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Autonomous Water Management Authorities (1)

SUMMARY

This article describes the background and conceptual foundations for the creation of autonomous water management authorities, which would be public organizations for residents of an area defined by economic and social considerations and covering an area framed by watershed divides. These authorities would have administrative and financial autonomy and the powers enabling them to conserve, protect and develop water and soil resources in the watersheds in their sphere of influence for the public good. Using the case of Peru as an example, we describe the nature of local, single-purpose governments, justify the need for creating them, and propose -for the case of natural resources- the establishment of a specific type of local government: autonomous authorities.

INTRODUCTION

LThe way in which a society chooses to develop the territory it occupies can be key to its economic and social growth. Local governments or municipalities should be understood as legal forms of public organization with authority for autonomous administration and financing of the activities required to exercise the powers granted by law. Autonomous water management authorities (*1*), described in this article, are designed as local organizations that serve and administer water resources within their sphere of influence.

The purpose of this article is to present the ideas and concepts underlying the proposal for establishing autonomous water management organizations for watersheds in Peru's coastal region.

Local government

Except in countries such as the United States and Canada, territorial development in the Americas has been shaped by decisions made by the central government in each country. During the past decade, in response to globalization and the signing of international agreements, countries adopted policies to reduce the State apparatus and foster decentralization. In some cases, reduction of the State apparatus was employed as a means of decreasing the budget and responsibilities of the central government. In the area of agriculture, for example, research and extension programs were reduced or eliminated. Decentralization has traditionally resulted in greater authority for local organizations, although the State has always maintained decision-making power. It has not been viewed, however, as a process which gives civil society executive and financial responsibilities, through local governments and organizations and without central government intervention.

In the United States, the concept of local government is so highly developed that some scholars consider it to be the foundation for that country's development. Under this perspective, local governments are granted authority and powers to administer services in the form of private enterprise, thus achieving greater efficiency and financial capacity.

Many forms of local government exist for the management, development and conservation of natural resources, and specifically for the management and conservation of water resources. These include authorities in charge of rivers, watersheds and irrigation districts, and multi-user organizations (the so-called conservancy districts) empowered to implement management plans for underground water, drainage and flood control. These organizations are "special-purpose districts," of which there are some 85,000 in the United States. A good

number of these are involved in water management (2). . Unlike municipalities, special-purpose districts are local governments created at the request of persons interested in solving a specific problem affecting citizens in their area.

Because special-purpose districts or local governments are political subdivisions with administrative and financial characteristics similar to municipalities, it has been necessary to modify state constitutions so that Congress can create general and ad hoc laws for each of them. This is because complementarity must be established between these political subdivisions and the municipalities, provinces or other traditional types of subdivisions, and to avoid overlapping powers or conflicting functions

Justification for decentralization: the case of Peru

El Peru is rich in water resources, but 98% of the water falling on its surface as rain runs off through the Amazon to the Atlantic Ocean. The rest of Peru receives just 2% of this water, and it is not easily accessed. Eightyseven percent of the Peruvian population makes use of rain that falls over the highlands –an annual average of 1200 mm in the north and up to 400 mm in the south. This rain is the only source of water for the 52 coastal valleys where 52% of all Peruvians live. It is not a large amount of water, but its concentration in the months from October to March on rugged territory with sharp differences in altitude (more than 4000 meters above sea level) produces run-off that even in normal years can cause torrential flows ("huaycos") and very damaging flooding

In the last 40 years the government has invested more than US$6 billion to increase water resources and improve their use, particularly for irrigation in the coastal region. Approximately 200,000 ha of barren land are to be incorporated into agricultural production under new water projects at different stages of implementation. In addition, contrary to the original designs, current costs of many projects stand can exceed US$20,000 per hectare of irrigation. The success of some new projects that are currently in operation is dubious, since the benefits gained from adding new areas to agriculture are overshadowed by the loss of productive land. In addition, there has been damage to population centers from flooding and salinization due to lack of controls on new water supplies.

