Eighth Replenishment. Subsumed in these overarching objectives are several that are more pertinent to the water resources sector, including:

- C improving access, affordability, and quality of water supply and sanitation services;
- C creating an institutional atmosphere that is conducive to improving water resources management;
- C building in-country capacity to plan and manage water resources development and use; and,

C incorporating adequate consideration of environmental uses of water, such as instream flow.

In addition, the Bank needs to be sensitive to the goals and objectives of individual countries. It should strive to encourage and facilitate institutional innovation to improve integrated water resources management within the countries of Latin America and the Caribbean, but not to directly control or manage that process. In responding to the needs and desires of the individual countries, the Bank should seek to instill integrated water resources management practices that are reasonable, efficient and sustainable given the conditions under which they are applied. It should also encourage the kind of analyses and planning which will lead countries to adopt improved institutions, to better existing infrastructure, and to encourage integrated sustainable water resources development and management. In this process, the Bank should refrain from pushing, forcing, or otherwise influencing countries to adopt policies and measures which they are not prepared to handle.

### **Strategy Guidelines**

This section identifies several principles that are proposed to comprise the general philosophy of the Bank's water resources strategy now being developed. These principles, together with the objectives identified above, would serve as a guide for the development and implementation of Bank assistance programs in the water sector.

#### **Focus on Institutional Innovation and Capacity Building**

Priority must be given to institutional analysis and change over or at par with building physical infrastructure. Not only does water resources management consist mostly of institutional design and implementation, but even the successful operation of individual projects depends fundamentally upon putting appropriate institutions in place. Many of the activities

involved in water resources management (demand management, for example) have little to do with building projects. Moreover, a continued focus solely upon infrastructure projects will fail to identify the needed institutional changes. Nonetheless, this shift from development to management will not be easy for LAC countries to make. Custom, habit, bureaucratic inertia, organizational structure, professional specialization, and political advantage all weigh in on the side of business as usual. Institutional change can even be politically unpalatable because it carries the potential of threatening existing power structures. Difficult or not, this shift in focus must be recognized as the first essential step for improving water resources management, implying that water use institutions must be inventoried, characterized, and analyzed just as explicitly, comprehensively, and carefully as are hydrologic and economic conditions. The Bank will have to exercise considerable ingenuity in devising water resources management programs which can accomplish needed institutional change, but which will also be acceptable and desirable to those whose cooperation is essential to their success.

The Bank could assist the nations of Latin America and the Caribbean in building their institutional capabilities in two ways. First, it could establish a knowledge base for institutional innovation and, second, it could train country water resources professionals in the need for and methods of institutional analysis. These two functions could be carried out by a number of existing institutes in LAC, some of which have, in fact, been doing some of this work. Each would have a small permanent staff, supplemented by visiting specialists on short- and long-term assignments, dedicated to issues of water resources management. The institutes would be, in part, think tanks, charged with conducting analyses of water resources management projects in their respective subregions. The dedicated staff would have the analytical skills needed to conduct state-of-the-art *ex post* evaluations of the large experience base

which already exists. They could then serve as expert consultants to new programs and projects in water resources management.

Since professional water resources staffs typically are dominated by engineering personnel with little training or familiarity with institutional analysis and action, the institutes should have a strong educational and interdisciplinary focus. Specialists in institutional analysis will also be needed to complement recipient country staffs. The institutes could consider establishing fellowship programs to provide graduate training in the social sciences which will provide the experts needed for this work. It could work out cooperative agreements with qualified universities throughout the world to meet this need.

### **Experiment with New Kinds of Incentives**

The incentives that are of interest in this section are those used to encourage countries to pursue improvements in water resources management and to cooperate with international lending agencies, not the in-country incentives, such as pricing, used to improve conditions in water resources management.

Traditional lending practices have been geared to increasing the supply of water or water treatment projects which, at least in principle, generate marketable products. The revenue generating potential of those products creates confidence on the part of borrowers that repayment is possible and justified. Thus, there is a willingness to borrow for such projects, even though the loans are not directly guaranteed by future returns. On the other hand, water resources management activities, such as water conservation, do not generate a future revenue stream. In fact, they often diminish revenue expectations. However, such measures may be easily justified on the basis of their prospective reductions in cost, primarily in the form of reduced need for capital investment to increase water supplies.

The Bank should consider developing an analytical procedure to determine the prospective benefits and costs of noncapital projects such as demand management; a procedure which would not only fairly display the long-term value of such measures but which could also become the basis for evaluating loan programs. Loans in support of improved water management will have to be associated with programs which are valued locally to the extent that LAC decisionmakers will undertake the debt burden necessary to pay for them.

Water resources management does not necessarily require investments as large as those for water resources development. Thus, these investments should not necessarily be judged or evaluated using the same criteria as the development investments. The Bank might explore the development of a system of credits or incentives for meritorious and promising water resources management proposals from recipient countries. Proposals for assistance loans could be evaluated for their ability to meet such criteria as problem solving orientation, consistency with substantive and/or procedural standards deemed conducive to effective water resources management, and compatibility with the goals of sustainability, alleviation of poverty, and protection of the environment.

A rating scheme for the proposals could be devised, despite the somewhat subjective nature of some of these criteria. Then, incentives could be linked to the ratings level. One way of doing so would be to key the priority assigned to prospective loans to the merit ranking of the project or program, with particularly deserving proposals receiving a higher priority than those which are less deserving. Other forms of incentives can be envisioned. One would be to provide assistance grants which would finance some portion of especially innovative and promising features (conventional loans would still finance the larger share of such projects). Another would be to extend the repayment period for proposals which would not generate directly

marketable outputs, but which would be expected to improve overall productivity in the longer term. Yet another incentive could be the extension of substantial technical assistance to proposals which required sophisticated institutional analysis capabilities for their success. Different forms of incentives could be devised to be most effective in encouraging different types of improvements in water resources management.

### **Distinguish between Long-Run and Short- Run Efforts**

Developing an institutional structure which will lead to improved water resources management is a long-run, indeed, never-ending process of experimentation, adaptation, learning, and improvement. Public and private decisionmakers need time to change ways of thinking and acting that have been long established. Likewise, the water users themselves need time to adapt to changing water management measures, practices, and rules. Furthermore, enacting far-reaching changes in national or regional water policies and laws is not something that should be done in haste, without full analysis and informed debate by representatives of all major stakeholder groups. One of the cornerstones of Bank programs should be to encourage and facilitate this long-term process of institutional analysis and innovation in the LAC countries.

There is little prospect that country interest in loans for individual water resources development projects in the traditional mold will cease just because the emphasis of the programs of international aid and lending organizations shifts away from them and toward water resources management. Nor should there be a hiatus in funding such projects unless and until a comprehensive national water strategy has been adopted and river basin management plans are far enough advanced to produce project plans. There will be certain projects which are so obviously and quickly needed (community water supply or municipal wastewater treatment

facilities, for example), that no national strategy or river basin management plan will be required to confirm their desirability. Therefore, the Bank should continue to fund short-term, or quick response, projects to solve immediate and pressing water use problems. However, current knowledge concerning what constitutes good water resources management should play an increasing role in generating and evaluating proposals for such projects. The Bank can help recipient countries to accomplish this and can institute increasingly stringent requirements for compliance with standards of good water resources management. Eventually, conformity with an integrated national water resources management strategy should be a condition of all loans for water projects.

### **Develop Integrated National Strategies**

The relationship between a country's water resources and its socioeconomic development is intricate. The diversity of hydrologic regimes, legal and administrative infrastructure, relative degrees of development, cultural characteristics, social aspirations, investment priorities, and geographical conditions precludes the development of a general water resources strategy for all regions or even for all countries within a region. Thus, the Bank's strategy needs to focus on national characteristics on a regional basis.

There is little hope for improved water resources management in LAC countries unless they possess national policy and legal environments that are conducive to effective water resources management. Many countries do not possess such fundamental institutions, or if they do, they are not structured effectively. Only minor structural changes will be needed in some countries, but more substantial changes will be needed in most. The Bank should consider proposing a series of country-specific national assessments aimed at improving water resources policies and laws. It would provide the high level

framework of laws and policies which would enable and facilitate water resources management efforts at the river basin or other subnational level, and the implementation of national strategies. Formulation of a national water resources strategy should begin by evaluating the effectiveness of existing top level institutions, current legislation and policies, and unique administrative and governmental features. It would not be a national water plan, in the sense that a plan has come to mean a collection of proposed water resources development projects, based upon hydrologic, engineering, and economic analyses.

Available resources, both financial and technical, cannot support the simultaneous undertaking of national water resources assessments in each country, nor would every country be equally receptive to undertaking such an assessment. Consequently, the Bank and other cooperating institutions should press for the initiation of national assessments in those few countries where the sense of need for institutional change is most evident, perhaps in the wake of drought, serious water contamination, or other water use problems. Undertaking just a few assessments at a time offers the additional advantage of testing and modifying the program as experience grows.

A major component of the national strategies should be a focus on water resources management at the regional or basin level. A water resources management approach at the level of the individual basin requires consistency of each new activity or project with the overall basin plan or program. Whereas technical assistance is more important than financial assistance in the analysis and decision-making phases of basin-level water resources management, financial assistance becomes the most important tool for international organizations to use in the implementation phase. To satisfy short-term needs, as noted above, and still ensure a reasonable prospect of consistency with future comprehensive national strategies and river basin management plans, the Bank should

consider imposing interim procedural, rather than substantive, consistency requirements for making water project loans. Such procedural consistency requirements could be based upon the conduct of a problem assessment process to assure that the proposed project would be likely to effectively solve a real problem. They could also require evaluation of the likely impacts of the proposed project on the goals of sustainability, poverty alleviation, and environmental protection.

### **Seek Cooperation among International Donor Agencies**

The twin tools of technical assistance and financial incentives which are available to the Bank and other international donor agencies can be most effective if used in a cooperative and coordinated manner. The recommendations of the proposed national assessment could form the basis of a cooperative lending program by the several international lending agencies involved. This would provide real impetus for adoption and implementation of comprehensive national strategies to improve water resources management. However, if international agencies do not cooperate and coordinate their efforts, it will be easy for recipient countries to continue to “cherry pick” desired water resources development projects and to avoid undertaking the difficult job of institutional innovation at the national level. There is little hope for achieving effective water resources management under these circumstances.

Only the establishment of firm coordinating agreements among the lending organizations can eliminate this destructive competition. Some cooperative efforts in support of large development projects have occurred in the past. A substantial expansion of such cooperation and coordination is now appropriate in the area of institution-building. The Bank should consider taking the lead in proposing a coordinated water resources management approach on the part of all of the major lending agencies involved in the region. Such a coordinated approach would not

only encourage efficiency, but it would also remove the ability of country politicians to play one agency against another to secure politically useful but questionable projects.

Water resources shared by two or more countries can be important elements in regional integration and development processes in some countries. However, these shared resources are of marginal significance to most Latin American economies. Even if the economic value of some of these shared resources is of marginal significance, their environmental value and the need to protect them will necessitate international cooperation and coordination. In this regard, support provided by international lending agencies can be instrumental in establishing new treaties, facilitating the continued operation of existing agreements, and forging cooperation among the numerous public, private, and nongovernmental entities that may be involved.

### **Conform to Established Goals**

The goals of sustainability, poverty alleviation, and environmental protection adopted by the Bank in the Eighth Replenishment should be stressed as constraints upon the selection and implementation of options for improving water management and for securing Bank assistance. The institutional problems which are identified in the problem identification process directly drive the search for options, and these will be, to some extent, unique to each country. For example, identification of a water scarcity problem in a national assessment could lead to a recommendation for institutional changes to facilitate water marketing, allowing scarce water resources to flow to their economically most valuable uses. The Bank might then require that the changes in water resources management rules which would permit water marketing also contain provisions for long-term viability, for avoiding environmental degradation, and for assuring maintenance of adequate potable water supplies for the poorest users—goals that unconstrained free markets might fail to achieve.

The Bank should consider developing a set of guidelines and/or procedures to test new proposals on their implications for sustainability, much as guidelines for conducting benefit-cost analyses have been developed and promulgated in most developed countries and by some of the lending agencies. The Bank uses an internal rate of return constraint, or lower bound, for assuring the economic efficiency and financial feasibility of proposed projects. Similar standards could be developed and applied for the other two goals of poverty alleviation and sustainability.

### **Strategic Measures for Water Resources Management**

Much of the literature on water resources management advocates measures such as river basin management, decentralization, privatization, stakeholder participation, human capacity building, water markets and transfers, institutional reform and innovation, cost recovery, and demand management to solve water use problems. Although there appears to be general agreement that certain measures, such as demand management and user participation, should be part of all water strategies, there is a plurality of opinions on the inclusion of others, including water markets and privatization. It is not the purpose of this strategy to specify how and when to use each of these instruments, nor to encourage their use. These concerns should emerge from the national assessments and evaluations of local conditions and problems.

While it is true that most of these measures have been underutilized in LAC, it is also true that none is a panacea. Each is feasible in some situations and not feasible in others. Each is a promising solution to some problems, and is likely to be ineffective in solving others. In addition, each is really a general term within which considerable variation may occur. What is too often absent in the literature is a discussion about how and in what contexts to adopt and implement these measures, and in what specific forms. What is crucial for successful water

resources management is a careful analysis of site-specific conditions and problems, and then an analysis of all of the measures that may be regarded as available options for solving those problems. The potential success or benefits of these measures should be evaluated relative to existing conditions in LAC countries and the possible long-term impact they could have on water resources management, not on theoretical or academic models. The solution process should assess how local political, legal, institutional, technical, economic and financial conditions match the requirements of the instrument under consideration. This is true whether the problems in question occur at the *water use level* or at one of the higher levels of *water resources management* and *water policy and law*.

In guiding countries on the use of these many measures, the Bank should assist them to strike a balance between the functions and responsibilities of the public and private sectors, between centralized management programs and market-oriented strategies, and between the expansion of services (increasing supply) and demand management.

### **Instruments for Implementing Bank Strategy**

The Bank has several instruments at its disposal which can be used to assist member countries in achieving improvements in water resources management. These instruments include the following:

C Country Dialogue

C Technical Cooperation

C Sector Loans

C Project Specific Loans

C Hybrid Loans

C Specific Funds

C Small Project Loans

C Private Sector Investment

In terms of the action levels of the analytical framework, Bank involvement can be geared at the national level where policies and laws are formed; at the institutional level where rules are formed for the integrated management of water resources; and at the local, water use level, at which the needs of the various stakeholders are met. It is anticipated that the main thrust of the new Bank activity regarding integrated water resources management will be geared to the institutional level, while maintaining the necessary linkages to the national level and taking account of needs and problems at the local level.

Bank action in the long and medium term would be targeted to the institutional (water management) and national levels primarily through country dialogues, technical cooperations, and sectoral and hybrid loans. Bank action in the near term would be directed to the institutional and local (water use) levels by lending for specific projects, technical cooperations, and loans to the private sector.

Water resources management affects numerous sectors and activities for which the Bank already has or is developing an implementation policy, including Public Utility Policy, Public Health Policy, Environmental Policy, and Urban Development Policy. Bank action in the water sector must be incorporated and coordinated with policies in these other sectors and with actions in modernization of the state and strengthening of civil society, particularly in areas such as water supply and sanitation, and issues such as privatization.

### **Summary**

The proposed strategy is meant to be a guide for the Bank's involvement in water resources in LAC. This is a period of rapid institutional

change in the region, and changes are occurring (and more can be expected) in water policy and law institutions. It is important that these changes be wisely conceived and effectively implemented. This will be a difficult political task, given the powerful interests vested in the status quo. The international aid and lending organizations can and should use their capabilities to make conditional loans and provide technical assistance in order to encourage what may otherwise be very difficult innovations in water policy and

law.

An equally important element of the strategy, and one that is not explicitly noted, deals with providing incentives for the different groups within the Bank to cooperate and coordinate their individual approaches to water resources management. The operations groups within the Bank must use the various instruments at their disposal in a consistent manner.

# Planning for the Integrated Management Of Water Resources

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## **Executive Summary**

According to specialists and officials from Latin America and the Caribbean (LAC), planning is an important component of any strategy for integrated water resources management—together with privatization, water markets and the creation of river basin organizations. This paper aims to stimulate discussion of the role of planning in water resources management.

In what may seem a contradiction, the coexistence of a national system for water resources planning and the ruling of market forces is but a reflection of an as-yet unresolved debate on the role of government in relation to water. At one extreme is the *laissez-faire* option, while at the other is the already exhausted option of a level of governmental intervention that has proven extremely inefficient. An intermediate position supports greater participation of all stakeholders, in order to guarantee socially acceptable situations for present and future generations.

Water resources planning in LAC has evolved on a project-by-project basis, with a minimum of information and technical experience. The growing demands for water and associated infrastructure gave rise to major sectoral investment programs. Since 1970, in spite of institutional weakness and a decision-making

process dominated by major single-purpose projects, different countries carried out important efforts to integrate their first national water plan, linked to economic and social development objectives.

However, these national water plans were unaccompanied by the necessary institutional and legal reforms for their implementation, or the mechanisms required to identify deviations from established policies and objectives, and thus had a minor influence in the evolution of water management. On the other hand, past experiences in regional river basin planning have more closely approximated the concept of integrated water planning.

Contrary to the conclusion of the IDB report, very few countries today assign a high priority to national water resources planning. Geographical concentration of water problems tends to result in a greater priority being assigned to planning at the river basin level. Nevertheless, growing sectoral conflicts in water use, the need for greater institutional coordination, and the evident importance of water to social welfare and economic development will necessitate, sooner or later, the incorporation of a national perspective in water resources management.

Taking into account both their particular physical and environmental characteristics and specific social, economical, legal and institutional

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framework, the countries of Latin America and the Caribbean will have to adopt a more integrated view of their water-related problems, as well as alternative solutions. Consequently, without losing sight of the important gaps that remain in the provision of water for the whole population, water resources planning must take place within new contexts and go beyond a series of investment programs for the expansion of infrastructure and water services.

Current trends reinforce both the need to introduce market mechanisms and establish a participatory system for water planning, under the leadership provided by the state, within which integrated management of both surface and groundwater, in quantity and quality, takes place according not only to short-term economic objectives, but also to long-term social and environmental perspectives.

In the conception of a strategy to guide their priorities for action related to water resources, the IDB has determined three possible levels of application: the national level, the institutional level, and the local level. The proposed draft of the IDB strategy centers on the institutional level, with proper links to the national level, and takes into consideration the local needs of water users and communities. Accordingly, this paper presents a proposal for a system of water resources planning.

National water planning focuses mainly on a multisectoral, long-term perspective. It facilitates the adequate evolution of a legal and institutional framework for integrated water management, consistent with national policies and requirements, as well as regional and local realities. It also provides a central point of view that minimizes local pressures in the allocation of water resources, thus contributing to their more efficient and equitable use. Finally, national water planning optimizes the use of the countries' limited qualified human resources. Regional water planning (institutional or operational) is more linked to medium- and short-

term situations. In particular, it facilitates greater local knowledge and the participation of communities, interested social groups, and the general public in the processes of water planning formulation and implementation. Regional water planning also promotes regional development and autonomy. Finally, it reinforces the decision-making process related to water allocation, water resources development, and water quality control on the basis of better local information. This facilitates the establishment of more appropriate policies for the solution of particular local or regional problems.

Within this general context, a strategy for integrated water management should also aim to *formulate and implement a systematic process of water resources planning for the selection, at the national and regional level, of policies, programs, projects and actions that both contribute to the achievement of social and economic objectives and are consistent with the goal of environmental sustainability.*

Building institutional capacity is a decisive factor in the development of the technical and human resources required by integrated water planning and management. Institutional capacity-building includes technology transfer and adaptation, as well as comprehensive training, all of which constitute a central element of the planning process.

The top-down approach to planning, carried out almost exclusively by the state, gives way to a more decentralized, participatory and democratic process, within which all stakeholders influence the formulation of policies, identify alternatives, define options for the distribution of costs and benefits, and make managerial decisions which affect their communities. Thereby, planning is mainly the result of negotiations and agreements among those legitimately committed.

The adoption of a bottom-up approach is directly related to the objectives of decentralization and participation. Decentralization does not mean

transferring all the responsibilities to the lowest levels, but to the most adequate levels for each function. Even with an effective policy for decentralization, coordination and planning are still needed. The same is true of a commonly-held criterion and support from the center, in accordance with the principle “Think globally and act locally.” Only the existence of truly autonomous local organizations, capable of raising their informed voice within the established decision-making processes, will guarantee the validity of a truly participatory bottom-up planning process.

Planning processes at the river basin level constitute an adequate forum to gather and assure effective participation of all stakeholders within a process designed to “internalize the externalities” associated with water use. This acquires greater relevance as water development reaches its technical, economic and environmental limits.

In almost all Latin American and Caribbean countries, implementation of regional water plans would require a review of the legal and institutional framework, and an evaluation of existing mechanisms to guarantee representation of all interested parties and the balance of each parties’ capacity for negotiation.

Planning processes such as the one described could be initiated with state leadership. The state, in turn, would have to evaluate its own institutional framework to ensure a unified and properly coordinated intervention. It is important to review present municipalization and decentralization processes, since they are constraining the instrumentation of river basin planning and inducing, in some countries, greater institutional dispersion in water management.

At the river basin level it is possible to achieve greater compatibility between national perspectives and regional and local aspirations. In a top-down process, the national view includes the quantification of the resources the state is willing to channel for implementing the national

water plan and the associated regional plans. This applies to financial resources as well as the required technical, technological, human and institutional resources. The two planning approaches meet at the regional level: the bottom-up approach to guarantee the due participation of all the stakeholders, and the top-down approach to incorporate objectives that reflect the national interest.

In spite of the evident priority of the bottom-up approach to water planning in river basins affected by water scarcity, water pollution, and the exhaustion of water sources, it is not advisable to forego the national perspective, where the state plays a fundamental role in relation to major transformations involved in achieving integrated water management.

In the end, advancing toward integrated water management implies the existence of a true “water sector.” This involves governmental institutions, as well as users’ organizations, private organizations in charge of various water-related services and activities, and all other social groups interested in knowing and contributing to the resolution of water problems. It is a primary role of the state to promote the legal and institutional reforms necessary to encourage this process, and this is, surely, a major task of the planning function at the national level.

