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Water Policies And Strategies

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Introduction

Water has played a crucial role in Mexico's national and regional development. For over 60 years, the expanding use of water in irrigation, cities and industries has been based on the development of hydraulic infrastructure throughout the country. However, continued population growth and urbanization have increased the conflicting demands for water. Conflicts have arisen between urban and rural users, between neighbouring cities, and, most frequently, between neighbouring states and regions. Increasing gaps between those who have access to water services and those who don't; deterioration of water quality in rivers and lakes; downgrading of water services due to poor maintenance and weak technical and administrative capacity of the organizations in charge of providing them; and water wastage or inefficient water use practices are, among others, the pressing problems which demand new approaches to water management in the country.

The Comisión Nacional del Agua (National Water Commission) was created in 1989 to unite all aspects of water management: a task which, under the Mexican Constitution, falls to the Federal Government. After an initial year of concentrated efforts to consolidate its organization, the Comisión Nacional del Agua (CNA) has defined a set of policies and strategies to meet present and future demands for water. Within the general framework defined by both policies and strategies, CNA has designed its working programs, incorporating the specific problems and demands of the Mexican society. In this way, short term actions are defined within a broader view to the future, determined by the country's economic and geographical diversity.

This document was originally edited to present a general framework for formulating the working programs of the CNA, centrally as well as regionally. The first chapter presents a brief description of the current situation in the development and use of Mexico's water resources, as well as a general discussion of present problems and issues concerning water management. The second chapter defines the conceptual framework within which the Government's task in relation to water is defined, as well as the role of the Comisión Nacional del Agua.

The third chapter lists the present Administration's policies relating to water management and development. Later, in the fourth chapter, the key aspects of policy implementation are discussed. The fifth chapter describes a desirable scenario for 1994, setting forth the most important goals that are expected to be achieved as water policies are implemented. In the sixth chapter, specific strategies for achieving this scenario are defined.

Finally, the seventh chapter describes the challenges facing the Comisión Nacional del Agua as the institution responsible for managing the national water resources, and for implementing the policies established by President Carlos Salinas de Gortari to improve the social and economic conditions of the country, and the well being of all Mexicans.

The General Director

Water Management and Development in Mexico

Mexico is a country of approximately two million square kilometers with more than 82 million inhabitants. With a mean annual rainfall of 780 mm, about 27% turns into a runoff of 410,000 million m^3 per year; renewable groundwater is estimated at 31,000 million m^3 , and non-renewable ground water is close to 110,000 million m^3 .

Rainfall distribution is very irregular. It is concentrated within a rainy season of a few months, and much of it falls in areas that are only lightly populated. The location of population and economic activity is inversely related to the availability of water.

Less than a third of total runoff occurs within the 75% of the territory where most of the country's largest cities, industrial facilities and irrigated land are located. Consequently, surface runoff and groundwater are increasingly insufficient to support the high growth rates and economic activity, resulting in the overpumping of aquifers and a need for implementing water transfers between river basins; additionally, water pollution has reduced the potential beneficial use of certain rivers and water bodies. Conflicts among competing users have increased, causing important political and social side effects.

Paradoxically, the abundance of water in the remaining territory also presents a severe problem. Land drainage and flood control are mandatory in order to foster socioeconomic development of the many backward communities located in this part of the country. Irrigation is practiced on a smaller scale; the primary industrial activity is related to oil production and refining, which has increased considerably over the last two decade. Water pollution related to these activities has become a critical problem. This area has a high potential for hydropower generation through large scale multipurpose schemes, which have not been implemented due to financial and environmental considerations, as well as institutional factors associated with the necessary coordination among all involved federal and state agencies.

Water Balances

On a national level, total water abstraction has increased to about 185,000 million m^3 per year, 43% of the country's renewable water, while total consumption represents only 15% of total renewable water. Hydropower generation still accounts for the largest volume withdrawn (60%), and irrigation accounts for over 80% of total consumption.

However, the national water balance does not reflect the pressing problems affecting a large proportion of the country's aquifers and river basins. Regional water balances in over half of the territory show considerable deficits, demonstrating the degree of ground water overdrafting, as well as the increasing problem of water pollution. Although excessive concentration of population and economic activity are definite factors causing these unbalances, it is undeniable that many of them are due to inefficiencies occurring over the last two decades.

Present Issues and Problems

Current issues and problems in Mexico's water resource management can be evaluated according to a global concept of efficiency that includes:

- The effectiveness of the legal and institutional framework within which water management takes place
- The efficiency or physical yield of water infrastructure
- The efficiency of water use

Legal and Institutional Framework.

Mexico's legal and institutional framework for water management has evolved over the last 64 years, beginning with the creation of the National Irrigation Commission and the enactment of the Irrigation Law in 1926. The integration of water management within the Secretariat of Water Resources (1946), the increasing regional development due to water resource development through River Basin Commissions (1940's and 1950's), the implementation of national sectorial water plans and schemes for the development of large regions like the northwest (1960), and the integration of the first National Water Plan (1975), represent some important stages in the dynamic process taking place in the management of the country's water resources.

A complete reorganization of the federal government took place in 1976. As a result, the two Secretariats of Water Resources and of Agriculture were combined into the Secretariat of Agriculture and Water Resources (SARH) to unify the actions for solving the problems of the agricultural sector. Urban water supply was relocated within the Secretariat of Human Settlements and Public Works -later to be decentralized to municipalities- with SARH responsible for planning, designing and constructing the major aqueducts necessary to supply bulk water to cities and industrial ports. Within SARH, all water related activities were allocated to the Under-Secretariat of Hydraulic Infrastructure, which in turn was reorganized to deal with irrigation and drainage programs, bulk water supply programs, and water management and planning functions. The National Water Plan Commission became the Mexican Institute of Water Technology.

The "sectorization" of the Federal Government's role in relation to water caused serious problems in coordinating water policies that were defined and implemented as a result of sectorial objectives, with very little intervention of SARH in its managerial role, thus aggravating the already critical problems of scarcity, conflicting uses and pollution in several of the major river basins in the country.

Due to these existing institutional problems, in February of 1989 the Federal Government created the Comisión Nacional del Agua (National Water Commission) as an autonomous agency, attached to SARH, as the sole federal authority dealing with water problems and conflicts. Through the modification of several bylaws and regulations, the CNA assumed an important role in the definition of fiscal policies related to water rights and tariffs.

According to the Presidential Decree that created it, the Commission will increasingly coordinate investment programs in the water sector, setting priorities and constraints which will reflect the actual situation in each of the country's river basins. The responsibilities of the Commission include:

- Define the country's water policies.
- Formulate, update and monitor the implementation of the National Water Plan.
- Measure water quantity and quality, and regulate water use.
- Preserve and upgrade water quality in the national rivers and water bodies.
- Allocate water to users, and grant the corresponding licenses and permits.
- Plan, design and construct the waterworks carried out by the Federal Government.
- Regulate and control river flows, and guarantee the safety of major hydraulic infrastructure.
- Provide technical assistance to users.
- Define and, if necessary, implement the financial mechanisms for supporting water development and the provision of water services.