Amendment to the Constitution of the State of Texas for the Formation of Local Governments for Conservation and the Development of Natural Resources (3)
a. The conservation and development of all of the natural resources of this State, including the control, storing, preservation and distribution of its storm and flood waters, the waters of its rivers and streams, for irrigation, power and all other useful purposes, the reclamation and irrigation of its arid, semiarid and other lands needing irrigation, the reclamation and drainage of its overflowed lands, and other lands needing drainage, the conservation and development of its forests, water and hydro-electric power, the navigation of its inland and coastal waters, and the preservation and conservation of all such natural resources of the State are each and all hereby declared public rights and duties; and the Legislature shall pass all such laws as may be appropriate thereto. b. There may be created within the State of Texas, or the State may be divided into, such number of conservation and reclamation districts as may be determined to be essential to the accomplishment of the purposes of this amendment to the constitution, which districts shall be governmental agencies and bodies politic and corporate with such powers of government and with the authority to exercise such rights, privileges and functions concerning the subject matter of this amendment as may be conferred by law c. The Legislature shall authorize all such indebtedness as may be necessary to provide all improvements and the maintenance thereof requisite to the achievement of the purposes of this amendment. All such indebtedness may be evidenced by

bonds of such conservation and reclamation districts, to be issued under such regulations as may be prescribed by law. The Legislature shall also authorize the levy and collection within such districts of all such taxes, equitably distributed, as may be necessary for the payment of the interest and the creation of a sinking fund for the payment of such bonds and for the maintenance of such districts and improvements. Such indebtedness shall be a lien upon the property assessed for the payment thereof. The Legislature shall not authorize the issuance of any bonds or provide for any indebtedness against any reclamation district unless such proposition shall first be submitted to the qualified voters of such district and the proposition adopted.

Recently the government adopted a policy to transfer, through public auction, new irrigation areas to the private sector enterprises, which pay a base price and then must meet a series of obligations depending on what investments are still required to make the land produce. To date, approximately 8,000 ha have been transferred for asparagus cultivation using the latest technology. Transfer has brought to light long existing water management problems, and to some extent this has been a factor in pressuring for change toward a more modern management system.

Investors receive assurance that water will be available. In fact, they are guaranteed a minimum volume per year, for which they pay fees that are usually higher than those paid by farmers in the older valleys. However, most of the owners in these valleys –who obtained their land as a result of the agrarian reform begun in 1968 and thus consisting primarily of small properties– do not have legally established rights over the water. In practice, this can generate a problem that is not addressed by relevant legislation, as it would give rise to a situation of owners with greater seniority than investors in new irrigation. Although they pay lower fees, they have no clear guarantee of water. If supply is short, one might wonder who will receive priority for water.

The fact that the Ministry of Agriculture is the agency charged with water administration creates an additional constraint. Traditionally, these authorities have been concerned primarily with irrigation and farmers. Many of the problems, however, have to do with organization for the development and management of water sources. Care is taken with respect to water use but not to control the quantity or quality of water sources. In general, watersheds are associated with mining operations. Runoff from treatment plants used in mining, as well as from cities and other industries, empties directly into the sources. In some places farmers use highly contaminated water for irrigation, water containing very fine sediments and metal residues. Dysentery is common in rural populations due to an excessive amount of fecal coliforms in urban discharge that pollute the water.

Although the central government apparently no longer supports largescale water projects, there is no guarantee of this in the future. Pressure is being exerted to continue with executing abandoned projects or second stages of large projects, such as Olmos, Majes andy CHAVIMOCHIC. The standard practice has been for the central government to finance these projects by assuming foreign debt, under pressure from local politicians who believe that continuing these works or large projects is a natural way of winning public approval. Apart from the restrictions on the economy caused by adjustments in regular spending in order to meet debt obligations, the problem is that citizens pay for works such as these, independently of where they actually live. During the last 30 years, 70% of public investment has been aimed at the coastal region. One may well ask, then, why people in other regions should have to pay for these projects. Worst of all is that these works were justified in economic terms to the banks that granted the credit, but not to the citizens, who are the ones that must pay for them in the end.