International fora consistently recommend a gradual strategy for implementing any type of river basin organization or authority for integrated water planning and management in real-life situations. In very few countries, if any, is it valid to adopt a generalized model. Experiences from industrialized countries are not completely transferable to the region, because the experiences of the countries in the region respond to very specific situations that should be carefully analyzed.

Nevertheless, recent experiences in the creation of this type of organization (for example, in Brazil, Chile and Mexico) could serve as a first

reference point, either from which to adopt this type, or from which to consider the problems associated with its implementation. These experiences could also be useful in analyzing an almost generalized trend to extend the role of water management at the basin level, in order to include a consideration of the management of all the natural resources involved. That is, to incorporate water management within a more global concept of integrated watershed management.

A possible explanation of this trend relates to the advent of the environmental approach, within which water resources are one more component of environmental systems. A more pragmatic reason is that water management has greater possibilities of evolving toward the integrated management of natural resources—in spite of the problems associated with poor institutional coordination, inadequate legislation and the absence of a conservation culture.

Nevertheless, the primary objective of internalizing the externalities of the water system must be maintained. This primary objective should set the guidelines for considering water management as a component of integrated watershed management.

Advancing toward integrated and sustainable water management faces a number of obstacles, including important gaps in the provision of water services, which inhibits demand management programs. The strong economic power of central governments *vis-à-vis* the financial capacity of state and municipal governments affects the latter's capacity to negotiate and also interferes with sustainable water management. Finally, legal and institutional factors obstruct decentralization or inhibit the creation and function of decentralized water management organizations at the river basin level.

Current experiences in water management at the level of the river basin show a strong emphasis

on the physical components of the systems, or on sectoral actions and investments. The organizational component, which includes participation and negotiation mechanisms, is by far the most important and most underdeveloped, because its implementation is associated with wider and more profound political and social transformations. Difficulties increase due to the lack of a “critical mass” to promote such transformations, for example, as associated with the planning function.

In sum, new conceptions in integrated water management lead to a reconsideration of the role of water resources planning, as well as the associated processes for plan formulation and implementation. The definition of an integrated water resources policy requires—today more than ever—the implementation of processes permitting society, not the state, to define its objectives and undertake actions measurable in terms of a declared willingness of what it is ready to pay.

## Introduction

In the process of adopting and adapting resolutions from a multitude of international fora on water, most countries in Latin America and the Caribbean have initiated a series of transformations in the area of integrated water resources management—all within their own political, economic and social processes and highly heterogeneous contexts and realities.

Some of the common elements adopted or being adopted by Latin American and Caribbean countries in their new water policies are greater political and economic decentralization; self-financing of the water services; global regulatory frameworks enabling integrated and sustainable water resources management; giving priority status to the solution of environmental problems; making water services finance the cost of the externalities associated with their provision; adopting the “user/polluter pays” principle as a mechanism for financing water management; and

taking the river basin as the most feasible water management unit.

These trends were identified in the IDB-sponsored study, *Elements for a Proposed Strategy of the Bank in order to Encourage and Facilitate Improved Water Resource Management in Latin America and the Caribbean*, which aimed at defining a strategy to meet the prevalent conditions of transformation and change. A national water plan is recognized by the specialists and officials interviewed as an important component of a water management strategy, together with privatization, water markets and river basin organizations.

Accordingly, many countries favor the idea or are in the process of formulating a national water plan as a means of overcoming the problems of fragmented water management and poor institutional coordination. Some legal reform projects (e.g., Brazil, Guatemala, Honduras, El Salvador) highlight the notion of a national planning system based on the definition of water as a public good justifying government intervention. Legal reforms also highlight the introduction of a legal basis on which to facilitate the implementation of market mechanisms and other economic incentives—according with the fundamental principle that water is a natural resource, renewable and finite, and should be valued economically.

Although it may seem contradictory, the coexistence of a national system for water resources planning and the ruling of market forces is but the reflection of an as-yet unresolved debate on the role of government in relation to water. It is part of a much more general debate questioning the role of the state in a totally open market economy. At one extreme is the *laissez-faire* option, while at the other is the already exhausted option of a level of governmental intervention that has proven extremely inefficient. An intermediate position supports greater participation of all stakeholders to guarantee socially acceptable outcomes for

present and future generations.

The intermediate position holds that water plays a significant role in the national processes of development with efficiency, equity and environmental sustainability. The success of this strategy rests on an adequate balance between the action of market forces and the intervention of the state, together with greater participation of all stakeholders.

Accordingly, at the Consultation Workshop on a Strategy for Integrated Water Resources Management, the IDB discussed the relevance of carrying out a pragmatic national water plan that takes into account the reality and conditions of the countries of the region. The following topics were among those discussed:

- C The role of water planning in the current context of market economies, open markets and regional exchange.
- C The characteristics, main components and elements to be featured in and addressed by the water plans within this framework.
- C The advantages and disadvantages of the top-down and bottom-up approaches. Objectives and goals of each approach. Considerations and elements that play an important role in accomplishing each approach's purpose.
- C The role of integrated watershed management in the previous context. Considerations and elements important to making this approach possible and effective. The role of river basin authorities or councils, their characteristics, and the legal and institutional factors that facilitate or impede their creation and/or adequate operation.

This paper hopes to stimulate further discussions of the role of planning within a strategy for integrated water resources management. The brief account of LAC experiences in water resources planning in the opening section serves

as background to a subsequent review of the deficiencies and limitations of these experiences and an analysis of the new conditions under which water planning efforts should be carried out. The analysis is based on the conceptual framework put forward by the IDB for discussion at the Costa Rica Workshop, and explored below.

## I. Water Resources Planning and Management in Latin America and the Caribbean

Latin America and the Caribbean is one of the most humid regions in the world, but it exhibits enormous contrasts. Extremely arid areas can be found in close proximity to extremely humid ones, and many zones fluctuate between drought and flooding. These disparities in the natural availability of water, coupled with the geographical distribution of the population and economic activity, result in a relatively complex situation for water resources planning and management, one characterized by both underdeveloped and highly developed hydrological systems.

For example, three of the major LAC hydrological divisions account for 52% of total gross domestic product and are home to almost 40% of total population. These three basins are the Gulf of Mexico (which includes the Valley of Mexico and other highly industrialized areas of the country), the South Atlantic (which starts at the southeastern tip of Brazil and ends in Uruguay), and the Plata basin. These three basins represent little more than 25% of total land area, and the surface runoff they generate is less than 10% of total mean annual runoff. This same uneven picture is seen at the country level.

Water resource management in LAC has been closely associated with economic and social development. In the early seventies, economies were relatively healthy and enough financing was available for water resources development, given

a general scenario of continuing growth. This situation prevailed until the early eighties and was accompanied by an intensification of water use, based on significant investments in infrastructure and the expansion of water services. This was reversed over the last fifteen years of crisis, characterized by high inflation, foreign debt, unemployment, and a general decrease in the standard of living.

Consequently, water resources management has been affected by low capital expenditure, poor maintenance of existing infrastructure, few data collection and assessment programs, and lack of training and education, among other factors.

To a great extent, the condition of relative plenty—albeit with significant localized problems—explains the low priority normally given by most countries to the systematic study of water availability and use. Few countries have even supported continuous, although generally insufficient, efforts to further their knowledge of their water resources and to improve the institutional and legal settings for water planning and management.

Within this general context, water planning has evolved according to the countries' particular developmental needs—mainly irrigation, hydroelectric power, and drinking water supply and sanitation. Increasing demands for water and water-related infrastructure, met with a project-by-project approach and a minimum of information and technical expertise, gave rise to the formulation of sectoral investment programs. “Sectorization” in water planning and development presented no major problems for some time, until excessive concentration of water use caused both conflicts and competition over local sources in a number of river basins.

Sectoral water plans have had a negative impact on water management. First, by overemphasizing the expansion of infrastructure to meet increasing demands, instead of regulating water demands and promoting more efficient water use. Second,

by considering specific projects in isolation, and thereby propitiating numerous conflicts or blocking alternative schemes with multiple purposes and objectives which could have reduced the costs of meeting the same requirements and thus provided greater benefits to the sector and the regional, or even to the national, economy. Third, by accentuating the dispersal of governmental responsibilities in relation to water, sectoral water plans make integrated water planning and management close to impossible.

It was not surprising that the recommendations on policy, planning and management contained in the Mar del Plata Action Plan (1976), which emphasized “integrated planning of water management,” “multipurpose water resources development,” and “national water policy,” were difficult to adopt in most countries. These countries were then characterized by weak public water management institutions, and by a global tendency for decisions on the development of water resources to be dominated by large single-purpose sectoral projects.

Nevertheless, as early as 1970, several countries started to take an integrated view of their water resources and to devise policies, strategies and specific goals for water development and use at the national level. Many of these efforts attempted to establish a close link with social and economic development objectives, and to present an integrated view, from national as well as regional perspectives, of sectoral water needs and the means by which these could be satisfied. In some cases, investment programs were formulated, together with recommendations for tackling water quality problems and other aspects connected with water management and development.

National water plans, however, were not accompanied by the institutional and legal reforms necessary to implement them, nor by the proper mechanisms to monitor possible departures from national policies and objectives.

Consequently, most plans had no relevant influence in shaping long-term water resources management.

Plan formulation was generally the responsibility of a government agency dealing with only one sector-based aspect of water use (e.g., agriculture, hydropower, drinking water supply and sanitation) or in charge of overall socioeconomic planning. In some countries, *ad hoc* commissions were created. Under these circumstances, national water planning was reduced to a technical exercise of very limited relevance.

Past experiences in regional water planning, which takes the river basin as the geographical planning unit, are closer to the concept of integrated water planning. Regional water planning received considerable impetus in Mexico, after River Basin Commissions were created in the fifties to foster social and economic development; a number of regional plans emerged to consider major inter-basin water transfers. Brazil, Colombia, Ecuador, Peru, and the countries sharing the water resources of the Plata River have also made important contributions in this area.

Contrary to the conclusion of the IDB consultants’ report, very few countries today give a high priority to national water planning. Geographically concentrated problems have resulted in greater priority been given to regional water planning at river basin or sub-basin level. Nevertheless, conflicts among sectors of water use continue to appear, and proper coordinating mechanisms are urgently needed. Given the obvious importance of water to economic welfare and growth—a very probable topic of discussion at the Costa Rica Workshop—the need for a national integrated approach to water planning and management is certain to arise sooner or later in all LAC countries.

The boom at the end of the seventies marked the climax of the expansion in government

intervention, typified by centrally-derived decisions to undertake major water-related projects. Today, the role of the state is subject to serious reconsideration, the aim of which is to both reduce public investments and expenditures in conditions of fiscal austerity and increase the efficiency of public services by transferring them to the private sector or to financially autonomous state companies.

To some extent, halting government intervention has opened the doors to new approaches and institutional arrangements for integrated water management that show a greater degree of social participation and involvement. These ideas are only just emerging, and for some years to come reconsideration of the role of government in water management will doubtless stimulate a major discussion of how to conceptualize the planning function per se.

## **II. A New Role for Water Resources Planning**

During the remainder of the century and beyond, most LAC countries will be faced with the challenge of ensuring the sustainable development of their water resources, at a time when there are significant gaps in the provision of water services, and financial resources are scarce. In addition, urban and industrial growth have created important water pollution problems which are not being properly addressed. In some river basins, conflicts over water use are likely to emerge or to become more severe, imposing serious restrictions on future social and economic development.

LAC countries must take a more integrated view of water problems and their solutions, taking into account the unique physical and environmental characteristics of each country, as well as the social, economic, legal and institutional framework. A comprehensive approach to sustainable water development and effective water management requires work in a number of

directions, including:

- C Reinforcing and improving water resource assessment activities, as the basis for adequate water planning and management at national and regional levels.
- C Developing the appropriate legal and institutional framework wherein integrated water planning and management can take place, even if government intervention in water use continues to be addressed in a sectoral manner.
- C Placing water resources management under a specific authority responsible for assessment, planning and regulations for water allocation and management.
- C Establishing flexible but properly implemented mechanisms for water allocation derived from a system of water rights. These mechanisms should be coupled to market oriented policies, and social and environmental objectives, and should also incorporate a participatory approach.
- C Implementing more aggressive policies and programs to foster efficient water use and the full use of the existing infrastructure, including water reuse. Policy instruments, such as pricing and cost recovery, are central to the implementation of this type of program, as are the transfer and adaptation of appropriate technology.
- C Developing policies and programs to address the growing problems of degradation and depletion of water and land resources. Conflicts between environmental protection, social development and economic growth objectives can and should be resolved within the concept of sustainable development. In many areas soil and water conservation programs deserve special attention.

Water planning must be placed in a new context, one that moves beyond investment programs for the expansion of infrastructure and services. At the 1977 Mar del Plata Conference, the need to achieve more efficient water use and address contamination problems was identified. Twenty years later, the same conclusions are being drawn, only now the problems have worsened and solutions must be sought within a different framework.

Indeed, current water management is linked to three objectives that may seem contradictory: economic efficiency, social development and environmental sustainability. The urgent need to implement new and more effective mechanisms derives from this apparent contradiction. One of the greatest forces for change is the lack of effectiveness of traditional mechanisms in producing the desired transformations. Incremental improvements in the efficiency of water use, for example, are well below what is possible and desirable.

To a great extent, profound changes in water resources management policies and strategies obey more general social and economical considerations. The trend toward economic liberalization strengthens the concept of water as an economic good whose development and use needs to be held to more rigorous standards of efficiency and quality control.

Furthermore, meeting the criteria of openness and efficiency means clearing avenues to social participation and democratization in decision-making, and hence to greater decentralization of tasks originally considered the exclusive realm of the state. Opening the economy also leads to competitiveness in the provision of public services.

The need for change is also related to society's greater acceptance of its responsibility toward the environment. This responsibility does not necessarily mean renouncing legitimate aspirations to improved well-being and the

eradication of poverty. What it does mean is a harmonization of the goals and needs of development with the limits imposed by the conservation of the environment.

A new role needs to be defined for public and private institutions. The public nature of some water-related tasks makes a clear case for government intervention, while in other instances the private sector could act more efficiently.

Past experiences support the feasibility of reconciling efficiency objectives with the public and social interest. The fundamental problem is to find the delicate balance between government intervention and market forces. While prevailing conditions make government intervention necessary in order to reach socially equitable and environmentally sustainable outcomes, these must be achieved without foregoing the advantages associated with open market policies and regional exchanges.

The few recorded experiences in the establishment of water markets indicate their potential. These experiences demonstrate, on the one hand, how useful market mechanisms are in facilitating the resolution of water conflicts by permitting greater internal mobility of water rights within irrigation systems. They also help when cities compete with irrigation systems for the utilization of a single water source. On the other hand, these same experiences indicate that market mechanisms by themselves can not guarantee the best water development, particularly with regard to environmental and distributive issues.

Current trends simultaneously reinforce the need to introduce market mechanisms and to establish a system of participatory water planning under strong state leadership. Ideally, this system would make it possible to consider the integrated management of water, both surface and ground, in matters of quantity and quality, according to short-term economic objectives and long-term social and environmental ones.

As is mentioned in the IDB consultants' report, the concerted governmental effort to formulate a national water plan could be taken as an indication of the importance of water in regional and national development, as well as the priority given to the solution of water management conflicts.

The report also points out that the importance of a national water plan relies on its role in the decision-making processes, and in the formulation of water policies. Consequently, the true value of a national water plan could be not so much in the plan itself, but in the nature and effectiveness of the process instituted for its formulation and implementation. Analyses of past experiences confirm this statement, both at the national and regional level.

### III. Characteristics, Components and Elements of Water Resources Plans

The IDB's water resources strategy encompasses three possible levels of application; namely, the national, institutional and local levels.

C The development of water policies and laws, as well as the definition of rules for intervening institutions, take place at the NATIONAL level.

C Integrated water management regulations, often applying to the entire river basin, are formulated at the INSTITUTIONAL level.

C The needs of the communities, municipalities and other interested groups are expressed and resolved at the LOCAL level.

Without discarding other possibilities, it has been proposed that the Bank center its strategy around the institutional level, properly linked to the national level and taking into consideration the local needs of water users and communities.

Water resources planning is closely related to political, economic and social processes, which determine the degree of the plan's administrative integration and the measure of its decentralization. The weight of authority at national level or the decision-making powers of regional and local authorities depend on a series of factors, including: geographical size; size and distribution of the population; legal system of water rights; water availability related to water use; regional differences; and, the diverse values and meanings of water in each society.

Nevertheless, it is possible to identify common criteria for developing a water resources planning system at the national and regional levels. The main characteristics of these two approaches are:

**National water planning:** Water planning at the national level focuses on a multisectoral, long-term perspective. It facilitates the evolution of a legal and institutional framework for integrated water management, consistent with national policies and requirements, as well as regional and local realities. In addition, it provides a central view that minimizes local pressures in the allocation of the water resources, thus contributing to their more efficient and equitable use. Finally, a national water plan optimizes the use of the country's limited qualified human resources.

**Regional water planning** (institutional or operational): Water management at the regional level is linked to medium- and short-term situations. It facilitates greater local knowledge and the participation of local communities, interested social groups, and the general public in the development and implementation of water planning processes. A regional system also promotes regional development and autonomy. Finally, it reinforces decision-making on water allocation, water resources development, and water quality control on the basis of better local information, facilitating the definition of more appropriate policies for the solution of particular local or regional problems.

It is thus possible to develop a system of integrated water resources planning that considers the three levels of application established by the IDB's conceptual framework, according to the following criteria:

- C Adoption of integrated policies taking into account the technical viability of the solutions, as well as their economic feasibility, social acceptability and environmental sustainability.
- C An adequate balance between water supply solutions and demand management.
- C Greater priority is given to the protection of water quality and the conservation of aquatic ecosystems.
- C Institution of decentralized, participatory, and democratic processes (see Figure 1) where all stakeholders can influence the formulation of policies, design alternative solutions, establish costs and benefits, and make managerial decisions affecting their communities.

The development of a water plan requires an understanding of the hydrological cycle and the factors that determine the availability of the water as well as its quantity and quality. It assumes, also, the existence of a dynamic and flexible process for identifying a set of objectives reflecting a nation's aspirations.

Achievement of objectives translates into water demands for all sectors, in each river basin. These new demands confront an initial water balance in order to identify, among other things, the need for new infrastructure or other actions to overcome existing obstacles, or take advantage of opportunities for achieving the proposed objectives.

Planning is, above all, an *interactive and adaptive process*. Interaction is necessary since water planning affects and is affected by national, sectoral and regional considerations about economic and social development, as well

as other environmental concerns. Therefore, the process requires continuous communication between the planners and all public and private institutions, or any other social group representing different interests and needs.

Adaptiveness, on the other hand, implies attaining an adequate balance between available information and analytical tools. In this way the planning process can generate immediate results, at the same time that needed information is identified in order to achieve better and more accurate results through the use of increasingly sophisticated techniques.

In general terms, the planning process can be thought of as the interaction of national and regional approaches. The most adequate regionalization assumes the *river basin as the basic planning unit*, within which geopolitical factors can be internalized. This probably implies further subregionalization in order to allow the translation of regional plans into state/municipal plans without losing hydrological consistency.

The *national perspective* incorporates the group of relevant variables involved in social and economic development, as well as those reflecting environmental concerns that are of national interest. It also considers aspects or conditions that are common to all regions, such as the evolution of institutions and law, sectoral development programs, the budgeting process and financial policies, human resources and technological capabilities. At this level the legal and institutional frameworks are not fixed elements of the process, but instruments available to achieve the established objectives.

The *regional perspective* allows for a more detailed analysis of a broad range of specific needs, considering the constraints and opportunities derived from water availability, the level of water development and use, and the projection of water demand according to specific scenarios. At this level the process identifies concrete actions to solve specific problems, as

well as the “actors” involved in their solution. At the regional level, and specifically at the river basin level, the process locates the mechanisms to allow for greater participation of all stakeholders in order to address and reconcile national objectives, policies and strategies, with regional/local objectives and perceptions which are relevant not only in terms of what has to be done, but also why it has to be done and who is paying for it.

The planning process is conceived as a *flow of information and decisions* aimed at harmonizing water use and water development to meet national and regional socioeconomic development objectives. Within this process, information, studies, plans, and initiatives for action stemming from various public and private organizations are the basis for evaluating several scenarios for population growth, economic activity, water demand, water balances, and short- and medium-range development plans including structural and nonstructural measures.

In the *socioeconomic scenario*, special importance is attached to the diagnosis of the economic and social situation, taking into account the dynamic nature of development and the role of government in changing existing or historic patterns, in order to arrive at alternative scenarios on a given date. Projections consistent with both existing trends and desired change, are integrated within alternative scenarios, targets and policies at national and regional levels, which may include variations in national and regional objectives and goals.

In the *hydraulic scenario*, the main task is to evaluate the evolution of water supply and demand in both quantity and quality. Water demands resulting from a given socioeconomic scenario are compared to water and land availability in order to identify possible conflicts, as well as the need for new infrastructure or other actions to eliminate constraints or take advantage of existing potential.

In the *generation of initiatives* the planning process considers the participatory processes through which all those involved in water development and management in a given river basin can channel their proposals to solve identified problems, from the definitions of objectives to the formulation of policies and the means to implement them.

The *integration of regional initiatives* covers all sectors of activity, as well as a set of environmental problems associated with watershed management or the protection of particular ecosystems. The first step is to integrate local initiatives to those identified at the regional and national levels stemming from both the public and private sectors. Many of these initiatives will lead to infrastructure projects, but they would have to be compared with alternative actions such as demand management through regulatory or economic instruments. The second step is to determine and evaluate the impact of different schemes, mainly in terms of the resulting water balances, the distribution of benefits and costs, and other aspects related to their implementation.

The *formulation and integration of programs* starts with regional evaluation of programs. The evaluation, which is made with reference to established national objectives, targets and policies, provides information about the quantity and distribution of the resources needed to carry out the proposed programs. Regional programs are integrated at the national level to determine their feasibility from this perspective and, if necessary, to recommend adjustments. Assessments of the financial, technical, technological, human and institutional resources required for implementation are carried out to identify bottlenecks and the necessary measures to overcome them.

Through a quantitative and qualitative accounting of needs and resources, water use programs are analyzed and integrated at the national level. This made the identification of the

overall feasibility of regional programs possible and provided recommendations for their adjustment in terms of national objectives. Furthermore, the social and economic scenarios can be adjusted to account for regional constraints or to make better use of actual regional potential. This feedback marked the ending of an iteration in the planning cycle.