An important issue related to the adequate institutional arrangement of Mexico's water management is that of water quality management and, therefore, the solution of water pollution problems. Water quality management is undoubtedly a task that should be carried out together with managing water quantity; unfortunately, this was not taken into consideration when the functions of the CNA and the Secretariat of Urban Development and Environment (SEDUE) were redefined.

Water management in Mexico is subject to a body of laws and regulations derived from the Constitution which declares that water is a national property. These laws define the scope of Government action as well as the rights and obligations of individuals and institutions, public or private, who wish to use the national waters. Just as water policy has evolved, so has the corresponding legal framework.

Today, adequate water management requires the strengthening and modernization of certain ordinances, including the constitutional mandate. The existing legislation must be reviewed and updated to consider greater administrative autonomy of the water services managed by the Government, possible participation of the private sector in certain aspects of water management and services, strengthening the financial aspects related to water rights and the pricing of water services, and the need for more effective measures to regulate the excessive exploitation of aquifers and other national waters -especially pricing mechanisms to allocate water for the most beneficial and equitable uses.

Infrastructure Efficiency

Water infrastructure constructed over the last 64 years includes a total storage capacity of around 150,000 million m³ -37% of mean annual runoff- to regulate seasonal and annual variations. With six

million hectares under irrigation, Mexico occupies sixth place in countries with irrigated land. An installed capacity of over 7,700 megawatts in hydropower plants contributes to one fifth of total national production of electricity; water supply services reach 70% of the country's population, but only 49% have access to sewerage services. Most of the larger rivers are partially or totally controlled -within technical and economic limits- through multipurpose dams, protecting significant agricultural areas and highly populated cities. These figures demonstrate both important accomplishments and significant deficits in meeting water demands.

Traditionally, additional water demands were met through the construction of new infrastructure without questioning either the validity of consumption patterns or the efficiency of existing water use practices. Therefore, adequate consideration was not given to the dual problem of water scarcity and the increasing costs of supplying it.

The apparent abundance of financial resources at the end of the seventies and beginning of the eighties reinforced the notion that water could be supplied at any cost; especially, if that cost was not borne by consumers, who benefitted from increasingly subsidized water services in the cities as well as irrigated areas. However, the economic and financial crisis of the eighties had a definite impact on water development; with the Federal Government lacking the resources, most water investment programs were reduced to a minimum -far below the amounts needed to meet increasing demands, not to mention closing existing gaps in water services. Available resources for investment programs were further limited by increased federal subsidies for operating and maintaining water services in cities and irrigated areas; nevertheless, these subsidies have been insufficient and consequently the infrastructure has progressively deteriorated.

Today, all of the 77 irrigation districts, covering 3.2 million hectares, need rehabilitation in varying degrees; additionally, nearly 400,000 hectares belonging to small irrigation units are underutilized due to technical as well as social, political and institutional problems. It is estimated that only 35% of the land with available infrastructure is irrigated in the spring-summer cycle, and only 60% is irrigated in the autumn-winter cycle: a global 50%. Deterioration of infrastructure due to poor maintenance and inefficient practices has lowered the efficiency of water use; irrigation efficiency up to the land plot has decreased from 65% in 78-79 to less than 62% in 87-88; in this last agricultural year, plot efficiency was 65%, with an overall efficiency of 40%; that is, less than half the water delivered to the plot is actually used for crops.

The cities present a similar picture: very low tariffs produce insufficient income to maintain the infrastructure. Although reliable information is unavailable due to a general lack of measurement, physical water losses might add up to 40% of water abstraction; these losses occur at the conduction and distribution facilities, as well as at the individual water connections. Water treatment and wastewater treatment facilities are perhaps the most critical case of ineffective and inefficient use of existing infrastructure; for instance, of the 256 municipal waste treatment plants, only 35% are operating and, those, with very low efficiency factors.

With the possible exception of water facilities operated by private industries for their own use, the general picture of water infrastructure in the country is one of progressive deterioration and use below its projected yield. The main factor accounting for this situation is the scarcity of financial resources -due

to subsidized tariffs- to carry out adequate maintenance programs, and to maintain the appropriate technical capacity of the organizations in charge of providing water services.

Therefore, a central issue in today's management of water resources is the definite priority that has to be given to the full and efficient use of existing infrastructure over new construction.

Efficiency in Water Use

Technical efficiency of water usage is affected by several factors:

- Available technology and current practices
- Water pricing and other regulatory measures for the allocation of water
- Organization for the provision of water services

Mexico's current practices usually lead to very low efficiencies. As was mentioned, plot efficiency in irrigation is only 65%; similarly, domestic water use efficiency -if assessed in terms of available technology to diminish water consumption- is about 60%. With very few incentives to make any major change, industrial water use is also inefficient.

Current practice and technology are directly related to water prices and the way they reflect the real cost of water. Tariffs for water service in irrigation districts show a descending trend: from full coverage of operation and maintenance costs in 1950, tariffs went down to 55% in 1960, came up to 65% in 1970, and went down again to about 25% in 1980, showing a minor recovery in 1988 of 30% of O&M costs.

In the cities, the average tariffs for water services vary from 0.2 US cents per cubic meter in Oaxaca to a little over 50 US cents per cubic meter in Tijuana. Most tariff schemes are differential so water prices reach, in the same city of Tijuana, nearly 1 US dollar per cubic meter. Nevertheless, as a general rule, water price is far below water cost. Since some industries are connected to municipal distribution systems, the low tariffs provide no incentive for implementing reuse technology or using treated wastewater.

Low tariffs -and therefore low income- have affected the organizations in charge of water services, considerably reducing their technical, financial and administrative capacity. The subsidized economy in which they operate create no incentives to increase efficiency, which results in poor quality of services. This situation forms a vicious circle: users are reluctant to pay more because the quality of services they receive is inadequate, and the services cannot be improved because the users do not pay enough.

This general situation of underpriced water has an additional implication to proper water allocation. Traditionally, Government has relied almost exclusively on regulation to reduce consumption, to induce water reuse, to reduce water pollution and to allocate scarce water resources; this approach has proven to be insufficient to achieve the desired results -especially in water pollution control, where the goals set in the 1975 National Water Plan seem to recede while pollution of rivers and lakes continues to increase.

Therefore, the core issue of efficient water use is adequate water pricing. First, in order to align water price with water cost (i.e. the cost of operating and maintaining water services, including adequate provisions for replacement), and second, to gradually have water price reflect scarcity conditions, so the resource can be properly allocated and users will receive the needed stimulus to increase efficiency.

A related issue is water pollution control. The introduction of water pricing to cover pollution costs -under the accepted principle that polluters must bear the cost of pollution control- is a policy that the country has studied and needs to put into practice as soon as possible.