One very important factor not generally taken into account is the vulnerability of land to natural disasters. In Peru, the most significant disasters tend to take place as a result of storms, tremors and earth quakes. In addition, every year there are disasters caused by lesser

water-related events (huaycos and flooding). Their occurrence is not associated with the "El Niño phenomenon" but rather with the great differences in altitude between the Andes mountains and the coastal region. The country has a civil defense system to respond to disasters. However, if permanent local mechanisms existed, the problems caused by these types of disasters would have a lesser impact, service would be much more effective and there would be more resources. This would also forestall the affected population's expectations, sometimes unmet, of assistance from the central government, which is always late in arriving.

The main remedy for solving these problems is genuine decentralization, in which the central government assumes a different role than the one it has played until today. In addition to legislating and regulating compliance with laws, it should provide technical and financial assistance to foster the formation and strengthening of local governments so that citizens can exercise their creativity and responsibility in selecting alternatives that optimize their development.

The process of decentralization in Peru

Inconsistencies in current water legislation in Peru cannot be corrected through amendments, and several bills for a law on water have been drafted since 1990.

Apart from seeking a solution to immediate problems, nations should address those affecting natural resource sustainability and environmental quality that transcend their borders and imply long-range concerns. Countries assumed commitments relative to these problems, and since Agenda 21 (1992, Rio de Janeiro) they are frequently reiterated in international dialogue and congresses. All proposals now include decentralization, environmental protection, integrated management and participation.

Albeit tentative, efforts have been made to move toward decentralization in Peru. Through Law Decree 653 of 1991, on the promotion of investments in the agricultural sector and other matters, the Executive Power was granted powers to create autonomous watershed authorities that are attached to the Ministry of Agriculture, which results in a limitation of autonomy. By 1994 five autonomous authorities had been created.

Concerned about legal security for the new entrepreneurs investing in irrigated lands, in 1996 the Special Commission on Privatization of Lands (CEPRI-Tierras) --the body responsible for auctioning new lands and a division of the Ministry of the Presidency-- attacked the problem by forming the Waters Group, comprised of well-known members from diverse sectors of users.

In January 2001, this group held its 29th meeting, in which one of the topics was the commission's proposal to reorganize the Rio Santa Water Management Authority (WMA). The area of this WMA, one of the five autonomous authorities created in 1994 and a division of the Ministry of Agriculture, covers the left bank of the Santa River, and exists alongside an irrigation district of equal territorial coverage and the organization that administers it, pursuant to the law in force.

In January of 2001, the National Technical Water and Soil Commission was established by a Supreme Resolution. This Commission is composed of eight members who are responsible for creating the legal framework for autonomous watershed authorities and updating a bill for a General Water Law. The resolution also mandated creation of the legal framework for autonomous watershed authorities, subsequent to discussion with the community. Some authorities would then be created as pilot projects, and the new General Water Law would be discussed with the community and different sectors of users to identify a project that could be approved by the legislature, after a new government took office on July 28, 2001.

In April 2001, work concluded on a proposed legal framework for autonomous watershed authorities, which was discussed at the International Workshop on Water Management, held in

May 2001, in Lima. Following are the main characteristics of the proposed legal framework. Passages that are not in italics are part of that proposal.

Framework Law for the Creation of Autonomous Water Management Authorities (AWMAs) in Peru

Statute or Code Authorizing the Creation of AWMAs

Through special legislation, the Congress could authorize the creation of local governments similar to municipalities, but having specific purposes related to the management, conservation and protection of natural resources. Autonomous watershed management authorities could be created within the framework of this legislation. As suggested earlier, this might require an amendment to the State Constitution or, as in the case of Peru, it might be sufficient to amend the Basic Law for the Sustainable Use of Natural Resources N.o 26821 of 1997.