At this point an iteration of the process is completed, and a National Water Plan (including regional components) has been established. Implementation can take place immediately within the system for integrated water management. Monitoring results during plan implementation provide the necessary feedback to the planning process.

The validity of programs and proposed actions depends heavily on the quality and reliability of available information. Therefore, an important result of each iteration of the planning process is, precisely, the definition of information deficiencies with concrete recommendations to resolve detected problems. Within this general conception of the water planning process, or a similar one that may be adopted, a strategy for integrated water management should incorporate the following objective:

*To formulate and implement a systematic process of water resources planning for the selection of national and regional policies, programs, projects and actions, contributing to the achievement of social and economic objectives, which are also consistent with the purposes of environmental sustainability.*

Starting from this general objective, and taking into account the realities of the existing capacity to implement a system for water planning such as the one just described, the following short-term objectives are in place:

C To design a system of information that covers immediate data needs, while ensuring the flow of data for systematic planning.

C To formulate policies concerning water development and control, at sectoral and regional level, with recommendations for the institutional measures required.

C To formulate alternative water development programs for the short-, medium- and long-terms, including a preliminary identification of projects at the river basin level.

C To establish a systematic training and instruction program to permit the development of a “critical mass” required to institutionalize the planning process, and to cover the additional staffing needs of all areas and activities included in the plans, programs and projects for water resource development and use.

C To implement the necessary legal reforms for statutory formulation and compliance of national water policies.

A strong water planning organization could consolidate around water resources assessment activities—including both potential and limitations. They could later evolve into the integration of regional, sectoral and national water management plans, properly linked to developmental and environmental objectives. Meanwhile, there are obvious indications of the priority to implement institutional arrangements for integrated water planning and management in the river basins with the most severe problems.

Institutional capacity building is an instrumental factor in the development of the technical and human resources required by integrated water planning and management. Institutional capacity building includes technology transfer and adaptation, as well as comprehensive training, all of which constitute a central element of the planning process.

#### IV. The Top-down Approach Compared to the Bottom-up Approach

Essentially, the concept of centralized planning—carried out from the top-down and exclusively by the state—will have to give way to decentralized, participative, democratic planning processes where all stakeholders have an influence in policy formulation, alternative designs, investment choices, and management decisions affecting their communities.

Hence, planning will be the result of negotiations and agreements to which all parties have become committed. Concerted actions should hold as long as their premises remain invariable. In this sense, the planning process, and its readiness and effectiveness for reopening negotiations and reaching new agreements, becomes more important than the specific results of the planning exercise.

The methodological framework for the planning process, as described previously, is still valid, with adjustments in the flow of information and the nature of the interactions among participating stakeholders. According to the new approaches and objectives, the planning process resembles more a bottom-up process beginning at the local level, where all the basic water management problems originate. These problems are subsequently integrated at the river basin level to address a group of relatively complex interactions, depending on the degree of “development” achieved at each river basin.

The adoption of a bottom-up approach relates directly to the objectives of decentralization and the effective participation of all stakeholders. To decentralize does not necessarily mean transferring all the responsibilities to the lowest possible level, but to the most adequate level for each function.

Decentralization means that the user can, and must make decisions on the future of his/her resources. However, a good decentralization depends on “a good center.” Total decentralization is not possible; even if an effective policy for decentralization exists, there is need for coordination, planning, common criteria and support from the center. This is the essence of the principle “think globally and act locally.”

Decentralization is a process that presently occurs in several forms, among them: transferring total responsibility for water management to a regional authority (corporation, state or municipality); transferring the administration of water services to formally constituted users\* associations; the granting of concessions or the privatization of water services; and implementation of water markets.

All these actions encourage the bottom up approach starting from a strong local base. The main task of the state is to support the creation and consolidation of users\* organizations, reinforcing their technical and administrative capacity, and creating the necessary incentives to help them achieve financial sustainability. Only the existence of truly autonomous organizations, capable of raising their informed voice within the established decision-making processes, will guarantee the validity and legitimacy of a bottom-up planning process.

Increasing the feasibility of efficient water use practices is one of the objectives of invigorating local level organizations, as well as propitiating the abatement of water pollution by means of regulations and incentives. Besides the water users, local interests include other social groups with objectives that many times are opposed to those of certain uses or users. The most evident example is that of nongovernmental organizations taking on the defense of broad environmental objectives.

There are other social groups, generally indigent and poorly organized, whose destiny is affected by water management, especially with the conservation of resources. An almost generalized example in LAC refers to communities settling on the upper lands of the river basins, or those living on the resources of fragile ecosystems such as wetlands. In both cases, the established processes should provide an opening for these legitimate interests, possibly with strong support by the state.

In a second level and in the same bottom-up direction, planning at the river basin level constitutes an adequate forum to bring together and encourage participation by all stakeholders in a process directed to “internalize the externalities” associated with water use. This approach acquires greater relevance as water resources development reaches its technical, economic and environmental limits. Then, decisions will generally mean the “sacrifice of some benefits” or the “imposition of additional costs” in order to reach greater collective well-being. Some decisions will lead to the construction of infrastructure, but mostly, they will refer to the implementation of regulatory and economic instruments for water allocation and conservation, in quantity and quality.

The planning process at the river basin level implies working with a large number of questions, among them: establishing water quality objectives, and willingness to bear the costs for achieving it; classifying water courses and defining their ecological uses, according to established objectives; determining policies and rules for water allocation through the existing regulatory and economic mechanisms, to deal with both normal and extraordinary situations; designing regional norms and regulations to confront specific problems of water scarcity, overexploitation and pollution; and establishing financial policies to reinforce the sustainability of water resources development and use.

Under this general perspective, implementing a scheme of regional planning like the one just discussed would force a revision of the legal and institutional framework in all or almost all LAC countries, and a realistic consideration of the mechanisms that can guarantee the representation of all parties involved, as well as an adequate balance of their capacities to negotiate.

It is possible that as a first stage, while the preconditions for real and effective participation are being established, the planning processes could begin under the state's leadership, which must review its own frame of intervention in order to present a unified and properly coordinated position when facing regional and local interests. It would also require a thorough revision of the municipalization processes and decentralization toward the states or provincial governments, now in progress. In many cases, these processes are opposed to the integration of river basin plans and, in some countries, they actually propitiate a greater fragmentation of water management.

A second objective of planning at the level of the river basin refers to confronting the national perspective with regional and local needs and notions about the ways to fulfill those needs, well as the balance between what different stakeholders are willing to pay for the benefits they expect to receive. The analysis of similarities and differences between national and regional objectives, in all probability, will show that there is a need to provide feedback to the planning process at regional level.

Concerns at the national level would include the assessment of the financial, technical, technological, institutional and human resources that, in a top-down approach, the state would be willing to assign for the implementation of the National Water Plan and the different regional water plans.

Accordingly, it is at the river basin level where the two planning approaches converge: the

bottom-up approach, to guarantee the participation of all stakeholders, and the top-down approach, to incorporate national objectives. Possible bottlenecks, as well as unrealistic or unfeasible situations that could arise as a consequence of the analysis at the national level will constitute another input to regional planning.

In spite of the evident priority of bottom-up planning in those river basins affected by major problems of scarcity, contamination and exhaustion of water resources, it is not advisable to forego the national view. It is within this perspective, that one can fully understand the fundamental role of the state in the profound transformations needed today to achieve integrated water management.

In a proactive rather than reactive position, where the state assumes its role as “agent of change,” top-down planning must undertake the resolution of important conflicts, conflicts that are largely derived from inter-basin water transfers or from conflicts between sectors of use. Other questions of national interest must also be addressed; these include water management in international river basins, establishment of national norms for water quality, programs connected to poverty relief, and global financial policies to ensure the sector\*s sustainable development.

In the end, advancing toward integrated water management implies the existence of a true water sector. This involves not only governmental institutions, but also users\* organizations, private organizations taking over different services and activities, and all other social groups interested in knowing and contributing to the resolution of water problems. It is a primary role of the state to promote the necessary legal and institutional reforms to encourage this process, and this is, surely, a major task of the planning function at national level.

## V. Integrated Watershed Management

Although there is a clear intention to establish a global framework to achieve integrated and sustainable water management, it is not equally clear that a trend exist to establish the operational and organizational rules for: establishing policies; achieving adequate institutional coordination; and securing effective execution of proposed actions.

International fora are consistent in recommending a gradual strategy for implementing any type of river basin organization or authority for integrated water planning and management to tackle real-life situations. In very few countries, if any, is it valid to adopt a generalized model. This is, because experiences from industrialized countries are not completely transferable to the region, and because experiences from the Latin American countries respond to very specific situations that should be carefully analyzed.

Nevertheless, recent experiences on the creation of this type of organizations (for example, in Brazil, Chile and Mexico) could serve as a first reference point; either to adopt them, or to consider the problems associated with their implementation. These experiences highlight the advantages of bringing all levels of government together with users to define global policies for water allocation, or to launch joint programs for river sanitation or the control of groundwater exploitation.

This is the case, for example, of the Lerma River in Mexico where a River Basin Council has been created to facilitate the coexistence of a legal regime of national ownership of water with the evident need for participatory decision-making. Another example is the case of the Paraíba do Sul River in Brazil, where the coordination of central and state governments has been enhanced in a situation of extremely complex jurisdictions, for the solution of regional problems that affect a

good part of the national and regional economy.

Experiences in other countries could also be useful in analyzing an almost generalized trend to extend the role of water management, in order to consider the management of all natural resources in a river basin. That is, to incorporate water management within a more global concept of integrated watershed management.

This last concept is associated with the solution of problems linked simultaneously to water conservation in quality and quantity, and the conservation of other natural resources—mainly soils and forests. In many cases, this could lead to the loss of unity in water management (that is, the integrated management of water quantity and quality) and almost paradoxically, to omit the importance of water in sustaining ecosystems.

A possible explanation of this trend relates to the advent of the environmental problem, of which water resources are one component. More specifically, water resources management becomes a component of a global concept of natural resources management. A more pragmatic reason would consider that water management has greater possibilities of evolving toward the integrated management of natural resources, in spite of the problems associated with poor institutional coordination, inadequate legislation and the absence of a conservation culture.

Nevertheless, the primary objective of integrated water management is that of internalizing the externalities of the water system, and this should be maintained. This primary objective should set the limits for considering water management a component of integrated watershed management.

In its wider definition, water management in a river basin includes four aspects: the organization of water users in the river basin; regulation of water use; water conservation and protection; and, water quality control and enhancement. While organizations at river basin level mature

into the forum for decision-making and shared responsibility for the solution of their water problems, they may undertake and resolve other problems associated with watershed management.

The advance toward integrated and sustainable water management faces a number of obstacles. The most important are: gaps in the provision of water services, which inhibits demand management programs; the strong economic powers of central governments *vis-à-vis* the financial capacity of the states and municipal governments, affecting their capacity to negotiate; and legal and institutional issues that obstruct decentralization, or inhibit the creation and functioning of decentralized water management organizations at the river basin level.

Current experiences in water management at the river basin level still show a stronger emphasis on the physical components of the systems, or in sectoral actions and investments. The organizational component that includes participation and negotiation mechanisms, by far the most important, is still underdeveloped. Its implementation is associated with more general political and social transformations, thus explaining its complexity. Difficulties increase because of the lack of a critical mass to promote such transformations, perhaps associated with the planning function.

## Conclusion

New concepts in integrated water management lead to reconsideration of the role of water resources planning, as well as the associated processes for plan formulation and implementation.

An integrated water resources policy requires the implementation of processes allowing society, not the state, to define its objectives and undertake actions measurable in terms of a declared willingness of what it is ready to pay.

Any discussion about integrated water management will invariably lead to legal and institutional changes. Water planning is not independent of these changes and should play a major role in their definition.

On the basis of the concepts discussed in this paper, the following questions are suggested as input to the Consultation Workshop on a Strategy for Water Resources Planning and Integrated Watershed Management:

C What has been the relevance of water resources planning in the participants\* countries; to what extent have they been put into practice; and, if they have, what were the two or three main limiting factors in the implementation of the plans?

C To what extent do existing legal and institutional arrangements propitiate the formulation of water plans and, consequently, what changes must take place to implement a

system of water resources planning?

C What conditions should prevail and what mechanisms should be implemented at each level (national, institutional (regional) and local, as defined by IDB) so that plan formulation is relevant, its results are positive and useful, and the necessary conditions exist to implement them?

C How, at what levels, and through what modalities, should the IDB's actions be directed in the short-, medium- and long- term, in order to facilitate, induce and improve the formulation and implementation of water plans at the different levels?

C What are the major issues in the field of integrated water planning and management that should be studied or researched at greater depth, in order to make the IDB's actions more effective and closer to the countries\* realities?

# Institutional Innovation for the Integrated Management of Water Resources

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## Introduction

In imparting instructions for the preparation of the present document, the IDB expressly stated that it should not be an academic dissertation nor end up as a case study. It should be pragmatic and take into account the reality and prevailing conditions in Latin America and the Caribbean, so that it could be used for an IDB strategy to promote the integrated management of water resources in the region.

Specifically, the following main issues were to be addressed:

C The role of the public and private sectors in the integrated management of water resources within the region's current context.

C The best institutional arrangements and dynamics, including their characteristics, main components and other elements necessary for the integrated management of water resources.

C Description of the institutional characteristics that facilitate the change from the top-down approach to the bottom-up approach with the participation of beneficiaries, interested parties, etc.

C The objectives, characteristics, elements and components to be included in plans, programs and projects for institutional renewal in the water resources sector.

Section I of this document contains a description of the current situation of water management. Mention is made of the styles adopted by the different countries of the world and of the characteristics of the agencies dealing with water resources. Section II refers to the situation in LAC. Sections III and IV set forth the main regional trends from a macro-institutional point of view and the consequences for those responsible for the administration of Latin American and Caribbean countries. Section V deals with the criteria for innovation in the organization of water resources management and the progress made in administrative sciences applicable to water resources management. Some conclusions are drawn as to the type of transformation that management agencies should undergo. Section VI presents a methodology for the design of institutional development programs together with project planning, selection and implementation processes, based on the "think globally, act locally" concept and on the use of strategic planning. Section VII submits a management system proposal which includes the institutional innovations required to attain the changes sought in management style. This last

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section summarizes recommendations for institutional changes in water resources management in LAC.

## I. Global Water Resources Management

This section, based mostly on Mateo (1989), is an overview of the nature, modalities and determinants of the manners in which water resources management is organized throughout the world.

After an analysis of the main organizational characteristics observed in many parts of the world, it can be concluded that *there is neither a given formula nor a model of universal application* to deal with the issue of integrated water management (Mateo, 1989). In this respect, the United Nations (1958) statement, from the classic book *Integrated River Basin*, should be recalled: “undoubtedly there is no single correct way of organizing and administering a fluvial basin program. The organizational plan should adjust to the overall government structure, cultural models, and political traditions of the countries and interested regions.”

### Origin and Evolution of Administration

Since early civilization, when man started practicing irrigation, governments have been responsible for water organization and management. In fact, the need to organize for the use of water resources has been one of the main determinants for the emergence of the public sector in the first communities.

Almost all important cultures have considered water a common good, a concept which has been transmitted to the present through colonization processes.

Through time, these principles have been adapted to different ideologies, producing different results in each location. Thus, in Israel water is managed almost exclusively by the central administration, while in humid countries riparian rights are respected and the private title of those who appropriated water rights in colonial times is accepted. A similar situation prevails in California, where the “prior appropriation rule” is applied. An intermediate position is seen in the Roman tradition, in Spanish legislation and in most Latin American countries. In all of them, a strictly public model is followed which continues the old eastern tradition with a certain amount of delegation to municipalities and irrigation associations.

Current world circumstances call for changes in many of these structures. The main determinant is, above all, the scarcity of water. With increasing demand and the limits to water availability, new areas are being incorporated into its administration. The use of groundwater, which was originally left to the discretion of land owners, is now being legislated and administered.

Another relevant element of change is environmental, implying the consideration of not only quantitative aspects but also water quality and its deterioration processes. So much so, that many experts hold that greater water restrictions are imposed by quality than by quantity.

### The Organization of Water Administration

The organization of water administration depends on a large number of options related to spheres of competence, which include a consideration of the physical factors at stake, the territorial-political system adopted by each country, and cultural and socioeconomic aspects. This gives rise to a variety of solutions at the country level. The physical determinant of the organization of water administration is the river basin. Many countries define policy objectives and administration schemes at the basin level.

The organization of water administration depends on the options adopted for the distribution of the powers of the state. The case is different when dealing with international or interjurisdictional rivers, which require special agreements among the entities involved.

In most small countries, water is managed by the national government, especially in the case of water shortages, of which Israel is typical. This situation is also found in countries lacking a regional or federal structure and where decentralization is weak. A centralized structure offers several alternatives. It can be set up in a single ministry or department, or jurisdiction can be shared by various entities involved in the different aspects of water management (sanitation, planning activities, public works, etc.).

Though the main decisions are centralized, in many cases this situation is compatible with a degree of functional diversification into basins or sub-basins, and even with the participation of representatives of users, enterprises and municipalities.

### **The Systems' Complexity**

Environmental issues arising from the need to control pollution and protect natural resources further complicate water administration. This situation obviates the need to organize spheres of competence in an interrelated manner and to include multiple heterogeneous aspects, such as the management of protected areas and natural parks, atmospheric monitoring, etc.

In the United Kingdom a single ministry is entrusted with the responsibility for water management, pollution prevention and impacts, and natural resources conservation. On the other hand, there are countries such as the Netherlands, Canada and Denmark, which have set up special ministries to deal with the environment and, to a lesser degree, with issues related to water resources. More often, however, environment

ministries or agencies are merely allotted a coordinating function, as is the case in Italy. In other cases, jurisdiction over environment is assigned to ministries or agencies which previously only managed water resources, as in Sweden and Spain.

The U.S. Environmental Protection Agency model has exerted considerable influence in federal countries. This model is moderately centralizing as regards policies and recommendations, but with many decentralized executive functions at the state level.

### **Levels and Functions**

In federal countries there is a second government level, (the states or provinces), which exerts a great deal of influence on matters pertaining to water management. In most of these cases, the states have total jurisdiction over water resources flowing through their jurisdictions. This is the case in the United States, Brazil and Argentina. When rivers flow through more than one state, or when the electricity or navigation services provided affect the nation as a whole, management is carried out with the participation of the federal jurisdiction through agreements entered into among the states.

In almost every part of the world municipalities or local agencies play important roles in water supply and distribution as well as in wastewater treatment and disposal. There are many cases in which the municipality performs the activities mentioned before, and consortia or users' associations have to be organized at different levels, including the metropolitan level. Likewise, there are exceptions to the decentralized model which give rise to state intervention either because the municipalities have a very weak infrastructure or because they have failed in their responsibility.

The functions to be performed by the different levels of water administration should be clearly defined in order to be able to reach objectives,

meet basic needs and preserve sustainable systems. All of this should be attained in harmony with the most appropriate territorial jurisdiction for the setting up of authorities with water management responsibilities.

In general, planning activities correspond to the highest level of government and constitute a common framework for other policies, including economic development. The final conclusion of the main policy or planning guidelines, provided they are functional and justified, should be drawn by the higher political bodies, that is, parliament, national water councils or similar organizations.

Local hydrological plans, or plans at the basin or sub-basin level, should be drawn up with the participation of local organizations, municipalities, users, etc. Executive activities at the sectoral level are normally undertaken by the entities supplying basic water services: municipalities and irrigators' associations usually have a considerable degree of participation in the case of irrigation, as do water supply agencies in the case of sanitation services.

## **II. Water Resources Management in Latin America**

The traditional organization of the state in Latin America is essentially sectoral. Thus, for example, the state has specialized in the most important water-related activities, usually hydropower generation, drinking water supply, irrigation, etc. Hydropower generation is the one most systematically developed and upgraded in the countries of the region. In second place, as regards development, is water supply and sanitation, with a very heterogeneous profile in the region. Irrigation is the least developed water activity from the point of view of technology, organization and finances. In Latin America, it is often the case that what is known as "private irrigation" is much more developed and better established than public irrigation.

## **Organizational Limitations**

Latin American countries lack an institutional arrangement that would make the integrated management of water resources possible, though efforts are being made toward this end. While environmental ministries or authorities play an important role in fulfilling unsatisfied social needs, they have not been able to reach this objective. An exception to the rule is Mexico, where the water sector has always been under a single authority with tremendous political and institutional power as reflected in its high annual budget. The authority's position was further strengthened in 1989 with the establishment of the National Water Commission, which performs a leading role in the decentralization process taking place in the sector. The rest of the countries still have to overcome the lack of institutional coordination.

The worst consequence of the lack of integrated water resources management is its effect on the least protected component: water-related environmental conditions. Given its characterization as a public good, water depends directly on budgetary allocations or on joint action for its conservation. It is usually under the jurisdiction of a large number of administrative organizations which very seldom consider it a priority. Though this situation gives rise to the creation of nongovernmental organizations, if there is no adequate institutional development, the environment will degrade in an eventually irreversible process, at least from the point of view of admissible costs.

The following problems have been identified in the countries of Latin America and the Caribbean:

- C there is a considerable scattering of water-related functions in a number of agencies;
- C certain areas are ignored in the legislation while others exhibit excessive rules and regulations;

- C the lack of an integrated water policy is reflected in the absence of plans, programs and projects;
- C the various agencies with jurisdiction over water management have overlapping functions in certain areas while other areas are not addressed at all;
- C an appropriate management mechanism for the integrated management of water resources and the instruments required to manage the sustainability of water systems have yet to be developed;
- C water resources management is essentially sectoral;
- C problems are dealt with from a mono-disciplinary approach;
- C institutions are vulnerable to political changes or change of authorities;
- C there are no instances of institutional coordination.

This list can be enlarged simply by citing well-known reports from the IDB, UNDP, IBRD and other multinational organizations.

### **Basin Management: A Promise**

Politicians and technicians devoted to development in general, and to water resources development in particular, have adhered to the concept of sustainable development (Batie, 1989). This concept is based on the notion of intergenerational equity, which means that present generations should not jeopardize the ability of future generations to acquire the necessary means to fulfill their material needs and enjoy a healthy environment.