Treatment facilities currently under construction must -if they are not to become ineffective- take into account the setting of tariffs that will fully cover O&M costs and capital expenditures, thus reflecting society's real willingness to improve the environment and the quality of the Nation's waters.

Technological changes are undoubtedly needed, along with a major organizational effort to promote the formation of efficient and financially healthy water utilities. The issue here is whether this effort should rest solely on Government or whether the desired changes should be the result of an effort displayed by society as a whole. Thus, stronger and more effective public participation is needed: in the planning process, the financing of public works, the management of water utilities and the adoption of more efficient water use practices.

Government and Water

Greater efficiency and effectiveness in managing the country's water resources is always a primary objective of national and regional governments. Whether there is plenty of water, or it is insufficient to meet growing demands, or its quality is impinged by highly polluting activities, government intervention is generally required to insure the efficient and equitable use of this resource. Government's role in water development and management is defined by the political, legal, and institutional structure of a given country, as well as its specific social, economic, and technological conditions. However, it is generally agreed that water management falls within the realm of government intervention.

Specifically, the government of a developing country, such as Mexico, has the task of providing the conditions within which a balanced process of development can be carried out to advance the well being of the people. In other words, the government of a developing country has to take a more active role in regulating different aspects of society and of economic life in order to implement desired changes. This has been the case in managing Mexico's water resources.

Two basic legal tenets determine the nature of government intervention: the first defines water ownership, and the second whether water use rights are attached to the land or to the person. In the first case, the general trend has been to consider water a public good, or even a national property, thus entailing greater government intervention in a unified system of water management.

In the second case, legislators have not maintained any standard criterion, either in theory or in practice. In some cases, mixed definitions have been adopted, particularly where collective irrigation services -provided through government investment- play an important role in the country's agricultural sector. The importance of defining to whom or what the water is attached arises from its relevance in determining rights and obligations within a system of water use control and allocation, including pricing mechanisms.

Under Mexico's Constitution, water is defined as a national property, to be managed by the Federal Government on behalf of all Mexicans. From this fundamental premise and taking into consideration the existing social, economic and political factors involved in the development of Mexican society, the primary task of Government in relation to water has been defined in the following manner:

"To administer the national water resources and to regulate their occurrence, in quantity and quality, in time and space, in such a way as to insure that the needs of the society are met and, at the same time, that conditions are established for proper water conservation in order to maintain water's key role in the socioeconomic development of the country."

This task implies the management of a number of physical systems, defined in nature by the boundaries of the river basins within the country.

Each hydrological system, with a finite volume of available water, serves various user systems, such as irrigation districts, municipal water and sewerage systems, industries, and hydroelectric systems, which use water according to their specific technical, social and economic conditions. These conditions

determine the volume and quality of water entering each user system, as well as the volume and quality returned to the physical environment.

User systems grow and multiply while the volume of available water remains constant within each river basin. Therefore, fulfilling individual needs becomes a complex task and conflicts arise, either due to increasing demands, or because water returned by upstream users alters the quality of the resource used by downstream user systems.

Given this dynamic process of water use, which is a consequence of socioeconomic development as a whole, the role of government can be further defined as:

- Regulate the hydrological systems, essentially to preserve the national water resources and, through the construction of adequate infrastructure, to adapt the quality and natural occurrence of water to the demands of the user systems.
- Regulate the interaction between the user systems and the hydrological systems, mainly to insure that demands are reasonable and conform to basic principles of water conservation, that water works are safe and adequate to satisfy demands, and that effluent water which is returned to the hydrological system conforms to established bylaws.
- Regulate the interaction between the various user systems within a given hydrological system, essentially to establish water rights, resolve conflicts, and, in general, determine water development priorities in accordance with national, regional and local objectives. Government's role in relation to water must also respond to a higher purpose - that of achieving equality and justice in the use of a national resource. Water should not be within the reach of only those who have the means to obtain it, but, on the contrary, should be available to meet the needs of everyone.

Major investment programs to stimulate rural development, strengthen the social and economic development of marginal groups and regions, and support policies for self-sufficiency in food production are governmental programs designed to achieve society's present and future goals. This is the essence of the Government's task in relation to water.

Government regulation is directed to user systems through which society satisfies its needs - from the most vital, that of obtaining drinking water and adequate sewerage, to those where water is just one of the inputs of a productive process, such as irrigation or industrial activity. To some extent, the user systems are self-regulating; that is, they are capable of managing their own interaction with the physical environment and with other user systems without the need for government intervention. A certain degree of adaptability is built into the systems, allowing them to adjust to changes in the physical environment or in the technical and socioeconomic factors which characterize them as user systems.

Nevertheless, there are two general cases which require government intervention: The first occurs when a user system or group of user systems loses its capacity for self-management (as has occurred in some urban water services and irrigation services), or when one or more systems introduce negative effects to the detriment of other user systems (as occurs in the Lerma River Basin - one of Mexico's most highly developed river basins). The second case requiring government intervention occurs when existing

conditions need to be changed in order to obtain social and economic objectives (such as development of the tropical region of the country).

In both cases, Government intervenes by modifying or eliminating certain systems (e. g. turning management of certain national irrigation systems over to the users), or by creating new systems (as would occur by turning over government managed public water utilities to private enterprise). In either case, the primary task of Government is to establish the conditions by which modified or new user systems operate autonomously -that is, with the technical, administrative and financial capacity to confront their own conservation and development problems.

Otherwise, if continued intervention from outside is required (mainly from the Government), user systems would lose effectiveness and efficiency and the cost of government regulation (e.g. subsidies and increased bureaucracy) would augment considerably.

In summary, the Government's task is not intended to be one of managing user systems, but rather one of providing the conditions under which users can determine their own relationship with water, within a framework of efficiency, equality and justice which guarantees the satisfaction of needs, now and in the future.

Water Policy

Within the conceptual framework just delineated, Mexico's Federal Government has designed a new water policy to strengthen and modernize its role in relation to water.

To improve water development and conservation, to revitalize the State's role as Water Authority, to encourage the active participation of society in solving its own problems, and to maintain water's key role in the socioeconomic development of the country, the Federal Government has established a sevenfold water policy aimed at:

- The creation of self-financing and administratively autonomous water utilities to provide water services in cities and irrigation districts.
- The establishment of a Financial System supported by the increased financial capability of user systems, which will recover operation, conservation and maintenance costs as well as capital costs for expansion and replacement.
- The efficient use of water by all users, including water reutilization and water quality conservation.
- The development of hydraulic infrastructure to meet new demands and to eliminate existing deficits, while promoting the full use of existing infrastructure.
- The development of technology capable of resolving the country's specific needs for efficient use of water and self-sufficient user systems.
- The establishment of a new water culture in which efficient use of the resource will result from the total mobilization of society.
- The consolidation of the CNA's leadership in water development and management to meet local and regional needs within the country's hydrological systems, while promoting national objectives.