> *The current proposal in Peru dealing specifically with water and soil resources is the formulation of a Law of Autonomous Water Management Authorities. This law would provide the framework for creating autonomous authorities in specific areas, and could be applied only in cases involving the creation of such specific organizations. Legislation currently in force would be maintained wherever these local organizations are not created- as in the Law on the Promotion of Investment in the Agricultural Sector, DL653, of 1991–.*

Purpose

The underlying rationale or purpose of the autonomous organization answers the question: "Why create this organization?" In Peru, the tendency is to think that these organizations are created to be the superior or maximum body in its area for resolving problems. In fact, autonomous watershed authorities created through the DL653 of 1991 do have this purpose, and this is an additional reason for their operational difficulties.

An autonomous water management authority (AWMA) is created to take charge of conserving, protecting, and developing water and soil resources in the watersheds under its area of influence, for the public good. In other words, the proposal recognizes that a great deal needs to be done in relation to water sources and the land resources associated with them. The AWMAcan be part of a first level in conflict resolution, but cannot replace the National Water Authority, which represents the State in this function.

The powers or authority of a water management authority would be the following:

> *(1) Prepare and maintain a master plan for the entire area of influence; (2) carry out flood control; (3) store and conserve water; (4) supply or sell water; (5) provide water for trade and industry; (6) construct reservoirs, dams and dikes for water storage, and infrastructure for water pumping and purification; (7) import water; (8) develop recreational infrastructure; (9) preserve fishing and wildlife; (10) provide drainage services; (11) conserve soil and other surface resources; (12) generate hydroelectric energy; (13) provide services for management of water quality; (14) provide management plans covering the entire territory to control water quality and reduce pollution; (15) provide funding services for projects to control water and air pollution; and (16) supervise solid waste disposal services.*

The AWMA is a body responsible for executing actions related to water sources, actions that were not taken previously or were carried out sporadically or only in emergency situations, each sector in isolation and without a responsible entity. For example, actions to protect rivers, for which enormous amounts of funds are spent every year, are the responsibility of these authorities, rather than the central government's General Directorate of Waters.

However, these actions must be implemented in accordance with a master plan for the watershed, with short-, mediumand long-range actions. The AWMA is the executing arm of the National Water Authority and, when so delegated by that agency, can act in all matters related to the administration of water rights and to the control of water distribution and use. The AWMAmust comply with current legislation that, for exercising its powers, may transcend the jurisdiction of the National Water Authority.

Soin conservation

A function of an AWMA also requires executing soil conservation policies in the watershed in order to increase storage and infiltration into soil, augment the amount of water during low periods, and reduce the risk of erosion to a minimum. In Peru, the National Watershed Management and Soil Conservation Program (PRONAMACHCS) promotes soil conservation as a basic strategy and as a motivation for organizing small farmers and conducting other relevant activities in the micro-watershed areas. For this reason, it would be relatively easy for an AWMA to justify budget expenditures for encouraging soil and natural resource conservation. These could be complemented with resources provided by the central government, which is anxious to promote conservation policies, particularly in depressed areas.

Territorial coverage

Definition of the coverage of a water management authority is based on economic criteria. The need to solve the common problems of all the residents in the AWMA must be taken into account. There must also be a balance between the quantity and complexity of the problems to be solved and the availability of funds for solving them. These resources should come from levies on the residents themselves. This would make it possible to carry out the actions needed to satisfy their current and future needs, manage water appropriately (in terms of quantity and quality) and protect it from deterioration by future impacts. Thus, the coverage of an AWMA can be defined in general as:

> *The set of inter-connected watersheds whose limits have been defined according to the works and activities that must be carried out in order to solve water problems and those of associated natural resources. Criteria also include the beneficiaries, the costs and the sources from which funding can be obtained to finance such works.*

For example, in Peru the Santa River watershed is connected to other watersheds (Chao, Virú, Moche, Chicama, Casma, Nepeña and Sechín) by the CHAVIMOCHIC and CHINECAS canals. Located in these watershed areas are the important cities of Chimbote, Trujillo and Huaraz, – with more than one million inhabitants and large industries and mines. Together, residents in these watersheds could cover the cost of installing sophisticated technical equipment for improving management. A watershed such as that of Chao or Viru cannot bear the cost of this equipment alone. In addition, it would be more efficient to have technicians who can serve several watersheds, with better equipment. In the department of Arequipa, the Management Authority should include the Chili River watershed, since the city of Arequipa, which is located on its banks and is the main beneficiary, could help finance a large part of the costs.