In this context and in the institutional scenario, there appears a new notion which is associated to the concept of integrated management of water

resources: *basin management*. This management approach integrates, in the area defined by a given water system, the management of all resources (at least water and soil), and all other components of the environmental systems in the basin.

Several Colombian basins are being managed with an integrated administrative system, which has yielded excellent results and which, in a way, is incorporated into its new environmental law. Chile has opted for basin management as a means to enable water systems to perceive and internalize externalities, something which the water market cannot achieve on its own. In Brazil, the most successful water management experiences are being conducted at the basin level. In Mexico, basin management is promoted by the water authority as a desirable addition to water management.

Chile presents an interesting case because it pioneered the incorporation of market rules in water administration in the region. In August 1981, legislation was enacted which recognized the public good nature of water and granted private individuals the right to its use. In practice, however, the law actually treats water as a strictly private good. The creation of a water market yields administrative savings because it entails the decentralization of operations. However, the old economic paradigm that markets can be efficient in allocating resources but that they will never solve environmental problems nor problems of extreme poverty still holds. Present actions aim at creating a decentralized and autonomous administrative framework, such as a Basin Commission, that will make it possible to manage externalities.

### **III.**

### **Main Trends in the Macroeconomic and Institutional Context of the Latin American Economies**

What has been said so far gives a somewhat static idea of the present situation. However, the

countries of the region are undergoing profound changes in their political, institutional, economic and social systems, and they are doing so at an unusual pace. Inexorably, all countries, regardless of their stage of development, are examining the possibilities offered by deregulation, decentralization, regionalization and privatization, all of which have a direct impact on management agencies. Thus, the water sector is directly involved, since many sector organizations (including hydropower and water supply entities, as well as irrigation, basin and environmental management agencies), are undergoing this process.

This affects both state agencies, whose roles and functions are undergoing profound changes, and private companies operating in more competitive and transparent environments. These processes, usually included in the term *state reform*, involve a number of considerations to increase the efficiency of the state. In Argentina, for example, this process aims at:

- C quality of service,
- C management efficiency,
- C cost reduction, and
- C expansion of the regionalization and decentralization processes.

These objectives are to be achieved through a set of principles and directives including the following:

- C Reform for the people.
- C Zero-based state and re-engineering processes.
- C Centralized planning and decentralized implementation.
- C The state designs, facilitates, finances and controls.

- C The state is not to purchase inputs; it is to purchase outputs.
- C The state is to foster the creative participation of the different social sectors.
- C Management by results is to be encouraged.
- C Management transparency (communication).
- C Information to guarantee equal opportunities.
- C Technology and training to perform new roles.

All of the above principles are very important, although at first sight they may look like simple statements. For example, the concept of a zero-based state is similar to that of zero-based budgeting; that is, mere pre-existence is no justification. An analysis is made of social demands and of the best manner, from the point of view of the people, to meet them; on this basis a new way to establish institutions and organize the state is sought.

The expected results are as follows:

- C privatizations and concessions,
- C outsourcing,
- C centralization and decentralization processes,
- C mergers,
- C full or partial suppression,
- C elimination of juxtapositions,
- C reallocation of resources,
- C integrated financial management,
- C labor retraining fund, and
- C integrated human resources systems.

The results should be examined through a direct assessment of their effects. Management itself

should also be evaluated as a process.

### **The Great Challenge for the Water Administrator**

From the standpoint of those officials or operators engaged in water resources management who seek to steer their activities to the solution of specific problems, the main concerns will be: a) to meet unsatisfied demand for safe drinking water; b) to expand the sewerage collector system and provide adequate effluent treatment and disposal; c) to control industrial pollution and toxic wastes to protect water resources; d) to adequately allocate water from both intersectoral and intrasectoral perspectives; e) to create auto-finance mechanisms and mechanisms for the collection of service fees so that the sector can achieve self-sufficiency; f) to adequately control environmental impacts or externalities on water, as well as those resulting from its use; g) to improve both the efficiency and the effectiveness of management agencies.

The resolution of these problems will require adequate management. Paradoxically enough, the natural instruments of change are the existing organizations themselves, which show a marked incapacity to make progress in these areas.

The challenge is to transform the management agencies, which are then to oversee their own process of change in order to carry out the modifications the water system requires.

Annex I outlines the concept of modern administration; i.e., strategic management, as defined in the context of institutional and organizational proposals described in subsequent sections. An administrator is any individual or group of individuals, or any public or private organization responsible for promoting the transformation of the system.

## **IV. Innovation Criteria in the Organization of Water Systems Management**

This section establishes the administrative criteria focussing on the internal aspects of water management organizations. These organizations are usually of a social type within the public sector; they are open, organic systems, with multiple products, that find themselves operating in very complex environments.

### **Scope of Management**

There is broad consensus on the fact that the scope of management should embrace the water system as a whole. In this regard, in approaching the integrated management of water resources, due account should be taken of the fact that one is dealing with systems of varied size and complexity. In LAC there are systems of great size, such as the Amazon and the Plata Rivers which, on account of their magnitude and complexity, cannot possibly be managed from an “integrated” approach with the tools and instruments available today. In these cases, it is advisable to consider management sub-units defined according to regional, jurisdictional or sub-basin criteria, or delimited on the basis of economic, sociocultural, and environmental variables, or on a combination of criteria and variables.

The opposite case is also found. There are numerous similar and interrelated small water systems, of reduced complexity, where a single sector—usually agriculture—prevails, as is the case in several Central American countries. Here, an “integrated water resources management” program may not be justified for each given hydrological unit. An institutional arrangement comprising a number of rivers may result in a better operation and more efficient management.

In all cases, it is always advisable to define which is the best way to identify optimal

administrative units.

### **Current Trends in Management Concepts and Practice**

Each organization is an open system that interacts with its environment, affects and is affected by a set of specific variables, and adopts a particular behavior to adjust to its environment. In turn, the objectives, values and motivations of society represent the general expectations of the individuals that conform it. It is currently acknowledged that the most appropriate way to manage this type of complex problem is by means of unrestrained thinking processes, creation and innovation, and by learning how to resolve complex problems and work in groups. Traditional experience is interesting only as preliminary training, not for the application or copy of old “recipes.”

Annex II formally presents a set of basic principles and criteria necessary for the design of functional management systems in keeping with the concepts now held by administrative sciences.

### **Brief Characterization of Management Organizations**

A management organization is an organic system: it resembles a live organism in that it has various components (organs) interacting in both a complementary and an interrelated manner. As with all living organisms, once they are created, their first objective is survival. Likewise, every organization has a life cycle: it is born, it develops and dies. If private, its life depends on a given market, and it dies when its market becomes exhausted. If public, an organization’s end is more difficult: it may lose efficiency and effectiveness, but these reasons may not be enough to decree its demise. Under such conditions, it may undergo a process of loss of legitimacy and value in the eyes of the population, a situation which usually gives rise to repeated institutional crises.

Management organizations are also characterized by the fact that they provide multiple services or goods: a water management agency has to resolve conflicts among users, make investments, meet specific demands and deliver goods of the required quality and in the required amount.

Furthermore, there is an asymmetry in public organizations between the level of responsibility held and information available; these organizations face the need to coordinate activities with other state sectors; they must meet multiple objectives; they are subject to the ephemeral nature of political leadership; and they have old-fashioned, usually enormous, structural models. In many cases, other factors add to the complexity, such as multiple political jurisdictions, different standards and behaviors in related agencies, a lack of a common internal “language,” and remarkable failures in the management of economic, financial and sociological issues.

As a rule, a prerequisite for adequate management is interjurisdictional, interinstitutional and intersectoral coordination, the complexity of which increases in direct proportion to the number of organizations operating in the same context.

In state organizations, which are usually affected by budget restrictions, there is no culture of production, no clear identification of the organization’s products, and little tradition of calculating costs. On the other hand, the internal systems of rewards and penalties are based on bureaucratic guidelines which motivate neither the administrators nor the personnel; they only add to the complexity of the situation, as people devote most of their time to surviving, to generating internal power and to maintaining the *status quo* instead of engaging in the organization’s improvement. Much energy is wasted on internal processes to the detriment of customer service.

## Principles of Human and Organizational Behavior

Given below are some conclusions from administrative theory concerning both human and organizational behavior, which are complemented with the more formal elements presented in Annex II:

- C Organizations are more effective when they focus on a single or limited number of objectives.
- C Centralized systems are more vulnerable than decentralized ones.
- C The most effective organizations are those closest to the users, where actions correlate to needs. The shorter the distance between contextual information and decision-making the better the results.
- C Opposing interests increase the quality of control.
- C What is productive is the organization as a whole, not its parts.
- C Structure is a function of technology, context, and of the pre-existing organizational culture.
- C Individuals respond to economic, psychological and social incentives. All human beings respond to motivation and are goal-oriented; they act according to objectives or aims. The organization will be more successful if it understands and takes advantage of human behavior.
- C An organization's first objective is survival. It will naturally tend to grow, expand, and protect itself even beyond the objectives set out in its statutes. Thus, the well-known cases of state hypertrophy.
- C Organizations, just like people, learn by doing and adjust to their environment.
- C The division of labor into functional areas of specialization tends to create the phenomenon of organizational "islands" or "feudal estates." Coordination is not attained automatically in an organization divided by areas of specialization.
- C Markets allocate resources well in the case of private goods, inefficiently in the case of merit or mixed goods, and quite badly in the case of public goods.
- C Structure should follow strategy, not the other way about. This means that the organizational model to be adopted should depend on the strategy to be applied, and that a change in strategy requires a change in structure.
- C The behavior of executive officers in decision-making simply tries to satisfy a set of objectives and not to maximize an objective function, as stated by economic theory. Human behavior is basically oriented to satisfying self, not maximizing an objective organizational function—a truism that applies even more in a hypercomplex context. Hence, idealizing human behavior in order to assess results does not yield positive effects.
- C To a large extent, human and organizational behavior are motivated by the quest for power. In modern organizations, one of the key elements that contribute to holding power is information.
- C Managerial skills and personnel abilities are critical factors in the modern world. Capital, technology and physical infrastructure are obtained through knowledge, innovation and creativity.

The problem in the state sector is that it has failed to adopt the organizational model, culture, and system of incentives necessary to foster the development of managerial capacities. The challenge lies in finding new mechanisms so that state employees do not lag behind their private sector counterparts: while many functions will

continue in the hands of the state, the continuous negotiation between the public and the private sectors leaves the state at a disadvantage. This is of the utmost importance in the present circumstances, as the state is delegating functions through privatization and incorporating market mechanisms in water allocation. The state has not yet developed the capacity to adequately negotiate the design of regulatory frameworks or perform adequate monitoring and control activities.

### **The Necessary Institutional Coordination**

In every complex system there is a need to establish institutional coordination between the various agencies and actors involved. This implies negotiation between the parties which, through a process of give and take, should try to bring their interests closer together. The role of the project administrator should be that of engineering the institutional arrangements required for success.

For this type of negotiation it is first necessary to clearly identify all the agencies engaged in activities having direct or indirect impacts on the system under consideration. The next step consists in defining the strategy to establish interinstitutional coordination.

According to Fernando Tenorio (1991), coordination “is a managerial function, calculated and deliberate, which seeks to impart order to a number of relevant activities that are themselves highly differentiated by both general and the operational contexts, with the aim of grouping and integrating these activities in the most appropriate form and at the right moment so that plans can be smoothly implemented.” For further recommendations concerning the development of institutional coordination, see Annex III.

## **V. Instruments for the Integrated Management of Water Resources**

This section (and Annex I) presents the main elements necessary for the proper design and operation of an organization. In other words, what is to be organized and how. It focuses on what the agency must do to manage water, and how these measures can be carried out.

The recommended central strategy is the classic environmental dictum: “think globally, act locally.” Thinking globally may be interpreted as the systemic understanding of the context in which the water cycle, water uses, etc. take place—an understanding that requires an interdisciplinary, intersectoral and interinstitutional approach. This means that all system components and their interaction should be known so as to be able to anticipate which effects a certain action on one of them can have on the others. The relationships between the system’s components and its external context variables should also be understood.

To “act” one should know what to do. One should have a clear idea of the current situation and of the desired state of affairs so as to be able to make decisions concerning the main courses of action that will take the system from the present to the desired state. Strategic planning is an appropriate mechanism for this type of analysis.

“Act locally” means to work on the system’s critical points through specific action units or “projects,” with the objective of attaining the desired state as quickly as possible.

In summary, this paper recommends that actions should be the result of a “strategic management plan” for the water system under consideration. The plan should be devised and implemented through mechanisms of the “action-training” type in an interdisciplinary, interinstitutional and intersectoral context in which the “projects” are designed and implemented with the active

participation of the system's main operators as well as of the beneficiaries of each of the actions.

## **Strategic Planning**

Modern management techniques recommend strategic planning as a most useful tool. In the first place, it consists in identifying the unit of analysis; in our case, the water system. On this basis, an analysis is made of the strengths and weaknesses of the internal context and of the threats and opportunities of the external one. This analysis is also known as FODA.

Within the internal context, well-trained human resources, efficient institutions with available funding, relevant research centers, a substantial availability of natural resources as regards both quantity and quality are examples of strengths. On the other hand, weaknesses refer to those aspects that somehow hinder development or otherwise entail environmental degradation processes. For example, the natural fragility of ecological systems, overpopulation, uncertainty concerning water availability, etc.

Opportunities are those elements from the external context that should facilitate the management of relevant basin aspects, such as easy-access low-cost funding sources, appropriate macroeconomic or institutional variables and regulatory frameworks that promote decentralization and participation. Threats are those factors that may negatively affect the system's activities; for example: extreme climatic conditions (droughts, floods, frosts, etc.), centralization processes detracting from the basin's autonomy, administrative restrictions that affect free exchange or the incorporation of relevant inputs, immigration and settlement of marginal populations on fragile areas or water sources and armed conflicts.

Strategic planning means to define an objective and identify alternative actions to achieve it. This should be done on the basis of the internal strengths and external opportunities while trying

to minimize the incidence of internal weaknesses and external threats. The result is the identification of the system's most pressing or strategic problems together with suggested actions to manage or control the different processes.

It is worth noting that the proposed analysis is distinctly prospective: it is an exercise in imagining possible future scenarios as well as the way system operators should behave in order to achieve sustainable development.

## **The Role of Training**

Training is essential for action to take place. Note, in particular, the 12 years of experience by INCYTH-CELAA in conducting workshops on "Training in the Integrated Management of Water Resources," jointly organized with CIDIAT and ECLAC, and the technical advisory services received by water resources or basin administration agencies. Formal university education in Latin America, as in most countries in the world, trains students in a single discipline. The combination of different types of knowledge necessary to design and implement solutions to real-life problems, which are interdisciplinary by nature, is left in the hands of the managers or administrators in charge. These people usually have the traditional professional background or are engaged in political careers—in either case, they lack interdisciplinary experience.

In such a context, a specific style of action-training is the best instrument to adopt an interdisciplinary dynamics at the institutional level. It simply consists in teaching the ABCs of management (economic, legal and administrative principles) and organizing heterogeneous working groups (interdisciplinary, interinstitutional, intersectoral) to develop a strategic planning process, define priority action guidelines, and develop projects and follow-up.

## The Project as Action Unit

Defining projects as operational units for specific actions makes it possible to delimit the scope of the work to be done, and to assign roles and functions correctly to the various project operators and to all the people who, one way or another, will be involved in it. It also permits the establishment of finance mechanisms, and the characterization of project beneficiaries and the agencies or institutions that will perform executive or control functions. This is what is known as strategic project management.

Let's assume that after the strategic analysis of a given basin or water system, it is concluded that one of the main problems affecting the system's sustainability is soil erosion due to water. In order to define and conduct a soil conservation project, it is necessary to go through a number of steps or stages on which Bank experience abounds. It is important to proceed to a revision of all feasibility reports (technical, social, political, legal, institutional, economic, financial and environmental).

## VI. Development of an Organizational Proposal for Integrated Water Management

As already stated, there are neither general rules nor recipes to design the most appropriate organization for the integrated management of a given water system. All the same, this section presents a general organizational structure which may be applicable to many cases in LAC.

### The Management System

In global terms, setting up an appropriate organizational system for the integrated management of water resources calls for the establishment of two key institutions. First, one in which the main actors and interests involved in the system's water resources management and use can meet; that is, a *water council* or

*committee* for the river under consideration. Second, the council's *ad-hoc advisory group* with the capacity to summon the best experts, technicians or mediators to assist the council.

The central idea is that these two institutions should work together in developing an "intelligence" that will make it possible to select the best course of action and to generate the best organizational structure for the system's effective sustainable development.

### On the Water Council

The main missions and functions of the water council are the following:

- C To collaborate with the traditional government agencies in the formulation of the most important water and environmental policies.
- C To be an appropriate agency for intersectoral conflict resolution.
- C To seek advice on the new problems cropping up in the system, on changing contexts—both internal and external—and to perform periodic strategic analyses in order to revise and eventually redefine the main action guidelines.
- C To define and establish the characteristics and validity of the appropriate interinstitutional coordination mechanisms in order to implement projects or actions.
- C To facilitate the creation of adequate organizational designs in order to make progress on the actions approved.
- C To become a forum for learning, practicing and consolidating the new organizational culture.

The rules of the game, duties, structure and constitution of the council will depend on the characteristics of each particular case. However, the following are criteria for a healthy and sustainable operation:

C Council members should not be numerous. What is important is that all sectors be represented: water utilities, and irrigation and hydropower agencies which, in addition to being the main water users, have so far been responsible for its management; regional institutions (municipalities); and even sectors which are not traditionally included, such as those engaged in recreation and tourism, biodiversity conservation, etc.

C There is a tendency to overrepresent the public sector. For reasons of natural interinstitutional jurisdiction, many unresolved conflicts are submitted to this new structure, a situation which jeopardizes the council's usefulness, validity, continuity and efficiency. In view of the importance of such difficulties, specific strategies should be adopted in order to, at least, minimize the risks; for example:

- (i) Provide, from the start, for the adequate representation of nongovernmental organizations with an interest in the water sector (irrigators' associations, chambers of industry, conservation agencies, etc.).
- (ii) Establish well-defined limits to the issues the council is to deal with. In principle, each sectoral agency (drinking water, irrigation, hydropower, etc.) should retain its functional autonomy. In other words, each sector should manage its own affairs and be accountable for its actions and results. The council is to act in cases of conflicts of use among sectors, or when a system operator produces externalities to third parties, or when multipurpose works are to be constructed, or when certain actions may affect other system operators; and in all those cases that demand intervention or in areas that have not been previously administered. An example is the protection of water sources and recharge areas, an aspect which is usually omitted in management systems.

C The profile of the council's coordinator, chairman or executive secretary (depending on its constitution) is of the utmost importance. This person should be highly regarded by the entire water community, advocate "global and strategic thinking" on matters pertaining to the water system and its interrelationship with other sectors, have the support of the highest political authorities, and should not be biased toward any of the sectors involved. (See Annex I.)

C Council members should not be paid: their participation should be motivated solely by the desire to represent their respective sectors, or be a natural extension of the functions they already perform in the system's agencies.

C The council should not implement projects, but it should have the power to decide the allocation of part of the budget of the executive agencies that constitute it. These resources can be applied to intersectoral actions or projects while their implementation is left in the hands of the operators, who should devise the necessary coordination mechanisms to carry out activities.

C The council should be assigned a budget so as to be able to meet its operating costs.

C A coordination board or a communication authority should be set up to keep the main actors informed and motivated to monitor activities, especially those in which the council's ad-hoc advisory group is involved.

The council constitutes an appropriate forum for seeking and achieving consensus over policies, proposals and plans. where the main actors and interests involved in the use and management of the system's water resources conduct negotiations and reach agreements. The council is a powerful institution, endowed with natural representativeness and capable of carrying out negotiations at higher levels.

## **The Council's Ad-Hoc Advisory Group**

In view of its constitution, the council will be mostly oriented to solving short-term problems. Only under exceptional conditions will its chairman's qualifications correspond to the requirements outlined above (6.b). Therefore, it is most important that the council be accompanied by an ad-hoc advisory group which should:

- C promote "global thinking" or the systemic approach to water problems.
- C have the capacity to conduct the necessary analyses that will make it possible to anticipate changes, and to lay the foundations for a prospective type of management (as opposed to the traditional managerial style, which is of a reactive nature).
- C have the necessary know-how to conduct periodic analyses so as to facilitate the definition of strategic action guidelines.
- C be able to summon the best experts or technicians as consultants or temporary members to provide the required technical assistance in the formulation of actions or projects.
- C have the capacity to assist agencies or working groups in the formulation of projects related to strategic action guidelines using a methodology of the "action-training" type described above.

The new projects and actions should have a flexible structure, preferably of the matrix type, and should be organized by projects so that technicians from all the agencies can participate. In a way, this amounts to working with "built-in" interinstitutional coordination from the start.

## **Bottom-up Changes Or the Other Way Around?**

The vertical direction of change is a much discussed concern of economic development. But in the field of management or administration the dichotomy between the bottom-up and the top-down approaches is false.

What is really useful is a dual approach; in other words, a combination of an earnest political decision to produce top-down changes and a participatory organizational model that facilitates bottom-up innovation.

In fact, if there is no clear and firm political decision—expressed through laws and decrees and effectively enforced—it is most difficult to achieve important bottom-up changes. Such efforts tend to be rather isolated or individual, and their effectiveness is much reduced in comparison with situations in which changes are promoted from the top.

Structural changes in Argentina's power generation sector provide a clear example of such a situation. It was introduced by the enactment of a law to deregulate the power generation sector that stipulated that privatization and free competition should be established for energy production, while energy transmission and distribution were to be regulated since they are considered public services. The top-down change led to a bottom-up approach, facilitated by the fact that private investors perceived profit-making opportunities. The new context contributed to the development of multiple undertakings in power generation. The institutions set up to regulate energy transmission and distribution have followed criteria of simplicity, experience and excellence, and have made significant qualitative progress. These changes brought about a marked increase in power supply and a decline in power rates—a situation which is expected to continue. This shows that with a good regulatory framework, responsive to real needs and generating good investment opportunities, better results can be

derived from the top-down approach.

In general, LAC countries have highly regulated sectors where deregulation processes should take place to permit an influx of private capital and the participation of those involved in the sector. It is the state's role to devise good regulatory frameworks.