Policy Implementation

Water policies and strategies are intended to strengthen the user system's technical, administrative and financial capacity and autonomy, especially in irrigation districts and water supply and sewerage services, in order to promote a healthier development of these services and greater participation of the users. They are also intended to reinforce the regulatory role of the State in providing the conditions for beneficial, equitable and rational use of water, and for the preservation of the environment.

Solving the financial problems involved in meeting the Nation's water demands is an important objective of established policy. The present financial deficit of the organizations that provide water and sewerage services and those that provide irrigation services has affected their technical and administrative capacities. Because of this, the need for intervention by Federal and State governments has increased,

requiring greater resources of all types to sustain organizations which have lost their financial autonomy.

In the present situation of limited resources, if not outright scarcity, Government intervention to maintain the existing user systems has undermined its capacity to further the socioeconomic development of the country as a whole.

Therefore, in implementing the Nation's water policy, aimed at establishing a new water culture, five key elements have been considered:

- water utilities
- water financial system
- water management system
- water technology system
- National Water Commission (CNA)

Water Utilities

The formation of water utilities is an important step towards a more rational use of water, stimulating more direct participation of the users in managing a resource which directly benefits them.

A fundamental premise is that society should assume a greater responsibility for its own well-being. Past efforts at decentralization have been hindered not only by the natural resistance to any major change or transfer of power, but also by a culture which fosters dependence, obligating the Government to assume a paternalistic role - that of supplier, donor and benefactor.

The present economic conditions no longer permit the Government to maintain this paternalistic role. A new relationship between Government and Society is needed in which the solution to water problems is a shared task. Moreover, it is no longer possible to maintain the present contradictory situation: subsidizing water services while exhorting the public to efficiently use this resource.

Therefore, the creation of water utilities, public or private, to manage irrigation and water supply and sewerage services has been given priority in the water policy of the present Federal Administration. The role of the Federal Government will be to provide the necessary technical, administrative and financial support for the completion of the process which would allow the evolution of existing user systems, with different levels of organization and financial feasibility, into autonomous and self-financing utilities.

In the end, rural and urban water services will be autonomous and self-financed, with users covering the total cost of services they receive and, if necessary, participating in the direct financing or covering the capital costs of obtained credits to carry out projects to improve the quality of water services.

Besides generating sufficient income to cover operating and maintenance costs and a predetermined percentage of investment costs, the utilities should also contribute to the financing of projects required for the development and conservation of the water resources within their respective river basins.

The form of organization each utility would assume, as well as the mechanisms of user participation adopted, will depend on the existing legal framework and the actual conditions of the user system.

Financial System

It is anticipated that the present economic limitations to expanding irrigated areas and water services in the cities will continue in the near future, especially the existing constraints on new projects which have been primarily financed by the Federal Government. This situation calls for greater participation of the community in financing the construction of the required infrastructure, as well as for greater commitment to conserving the limited water resources of the country.

As previously discussed, a key factor to implementing the new water policy is to cover the total cost of water services with adequate tariffs, thus strengthening the financial capacity of individual user systems. Those subsidies which would still be necessary should be explicitly defined to prevent inefficiency and excessive dependence on Government financing.

The financial strategy of the water sector rests on two elements. The first is the establishment of a single fund for water development (FINAGUA) combining all available financial resources: Federal, state and municipal funding; national and international credits; resources available from the private sector; and the increased income from collection of water rights and taxes levied to recover government investment in water infrastructure, as anticipated in the existing legislation.

FINAGUA is a decentralized system, with funds operating at the state level. Coordination at the central level guarantees compliance with national standards, policies and objectives. By integrating diverse sources of funding and thus maintaining a constant flow of resources, mainly from increased collection of water rights, FINAGUA will become an efficient instrument in the rational use of financial resources. Additionally, the water sector's long-range planning will be strengthened and investment programs will properly consider their pluriannual nature.

Since operation and maintenance costs of services will be fully covered by the consumers, a large proportion of FINAGUA's funds will be available to finance the expansion and rehabilitation of existing systems or the creation of entirely new ones.

The second element of the financial strategy will be to radically change the present mechanisms of financing projects dealing with infrastructure, such as expanding and improving water supply to the cities. Under the new system, project financing through budgeting will gradually be replaced by credit schemes operated through FINAGUA. Thus, a given project could be financed by funds generated by the user system, credits granted to the user system by FINAGUA, credits granted by other national or international financial institutions, or through a combination of these options.

In any case, the decision will lie with the user system. The credit it can obtain will be directly related to its financial capacity or to a commitment to revise its tariff structure in order to increase its capacity to pay. In other words, project financing will be the responsibility of the user system, whether through direct expenditure of capital or through the amortization of capital costs.

Credits obtained through FINAGUA will vary, depending on the socioeconomic conditions prevalent in the specific regions or groups of users, as well as on national and regional policies set up to induce efficient water use. It is foreseeable that the present level of development in some sectors of the population will limit their ability to pay; in this case, the relevant financial policy would have to be reviewed within the framework of programs, such as the National Solidarity Program, which have clearly defined goals of social and economic development, as well as redistribution of income.

This gradual shift in financing -from budgeting to credit- will cause the organizations in charge of water services to adopt more vigorous actions to bring tariffs in line with the real cost of providing services, thus becoming financially self-sufficient.

Water Management

The water scarcity and contamination prevalent in some river basins, the excessive rainfall affecting others, and extreme meteorological disturbances occurring throughout the country, validate the importance given to effective water management.

Water management involves activities of differing nature and scope, but all must be based on a better understanding of the hydrological system, as well as the way water is used and how this affects the quality and quantity of the resource.

Water measurement is, without doubt, the basis for an adequate management of the resource. It serves to plan and define alternate uses, to resolve conflicts, and to determine the measures needed for water conservation. Thus, it is important to strengthen the hydrometeorological network, the national network which monitors water quality, and other activities to measure and determine water availability and use.

In practice, water management results in the exercising of distinct acts of authority. Granting and revoking permits and concessions, overseeing the quantity and quality of the water utilized, establishing sanctions and reserves, identifying conflicts and their possible solutions - all these involve bureaucratic processes, a series of transactions on which the user will have to spend a certain amount of time, depending on the administrative capacity of the agency involved. The formation of the Water Administration System should facilitate these transactions, by minimizing bureaucratic involvement and placing problem solving near the origin of the problem; in other words, improve the Government's response to its citizens.

Solutions to conflict, both those occasioned by the excessive use of ground and surface waters and by the contamination of the resource, should be sought along two parallel paths. It will be necessary to implement stricter regulations regarding use and exploitation; these regulations should be formulated with the participation of the users involved. At the same time, programs must be intensified to assure

the best conditions of water usage: to clear up rivers and large bodies of water, to promote efficient water use, and to build an infrastructure for regulation and storage.