Jurisdiction and coexistence with other organizations operating in an AWMAarea

It is important to describe the nature of the AWMA in relation to other organizations.

> *Within the area of influence of an Autonomous Authority there may exist other organizations that are also autonomous and have specific powers regarding the use and management of water and other resources. These may include irrigator organizations; farming, industrial, and mining organizations; organizations of hydroelectric companies; municipal water users organizations; organizations for natural resource conservation; and multi-purpose organizations (such as irrigation, drainage, flood control, recreation, and other services involving the supply of drinking water and wastewater treatment), and others.*

Like any other user, to be able to dam water, generate energy and sell water and energy, the AWMA would have to be granted the corresponding rights and permits pursuant to the legislation in force. Accordingly, the jurisdiction of an autonomous authority over its territory includes the resources associated with the execution of plans and projects under its responsibility and carried out with resources generated from levies on all users and self-financing activities exercised under legal mandate. Through previous agreement with the agencies responsible, the autonomous authority could also have administrative powers over water works or other State properties.

With respect to water rights administration, this is the responsibility of the National Water Authority. However, since an AWMA is created to conserve, protect and develop water sources, it has technical capabilities and resources enabling it to exercise this responsibility, if so charged by the National Authority. This responsibility signifies maintaining records on rights, setting up and operating the information network needed to assess water availability, and distributing same according to the priorities and rights established.

Organization

An autonomous authority consists of a board of directors and a technical department.

> *The board of directors comprises up to nine members equitably representing water users in the watershed area. The by-laws of each Autonomous Authority establishes the number of members in its board. Board members will serve for six-year periods and will be replaced in thirds. Members should be registered voters and persons of good moral standing, with ten years of professional experience in activities related to natural resource management, dedication to community service, and more than five years of residency in the authority area. Board members elect a president, vicepresident and secretary/treasurer from among themselves. The first board shall be named through supreme resolution based on a proposal by the General Directorate for Water and Soils. Candidates must satisfy eligibility requirements. During the first term, the board will have the additional responsibility of developing conditions that will allow for the most equitable and suitable participation of all users interests in the organization's government. Board meetings should be attended by advisors and representatives of related public agencies, as invited guests.*

Along with finance administration, the AWMA's command and management structure is the foundation for the autonomy and local government that characterize this type of organization. Discussion is taking place regarding the composition of the board and procedures for naming its members. Options including doing this through general elections held at the same time as municipal elections, or some other mechanism of democratic election. In these cases, candidates' requirements must be defined. As another option, the Executive Branch could name directors from candidates proposed by watershed residents, as long as they meet eligibility requirements, and would be subsequently ratified by Congress. Designation in mixed form is another possibility.

If Peru truly wished to break away from the now entrenched tradition of centralizing government powers, it should allow residents and farmers in the watershed to have an open vote as to whether or not they want a water and soil authority. If they do, these residents and farmers should elect board members periodically (with perhaps an entirely new board every three years, but staggering changes of individual members). The National Authority offers them technical advice, but may not veto decisions made by the watershed authority, not even at a second level of resolution. If the watershed board insists on not respecting duly approved national regulations, a mechanism would be needed for placing the watershed administration in trust for the exclusive purpose of rectifying decisions that contradict national

regulations and electing a new board(4).

A point in favor of establishing the board through general elections is that this would encourage a proportional representation of users. The argument that user sectors should be represented can be countered with the argument that if all voters vote, in reality all sectors are proportionally and equitably represented. On the other hand, a point in favor of having the Executive Branch name board members for subsequent ratification by Congress is that this may foster the selection of the most suitable representatives, although this could also be accomplished through the candidacy requirements established.