## **VII. Final Recommendations for Institutional Innovation**

This paper contains many recommendations to design a system for the integrated management of water resources. The state should be endowed with solid and strong institutions capable of regulating the changes that are taking place. This section summarizes the most important recommendations presented in this paper:

### **At the Macroinstitutional Level**

- C The state and each of its institutions should be well aware of the objectives to be attained in water management. To this end, it is recommended that action be taken to facilitate decision-making and the commitment of the actors to move toward the integrated management of water resources at the highest political-institutional level.
- C Adequate methodologies and case studies should be developed to facilitate a macroinstitutional arrangement for integrated water management that has the necessary intersectoral and interinstitutional coordination. This goal should be achieved with the participation of sectoral agencies and the social sectors directly involved. In this case the action-training technique is especially useful.
- C Essential institutional coordination activities—whether at national or state levels—among the sector's agencies administering the different water uses should be carried out without complications or red

tape. This is of critical importance in order to move beyond sectoral management and into the integrated management of water resources.

### **Management at the Agency Level**

Below is a list of a number of recommendations aimed at improving the administration of water management agencies proper.

- C Structures should be simple, flexible and integrative. The height of the organizational pyramid should be reduced to the minimum, with only two or three levels. Agencies should be structured according to projects or follow a matrix model.
- C Rules and regulations should be simple and flexible, and the interpretation of specific cases and adjustment to contextual changes should be left to the actors.
- C The objectives, functions or purposes of each organization—and of every one of its units—should be clearly defined; an attempt should be made at quantifying their products and relating them to the organization's inputs in order to determine the production function.
- C All participants should be integrated into a strong organizational culture by making them aware of the objectives pursued and of the desired values and attitudes. The use of a common "language," a natural coordinating mechanism, is critical.
- C Organizational information should be broadly disseminated in order to prevent the formation of administrative feudal estates, power islands, and the discretionary use of data. This can be attained, for example, through a free-access information system and regular briefing sessions.
- C Internal processes that do not yield added value should be reduced to the minimum. All costs that do not add value to the final subproducts

should be continually reviewed, adjusted, modified, and eliminated.

C Simplification is the golden rule. Each member of the system should think in terms of the contribution he/she can make for accomplishing things faster and easier instead of protecting his/her status with new regulations, rules and procedures.

C Members of the system should trust organizational learning. This means that learning and error recognition should be rewarded instead of punished. When errors are punished, people resist changes.

C In the process of simplification, objectives should be met using the smallest possible amount of internal inputs. Unlike the private sector, products should be purchased and supplied. That is, products not inputs are to be purchased. An organization should aim at supplying the products and rendering the services which are genuinely demanded from it, and not “do everything” endogenously.

### **On Management Techniques**

Management techniques should promote the incorporation of strategic planning and project management as instruments suitable for the strategic management of water resources. It is important to understand that the integrated management of a system is not the simultaneous management of each and every one of its components, but rather the management of important or strategic elements.

It is recommended that the basin management agency or agencies carry out basic activities with adequate coordination for a correct management. In this sense, the following should be pointed out:

C A minimum agenda of investments or action projects, reasonably assessed as regards their technical, socioeconomic and environmental feasibility.

C Adequate criteria and procedures to safeguard rights; rules of the game to facilitate the sustainable development of the resource under consideration.

C Information systems and data banks to expedite decision-making at different levels.

C Adequate cost-recovery systems.

C Systems that facilitate and encourage the participation of both users and relevant social operators.

C Simplification of procedures to obtain the information required for granting water rights.

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### **Annex I: The Administrator's Role in Water Management**

At present, it is recommended that a dynamic approach to water systems be adopted. This is consistent with the modern administrative concept of strategic direction or management.

An administrator is any individual, group of individuals, public or private agency, whatever his/its location or level of operation, responsible for ensuring that the changes to be implemented to the system actually take place.

A change of attitude is therefore essential. Such a change should be directed toward the specification of an analytical methodology, called "strategic management." This generalized attitude is necessary to systematize the thinking of all the actors, and facilitate the movement of resources so that they can center around a common axis that will serve as a guide to all its members. This is why the administrator's role as negotiator is so important, since he should aim at reconciling all the interests at stake that seek to obtain individual gains which might jeopardize the global system.

Strategic management is a sequential process which starts with a planning stage based on certain objectives. This first stage is an in-depth analysis of the system's structure and internal operation, and of the environment in which it operates. The aim of the analysis is to detect the system's weaknesses and strengths as well as available opportunities and potential risks.

For example, many water systems lack the legal instruments necessary to control water pollution caused by urban and industrial effluents which effects human health, and the quality of agricultural products, among others. The role of the administrator at this stage is to obtain all the available information as well as the support of all the sectors involved to develop and institutionalize the rules that will make water pollution control possible.

At a second stage, the administrator should design strategic alternatives to solve the problems diagnosed, and the projects, programs and/or budgets to carry it through.

At a third stage, the administrator should devote himself to the implementation of programs. He

should now bear in mind that each component of the system (or of any other system) takes its own time to react to given stimuli. It is important that the administrator is aware of the inertia of each one of the actors so that he can avoid making untimely decisions.

The administrator should arrange for the necessary resources and means to fulfill the objectives sought. He should also be able to overcome obstacles, such as the tendency to excessive bureaucratization, resistance to change, interjurisdictional problems, and others.

Finally, there is a control stage, which should be directed towards the degree of fulfillment of the objectives sought. The concepts of effectiveness and efficiency are introduced at this point.

In short, the modern administrator should constantly teach, preach and exercise the following:

- C Global and integrative thinking.
- C Cultural change and transformation of public ethics and values.
- C New leadership and system management techniques.
- C New communication and management of change techniques.
- C New project financing and administration models.
- C More relevance to qualitative variables than to quantitative ones.

## **Annex II: Basic Principles for Organizing Water Management**

This annex contains a set of basic principles and criteria necessary for the design of functional

management systems. Following these criteria during state reform or institutional development processes will greatly increase the likelihood of establishing an integrated water resources management system.

### **Management Agencies Are Open Systems**

Sectoral water management agencies, just like an institutional agency for integrated water management, are open systems. A system is open when it is in permanent interaction with its external environment so that a constant exchange of human resources, materials, information, etc. takes place. This situation demands continual changes in the agency.

A system is said to be closed when its components do not interact with the surrounding environment, i.e., it receives no outside feedback—a fact that delays or hinders the agency's adaptation to the changing environment.

In open systems there is a self-regulation process (dynamic homeostasis), by which different mechanisms participate in maintaining the system's balance in the face of an outside stimulus. If the self-regulating mechanisms are not operating, the system can be destroyed. These mechanisms can be present in enterprises, utilities, ecosystems, and other organizations.

### **A System's Structural Elements**

In order to organize a system it is necessary to define the characteristics of a given structure, such as its hierarchy, specialization, formalization, coordinating mechanism, degree of centralization, and size, structures and technology.

**Hierarchy:** The system's hierarchy is its vertical division of authority and defines the line of command. A system can be shaped like a pyramid or be more or less flattened; it can distribute authority or concentrate it. In general,

bureaucracies are more hierarchical than enterprises. This dimension should be analyzed for each case since there are no general recipes applicable to all situations.

The functional value of hierarchy has socio-psychological and organizational bases. Authority minimizes the conflicts arising in all systems and it must be present in every organized group. Whenever man decided to undertake group actions, he has had to resort to hierarchies (which is not the same as authoritarian or democratic styles of leadership). H. Simon has shown mathematically that a hierarchical system is more efficient than an anarchical one; the issue to be decided is which hierarchical system is to be used.

**Specialization vs. Integration:** A system should perform multiple functions. The question is how to divide human labor—horizontally—to carry out these functions. This poses the dilemma of achieving an appropriate balance between subdivision into specialties and the degree of integration necessary to resolve complex problems such as water and environmental management.

The most contrasting criteria are those that divide labor according to functions, territories and projects. For instance, organizing departments by functions (the technical area, the commercial area, the financial area, the accounting area, etc.) means grouping together all activities considered similar because of their conceptual and technical nature. In theory, management fostered this type of grouping to “take advantage of the specialization of human knowledge.” But this has also led to feudal systems or “organizational islands,” to the partial treatment of problems, and to an increase in bureaucracy, among others.

Territorial division groups activities on the basis of a physical operation area, with the objective of globalizing the approach to the problem and, thus, providing situational solutions. However, there is a modern world of knowledge, technology and economic costs which hinders the application

of this criterion. It is applicable to simple, standardized activities with minimum information requirements.

Division of labor into projects or programs groups activities and resources according to clearly differentiated projects and programs. For instance, a national sanitation program geared toward the construction of sewers.

Modern solutions call for matrix structures, division into projects, and the design of flexible programs. In general, criteria are combined depending on specific circumstances. The current approach favors temporary divisions rather than permanent ones (in a horizontal sense) in keeping with the strategies and policies adopted; with decisionmakers holding globalist or integrative views, multidisciplinary working teams and adequate coordination mechanisms.

**Formalization:** A system’s formalization often depends on its public or private nature and on its size. Formalization is the degree of institutionalization of structures, procedures, methods and norms. For example, bureaucracies are more formalized than the small economic units of the agricultural market. A volunteer association for the protection of the environment will not require voluminous paper work to operate, but a state agency will invest considerable time and effort in formalizing multiple activities.

When a system is designed, a “structural management model” which determines the degree of formalization is also adopted. Computer science contributes to making formalization more efficient, especially as regards figures, data, accounting, and process management without wasting human time and energy.

**The Coordinating Mechanism:** Since division of labor and specialization are givens, the development of a system requires mechanisms to coordinate the diversity and complexity of its activities. Classical management authors were of

the idea that coordination would occur spontaneously—just like the “invisible hand” of the perfect competition model in economy. However, this is not so.

There are different coordinating mechanisms which are useful depending on the nature and circumstances of each system:

- C Standardization of processes, norms and methods.
- C Standardization of knowledge and values.
- C Design of plans, programs and projects with a quantitative determination of objectives.
- C Permanent group dynamics.
- C Combinations of the above.

### **Centralization and Decentralization:**

Another of the structural dimensions of a system is the degree of centralization in decision-making. Centralization and decentralization are extreme theoretical points in a continuum. There is neither absolute centralization nor absolute decentralization. They have to do with decisions and not with physical concentration or geographical dispersion. For instance, a sanitation agency can have geographically decentralized systems and still operate as a centralized enterprise.

There are advantages and disadvantages in increasing the degree of decentralization of a system; this is why there are no recipes that fit every situation.

**Size, Structure and Technology:** Each system has a certain size and structure and requires a specific operation technology. These three elements are mutually dependent. Thus, a large system adopts oversized technologies and runs the risk of having “heavy” structures. On the other hand, a small system is technologically and structurally more flexible. A bureaucratic structure tends to adopt excessively formalized

technologies and adhere to them for a longer period than a divisional model, for instance.

A closed, bureaucratic structure based on functional specialization is not advisable when working with sophisticated, innovative technologies with high knowledge components..

These elements depend on the influence of context and on the strategy adopted to negotiate with it. It is said that structure follows strategy, and that size conditions flexibility and survival in a context with a high exchange rate. It is also said that adequate technologies are those adopted by organizations of excellence, and that these organizations are excellent when they optimize their connection with the surrounding environment.

A centralized structure, for instance, runs more risks of collapsing than a decentralized one when certain context conditions change abruptly. On the other hand, when there is an economic crisis and funding becomes critical, there are more elements in a centralized structure that will enable it to react.

In short, in order to design a system, an analysis should be made of all the elements in the specific situation. In systems analysis this is known as situational or contingent approach. Priority is given to the interdependence between variables, elements and the dimensions in connection with a context.

### **Nature of the Agencies Involved**

An appropriate system for water management should be made up of a combination of public and private entities.

The presence of and the actions taken by the state cannot be questioned when conflicts and opposing interests arise, when public goods must be administered, and when there are externalities. In general, there is broad consensus on its policing role. This entails the formulation of

policies, objectives, goals, and the permanent evaluation of their fulfillment, exercising punitive authority in case of noncompliance. The role of the state in environmental management is to ensure the common wealth, to help resolve social conflicts, and to promote sustainable development.

The debate nowadays centers around which functions the state can carry out efficiently and which ones should be delegated to the community.

The role of nongovernmental organizations is essential and increasingly important. Given that environmental issues are related to human survival, the whole community has a stake in them and adopts multiple forms to protect its rights. Nongovernmental organizations constitute at present an appropriate mechanism for promoting environmental awareness and education, lobbying for protection laws, encouraging scientific research and development, monitoring dangerous or critical cases, and even for direct action to protect biodiversity.

Nongovernmental organizations have the advantages of definite objectives, small degree of formalization, and small size. These characteristics make them flexible and mobile. However, they tend to focus on a single aspect of the problem, so that the role of the state is necessary to ensure integrality and, hierarchically, to resolve conflicts.

A modern environmental system aims at integrating all operating organizations while the state seeks to delegate the execution of specific actions to the best qualified ones.

### **Annex III: Recommendations for Institutional Coordination**

To carry out interinstitutional coordination it is necessary to define first the “project to be carried out.” Once this is done, the organizations and/or

organizational units that have jurisdiction in the field or that will be affected by the project should be identified. To do this, it should be borne in mind that there is interaction when:

C the results they should attain contribute to or are added up to obtain an objective; or

C the results of an organization are inputs for the operation of another organization.

The following three main variables should be established for each organization:

C administrative activities performed, especially planning and control activities applied at different levels;

C functional systems; and

C information and decision-making systems used.

First, in a bureaucratic organization, the time required to meet a request is relatively long. This means that, if a request is to be made to such an organization, the time it takes will have to be considered to prevent delays in the execution of the project.

Second, the type of relationship among the different organizations should be defined.

Then, it is necessary to assess the probability that organizations will participate in projects, to identify who will be making the decisions, and to involve the organizational units or organizations in active participation.

Once a basic agreement has been achieved, direct contact should be established with the persons from the other agencies who will be working on the project. The activities in which they will participate and level at which they will do so should be defined. A reliable and simple information system should be set up to link individuals, working groups and agencies. Finally, the responsible organization and the

employee held responsible for a given activity should be identified.

# Community Participation in Watershed Management

*Lori Barg<sup>1</sup>  
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## Executive Summary

Overuse of aquifers, contaminated rivers, deforestation and many other environmental problems are increasingly common and are linked to social and economic problems. Growing populations and development bring increasing and conflicting needs and uses on water resources. This calls for management of these resources. New systems that involve the community in sustainable management of this limited resource, such as Citizens' Monitoring Networks, must be created.

The success of these program relies on 100% participation, legal authority to enforce decisions, and national laws that back up local decision-making bodies. This involves education. On the community level, this means outreach to and inclusion of previously marginalized members of the community. On the government level, workers who are accustomed to top-down decision-making, must be taught the skills of networking, organizing and outreach. There must be a collaborative relationship on local, regional and national levels.

The national government's role should include setting standards and regulatory practices, oversight management and consultative services with a clear legal transfer of authority to the community level. Community participation could be facilitated by training community outreach

workers/mobilizers, agricultural extension agents, health care promoters, and others, who would in turn train their constituencies in practical methods such as: conducting physical surveys of land uses, biological monitoring of indicator organisms, coliform testing in surface water, and conducting wellhead protection planning. Communities must have primary responsibility and input into regional and national organizations for all phases from planning, policy-making, decision-making, project implementation and evaluation. Community participation works because people know their community and are in the best position to identify problems and their causes and determine how to resolve them given limited economic and human resources.

Conflict is inherent in resource management, competing interests should be acknowledged at the beginning. Mediation, binding arbitration or other conflict resolution methods should be built into the process. Community, regional and national organizations must be linked, be nonpartisan, and have the legal authority to enforce decisions. Economic development and wise resource use go hand in hand. Short sighted policies must be replaced with long-term planning to protect the resource base and promote sustainable development.

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## Introduction

Water is life. There is nothing we can do that does not affect water. A few minute's thought, or a day without water, can show us how true that statement is. But the threats to our limited surface and groundwater resources are enormous: overuse, contamination, mining of aquifers, deforestation, and salinization of freshwater aquifers are common global problems. The importance of water in our lives, combined with existing threats, make water resource use a global problem, but one that must be solved at the local level.

Many top-down development projects have been unsustainable socially, economically and environmentally. Because of this, community participation has become a requirement of lending institutions. To implement programs that truly involve the community, governments must develop *a new orientation* from a top-down decision-making approach to become facilitators, networks and collaborators with communities.

Community participation in watershed management calls for the creation of a system to enable each community to:

- C identify the problems of immediate concern within their community and the causes of those problems,
- C acknowledge conflicting interests and create mechanisms for their resolution, and
- C prioritize the solutions given limited economic and human resources

Each community calls for a different approach. There are no magic formulas as every country and community is different. The first step is promoting a sense of identity, pride, accomplishment and ownership to help people get involved in managing natural resources. Education and practical activities such as biological monitoring and surveys of a

community's land use, water resource, agricultural, industrial and economic base are vital.

Each program must be built to fit the needs and capabilities of each community. The success of the program requires that everyone participate. This takes active outreach to ensure that previously marginalized people are given a voice and a role in planning, policy-making, problem solving and implementing solutions. Everyone must understand why conservation of resources and protection of the earth and its resources brings a stable economy.

Everything is interrelated, a cursory analysis of any environmental problem shows the myriad other problems that it is connected to. The solution must be approached step by step. Good planning, constant reevaluation, flexibility, good listening, and a willingness to change course as often as rivers do in a flood plain can bring about sustainable resource use and sustainable economic development.

Community participation is not acting in a vacuum, there are strong business and social forces that emphasize short-term economic gain at the expense of long-term sustainability. These short-sighted actions leave communities with eroded soils, dried up or salinized aquifers, deforested and with a degraded resource base. Natural resources are the true wealth of any country and are irreplaceable.

There are some basic requirements for citizens' organizations to be effective. They must be nonpartisan, they must have legal jurisdiction and be connected with regional and national groups that give them the legal authority to ensure that their decisions are enforced. Strong national environmental laws must be in place. Citizens' Monitoring Networks are one approach that transcend many of the problems encountered in the past.

These problems must be tackled before it's too late. The rapid desertification of the planet is warning us. Since every community is different, we will never figure out the perfect method. It is important to start, as Myles Horton said "the only way to start, is to start."

One way to start is to carefully select an area where there is an identified problem, and the community is already organized and interested in resolving it. It helps if the results can be easily measured. It is okay to start small and learn from experience. A community that is successful, whose results are visible, can help foster other communities' aspirations. Some communities are reluctant to try new things unless they know they will work. Helping communities to identify problems and their causes, and decide on a solution helps to make use of limited economic and human resources and build capacity within the community. This is sustainable resource use and sustainable economic development.

### **What Is Watershed Management?**

*The sage's transformation of the world arises from solving the problem of water. If water is united, the human heart will be corrected. If water is pure and clean, the heart of the people will readily be unified and desirous of cleanliness...The pivot is water. SLao Tzu*

A river basin is a living system. Rivers are the veins and arteries of the earth. They serve as the connecting link between environmental, human health, and socioeconomic problems. For years economic growth and environmental quality have been perceived as being mutually exclusive. On the contrary, they are completely dependent on each other. History gives us many examples of civilizations that collapsed as they overused their resource base. Watershed management allows for sustainable resource use. This is not only good for the water, but for society and economic growth as well. Potential conflicts in watershed management arise not only from different uses of water, but different needs in the upper, mid and

lower parts of the basin, as well as in urban and rural areas. For example, flood control and water quality is a priority in lower parts of the basin, while water supply is more important in its upper parts. Conflicts between rural use, municipal supply and maintaining minimum flows in rivers are inherent. Conflict resolution methods (mediation, arbitration...) need to be built into the management process. Multiple uses, as well as different interests and needs, require multi-level basin wide management on local, regional, national and international levels.

A river basin is a place not just with economic uses, but with deep connections for the communities that live there. Pride in maintaining the integrity of a system that supports us must be fostered. Watersheds reflect the complexities of where and how we live and our many interacting and conflicting needs. One of the main conflicts is between instream and out of stream uses. Water is withdrawn from streams to be used for municipal and industrial supply, irrigation and cooling electric generation, and used instream for navigation, conservation, fish and wildlife, flood control and hydropower.

### **Why Watershed Management?**

Over the last decades we have seen the degradation of entire watersheds. Massive deforestation, bursting oil pipes in the upper Amazon, increasing colonization of traditional homelands of indigenous peoples, and rapid urbanization are some of the tough issues facing Latin America and the Caribbean. Watershed management is critical because many problems are not only local or watershed wide, but global. Since these problems are interconnected, the solutions and their management must also be interconnected. When water, or any resource, is limited it requires management to balance environmental, social and economic values.

The bottom line is that it is cleaner and cheaper to manage a watershed for protection than to remediate problems. Resource degradation

involves high social costs including lost work days, lost lives and increasing health care costs. Additional economic benefits are derived from wise resource use and protection. Householders have more energy to put into productive work when they are not walking miles for water or wood. Relatively simple efforts such as reforestation yield many benefits such as recharged aquifers, fodder, fuel and increased soil fertility. Sustainable resource use is also sustainable economics.

There are important social reasons for watershed management as well. We are all interconnected. We have the right to dignity, which clean water, healthy communities and a living wage afford us. As populations grow they bring increased demands on water supply. High population density is already leading to overuse and mismanagement of ground and surface water. We can expect water supply problems to increase as people and activities shift to water-short areas. Practical plans to make water resource use sustainable include water conservation, water allocation, increasing water use efficiency, and pricing mechanisms to reflect value.

### **Related Environmental Aspects**

Any sound watershed management plan incorporates an understanding of the complex interconnections between social, economic and environmental problems. Watershed management plans may tend to focus on critical land/water interfaces such as shorelands, wetlands, estuaries and floodplains. But since water doesn't observe boundaries, a more comprehensive approach to watershed management is required.

An understanding of this complexity makes it impossible to single out an environmental or social problem and deal with it in an isolated manner. A fairly simple analysis of any problem reveals many other related ones. For example, examine deforestation. An exercise in environmental mathematics reveals that:

Deforestation=> more erosion=> loss of topsoil=> aquifers drying up=> less rain=> change in the climate=> less productive agriculture=> increased sedimentation of rivers=> water contamination=> increased health problems=> social unrest

The first step in developing a watershed management plan is to conduct an inventory of existing conditions. This inventory should include a thorough description of all water resources: i.e. gradients, flows, geomorphology, watershed size, water body size, groundwater/surface water interactions. It requires technical expertise and can be facilitated and directed by the national government and regional planning commissions. This information should be as detailed, accurate and clearly presented as possible in order to help communities direct management practices to address defined problems.