One last aspect of the Water Administration System which should be considered is disaster prevention. This involves improving the means of predicting and evaluating physical phenomena, such as the hurricanes which year after year lash the country's coasts and generate extraordinary rainfall and runoffs. It's also necessary to improve the organization for mitigation and assistance to disaster victims, as well as to assure the physical integrity of hydraulic works already constructed whose failure could provoke a full-scale disaster.

Water Technology

To adequately confront water problems, it is necessary to develop the appropriate technology. Building a new water culture does not imply solely becoming more conscious of the value of water and the necessity for its rational and efficient use. This is an important step, but it is only the beginning.

It will be necessary to develop a technology capable of satisfying the population's demands without wasting resources, both in rural and urban areas, and equally for large systems and individual users.

The Mexican Institute of Water Technology (IMTA) should direct this technological endeavor, coordinating the work of universities, research centers, and all other involved institutions. Its task will be to orient the activities of these institutions to the practical problems facing users, water institutions such as the National Water Commission, and agencies in charge of water supply and irrigation.

Although IMTA should be involved in updating and transferring existing technology to face the problems traditionally found in water development, its main emphasis should be on adapting and developing new technology for the efficient use of water, greater utilization of waste waters, and the improvement of water quality.

The complexity of the technical problems increases even more when the social and economic factors involved in water use and supply are considered. IMTA will have to develop techniques and methods to adequately handle these aspects as well.

It will be necessary to prepare technicians and professionals, as well as users, to achieve the goals established for the new institutions and utilities involved in the water sector.

National Water Commission

In the last chapter of this document, the challenges which the National Water Commission must meet to consolidate itself as the National Water Authority will be delineated. Here, it is sufficient to state that although still in a process of internal evolution, the Commission is already responsible for implementing the changes called for in the new water policy, especially the creation of water utilities and the Water Financial System.

Water Development and Conservation in 1994

Implementation of the new water policy should result in the following scenario for 1994:

1. All major cities -at least those with a population of over 50,000 - will have established water utilities that have achieved, or are close to achieving, financial self-sufficiency through tariffs charged to consumers. These tariffs will cover all water costs, including investment recovery.
2. Similar self-financing water utilities will have become operational in 20 irrigation districts, which represent 55% of irrigated areas presently administered by the Federal Government. Rehabilitation programs will have enabled a further 40 irrigation districts, representing 25% of these areas, to move towards self-sufficiency. The remaining 17 districts will be making full use of the existing infrastructure to reach efficiency levels near the national average.
3. In the rest of the country, especially in rural areas, a significant improvement in water supply and sewerage services will have diminished existing inequalities.
4. Efficiency in collection of water rights will have been progressively increased to at least 70% of projected total income.
5. Federal Government subsidies to the water sector, except those clearly directed to groups or regions of limited means, will have been almost completely withdrawn. All income generated by the sector will be used to finance its own programs.
6. With the exception of a few major projects which are multi-regional or multi-sectorial in scope and for which Federal Government financing continues to be necessary, almost all new projects in the sector will be financed through FINAGUA.
7. Works to enlarge or improve existing user systems will be largely self- financed with minimal support from state and municipal governments.
8. Efficient water use will have become common practice due to available technology.
9. Significant advances will have been achieved in water metering. Input and output will be measured in all major cities with populations of more than 50,000 and in all irrigation districts. Metering of individual consumption in large cities will allow recuperation of 70% of potential income. At least 50% of the irrigated areas will be charged by volumetric consumption.
10. Through a combination of better measurement, increased installation of water-saving equipment and greater public awareness, unit consumption of water for all uses will have decreased and the productivity of water use will have increased with respect to present levels.
11. Water resources development in the principal river basins will have been optimized through specific programs for allocating available water, clearing up streams and water bodies, and maintaining infrastructure in safe and optimum condition.

12. **Appropriate regulation will have been implemented for groundwater extraction, especially in those aquifers that have been over-mined, in order to maintain the viability of urban development and economic activities dependent on these sources.**
13. **New goals for water quality will have been set and achieved in accordance with the specific conditions of the various hydrological regions of the country. As a minimum, but still far from optimal, contamination will not have increased beyond 1989 levels. Programs for progressive reduction of all major sources of contamination will be in process of implementation.**
14. **Consultative Councils will be functioning in all principal river basins of the country, enabling state governments and users to participate in the decision-making process to resolve problems and conflicts that affect them.**
15. **Water planning systems, with public participation, will have been established at local, regional and national levels. Progress will have been made towards optimizing the requirements of user systems and the viability of the hydrological system.**
16. **There will be a steadily increasing flow of technically well-qualified personnel, thus strengthening the capacity of water utilities for self-management, as well as reinforcing the technical capacity of the National Water Commission, the state agencies involved in water services, and the engineering and consulting resources of the private sector.**
17. **The National Water Commission will have consolidated its role as Water Authority. Managers at regional and state levels will be effectively exercising broader responsibilities.**
18. **Financial policies will have enabled greater continuity in constructing new infrastructure to maintain the rhythm of expansion in irrigation systems, water supply and sewerage systems required by urban centers, flood control, generation of hydroelectric energy, wastewater treatment, and reutilization of effluent waters.**
19. **Increased awareness of the real value of water will have fueled society's efforts to use it more rationally, controlling water demand prior to increasing the supply, and sharing with the Government the responsibility for this vital resource.**

Specific Strategies

Specific strategies have been designed to obtain the goals of the proposed scenario for 1994. These strategies are in accordance with the policies established for the water sector in the National Development Plan 1989-1994, as well as in the National Water Development Program.

This chapter presents a brief summary of the programs for irrigation and drainage, for water supply and sewerage services, and for the management of national waters. These medium range programs -together with the very concrete problems and needs identified through processes of public consultation and negotiation between the federal government and the state and local governments-, mark the starting point for CNA's annual working programs at central, regional and state levels.

Irrigation and Drainage

Agricultural output must grow at an average annual rate of 3.5% during the period 1989-1994 according to the projections of supply and demand of agricultural goods, which take into account population growth, possible changes in consumption patterns and a favorable evolution of the agricultural sector's balance of trade. This projected growth must occur within the following existing situation:

- Of the 20 million hectares that are cropped in the country, about 6 million hectares are irrigated land and contribute 50% of national agricultural output; that is, productivity of irrigated land is 2.5 times greater than that of rainfed agriculture.
- The 77 irrigation districts that operate in the country account for 60% of total irrigated land, while the remaining 40% (over 2.5 million hectares) is distributed among more than 27,000 small irrigation units. About 30% of total agricultural output is produced in the irrigation districts, whose cropped surface only represents 16% of the total -including rainfed agriculture.
- To some extent, all the irrigated systems -irrigation districts as well as small units-, have deteriorated and their productivity has fallen considerably. This situation, and a decreasing trend in public investment in the agricultural sector, have slowed down the sector's rate of growth, which in the last decade has been below the growth rate of the national economy as a whole.