The following tables list some of the important environmental aspects to consider in gathering an inventory of existing conditions, problems and potential problems.

### **Urbanization**

Urban areas present special problems. The communities change rapidly. They are densely populated and have large marginalized communities. Contamination from debris, animal and human waste, industry, tire and brake residue, heavy metals, hazardous materials spills, air pollution fallout and erosion from construction activity are concentrated in a small area. In the 1960s people believed that "dilution was the solution to pollution." A look at the social trends toward urbanization makes that statement totally inappropriate and out of touch with reality.

Innovative planning can help deal with many environmental problems stemming from urbanization. Curitiba, Brazil, is an excellent example of a city where good planning has paid off. For example, solid waste, both organic and

inorganic is exchanged in the favelas through a program called “garbage that is not garbage.” In this program favela residents exchange their organic waste for food (thus supporting local farmers), and their inorganic recyclables for bus tokens. This program was cheaper to implement than providing infrastructure. Participation is high due to the immediate economic benefit gained by the participants, but there are additional social benefits of environmental education and pride in their community.

### **What Is Community Participation?**

*In most developing regions, and certainly in Latin America, governments have traditionally viewed independent organizations as a threat to be subdued. Cultural biases and prejudices against the poor and ethnic minorities feed this belief. Conversely, grassroots and other independent organizations have long viewed government as an anti-democratic authority to be challenged and opposed. Against this backdrop, bridges must be extended between governments and their new constituencies so that opposition can be turned into propositions and confrontation into negotiation. At the same time, all parties must begin to accept each other as indispensable partners in sustainable development. SZazueta*

Community watershed management involves a completely different approach toward resource management. Instead of private interests controlling resources, a holistic participatory approach where communities control resources must be implemented. This change won't be easy. It involves actively unlearning many old ways of doing things, and learning new ways.

Government staff need to learn to work as communicators, facilitator, networkers and negotiators instead of top-down decisionmakers. The most crucial skill to be learned is networking. Networking involves connecting nongovernmental organizations (NGOs), existing agencies, nonpartisan people, postmasters, religious and village leaders, health promoters,

agricultural extension agents, social workers, teachers, good students, individuals and groups, neighborhood commissions, local, regional and national governments and their constituencies.

Community participation is the crucial link allowing both environmentally sound development and equitable economic development to occur. The existing conditions and problems are known best by the people living in the community who have a stake in the outcome. The key reasons for making the change towards community watershed management is that it is mutually beneficial, sustainable, successful and easier in the long run than top-down management.

Industry, agriculture and communities all contribute to resource degradation and are therefore in the most powerful position to make a lasting change. Local community groups have an intimate knowledge of their area. Therefore the management plan they develop will be based on better data, be more accurate and generate more political support than a top-down organizing plan generated out of the capital. Community participation requires planning and education to set up. Eventually things speed up as capacity is built by more individuals and organizations. Officials accustomed to top-down decision-making need to learn patience. Community participation works because it:

- C Builds upon a perceived problem.
- C Brings a wider range of experiences into decision-making, and helps make policies and projects more realistic.
- C Fosters a sense of ownership.
- C Gathers political support for and reduces opposition to policy proposals, projects and other decisions by incorporating stakeholders' concerns.

- C Empowers people, builds local capacities and makes implementation easier.
- C Builds communities' technical and organizational capacities as well as ability to negotiate.
- C Reduces costs.
- C Taps local resources.
- C Is flexible, allows for modification.
- C Incorporates local organizations as support mechanisms.
- C Helps form new leaders.
- C Keeps the populace informed.
- C Decentralizes decision-making.
- C Provides good data and information that is accurate, widespread and reliable.
- C People who are organized and organize information are better equipped to make sustainable decisions about land and resource use.
- C Programs stand the most chance of success if power and control in decision- making are in the hands of the people most affected by existing problems.

In contrast, analysis of nonparticipatory development projects show that they are often discontinued after financial assistance ends. Top-down development projects are often rejected by the people they are designed to serve. Even well-intentioned development projects aimed at improving health and sanitation are often failures due to the lack of participatory planning. For example, how many people know a story about a latrine-building project that resulted in the building of 5,000 new chicken coops or corn storage sheds. It takes more than providing a

resource to make sure it gets used as intended.

The problems associated with participatory planning have more to do with raised expectations and dashed hopes. People appreciate being listened to. They become motivated. Their expectations get raised, but, the necessary support to implement plans is not necessarily immediately forthcoming. In a case like this, it is better to get people involved, either with a small grant, or a self-help program to implement some part of their action plan, while waiting for larger funding to come through. This helps keep people's interest and their support.

Other "side effects" of participatory projects is that they may go in unintended directions. For example, land tenureship may become a more important issue than resolving a non-point pollution problem through best management practices. The other advantage/pitfall of participatory processes is that they generate conflict. Conflict is healthy, positive and an integral part of development. Mechanisms to resolve conflict such as a commitment to listening to all sides, mediation and binding arbitration should be built into the process from the beginning.

### **Who Is the Public?**

The first question when working in participatory programs is basic, "Who is the public?" The public is neither monolithic nor homogenous. Participatory processes should be truly democratic and not be dominated by special interest groups or existing leadership within a community. People of different socioeconomic status, culture and gender must be included in the decision-making process. All key stakeholders should be invited to participate (the water supply owners, users, businesses, industry, recreation, hydroelectric, and conservation interests).

Groups previously excluded from decision- and policy-making need to be brought into the process. Outreach through existing networks

such as teachers, religious groups, social workers, agricultural extension agents, health promoters and women's groups can help to reach people who are not ordinarily part of a community's leadership. Outreach workers and community mobilizers can meet people where they live and work. Informal meetings build social relationships, increase people's comfort level and help to ensure that all members of the community are included.

### **Strategies to Foster Community Participation**

The first thing required to make the shift to participatory management is political will. Policymakers need to change their role from top-down decisionmakers and increase their skills in facilitation and networking. Three important aspects of the decision-making process are that it:

C be completely open;

C include the interests of all stakeholders; and

C be detached from political parties, as partisan politics undermine public participation.

Governments and NGOs also provide technical support and resources for implementation, operation and maintenance.

This change will require a restructuring of existing institutions to build more and better mechanisms for listening to and consulting with various stakeholders before policies are adopted or reformed. These stakeholders must be included in all phases through:

C planning,

C policy-making,

C project design, and  
C implementation.

Government, business and the public must act as partners formulating policy together, while citizen groups define the problems, formulate solutions and action plans, and help implement activities. The overall goal is that citizen groups develop the capacity to deliver services with the aid of the government. Resources should be channeled directly through participatory organizations.

One of the pitfalls of any organization is bureaucratization. Government agencies, consultants, NGOs and grassroots organizations should be spending their resources on their work, not on high salaries, cars or fancy offices. Agencies must be accountable on all levels, local, regional and national. NGOs and the government must not promote factionalism and inequity, but increase the capacity and democratization of communities.

There are a variety of structures that can be implemented to make a process participatory. The most important is to make the process flexible enough to allow the councils to balance the different interests and needs that come from multiple use of a limited resource and to resolve conflicts. In participatory management the government needs to make the role of the public clear in order to foster trust. Since public participation can range from voicing an opinion to making decisions the people need to know:

C Why is the government body soliciting input, and

C How will it use it?

C Is the body advisory only? or

C Does it have decision-making capability?

Structures that have been used to foster community input include river basin councils, citizen's advisory boards, water resources boards and federal laws.

## **River Basin Council**

A river basin council conducts comprehensive, basin-wide planning and management. The basin council must have legal standing and policies to address cost sharing, water transfers, water quality and quantity issues, and interjurisdictional conflicts. In addition to planning, councils can provide technical assistance, operation and maintenance for smaller projects and rehabilitation of existing projects. A good committee structure facilitates accurate information flow and ensures that all stakeholders are involved. The Lake Champlain Basin Committee (United States and Canada) includes the following committees: managing nonpoint source pollution; preventing pollution from toxic substances; reducing nutrient loading; protecting human health; managing fish and wildlife; protecting wetlands; managing non-native nuisance aquatic plants and animals; managing recreation; and developing an action plan for educating the public.

## **Citizen's Advisory Board**

Nonpartisan citizen's advisory boards are appointed by a governor (or equivalent) but serve a longer term than the political party in power. Citizen's boards include academics, NGOs, and business and labor representatives. Citizen's advisory boards report to the legislature and make recommendations that can be turned into policy. Citizen's advisory boards deal with conflicts between interests representing industry, water quality, recreation, and the hydroelectric sector.

## **Water Resources Board**

Independent citizen boards make public policy decisions. They are not partisan. Their decisions are legally binding, and if challenged, the challenger has the burden of proof. Water resources boards must conduct all deliberations in public. In addition, the board must do active outreach to provoke public comment (mailing

lists, newspapers, radio...). The challenges associated with citizen boards are that they require complicated legal understanding and demand extra effort from the volunteer board. It is often helpful, to ensure effective functioning, that the board have at least one legal, and one technical person on staff. This is not necessarily to make legal or technical decisions, but to help clarify confusing issues.

Other structures to involve the public include governing and advisory boards, steering committees, consultation forums and public audiences.

Regardless of the structure, it is imperative that decision-making bodies have regulatory and legal authority. A citizen's board must have legal existence and legal jurisdiction to be effective. It must build public trust by actively investigating environment complaints from citizens and prosecuting offenders. The board acts as a regulatory body to back up citizens and enforce decisions. This is another important reason for ensuring the political and financial independence of a board.

## **Federal Laws**

Participatory structures must operate under progressive federal laws designed to protect the environment. Federal governments must institute and enforce regulatory requirements, retain oversight, and provide consultative services in technical areas such as conducting environmental impact assessments and comparative risk assessments. However, the federal government's role should involve a clear transfer of legal authority to communities. Examples of national laws to facilitate community watershed management include:

C Make multinational corporations conform to the laws of the parent country's Environmental Protection Agencies.

C Regulations on Point source pollution that require control of point pollution sources from industry with enforced fines, and cost-sharing to implement wastewater treatment for domestic waste.

C Regulations on non-point pollution include vegetative buffer zones, set-back zones, and no-spray zones; and best management practices for farms, woodlots, chemical and petroleum storage, hazardous waste storage, developed areas, sanitation practices, construction sites, mining, sand and gravel and resource extraction.

C Required wellhead protection planning in recharge areas for public water supplies.

C Bans on the importation or international transport of hazardous materials, and implementation of a public education campaign on hazardous wastes.

C Setting drinking and recreational water quality standards.

These national laws can be linked to participatory programs such as a pipe-watchers program that teaches citizens to identify point pollution sources. Education, communication and pride help in the enforcement of national laws. Regional organizations can help provide needed support to local groups so that there is a clear chain of communication and enforcement between local, regional and national organizations. The existence of national laws gives community groups the necessary legal authority to deal with major water quality problems.

### **Nuts And Bolts: How to Implement Participatory Programs**

Community participation is a buzzword. Everyone talks about it, but how is it actually done? Each community calls for a different approach. There are no magic formulas as every

country and community is different. Some things are universal though. It is important to promote a:

C Sense of ownership and empowerment.

C Sense of community (or family, region, nation).

C Sense of identity and pride.

C Sense of accomplishment.

It is important to get people involved in specific activities that help to identify problems and potential problems, establish priorities and take action to resolve them. The primary responsibilities of participatory organizations is to gather information that is factual and sound, incorporate the views of all involved parties and identify opportunities to make participation work. This work requires training of community mobilizers and outreach workers in practical methods to conduct a resource inventory, make a plan of action and implement changes.

### **Biological and Physical Surveys**

Two programs that provide accurate and widespread information and don't require any specific expertise are biological and physical monitoring. The United States Environmental Protection Agency uses rapid bioassessment protocols to identify water quality problems. NGOs such as Step by Step have been training people from Latin America and the Caribbean in using biological and physical indicators as a preliminary assessment of water quality and ecosystem health.

Biological monitoring uses bottom-dwelling insects in rivers as indicators of the health of the ecosystem. Studies in population and diversity on the order level are easily carried out with minimal training.

Physical surveys of land use and environmental conditions in a water body provide valuable data

to help assess changes to an ecosystem. Physical surveys can be combined with community interviews to determine how the ecosystem has changed over people's memory. *Are there more or less fish? Are they larger or smaller? Is the lake greener or more polluted, smelly?* Physical surveys done by community members are much more accurate than those done by outside "experts." The people who live in the community know detail such as, *What was planted where? What pesticides are used? How is the farm managed? What crops are grown? What changes have occurred in the fertility of the soil, slope, distance to surface water? Has the well dried up seasonally? Less or more often than in the past?* The information provided in these physical surveys relies on tapping into people's existing knowledge of their watershed. The biggest advantage is that as the information becomes organized, it helps people to prioritize and resolve problems. Community participation has the incredible advantages of being able to provide reliable data from a vast area.

Both biological and physical surveys use technology that is easy to disseminate, therefore extension costs are low. This is in sharp contrast to chemical analysis which is expensive, requires trained technicians, good lab equipment and analysis of the right parameter at the right time. For example, analysis for pesticide requires knowledge of the pesticide and collecting a water sample at exactly the right time after application and after a rain. Biological surveys, on the other hand, provide a picture of the contaminants' actual effect on life. If there was a pesticide wash down the river the effects would be visible in reduced diversity and reduced populations of aquatic life.

As much as possible, the results obtained should be quantifiable, for monitoring status and trends. Creating indexes for summarizing multiple parameters is one approach. It is desirable to maximize data comparability, measure the same parameters, and conduct quality control analysis. Community monitoring efforts can be linked with

trained technicians at universities nationally and internationally. Central groups can help to summarize the data and provide feedback to the communities in the form of data summaries, newsletters and technique updates. (Rathbun)

A thorough inventory of the watershed using biological and physical surveys helps communities to rank potential risks and decide which areas are critical and how to prioritize expenditures of money and time.

### **Participatory Rural Appraisal and Comparative Risk Assessment**

One of the most commonly used participatory methods is Participatory Rural Appraisal (PRA). PRA and other community planning methodologies can be used to build local capacity. PRAs can be either broadly focused or issue focused. It is better to start with a broad appraisal of the concerns and problems in the community because it is important to know where water resource problems lie in the bigger picture. Participatory methodologies can be focused to concentrate on watershed issues. Participatory Rural Appraisal:

- C Is community driven.
- C Is affordable.
- C Provides technical support to address important needs.
- C Enables communities to get information while retaining control over resources and activities.
- C Improves peoples capacities to analyze information.
- C Builds support for decisions on project planning and implementation.
- C Relies on local organizations, knowledge and capabilities and therefore results in proposals and actions that the communities can carry out given external resources.

Comparative Risk Analysis (CRA) is a methodology that is just being adapted to a more rapid participatory framework. In the past, CRA has relied on experts gathering data to help assess risks. Instead, biological and physical surveys completed by the community can provide the information previously provided by experts. Using a participatory process means that people will have a stake in the outcome and that because those living in the community have identified the risks, they will be more likely to put time and energy into solving problems. As an extreme example, an expert might find ozone to be a major problem, but the community may indicate that limited water supply and degraded water quality are more important to it. The community might be more willing to put energy into reforestation of the watershed, implementing conservation programs, and conducting a leak detection program rather than battling the production of chloroflourocarbons.

### **Urban Areas**

Urban areas face a different and more difficult challenge than rural areas. In urban areas, and areas with changing populations, people tend to be disconnected from their watershed. Populations are diverse, there are many conflicting interests and it may be hard to mobilize the people. Water supply, wastewater, flood zones and degraded water quality are daily issues for people living in peri-urban areas. Good planning, like in Curitiba, combined with education and programs like “garbage that is not garbage” can provide a rapid change in how urban people relate to their watershed. Environmental and economic problems are inseparable, and participatory management can help solve some of them, or at least give people the chance to try.

The challenge is to develop and foster the understanding that “urban watershed” and “healthy ecosystem” are not mutually exclusive. Education is critical to help people understand there is a stream nearby. Programs can help to

involve people in their watershed. Examples are: naming streams, celebrating water, addressing local issues, monitoring trash dumps, storm flows, industrial sites, construction areas for erosion, point pollution sources, illegal dumping, conducting biological indicator monitoring, promoting community green space, flood control zoning, community gardening, re-vegetation along rivers, coliform testing, and school education “paired watershed projects.”

### **A New System, Citizen’s Monitoring Networks**

So how does PRA, CRA, biological and physical monitoring and community involvement in planning, problem identification and implementation get turned into something that is reproducible and enforceable on the local, regional and national levels? The most reproducible techniques use basic low cost appropriate technology and provide training for trainers who are involved on the community level.

Regulatory bodies in the United States, while well-developed, are often unable to address the huge number of environmental problems. They have to prioritize which one of several problems should be dealt with first. In the United States there is high interest in volunteer monitoring. The problem with volunteer monitoring is that the bodies have no legal or decision-making power to help implement changes. Community participation and monitoring, which is part of a larger policy-making, legally constituted decision-making body can help to avoid some of these problems. Management bodies that operate in a participatory manner yet have legal jurisdiction and work on local, regional and national levels might be termed Citizen’s Monitoring Networks

Citizen’s Monitoring Networks (CMNs) are part of an integrated approach to watershed management. CMNs are part of a circle of communication, information and action between

the bottom-up approach and the top-down approach. CMNs do not have to rely on the creation of a new structure. They can build on existing structures and culturally appropriate management methods. Briefly, CMNs have several advantages:

C CMNs rely on trainers/mobilizers in each community; teachers, religious leaders, health promoters, agricultural extension agents, social workers and students to teach simple low-cost techniques to do environmental monitoring at the community level.

C CMNs are local, people are intimately aware of what is happening in their neighborhood. They are great resources for regulators and policymakers. (if they exist), and communities to assess current and potential problems.

C CMNs enable the completion of a link between any policy or regulation that is in place and allow citizens to provide information that help the policymakers and regulators to enforce protection and sustainable management of natural resources.

C CMNs incorporate community participation and education around the environment, as well as providing a community with skills to do something about their knowledge of existing problems and potential risks.

C CMNs provide a forum for communities to communicate.

C CMNs are a grassroots, bottom-up organizing approach to dealing with complex environmental problems.

C The focus of CMNs is watershed management. Watershed management transcends partisan politics and requires cooperation among many different users.

CMNs incorporate many aspects of participatory planning. They are nonpartisan, promote responsible communication between local,

regional and national levels. They provide communities with the legal authority to implement needed changes. They are cheaper to establish in the long run than centralized regulatory bodies. They reduce the burden on legislatures and regulators and provide widespread, accurate and reliable data to legislators.

## Local/Regional Relationships

Regional groups have at least three important and diverse roles in Citizen's Monitoring Networks. They *connect*, *serve* and *direct* local communities. Regional groups can network local communities to help them understand their place in the bigger picture. For example, how their water quality is affected by the waste dumped upstream. In this capacity, regional groups can *connect* local communities by summarizing the data communities have gathered, and bringing it back to the local communities to enable them to see their place in the puzzle.

In the *service* capacity, regional groups can provide training for local communities in capacity building in technical, administrative, financial and legal arenas. The impetus for this training program can come from both the local communities and the regional commissions in response to felt or perceived needs.

Regional groups also provide an important *directive* function as oversight and authority to ensure that local communities are conforming to national or regional regulation. For example, in a community in Kentucky the local industry, a tannery, was contaminating the stream and destroying the municipal sewage treatment plant as well. But both the municipality and industry wanted business to continue as usual. Regional groups can serve as watchdogs to help prevent local corruption from taking over.

Regional groups provide important links between local and national levels. In this capacity they have to supplement, but not repeat the work that

is done on the local and national levels. Citizen's Monitoring Networks would be isolated, individual groups, and not networks, without the activity of regional groups.

## Implementation

So, with all these good ideas for monitoring, networking, citizen's boards, how do identified issues and selected solutions get implemented? Participatory processes include not only assessing and identifying problems and their causes, but taking action to resolve those problems. Organizing help is needed to assist citizens to prioritize problems and develop an action plan. There are three main approaches to developing an action plan, they are:

C **single purpose**, few actions, involves specific interests, resources and issues, addresses specific need;

C **multi-purpose** several actions, multiple focus, river corridor management, involves various interests, resources and issues works simultaneously to meet several needs; and

C **comprehensive** approach, many actions, broad focus, watershed management, involves all interests, resources and issues, satisfies numerous needs while utilizing a long-range planning philosophy.

These approaches can be used at different times. For example, the single purpose approach can help a group to establish a track record of success and raise its confidence. This will enable the group to tackle multi-purpose and comprehensive approaches to existing problems.

Problems can be assessed from different perspectives. For example, there might be:

C an **immediate** need to implement household water disinfection to prevent spread of disease;

C a **moderate** need to implement sanitization education in the community; and

C a **long-term** need to restore the health of the watershed.

All these approaches are useful at different times. For example, a community might choose an approach based on involving the community in a short-term educational program to break the household contamination cycle and then educate to organize for long-term improvement in human and environmental health. The media (TV, newspapers and radio) are critical tools for organizing a community and spreading the word. Other methods to educate the community are special events such as watershed festivals, river clean-up days, as well as speakers, meetings and hearings,

Community meetings, brainstorming sessions and surveys can help take the pulse of a community. Questions such as the following can help groups to focus their decision-making process.

C How easy is it to resolve the problem?

C How much time is needed?

C What does it cost to fix?

C Is it possible for the community to pay?

C Does anyone have legal jurisdiction over the problem? Who?

C Is the action aimed at personal, or larger scale changes?

C Who will oppose you?

C Who won't listen?

C Who will support you?

C How do we talk to people?

Planning needs to be grounded in the realities of the community. Focus questions such as the

following can help a community determine if the plan is doable.

- C Is the solution more expensive than we can afford?
- C Are the economic, social, ecological or health related effects of failing to invest acceptable?
- C Do we have the technical skills?
- C Is this too complicated for the community to administer?
- C What resources are available?
- C How do we build group decision-making skills?

### **Financing**

Financing should be available for community groups to:

- C Apply for technical assistance for watershed management.
- C Establish a watershed management structure.
- C Carry out the watershed management process.
- C Conduct education and outreach activities to all stakeholders, using the media and public meetings.
- C Conduct inventories of existing resources, problems and causes of problems.
- C Develop skills, including facilitation and strategic planning, to implement the action plan.