To change the afore mentioned situation, it is necessary to restore -and even improve- the productivity in the irrigated areas, as well as continue to expand the infrastructure for irrigation and the technification of rainfed agriculture. This must be done in conjunction with the evolution of the demand for food and other agricultural goods.

Therefore, the irrigation and drainage programs for 1989-1994 aim at the following goals:

- The operation and maintenance of the 77 irrigation districts presently under the responsibility of CNA, until the process of turning over their administration to the users is completed.

- The modernization of 20 irrigation districts -located in the North and Northwest-, with a total of 1.9 million hectares.
- The rehabilitation of 40 irrigation districts, which account for 850 thousand hectares and are mainly located in the central part of the country.
- The implementation of measures to enable the full use of existing infrastructure in the remaining 17 irrigation districts, which cover 410 thousand hectares.
- The implementation of the same program to promote full use of infrastructure in the 27,000 small irrigation units operated by farmers, which account for a total of 2.8 million hectares.
- The construction of infrastructure to irrigate an additional 500 thousand hectares and to upgrade 750 thousand hectares of rainfed agriculture areas, giving priority to the conclusion of the 127 projects presently under construction and to the commitments of the Federal Government as a result of negotiations with the state governments and the future beneficiaries.

Altogether, the required investment for irrigated areas currently under production is close to one billion U.S. dollars. Investment for expanding the irrigation infrastructure amounts to more than 1.4 billion dollars, whereas investment in rainfed areas amounts to little more than 0.5 billion dollars. Total investment for irrigation and drainage programs during 1989-1994 comes to 3.2 billion dollars. Average annual investment is close to 0.6 billion dollars, which is equivalent to the level achieved in 1983 and three times that of 1989. Given these proposed levels of investment, it becomes essential to locate adequate sources of funding.

Contracting new international credits, participation of private investment and more adequate tariff systems are among the alternatives under consideration. More than ever, the construction of new projects will depend on a more explicit willingness of the beneficiaries and the state governments to contribute to the financing of such projects.

As a result of these investment programs, the cropped area in the irrigation districts under operation will increase by 500 thousand hectares. Also, the expansion programs and the programs to promote full use of infrastructure will increase the Nation's cropped areas by another 800 thousand hectares.

This increment of 1.3 million hectares will result in an additional output of 5 million metric tons, equivalent to 50% of the present volume of imports. The investment programs in irrigation and drainage will result in an internal rate of return of over 20%.

Water Supply and Sewerage

Available information show that about 30% of the country's population have no access to public water supply services, and that 51% are not connected to public sewerage services.

In the urban areas, the 12.7 million people who do not have water services are generally located in low income zones. About 21.5 million people in urban areas have no public sewerage services. The absence of sewerage services -greater than that of water supply-, generates serious problems since sewage flows without control and in the open, generally in the streets. Unfortunately, these statistics do not reveal the quality of services; in many cases, service is not continuous and supplied water is not disinfected.

In the rural areas, statistics cannot reflect the whole spectrum of situations: from those areas in which water is completely lacking or its access very troublesome-, to the areas where water supply is acceptable but the existing infrastructure is precarious.

Nationally, the population receives 170 thousand liters of water per second (lps); about 49% being supplied to the large urban conglomerates of Mexico City, Guadalajara and Monterrey. Total water supply generates 115 thousand lps of waste water, of which only 15% is treated in any way. In general, industry has no interest in using treated water due to the low prices they pay for potable water.

Conservation and maintenance of infrastructure for water supply and distribution, as well as that for sewerage services and waste water treatment, have been inadequate, and will require large investments for rehabilitation.

Worldwide, there is considerable variation in the organizations in charge of providing water services to cities; in most countries the adopted organization is the result of local and regional historical background. In Mexico, the rapid shift of water services from the Federal Government to the state and municipal governments, without the necessary technical support to ensure the healthy development of municipal or state water utilities, has had negative effects; moreover, it has led to a deterioration in the services offered to the public. Within the present institutional framework there exist a great variety of organizations or water utilities with varying degrees of technical, administrative and financial capacity and autonomy.

The continuous deterioration of the organizations in charge of providing water services explains the present limited capacity to properly operate and maintain the associated infrastructure. The low level of generated income from service charges is both cause and effect of the present situation. This low level of income is due to inadequate collecting procedures as well as extremely low prices of water services -both water supply and sewerage. Frequently, even large consumers are not charged for the water supplied to them.

Many water utilities that supposedly operate with some surplus -according to the accounting figures-, in reality are financially unsound; in these cases, their accounts are incomplete because they do not consider replacement and depreciation costs, nor are conservation and maintenance works carried out to the extent that is required. Moreover, the limited financial capacity makes it impossible for the utilities to give adequate attention to the problems of backward neighbourhoods within the cities or to the rural areas that are under their geographical jurisdiction. Disinfection works, treatment of the cities' effluents and programs to induce a more efficient use of water are also limited or excluded from the utilities' activities.

Considering population growth and the need to close existing gaps, water services for three million people must be provided every year, which means an annual average investment of nearly one billion dollars. The large urban areas will require 57% of total investment, the rest of the urban areas another 35% and the remaining 8% is needed for rural areas.

The relatively small percentage of investment assigned to the rural areas (over 70 million dollars a year) is nevertheless considerably higher than the previous level of investment. Since population growth in the rural areas is nearly zero, most of the investment is needed to eliminate existing gaps. Also, the rate at which water services coverage would increase in the rural areas is higher than that foreseen for the urban areas. Thus, the proposed investment for the rural areas is a major step in providing better living conditions for this sector of the population -especially the Indian communities.

The solution to the problems associated with the provision of water supply and sewerage services is envisaged within a policy of real decentralization of water services in the country, for which the following strategies have been adopted:

- The consolidation of water utilities for the provision of water supply and sewerage services.
- The consolidation -at the state level- of an organization that is responsible for the water supply and sewerage sector.
- The strengthening of the regulatory role at central level in order to enforce and monitor the implementation of policies established by the Federal Government.

The consolidation of water utilities implies that the assistance provided by the Federal Government should be oriented towards the following:

- To strengthen the autonomy and managerial capacity of the water utilities, instituting the necessary legal changes to allow them to become decentralized organizations at state or municipal levels, with their own assets and legal personality.
- To democratize the Directive Boards of the water utilities, with proper representation of all sectors of the population. Public participation will enable the people to know and be part of the decisions that affect them. The regulatory role of the State assumes its proper function within this type of Directive Board.
- To insure that the financial resources coming from water charges are not diverted to purposes other than those associated with the provision of water services.
- To institute the changes necessary for Directive Boards to analyze and approve tariffs and charges for water services.
- To provide the conditions under which the water utilities can become financially self-sufficient and their technical and administrative capacity improved.

It is foreseen that the management of large aqueducts (Cutzamala, Yurivia- Coatzacoalcos, Tijuana, and so forth) supplying bulk water to several systems and municipalities could be taken over by specific

decentralized utilities in charge of their operation, maintenance and expansion. The Directive Boards of these utilities would include representation of the "client" organizations, as well as the corresponding federal and state regulatory agencies.

In the case of ad hoc organizations established by rural communities to solve their water supply problems, it will be necessary to adapt the Federal Government's technical and financial support to the specific needs and developmental processes of the community. This is especially important in the Indian communities, whose requirements must be studied to provide solutions better suited to their particular environment.

At the state level, the present policy anticipates the existence of a specific organization in charge of planning and budgeting the development of water supply and sewerage services throughout the state, as well as providing technical assistance and supporting services to the water utilities and other local organizations. Although this state level organization would have to directly provide water services in those cases where the municipalities are unable to do so, its main task would be to strengthen local capability, thus furthering the decentralization process.

It is recommended that this organization be separate from the state's administrative organization to insure effectiveness and efficiency. The state organization would be responsible for formulating the State Water Supply and Sewerage Program with the participation of CNA; moreover, it would be responsible for supervising compliance with established technical and administrative norms and regulations.

In planning and budgeting, the state organization must be included in the Special Subcommittee for Water Supply and Sewerage, which has recently been created within each COPLADE (State Committee for Planning and Development).

Within this decentralized scheme, the **National Water Commission** -as the institution responsible for the water sector at the federal level-, must implement and evaluate the results of federal water policies and establish general norms to insure the implementation of such policies. Also, it must define technical and financial standards and procedures, and exercise its duty as the Federal Water Authority by granting permits and concessions for water use and the discharge of effluent waters.

One important task of CNA is to intervene with state and local governments and the water utilities in the study and implementation of those projects that imply alternate uses of water sources, the transfer of water from one river basin to another, changes in the present use of water sources, or exchanges of water of different quality.

The CNA will provide technical assistance to the several state, municipal and local organizations; develop training and development programs; participate in the formulation of the State Water Supply and Sewerage Programs; design a National Information System; and be directly in charge of the engineering and construction of those works where Federal intervention is necessary -that is, when the project involves several states or when the complexity of the project requires such intervention, and is accepted by state governments.

Water Management

The present problems in water development and use call for a radical change in the management of the country's water resources to promote their efficient use, as well as greater participation of water users in the solution of the problems and increasing conflicts associated with growing demands. The modernization of water management is a key element of the new water policies, supported by a strong Water Authority to insure the most beneficial use of the Nation's waters.

The process of consolidating CNA's technical and administrative capacity will be completed at regional and state offices. Moreover, administrative procedures for the granting of all type of concessions, licenses and permits will be greatly simplified for the benefit of specific users and the general public.

Greater priority will be given to updating inventories of water users -both those using surface and ground water. This is especially important in those river basins and aquifers with increasing demands and, consequently, greater conflicts among users.

Surface Water

The proper legal procedures to incorporate over 1,500 streams to the public domain will be completed by 1994, including the delimitation of channels, reservoirs and associated land resources. On the other hand, more than 300 streams will be partially disincorporated from the public domain together with the hydraulic infrastructure located near some urban areas, to enable the respective municipalities to operate and maintain the infrastructure, as well as administer the associated land.

The inventory of all infrastructure related to flood control will be completed, and the corresponding program for the conservation and maintenance of such infrastructure will be under way; it is foreseen that this program will include 250 large dams and 4,100 kilometers of channels and levees. Also, important steps will be taken to carry out watershed conservation programs to preserve the water in the most important river basins.

The country's hydrological and meteorological networks will be updated, both in quantity and technology. The expansion programs include over 500 climatological and 300 hydrological automatic stations, as well as 75 laboratories for sediment control and the implementation of telemetering networks in 10 river basins. Hydrological and meteorological information on reservoir sites -together with the information on sediment deposition and reservoir routing- will be sistematized at both central and state levels, thus providing better information for decision making, such as the allocation of water that is available in the 250 larger dams.

Better information systems will also improve the accuracy of water balances and hydrological studies needed for design and construction activities. Improved information will also aim at the evaluation of the risk of flooding and the probabilities of drought throughout the country.

Ground Water

National restraints to ground water use will be set up; regulations will be established for the use, development and exploitation of ground water in 20 aquifers with problems of over-exploitation. Likewise, the work of creating water reserve zones for cities of over 50,000 will be continued. Control measures will be initiated in all areas of the country to eliminate or lessen the problem of clandestine drilling of wells.

To regularize, at national level, the rights of users of ground water, inspections will be carried out throughout all user sectors, including official institutions. Legally established sanctions will be applied wherever necessary. Through these acts of authority it is hoped to rapidly overcome the attendant inertia of the traditional frauds within the water management sector and lay down precedents leading to the recognition of the CNA as the sole water authority.

From the General Ordinance of the Federal Water Law Regulation, accords will be established for each aquifer, paying particular attention to those aquifers subject to over-mining. As part of this action, representatives of the involved institutions, facilities and users will form part of the committees created to oversee compliance with the regulations.

Taking into account water availability, general employment of the area, and the preference order established by law, the redistribution of water will be regulated, safeguarding essential uses, promoting a balanced development of the various sectors, and diminishing the existing conflicts associated with water use.

Once the restrictions to ground water development have been extended across the country, their severity can be revised according to the actual conditions of exploitation in each aquifer. The disappearance of zones of unrestrained ground water exploitation will help to prevent the chaotic proliferation of ground water developments and a new generation of over-exploited aquifers.

Operating policies for aquifer abstraction will be formulated and applied. They will include the joint management of surface and ground water and the utilization of treated waters in irrigation and industry to free large amounts of potable water for other uses.

Studies will be carried out to locate new sources of ground water and to establish reserves for large population centers and for irrigation districts which rely on wells.

Water Pollution

The 30 water quality laboratories (25 state and 5 regional) will have an annual working capacity of 46,400 samples and 2,887,000 analyses. The monitoring network will be made up of 830 stations, covering 550 water bodies. In total, 23 reservoirs, 108 streams and 13 aquifers will be classified. The environmental impact of hydraulic works carried out during 1989-1994 will be studied to prevent adverse effects from their construction or operation.

Several national inventories will be carried out: one for those water bodies infested with aquatic plants; another for the use and management of water and waste water in urban centers with populations greater than 10,000; and still another of 8,500 waste water discharges and the same number of applications for the discharge of waste water and the granting of the corresponding permits.

Through the national monitoring network and laboratories, systems for obtaining timely data and parameters will be set up to regulate the inputs and outputs of sewerage services. Water quality in streams, reservoirs and water bodies will be improved through a program of monitoring, water treatment, and the classification and surveillance of receiving bodies.

The norms and regulations of the Federal Water Law will be extended, modified and applied to control and improve the quality of the country's waters. Charges will be established for the use of receiving bodies to accept discharges of effluent waters.