A national funding strategy can be coupled with matching funds and in-kind support from businesses, municipalities, citizen's committees, corporate and nonprofit foundations and schools.

### **What Might go Wrong? What Might go Wrong? What Might go Wrong?**

Every solution creates a problem. If you can anticipate the problems caused by the proposed solution, then it can be dealt with in advance. Provision to reevaluate should be made early on in the process. For example, a coastal community might decide that it needs a new water supply because the old water supply is insufficient. A new well might be developed, but the community may continue to use so much water that the source is depleted and water quality deteriorates as salt water begins to penetrate into the freshwater aquifer. Planning for the future might involve 1) developing a new well and roof collection systems for water, 2) implementing household and community water conservation practices, 3) reusing grey water, assessing who uses the most water, and making changes made to develop, for example, a different irrigation system for agriculture, industrial reuse, household grey water reuse, 4) artificial recharge of the aquifer using greywater after primary and secondary treatment, and 5) reforestation for long-term protection of the aquifer. Evaluation needs to be built into every action plan. Planning in a living environment like a river basin means that attention needs to be paid to what is really happening, and not to what we expect to happen. Reality has a way of surprising us. The best laid plans often don't turn out as we expect.

### **Community Participation: When Local Problems aren't Local**

There are many situations where what is good for one community may not be good for another since "we can't all live upstream." For example, a city needs to site a landfill in a surrounding community. This landfill is a benefit to the city, but a detriment to the community in which it is located; or a village needs to be relocated in order to develop a dam to produce hydropower for communities downstream; or an industry wants to locate in one community, while the downstream communities will receive its wastes,

but not its jobs and economic benefits.

How do these situations get resolved? These situations require bargaining, compromise, negotiation, and active conflict resolution to achieve a just solution. The decisions that are made need to reflect and balance competing values. Too often these situations get resolved by dealing with communities (poor, minority, indigenous) who are in a weak position to participate as equals. Practically, conflicts have been resolved through bargaining: “We’ll take the landfill, if we get a new school, high tax base, health care center, etc.” To start the process there are important questions that must be asked, such as:

C How are the questions of long-term sustainability, and not short-term gain, given priority in decision-making?

C What values are used to decide who wins?

C How are win-win solutions created?

C What about environmental justice issues?

Environmental justice issues are especially important when not all players have equal power. It is important to make sure that all players have an equal voice and access to advice, technical information, etc. Otherwise those with money and power are sure to win. This means that before the bargaining can start, all stakeholders must be helped to develop their capacity to ensure they come to the table as equals.

To arrive at a solution to the preceding questions, it is key that all stakeholders are actively involved. As a bottom line, active outreach to ensure complete public participation, good mediation and conflict resolution skills, and support for sustainable institutions to ensure that agreements are carried out, must be incorporated into the process. It is important to remember that individuals, families and communities can make mistakes. So, in addition, the process must build

in a regular system of evaluation and re-evaluation to ensure a flexible response to changing conditions.

In order to turn a win-lose situation, into a win-win situation, it is important for all players to have an open mind and be willing to seek other solutions. For example; decentralized smaller hydropower, rather than massive centralized schemes requiring big dams; initiating recycling programs and industries to use recycled materials, rather than creating another landfill. In part the solution involves asking the question, is this really necessary in the first place? What conservation measures can be implemented first? An analysis of alternatives is typically done in the process of completing Environmental Impact Assessments (EIA), but often, though the EIAs are objective, the conclusion reached is subjective. An informed, participatory process can help address the subjective recommendations common to EIAs and address some of the problems that may result when short-term solutions are chosen, rather than solutions that promote long-term sustainability.

## Conclusion

Participatory management sounds like something a used car salesperson might want to sell you. Participatory actions are sustainable economically and environmentally. They are more cost-effective in the long run, more effective, provide reliable data, and are more sustainable than top-down centralized decision-making. There are initial costs up-front in training, outreach and education, but compared to the long-term consequences of a degraded resource base, setting up a participatory framework is affordable. Community participation involves a collaborative approach. Community organizations have legal authority and gain enforcement capabilities from working together with national governments that maintain oversight, regulatory and consultative roles. It helps to start a participatory process with carefully selecting an excited, motivated

community or watershed with a clear interest in resolving a problem. Successful implementation of a participatory project can make a government look good. Legally empowered community organizations collaborating with regional and national governments creates a win-win situation. Existing political and moneyed power structures need a new paradigm to shift their emphasis and training from top-down decision-making to truly sustainable development.

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# Water Markets, Monopolies and Rights: Institutional Elements

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## Summary

Water is a scarce resource of economic value with significant environmental and social functions. It is, therefore, usually owned by the state as part of the public domain, on which rights to use the water are granted to individuals. Such rights are normally protected by constitutional provisions on private property, on the grounds that the private sector will not make investments without a guaranty of title. In return for this stability, the water granted for use must actually be used for socially beneficial purposes, or the rights are revoked. Although there are a few systems, such as the Chilean Water Code or the proposed water code for Peru, in which no conditions are imposed on water use, they are not common. Chile's Water Code is currently in the process of being reformed to require some specification of use when rights are requested.

The legal issues that influence the stability of water rights are structural elements. They include the above-mentioned regulations that ensure stability, those which recognize preexisting uses and rights, and those which provide for the transfer of water rights.

Recognition of preexisting rights and uses is fundamental, insofar as it acknowledges established economies and ensures social stability.

Since water has an economic value, its transfer is an important component to ensure optimal economic use. Water sector experts must at least be open to the idea of the transfer of rights. However, since water rights transfers have an impact on third parties, social stability and the environment, countries with mature systems regulate transfers so as to prevent any damage to third parties or the environment, and to maintain social stability and harmony. The regulations are also designed to protect the means of subsistence of the most marginal population groups, including indigenous peoples. This approach is consistent with current economic, environmental and social concerns.

## Introduction

Fresh water is a scarce natural resource, which, due to a variety of phenomena, is becoming more and more valuable in economic terms and more essential in terms of social services and needs. Proper water management and conservation require appropriate legal instruments that both ensure private investment to develop the economic potential of the resource, and allow for proper control in view of environmental and social goals.

The institutional and legal frameworks of the different countries determine how the private sector is motivated to invest in water development. Legislation plays a structural role

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of socioeconomic engineering, as it determines how economic agents are linked to production resources. This function of the law is of the utmost importance, since it has an influence on whether or not economic operators perform a certain type of duty and how such duties are performed. If the activities are economically beneficial, the operators will carry them out of their own accord, without the need for any public coercion. This set of regulations is decisive for stability and flexibility in the water rights of economic agents. They are called *structural elements* because they determine the basic structure of water rights.

At the same time, as a result of the physical, chemical and biological characteristics of water,<sup>2</sup> the legislation includes a series of elements to regulate how individual water rights can be exercised, so as to ensure that the types of use do not result in resource waste, lead to speculation or monopolies, cause irreversible rigidity in water allocation, or lead to environmental degradation. These are known as *regulatory elements*.<sup>1</sup>

The challenge—and the virtue—of water rights is to strike the right balance between structural and regulatory legislation. Through the former, the stability and flexibility of the rights are preserved, so as to ensure, or at least promote, their optimal economic yield. Through the latter, efficient, orderly use of water is ensured, production capacity preserved, the environmental role of water safeguarded, water quality guaranteed, and the establishment of monopolies and speculation prevented. The structural regulations should not lead to monopolies or environmental degradation, and the regulatory elements should not suffocate the economic system. The purpose of this study is to identify

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<sup>2</sup> Water is a resource in a constant state of flux, with great potential for energy generation or to act as an agent to transfer negative externalities, playing a crucial role in the environment, and which can be used for a number of purposes, if properly planned.

the various ways in which the legislation of different countries in the world have addressed this problem. A number of issues connected with water rights are reviewed, including water rights systems, protective measures, water rights markets, information systems, forfeiture of rights, management and information systems and organization for water resources administration.

It should be borne in mind that water rights systems do not usually constitute legal obstacles that reflect absolute ideological positions. The need to address concrete problems has led legislative systems to take the measures called for by the specific situation, public welfare and government ethics. Thus, for example, all the systems, except for a few rare cases now being changed, recognize private rights for water use but subject them to certain conditionalities (payment of fees, use subject to permits, environmental and social restrictions, etc.). Certain systems allow water rights marketing, but all require actual, beneficial use of the water as a condition for marketing, in order to prevent monopolies and speculation. Even in these systems, water rights transfers must be authorized by administrative or judicial authorities, are subject to public notice, are registered and may be subject to conditions the original rights did not have. The right to transfer water rights cannot be conceived, has no legal meaning, if it is not associated with effective, beneficial use of the waters. The section on this issue will carefully review how the water rights market mechanisms work and their numerous conditions.

### **Structural Elements in Water Legislation**

As mentioned above, the structural aspects of water legislation concern: a) the stability of the water and land rights allocated to the population; b) recognition of customary rights and uses; and c) the transfer of water rights.

## Stability of Water Rights

With few exceptions, under most water codes, water is considered to belong to the public domain. There is a nascent trend to consider water part of the “national wealth,” which supersedes and is the equivalent of the public domain declaration, from which water is eliminated. This conception seems to view the public domain as equivalent to national wealth.

This is a mistaken view. National wealth is an accounting term, and in addition may be considered a generic term whose conventional meaning differs from that of public domain. If they are considered synonymous, it is better to use the well-known, conventional term of public domain. Otherwise, legislators must bear in mind that without intending to do so, or without realizing it, they may be disappropriating the public domain. This terminology has been used in the proposed water code for Peru. In France, where the term “national wealth” has been used to refer to water, it is understood that such usage does not imply that privately owned waters become part of the public domain. The author recommends using conventional terminology, unless the legislation drafters, the Congress of the country in question, the Executive, and indeed the population at large are all completely certain that they do not want the country’s waters and their manifestations, such as the Marañón River, the Amazon, the Bío-Bío and Lake Titicaca, to be part of the public domain.<sup>2</sup>

Nevertheless, the rights granted to individuals for use of such waters is protected, in the vast majority of the systems, by constitutionally guaranteed property rights, provided that the objectives and conditions under which the rights were granted and recognized are fulfilled. This is an example of the balance to be struck, as mentioned above. A system of safe, stable water rights tends to increase productivity, since the users are aware that the investments they make in the development and conservation of the waters imply capitalization of the investment to their benefit. When legislative changes are made,

preexisting uses are therefore generally recognized. This is a traditional principle of water rights, whose origins may date back to Roman law.<sup>3</sup> The purpose of the principle is not to perturb existing economies and uses.<sup>4</sup>

The stability of uses and rights predating legislative changes is essential for social stability. To ignore them leads to social instability and even tension.<sup>5</sup>

Stable rights are an important element of economic investment and conservation. Without legal stability, there is no incentive to invest or conserve with a view to the long term.<sup>6</sup>

## Customary Rights and Uses

The issue of preexisting rights and uses is crucial for indigenous peoples, especially when those rights and uses are based on customary rules or on agreements or laws in the country in which such groups are located.

In the United States and Canada, indigenous peoples’ rights are given special consideration and protection. Thus, for example, Canadian judges have decreed that treaties and laws must be interpreted equitably, broadly and liberally in favor of Indians. The United States Supreme Court has sustained a similar interpretation, stating that “...it would be extreme to believe... that... [the Congress] took from the Indians the means to continue their ancient living customs... and yet did not give them the power to change to new customs.”<sup>7</sup>

In South America, there has not yet been a detailed analysis of the issue of water rights and uses and indigenous groups. However, certain bills recently submitted to the legislatures and recent events and judiciary decisions in the region would seem to indicate that indigenous populations have not been accorded the same operating priorities as their counterparts in the United States and Canada.<sup>8</sup>

## Transfer of Water Rights

Because of the relative scarcity of water, given the increasing demand for the resource, important developments have occurred in the types of transfer of rights. The principle of water rights transfer must be accepted in order to ensure flexibility, vitality and optimal use in water management. At the same time, a more detailed analysis of the major factors and conditionalities of these markets in systems with some experience needs to be conducted in the region.

### Regulatory Elements in Water Legislation

The most important regulatory elements of water legislation tend to protect both the quality and quantity of the natural resource base and to prevent the transfer of negative externalities between water users. They include the following:

- C The resource is under public control, either through the police power of the state or through public sector ownership of the waters, expressed through the need for permits for water use and waste dumping or discharge.
- C Water rights are allocated on the condition that they be effectively used for beneficial purposes, and in certain cases, even according to regulations for reuse. Noncompliance with this condition usually leads to forfeiture of the rights.
- C The law stipulates what uses are beneficial, even in some cases the minimum water flows, as needed for environmental protection.
- C Systems of preferences and priorities are set for the various possible uses of the resource.
- C Water quality is subject to public control, including standards for absolute and several civil responsibility for environmental damage, standards for discharges and the water quality of receiving bodies, control of the use of

products affecting water quality, technological requirements and regulation of use of soil and surface areas.

- C Water uses are subject to public control, in order to ensure that the resource is used according to the water rights granted, including such monitoring activities as rights of entry and inspection, sampling, the authority to require information and records and to approve the construction of works on a certain scale, rules on how the water should be used, suspension of rights in the case of improper or unauthorized practices, and revocation of rights in cases of violation or nonuse.
- C Springs, water supply points and streams are protected, river basins and deforestation areas are protected and managed, recharge areas are preserved, water use is comprehensively planned, and surface water and groundwater are used jointly.
- C Water rights may be reallocated during emergencies.
- C Fees and taxes for water use are set and collected.
- C There are expeditious procedures for conflict resolution and special rules to handle emergency situations.

Described below are certain basic elements of modern water legislation, as found in a selective sampling of laws enacted in the past decade.

### Conditionalities for Water Use

#### General

The German Water Code, according to amendments enacted on September 23, 1986, establishes a series of conditions for water use and the permits granted for this purpose. It

requires effective use of the water rights, prevention of adverse impact, payment of compensation, preventive evaluation of the impact of certain uses, the appointment of caretakers, implementation of measures to alleviate any adverse impact and the payment of common control costs (Article 4).

German legislation even allows ex post conditions to be imposed on the granting of a permit or status. Such conditions may be based on financial or environmental needs for proper water management (Article 5).

The system for use control is extremely strict, and water rights may be revoked for nonuse, lack of need, change to unauthorized use, or uses not covered by the allocation for which the permit was granted. A permit is required for both water use and for dumping waste into waters.

Applications may be rejected and permits are granted only for specific purposes. A permit does not imply that the state is entering into a contract with the beneficiary ensuring that the latter will always have a certain quality and quantity of water available to it. Use by landowners and riparians may not adversely affect third parties, the water, its flows, or the water balance (Articles 15 and 24).

Water systems in Europe and Asia have all evolved towards requiring permits for water use, subject to effective use of the water, payment of fees and rates and to the absence of damages to the environment for the rights to remain in effect. Often the permits may be amended, as required by environmental needs and circumstances.

It is interesting to note that the recent Water Code of France (1992) allows changes in water rights without compensation when required for public health reasons, general safety, when the aquatic environment is being subjected to major threats, and in the case of abandonment or poor maintenance of works and facilities (Article 10, paragraph iv).

Other noteworthy legislation is the 1988 Water Code of China, the 1991 English Water Resources Code and the 1985 Water Code of Spain. The latter subjects water rights to the condition of effective, beneficial use, under penalty of forfeiture (Article 64). It also allows for amendment of the concession for supervening cause (Article 63). The new Water Code of Mexico also includes a clause requiring effective use of the water under penalty of forfeiture.<sup>9</sup>

### **Effective, Beneficial Use**

Among the most important provisions of water legislation, special attention should be paid to the effective, beneficial use clause. Because the resource is scarce, there is no reason whatsoever to allow an individual to obtain water rights and not make use of them. Otherwise, it could lead to speculation and the possibility of obtaining wealth through the mere passage of time, at the price of a scarce commodity that is part of the public domain and for which there is great environmental, social and economic demand. Failure to require effective, beneficial use fosters monopolies and may lead to management of the resource as an instrument for unfair economic competition. Blocking access to the resource blocks the entry of new competitors and any increase in the supply of goods and services. This is particularly true for mining in arid zones and energy generation.

Hence, in United States, legislation in arid areas, which is rooted precisely in mining, “prior appropriation” has made effective, beneficial use a fundamental element of water rights. Without use there is no right. The use must be identified and may not be contrary to the public interest involved in water use. This is such a fundamental point that in proposed legislative changes (an issue considered further below), the only uses recognized and protected are those actually made. The uses must be efficient and reasonable. There is a fundamental preoccupation with the prevention of monopolies and speculation.

The government has the ongoing authority to require improvements in the efficiency of water use in order to ensure the most extensive use possible of the natural resources. This system is followed in several states, such as Colorado, Kansas, North and South Dakota, Arizona and Montana. The public interest includes better, more optimal use of the state waters (South Dakota). Water may not be used for speculation or wastage; the uses must be socially accepted; the methods of use must be efficient; and the uses must be reasonable. No individual may be given an absolute monopoly on the resource by being awarded more rights than what the individual needs for effective, beneficial use.

In short, water is not an element for speculation, especially considering that its allocation is the result of a government initiative. Space limitations prevent any further development of this issue, but more in-depth analysis is recommended before any water legislation is approved that would eliminate the effective, socially beneficial use clause. It is recommended that a detailed review be conducted of United States legislation, where the principle has been most clearly expanded upon, particularly in mining, energy, and household and irrigation needs in the arid zone of the country.<sup>10</sup>

The effective, beneficial use clause is so important that United States legislation has accepted it as a criterion for legal recognition and protection of uses predating legislative changes. In many American states, the system of riparian rights was used as the criterion for allocation of water use rights. However, because this system does not provide for the best use of water in the economic sense, it was gradually replaced with the permit system. When this happened, many riparian owners complained that their property rights were being affected, since what used to be included as part of their property rights on the land could now only be established by obtaining a permit from the government.

Courts and judges in the United States ruled in many cases that the change in water rights was a legitimate exercise of the state's police power and regulation of the public domain, and that its only limitation, so as not to infringe upon constitutionally guaranteed property rights, was the need to respect acquired rights, *only insofar as there was effective use*. Certain states established a deadline for effective use of the water, upon the expiration of which the rights in question would be forfeited with no right to appeal if effective use was not being made (see legislation in Oregon, Washington and Kansas).<sup>11</sup>

This background is extremely relevant to the countries of Latin America, the laws of which currently allow water rights to be held without the effective use clause. When the scarcity of the resource makes better use of it necessary, the countries may enact changes in their legislation based on the above-described precedents in the United States.

For the countries that are in the process of implementing new legislation, it is recommended that under no circumstances should rights be granted without requiring effective, beneficial use within a certain time frame. Comparative legislation provides more than enough examples of the problems generated by this alternative and of the speculative manipulations to which it gives rise for such a basic resource as water.

The Chilean Water Code does not include any effective, beneficial use clause. It is interesting to cite some experiences on the implementation of the code in the context of mass privatization of water-related public services, in which the main institutions involved become major protagonists of water use and water becomes a basic element of the market power strategies of the utilities:

*As mentioned above, the regulatory system is based on competition in energy generation. However, in actual practice, there is no competition in Chile. ENDESA holds approximately 65% of generation capacity and*

*CHILGENER, 14%. Water rights basically belong to ENDESA, which has an incentive to evaluate projects on the basis of the return on its internal marginal capacity. It achieves a long-term monopolistic balance by postponing investments. New entrepreneurs cannot enter the market since they do not have the water rights to carry out the most efficient projects. Water rights should not have been privatized with the utilities, but returned to the State to be awarded anew, subject to the condition of effective use within a certain time frame.<sup>12</sup>*

Thus, the Chilean experience seems to confirm the grounds cited by other legislations for instituting the principle of effective, beneficial use as a fundamental element of the legal structure of water rights.

Monopolization by creating barriers to entry, through the control of essential production inputs and natural resources, is a classic feature in the economic literature.<sup>13</sup> The existence of water markets does not necessarily remedy the situation, since often the crucial inputs for production are not placed on a competitive market.<sup>14</sup>

Thus, the lack of any effective, beneficial use clause and of mechanisms to remedy the development of monopolies seems to have a negative impact on water markets and therefore on efficient allocation of the resource. With few exceptions, empirical evidence shows that the water markets in Chile have not been working at their full potential. In a seminal study on the issue, Bauer noted that the lack of public-interest elements in Chilean legislation has been considered by some a factor fostering trusts and speculation, and that the government virtually guarantees undervaluation of water rights by not having imposed obligations in the public interest.<sup>15</sup>

Indeed, for major institutional users, absent some institutional mechanism for forfeiture or the obligation to place the rights on the market, there are few incentives for the sale of water rights,

compared with the strategic advantages afforded by control of an essential production input, for purposes of corporate market control policy. The public debate on the future energy policy of California, in the context of the market, therefore expressly calls for the policy not to allow any sources of generation to be monopolized.<sup>16</sup>

## **Quality Control and Environmental Protection**

### **General**

The same reasons that lead to a search for alternatives to ensure effective, beneficial water use require that measures also be taken for environmental protection. Such measures are instituted through generally enforced, binding legislation associated with penalties and objective, several, absolute responsibility for environmental damage. In certain cases, responsibility may be retroactive and may be borne not only by whoever caused the damage, but also the investors and financiers involved and, in case of holdings, the parent company of the holding to which the damage-producing enterprise belongs.

In certain cases, responsibility for pollution also extends to the government officials and staff of the polluting legal entity. In addition, penalties are imposed in the form of cumulative daily fines for each day of violation. Systems are established for inspection, sampling and information reporting. Standards are set for the quality of effluents, treatment, and receiving bodies. Dumping permits are required and special standards established to control toxic pollutants. Fines are charged for pollution. The quality and quantity management systems are unified into a single agency, in Europe generally organized by river basin.

The systems are based on certain key principles, including: 1) the principle of prevention (pollution control at the source); 2) the principle of precaution (that if there is a risk of serious

pollution, even without conclusive evidence, control measures must be taken); and 3) the polluter-pays principle.

Below are a few examples of pollution control systems and of the legal doctrines established to protect the environment.

### **Germany**

The 1986 Water Act of Germany establishes prevention of water pollution and any changes that might have an adverse impact on water properties as a general obligation, and requires economical use of water for conservation of the natural water resources (Article 1(a)). It also requires that discharges into waters be subject to a maximum pollutant load and be regulated according to technical treatment standards. It calls for use of the best technology available to control toxic pollutants (Article 7). The *Lander* (states or provinces) are in charge of control programs. Responsibility for damages resulting from pollution is absolute, objective, several and indiscriminate (Article 22). The code also provides for maintenance of adequate flow, navigation, environmental requirements, protection of morphological features, banks and the self-purification capacity of rivers.

There is also a supplementary law dated November 6, 1990 on charges for dumping. The charges are based on the risk level of the discharge, its toxicity for fish, quality standards established for the receiving body, and units of pollution downstream. Charges for pollution are payable by any individual dumping waste into the country's waters.

### **The Netherlands**

The Netherlands also has a pollution control policy that is primarily geared toward ensuring that the country be safe and liveable, by implementing and maintaining safe water systems that guarantee sustainable use and development of the resource.

The Netherlands has established three basic principles for controlling pollution of its water resources: reducing pollution at the source; using appropriate water designs; and making informed, rational use of its water resources. The control system includes management of point and nonpoint pollution, in the latter case through control of certain products and of land use. The costs of pollution control are covered through the ordinary budget (taxpayers) and specific taxes on polluters.

### **Public Trust**

Before closing this brief review of the issue, reference should be made to the doctrine of public trust developed by courts in the United States.<sup>17</sup>

In 1869 the Illinois legislature granted rights to the railroad over the bed of Lake Michigan. Four years later, the legislature revoked the law on the basis of which the lake bed rights had been granted. The railroad argued that revocation of the law affected its ownership rights stemming from the previous law. *The United States Supreme Court ruled that the first law was invalid because it violated the principle of public trust under which the State of Illinois had ownership rights over the lake bed. Public trust cannot be relinquished by the State through the transfer of ownership.*

This case is of great interest, because its principles may be applied to cases in which the way water rights are granted is the functional equivalent of alienation and transfer of the public domain over water. An instance of possible application of this principle is the granting of water rights for an unlimited period without any obligation to use the water effectively. Such a situation would be in violation of the public trust, since the state would have functionally relinquished its duty/authority to control proper use of the public domain by granting rights not subject to any conditions with respect to use and without any limitation in duration. At least one of

the following two elements must be present:  
a) mandatory effective, beneficial use; or  
b) limited term of use. Otherwise, the legislation would be invalid because it would violate the public trust principle.

The public trust principle has also been applied for environmental protection (under United States law, the concept of the environment, according to the National Environmental Protection Act, is a broad concept that is not limited to the natural environment only and may even include social elements).<sup>18</sup>

The principle has also been applied to limit the diversion of flows based on water rights when such diversions result in the drying up of a natural lake. This has been considered noteworthy given the sanctity of water rights in Western states.<sup>19</sup> Again, this application of the doctrine could be useful with regard to the management of water rights granted, when the exercise of such rights has an adverse environmental impact.

## General

Water rights marketing is considered a good alternative policy to optimize the use of scarce resources. It also provides mechanisms to postpone costly works through the reallocation of available waters by means of their allocation—for a price—for uses with a higher return.

Water markets are a distinctive feature of the legal system in the American West. In California, Nevada and Utah, water rights may be transferred independently from land rights. In other states, such as Arizona, water may only be transferred as an accessory to land rights. In those states the reallocation of water rights is the most important policy matter of the arid West, with the single exception of water quality problems.<sup>20</sup>

The United States water rights transfer system differs fundamentally from the system adopted in South America by Chilean legislation or the code currently being considered for Peru, which was inspired by the Chilean system. In the United States, as mentioned earlier, water rights cannot be considered valid if not linked to effective, beneficial use of the waters in question. Waters that are not actually used cannot be transferred, since no one has a right to them. *In United States legislation, effective, beneficial use is the source, the cause, the means, the raison d'être, and the basic condition of water rights. Water rights that are not effectively used cannot be transferred because they simply do not exist.* On the basis of this principle, United States legislation seeks to prevent speculative gains, in which a person or enterprise reaps benefits from the mere fact of acting as intermediary in the marketing of a commodity belonging to the public domain of the state or the nation. The issue of trust prevention has already been discussed above.

## Requirements for Water Rights Markets

According to Anderson, the authoritative American treatise-writer, two basic requirements must be met for water rights to be reallocated. First, the waters must have been effectively used for beneficial purposes prior to the transfer, and must continue to be effectively used for beneficial purposes subsequent to the transfer. Second, the reallocation may not adversely affect other users and must be in the public interest, as authorized under administrative or judicial procedures, according to the system in force in the respective state.

Transfers outside of the area of origin (watershed) are not always authorized. Not all states allow transfers of water rights.<sup>21</sup>

## **Arguments for Water Market Regulation**

The issue of water rights markets is not free of debate. Although a number of highly regarded experts support their implementation, other equally reputable ones have expressed some reservations. The most important of these is concern about the concentration effect that marketing produces, since generally the users with the most resources are the ones that purchase the rights from users with less economic clout. The goals of optimal economic use would be met, but the concentration processes could have adverse social and environmental effects. This can be clearly seen in the western United States, where conflicts are arising over the transfer of water rights from ranchers and farmers to major cities. The interests at stake include the growth of the cities and the culture, life-style, environment and future of the rural farming communities. It has thus been asserted that the current water market system in the United States is incapable of equitably resolving conflicts connected with transfers.<sup>22</sup>

Water markets are so complex that the transfer procedures are affected by a great many factors, such as: a) the priority of the rights transferred; b) the profiles of the buyer and seller; c) geographical flexibility in the use of the transferred water rights; d) the economic scale of the operation; e) the stability of the right; f) the volumes of water transferred; g) the characteristics of the buyer; h) the overall water management system; and i) the regional economies in which the transaction takes place.<sup>23</sup>

The complexity of the markets has led a considerable number of experts to demand that water rights markets, where they exist, be properly regulated. Babbitt thus asserts that the absence of control and regulation in water markets leads to “economic Darwinism,” that is, domination of the big and powerful.<sup>24</sup>

Such cautious positions are reasonable and understandable, since economic laws rarely play an absolute part (in the words of a California judge: “In the opinion of this Court, the notion of ‘rational profit maximizer’ is an economic construction that has no counterpart in the real world and therefore does not constitute adequate grounds... [for the Court to base its decision on in this case]”).<sup>25</sup> Yet, examples can certainly also be given in which rigidity in a water allocation system (in conjunction with other institutional, macroeconomic and social factors) has resulted in inefficient resource allocation, overproduction without effective demand, unnecessary investments in infrastructure and, in a few cases, mass collapse of certain regional economies in South America.

## **Regulation of Water Markets Under United States Law**

Mature water rights systems accept the transfer of rights under specific conditions and subject to public administrative control.<sup>26</sup>

Noteworthy among the conditions imposed on transfers are the following: the appurtenance statutes of certain states prohibiting the transfer of water rights in order to prevent land speculation; approval of transfers by administrative or judiciary bodies granted only under certain conditions; announcement of requests for transfer before such transfer is granted so that public or private opposition can be voiced; the requirement that no damage to third parties be caused; registration of the transfer; the duty to mitigate any adverse environmental impact; subjection to environmental impact assessment; imposition of conditions the original rights did not include; evidence of effective, beneficial use of the resource prior to formal transfer of the water rights to the buyer; failure to obtain approval resulting in forfeiture of the rights and even misdemeanor charges; in the case of irrigation districts, approval by the district when a right is

transferred outside that district; and, in the case of indigenous people's water rights, approval of transfers by the central government.<sup>27</sup>

Transfers must be in the public interest, subject to review according to their impact on the economy, fisheries and hunting, public health, loss of alternative uses, damage to other persons, public access to public waters, qualifications of the buyer, etc.

An important element of water rights transfers is protection of the public interest locally and in the area of origin.

Lastly, in order to prevent damage to third parties and to water supply sources, in principle transfers are limited to historically consumed volumes of water instead of nominal allocations. This background reflects the current situation of water rights markets in the United States, the area in which the most experience has been accrued.

## **South America**

Water rights transfer in South America is still at the nascent stage. There are countries in which irrigation systems have been extensively developed with absolute prohibition of any transfer of rights. The system now seems to require some adjustment, since demand has diversified and increased.

In other countries, such as Chile, transfers of rights are allowed. The draft water code for Peru would also authorize transfers. However, in both models, the innumerable public, social and environmental factors painstakingly considered in the United States have been set aside. With the elimination of the effective, beneficial use clause, this system may lead to monopolies, concentration of water in a few hands, restriction of competition through the accumulation of rights for trust purposes, and adverse social and environmental effects, to the extent that low-income segments transfer their rights to the

segments wielding more economic power. This scenario is feasible because only the market elements of the American West's prior appropriation system have been adopted, with the public interest elements so crucial for the United States system being overlooked.

In Chile, due to the limitations of the institutional system, water rights titling, the physical foundation of water regulation, transaction costs, lack of legal information and cultural resistance, transfers have reportedly been quite limited. The Chilean Water Code has also been criticized for having a critical flaw in its economic logic, that water rights are free of charge,<sup>28</sup> but supporters of the system claim that this is irrelevant since it only has to do with initial income distribution and not with the economic efficiency of water allocation through the market system (what matters is that the rights be freely transferable).

Detractors counter that the code fails in its economic purpose, and that agricultural output has been improved more by irrigation subsidies (Law 18450) and the marketing system. As for the equity of the Chilean code, Bauer argues that the system may not have been successful, since small landowners did not have the information or the resources to benefit from it. Bauer also criticizes the limited efficiency of the markets, citing the fact that the institutional arrangement created the conditions to discourage water transactions. Instead, the system may have contributed to small users losing their rights.<sup>29</sup> Equity is now an issue for such organizations as the World Bank,<sup>30</sup> whose consultants have expressed concern about how the system would operate in the context of subsistence agriculture. They also argue that inadequate distribution, in the sense of access to large portions of production resources, is a factor to consider in the processes of environmental degradation.<sup>31</sup>

## Conclusions and Recommended Legal Policy

In most countries in the world, there is serious concern about comprehensive management and conservation of water as a natural resource and the prevention of monopolies based on water resources. Nevertheless, in South America there is a tendency to believe that granting unconditional rights over waters ensures that the markets will automatically resolve any problems that may arise. Practice seems to indicate that this is not the case. In Chile, there are problems with monopolies, conflict resolution when multiple parties are involved and undermining of the environmental role of water, which is secondary to its economic exploitation.

Hence the current proposed reforms to water legislation in Chile. These include the possibility of imposing both terms for expiration of the rights and fees or taxes on water use as mechanisms to prevent markets from being blocked through acquisition for speculative reasons. However, since water rights have been granted in Chile without any conditionalities, above all without an effective, beneficial use clause, some authors claim that measures to modify the conditionality of a right would require constitutional reform.<sup>32</sup>

This author does not concur with this view, because the concrete impact of such measures would be to make waters become functionally private in Chile. As noted earlier, similar situations in the United States were resolved by considering that the imposition of conditions on water rights was a legitimate exercise of state authority over a good in the public domain. Moreover, in the case of Lake Michigan, the granting of property rights on a piece of property under the public trust was deemed invalid because the state could not relinquish the public trust. The analogy with the case of Chile is clear: if the property is part of the public domain, it continues to be governed by the duty to protect. If it is not part of the public domain, because of

the way in which the rights are granted, there would be functional alienation of the public domain, which would be questionable, since public property would then only be a meaningless label. However, the purpose of this article is not to reverse the Chilean case, which, legal considerations and comparative law aside, is a matter connected with the times, space and prevailing political philosophy.

The purpose of this study is to demonstrate that even if there is agreement among a number of authors that monopolies and speculation may arise, *once unconditional rights are granted it is very difficult to reverse the situations created. It is therefore essential that the legal reform of water legislation in South America not result in the granting of unconditional water rights. Requiring effective, beneficial use and support for work are ways of preventing monopolies.*

Once the use requirement is established, the logical question that follows is what happens when the legally established or conventional deadline for exercising water rights expires and effective use has not been made? There are basically three possible alternatives:

- a) Upon expiration of the deadline, if use is not being made for any justified reason, the rights are forfeited and revert to the market through the state. The market squeeze is eased through the action of the state and legal regulations. This is the solution adopted under the laws of the United States, Mexico, Spain and Argentina. In the opinion of the author, it is an appropriate and expeditious one, with the advantage that the state must declare forfeiture of the right and that an individual may report a situation and call for action.
- b) A second alternative is that once the deadline expires without use being made for any justifiable reason, the state be required to auction the rights off, either at the government's initiative or at the request of

another party. The procedures are simple, and the waters are immediately returned to the market. The market squeeze is eased through market forces. Mandatory auctioning upon expiration of the deadline is in the public interest and the state cannot deny it. Given that the beneficiary did not make any investments in use, the funds collected are transferred to a general water management fund or to general income accounts. A beneficiary whose rights have been forfeited for nonuse may not take part in the auction. This alternative meets the need for the system to be simple, eliminates discretionary action by the state and allows for prompt return of the waters to the market through its very “flow” and vitality. It eliminates ownership by mortmain and helps prevent and control monopolies. In short, the market acts as a functional corrector.

- c) A third alternative suggested is that the problem of speculative, monopolistic or unused rights be resolved through a tax, permit or general charge on unused waters. In the opinion of the author, this is the least appropriate of all the alternatives because:
- i) the opportunity costs for each nonusing beneficiary would have to be determined, which is no small task in itself, requiring a high level of information and monitoring and a sophisticated regulatory apparatus;
  - ii) in order to determine opportunity costs, information would have to be obtained from the enterprises that would be affected by the tax, fee or general charge, which can at the very least be expected to be difficult to obtain or distorted, bearing in mind the lessons of privatized public services with regard to incomplete or skewed information;
  - iii) the tax charged would have to be high enough to act as a deterrent, in which case major utilities monopolizing waters can be assumed to have more than enough capacity to influence the procedures and control their

outcome—the phenomenon of corrupt regulators is well known in public utilities and there is no reason to believe that the same could not happen in water management; and iv) it is clear that the whole process of determining opportunity costs, setting a charge, and implementing the system would be subject to a high degree of discretion on the part of the state and to its expeditiousness.

One of the objectives of this study is to analyze the legal elements of water markets. In the opinion of the author water rights markets are, under proper regulatory and control conditions, a suitable instrument to promote more efficient allocation of water resources. These conditions include, among others:

- C adequate information
- C proper legislation and clearly defined, stable rights
- C an adequate system for management, administration and registration of water resources and rights
- C an efficient system of water storage and conveyance
- C the requirement that waters be effectively used for beneficial purposes
- C public oversight and control of transfers, with the possibility of opposition as discussed herein, with special provisions for those segments of the population with less education and information or fewer cultural advantages.

The above-listed conditions are preconditions. Without them, implementation of a water market system could result in serious problems and social and economic conflicts.

## Endnotes

1. This terminology, and the substantive functional difference implied by the different legislative elements, has been accepted in various documents by international organizations, including the seminar on water legislation organized by the World Bank and ECLAC in September 1994 (Water Legislation: An Integrated Approach, Carnegie Conference Center, Washington, D.C., September 8-9, 1994); United Nations Economic and Social Council, Committee on Natural Resources, "Permanent Sovereignty Over Minerals and Water Resources," *Report of the Secretary General*, 1993; United Nations Economic and Social Council, Committee on Natural Resources, "Legislative and Institutional Aspects of Water Resources Management: Institutional and Legal Issues in Water Resources Management," *Report of the Secretary General*, 1994.
2. This is the terminology used in the legislation of, among other countries, Argentina (art. 2340 CC), Chile (State property [over which the entire nation has domain] for public use, art. 589 CC and Fifth Water Code), Ecuador (art. 2 of Water Code 369) and Spain (art. 2 of Water Code 29/1985). It is also the terminology used in American states ("Abstraction and Use of Water," UN, 1972, p. 16). It has specific characteristics that are universally understood according to the science of law. Because the public domain is specifically defined, by eliminating the link between water and public domain, it could perhaps be argued that water has been disappropriated. In addition to this study, at least two authors appear to support this view. Gazzaniga, commenting on the 1992 Water Act of France [see Jean-Louis Gazzaniga, "Loi sur l'eau du 3 janvier 1992," *Environnement*, Fascicule 610,8,1993, Editions Techniques-Juris-Classeurs-1993, France, p. 6] and García Montúfar [commenting on the water bill for Peru in *El Universal*, Lima, Peru, June 21, 1995, p. B-6].
3. See *Lex Coloniae Genetivae Iuliae*, 43 A.D., from the period of the Republic, according to which waters connected with public land open to colonists was subject to the same uses and charges that existed under its previous owners, as explained by Costa in *Le Acque nel Diritto Romano*, Bologna, 1918, 16, 18, as cited by Dante Caponera, in *Principles of Water Law and Administration*, Balkema, the Netherlands, 1992, pp. 30 and 50.
4. United States Supreme Court, 1984, *Syllabus and Opinions*, No. 80; Supreme Court of Justice of the Republic of Argentina, *La Pampa v. Mendoza*, 1987,L-195-XVIII.
5. Françoise Conac, "Land and Water Rights Issues in Irrigated Schemes in Sub-Saharan Africa and Madagascar — Conflicts that might be avoided," *DVWK Bulletin No. 16*; Paul Parcy Verlag, "Situation-Specific Management in International Irrigation Symposium," Hamburg, Berlin, 1989; Richard Perrit, "Proceedings of the African Experience with River Basin Development," USAID African Bureau, 1989.
6. S.V.Cyriacy-Wantrup, "Dollars and Sense in Conservation," Circular 404, University of California at Berkeley, 1951; Morris Cohen, *Law and the Social Order*, Anchor Books, New York, 1967; John R. Commons, *The Economics of Collective Action*, The MacMillan Company, New York, 1950; S. Lee Gray and Kenneth Nobe, "Water Resources Economics, Externalities and Institutions in the United States," *Global Water Law Systems*, Valencia, Spain, 1975.
7. *Winters v. United States*, 207 US 564, 1908, United States Supreme Court; "Resources," *The Newsletter of the Canadian Institute of Resource Law*, No. 18, Spring 1987; Richard Barlett, *Prior and Paramount Aboriginal Water Rights in Canada* (book review).
8. Proposed Water Code for Peru, June 1994; *Latin America Weekly Report*, June 30, 1994, "Two dead as protests against end of land reform spread through Ecuador"; Marcela Enríquez Vásquez, Byron Real López, *Vida por Petroleo: El caso del parque nacional Yasuni ante los tribunales*.

9. Luis Téllez, “Nueva Legislación de Tierras, Bosques y Aguas,” Fondo de Cultura Económica, Mexico, 1993, pp. 110-111.
10. Beck and Goplerud, “Waters and Water Rights: Riparianism and Prior Appropriation,” The Michie Company, Virginia, 1991, pp. 105 *et seq.*
11. See Beck and Goplerud, *op. cit.*, Vol. 1, pp. 366 *et seq.*
12. See Eduardo Bitrán *et al*, *Privatization and Regulation in Chile*, Brookings Institution, Washington, D.C., April 22-23, 1993, pp. 50 *et seq.* Permission to quote requested orally.
13. Lawrence Anthony Sullivan, *Antitrust*, West Publishing Co., St. Paul, Minnesota, 1977, pp. 25, 31 and 77.
14. Mark Armstrong *et al*, *Regulatory Reform: Economic Analysis and British Experience*, The MIT Press, 1994, p. 117 and footnote on p. 22.
15. Carl Bauer, *Against the Current: Privatization, Markets and the State in Water Rights, Chile, 1979-1993*, Berkeley, California, 1995, pp. 2, 57 and 171.
16. See California: R.94-04-031, I.94-04-032 COM/DWF DRAFT (WP6.1), p. xxxvi; also paragraph 68 of the “Findings of Fact” in the same document, in which it is concluded that the concentration of generation units is a serious concern of the government. In addition, see Draft Policy Decision COM/DWF, same numeric code, COM/JJK/JLN, p. 32, according to which holders that concentrate generation units would be required to transfer them.
17. *Illinois Central Railroad Co. v. Illinois*, 146 U.S. 387 (1982).
18. Roger Findley, Roger *et al*, “Environmental Law,” Nutshell Series, West Publishing Company, St. Paul, Minnesota, 1992, p. 28/29.
19. *Ibid.*, endnote 13, pp. 295 *et seq.*
20. Beck and Goplerud, *op. cit.*, Volume 2, p. 234.
21. See Owen L. Anderson and Pauline Simmons, “Reallocation,” in Beck and Goplerud, *op. cit.*, pp. 234 *et seq.*
22. Helen Ingram, “The Trust Doctrine and Community Values in Water,” World Conference on Water law and Administration, Valencia, Spain, 1989, p. 10.
23. Bonnie Colby *et al*, “Water Rights Transactions, Market Values and Price Dispersion,” in *Water Management Research*, Vol. 29, Issue 6, June 1993, pp. 1565-1572.
24. Babbit, “New Laws Needed to Slake West’s Thirst,” *Albuquerque Journal*, August 10, 1988, p. A9, as cited by Ingram, *op. cit.*, p. 11.
25. *Natural Resources Defense Council v. Duvall*, July 26, 1991, 777F Supp. 1533 (E.D.Cal.1991).
26. For a more detailed description of the issue and of the complex regulatory system in the United States, see Anderson, *op. cit.*, pp. 233-399.

27. Michael C. Blumm, "Reserved Water Rights," in Beck and Goplerud, *op. cit.*, Vol. 4, pp. 199 *et seq.*
28. Carl Bauer, "Derechos de Propiedad y el Mercado en una Institucionalidad Neoliberal: Efectos e implicancias del Código Chileno de Aguas de 1981," Santiago, Chile, August 1993, pp. 1-4.
29. Bauer, *op. cit.*, p. 3.
30. Larry Simpson, "Os Mercados de agua são uma opção viável?" *Finanças e Desenvolvimento*, June 1994, Vol. 14, No. 2, IMF-IDB, Washington, D.C., pp. 30-33.
31. World Bank, *The World Bank and the Environment: First Annual Report*, Washington, D.C., 1990, pp. 42-44.
32. Figueroa, as cited by Guillermo H. Donoso, in *Análisis del Mercado de Aprovechamiento de las Aguas*, p. 14 (no other information on this publication available).