Reuse of Water

Through the National Water Development Program, irrigation with treated water will be extended to a total of 50,000 hectares. Short-term projects are being planned for Hemosillo, San Luis Potosí, Aguascalientes, León, Mexicali, Saltillo, and Gómez Palacio. Likewise, water reuse in industry will increase from 5 m³/sec to 15 m³/sec. Regulations for the quality of water effluents generated by the irrigation of 156,000 hectares will be included in the same Program.

In general, hydraulic infrastructure will be constructed for waste water treatment, and existing works will be rehabilitated and maintained, with emphasis on the reutilization of water in irrigation, industry and municipalities, as well as its exchange for fresh water in those cases where permitted by water quality requirements.

Safety and Prevention of Disaster

Special groups will be set up in the 32 states and the 6 regional offices of the National Water Commission, duly integrated into the necessary command, operational and support units.

The program of monitoring those hydrological phenomena which frequently threaten the country will be strengthened -together with the corresponding warning systems-, to prevent or lessen their negative effects through the operation of dams and emergency control works. Also, participation in the hydrometeorological aspects of the National Civil Protection System will be intensified, formulating contingency plans in the country's principal river basins.

Many of the principal dams will be rehabilitated, establishing formal plans for the maintenance and conservation of the works. The important dams (estimated to be around 3,000) will be inventoried and potential risks to their surroundings will be evaluated.

Challenges Facing the National Water Commission

On February 1, 1989, during the investiture of the National Water Commission, the following statement was made:

"The Commission was created to bring unity and congruence to the actions of the Federal Government in relation to water. Its duty is to be an efficient and modern institution: efficient in its organization and its working systems; modern in the design of its policies and in its response to the needs of the society.

The Commission will be inspired by the vision of a new Government: effective participation of society in decision-making; respectful coordination of institutions; and the exertion of an authentic authority in managing the Nation's waters.

We must not lose sight that the basic responsibility of the Commission is to establish a new water culture, based on a clear knowledge of the real value of water."

These statements reinforced the formal definition of the National Water Commission: supporting the process designed to bring about the quantitative and qualitative changes defined by the Federal Executive to modernize the country.

In dealing with the technical complexity of managing the country's water resources, of regulating them through infrastructure works, of providing the conditions which would improve the quality, efficiency and coverage of water supply and irrigation services, and those conditions which would permit the development of water for other uses such as hydro-electricity, aquaculture, tourism, and industry, the Federal Government faces four clear challenges: the political process of water management, the change process involved in the creation of a new water culture, the commitment to achieve greater effectiveness in water management, and the need for the CNA to reach a satisfactory level of technical and administrative excellence.

The National Water Commission is not an entirely new institution; it is founded on more than sixty years of experience in water management and development, and relies on valuable personnel who have faced the water problem for many years. Supported by this institutional capacity, the Commission is initiating a new stage in the government's task in relation to water.

The Political Process

Water and conflict are two words that are becoming more and more associated. Thus, in addition to its developmental activities (mainly through the construction of infrastructure), the Government has to strengthen its regulatory function. The country's political trends towards more democratic processes and citizen participation in decision-making will certainly influence the conditions under which this regulatory task should function.

As the country's Water Authority, the CNA assumes responsibility for solving the numerous conflicts associated with water use. Although the solution to these conflicts will generally result in acts of authority (restraints, sanctions, abrogations, etc.), negotiation processes will also be involved, in which the success of the CNA will depend on its capacity to assume leadership and propose concrete solutions which are enforceable.

To acquire, and later maintain, such leadership requires continuous negotiations with authorities, institutions and groups of users, with whom compromises have to be worked out. These negotiations will have to be carried out through the distinct levels of CNA's organization - central, regional and state - and will result in a flow of information which will feedback into the Commission's programs and activities. More actively, the CNA should not only resolve conflicts, but also anticipate them; it has the experience and the planning methodology evolved over the last two decades, which should be actualized according to the present problems and circumstances.

Planning "from above", which at one time enabled the enactment of long-term changes -many of which are taking place today- should now be changed to planning "from below". Water planning should be the result of a process that includes the participation of those directly affected by the Government actions carried out through the Commission; to this effect, the negotiating capacity of state and regional units of the CNA should be strengthened.

Invoking public participation is not, nor should it be, merely rhetoric. The Mexican society is now mature and pluralistic. Mexico is a large country and it would be difficult to manage it under centralized criterion: the cost of doing so is beyond the available resources and, in addition, centralization is inconsistent with the objective of strengthening the democratic life of the country.

Negotiation, participation and decentralization are, therefore, the elements of the political challenge that the CNA must face to assume its role as Water Authority.

The Change Process

If the nature or type of institution of the CNA had to be defined, the best description would perhaps be that of "change agent", since its purpose is to induce changes - in the use of water, in the management of the resource, and in the characteristics of government intervention - which will give form to the new water culture.

This has an important impact on the organization of the CNA. Involved in an internal change process (from Undersecretariat to Commission, from Officers to Managers, from dependence to autonomy), the defense mechanisms usually accompanying this process could negatively influence the CNA's capacity to induce external changes. Also, the external changes that it tries to bring about will have an impact on its own organization. The creation of water utilities, for example, will mean less intervention by the CNA and, for that reason, a change in its organic structure.

Therefore, the process of structuring the CNA should foment an open attitude towards change. The institution must also speed up the process of delegating authority and responsibility. Undoubtedly there exist certain risks and costs, but it will be very difficult for the Commission to stimulate decentralization if internal decisions are too centralized.

Effectiveness

The speed at which the Commission responds to the problems it faces is a measure of its effectiveness, and is one of the main indicators of its performance as a modern and efficient institution.

The transition from a centralized agency with bureaucratic systems and controls -usually externally imposed- to a decentralized utility with greater control over its own resources and decisions, implies a series of underlying processes which will have to be understood and regulated.

Autonomy does not necessarily imply the internalization of control, resulting in an excess of monitoring and control systems. As an alternative, the institution can favor effective delegation of authority and responsibility. This will also require systems, norms and procedures, but they should be designed within a framework of greater delegation of authority to those directly responsible.

Insomuch as the organization works with greater autonomy, with well-defined limits to its authority and responsibility, the institution will be more effective. Those responsible for carrying out specific actions will be clearly identified, and the evaluation of their performance will be straightforward.

Excellence

To preserve and enrich a longstanding tradition of expertise in the field of water management and development in order to confront present and future challenges is the fourth challenge facing the Commission.

To reach this level of excellence implies a major impulse in the development and transfer of the knowledge and the technology required by the institution to adequately solve its problems. The goal of the Commission should be to achieve excellence, not only in those matters in which the country has distinguished itself, but also in those leading to the new water culture, such as the innovations required to increase the efficiency in water use.

All this will be possible to the extent that the Commission propitiates and makes real use of the creative potential of its personnel, establishing working conditions which adequately canalize this potential.