The option chosen for this proposal is to select a board that meets requirements, is named by the government for the first term and is additionally charged with creating conditions for democratic selection of the next board.

Public sector (State) participation in the board

This is another issue meriting discussion. Once the conclusion is reached that autonomy is indeed a condition for success, the question always arises, "Fine, but to whom does the autonomous authority answer?" If autonomy is desired, the public sector-central government may only participate by providing technical advice and support, and cannot sit on the board. Otherwise, it could occur that government assistance becomes an expected commodity, undermining the residents' responsibility. In addition, government representatives are always dependent on some authority and consequently cannot be independent in their decision-making, which robs the organization of its autonomy.

Technical Management

Technical management will be organized in each specific Autonomous Authority according to whatever is necessary for the optimal administration of matters pertaining to the Autonomous Authority, according to the particularities and conditions of its area, as well as for addressing the matters delegated to them by mandate. Technical management is headed by a technical manager named by the board.

The functions of technical management include the following:

Conduct studies, prepare and implement the plans necessary for increasing the water supply in order to improve efficiency and protect sources and the areas served from storms; establish water supply by forecasting availability; implement the information management system on water resources in the watershed; define and operate technical instruments to obtain the information required to administer water in accordance with the rights granted and to control quality; operate and maintain infrastructure under its charge and enforce controls on water deliveries according to its jurisdiction; monitor the behavior of the water it distributes for different uses in order to detect negative impacts from poor use that could affect properties and water sources, and take the pertinent measures pursuant to the rules currently in force; establish a regime governing the use of underground water in order to maintain a balance with use of surface water; train and provide users with technical assistance to facilitate sound management of the resource throughout its area and collaborate with outside organizations; and other functions assigned by the authority's board.

The National Institute for Development El Instituto Nacional de Desarrollo (INADE) of Peru's Ministry of the Presidency is in charge of the large-scale water projects. Within the areas of the potential autonomous water management authorities, INADE has nine special projects participating in the aforementioned privatization process. At the start of an AWMA's

operations, it has been suggested that a mechanism be established to allow INADE, due to its experience and technical capabilities, to serve as technical manager of an AWMA in areas where it has special projects.

Financiamiento

To be effective, an autonomous authority must have sufficient funding for its operations. In the past, funds were levied primarily among a small group of users whose interests were primarily agricultural. This has made it impossible to obtain sufficient funding, obliging watershed authorities to establish a very narrow range of objectives, with their concerns focusing on the value of fees for water use. The paucity of funding has also made local organizations' over-dependent on the central government for funding, which is counterproductive to the autonomous role of an AWMA.

For genuine autonomy in its operations, AWMAs must be financially self-sufficient, which must derive from income generated within its own territory.

Nowadays, funds for protecting water sources in Peru are generally fees paid by non-agricultural users. Non-agricultural users - not all residents- who utilize water directly from sources are charged a fee per unit of volume, and include the exeption are the hydroelectric companies which pay per KWh produced. Ninety percent of the revenues from non-agricultural uses comes from this subsector. In the last three years, annual revenues in this category totaled approximately US$3 million for the entire country, and were distributed as follows: 60% to the technical administrators of irrigation districts (ATDR) (5), 35% to the Soil Conservation Program for the Upper Andean Watersheds, and 5% to the central administration.

Since the customer base of a watershed authority would be broadened to include all the residents of its territory, everyone residing there would benefit from the services of the AWMA. If everyone benefits from these services, every individual in the watershed should participate in its financing.

The main concept here is that payment for services rendered by an AWMA for managing water sources should be proportional to the benefit derived from the water. In other words, the cost of protecting a city from floods should be established in accordance with the value of the properties protected. The service of delivering suitable water to an industry has a value corresponding to how important water quality is for the product of that industry. In general, water for industrial, mining and municipal uses has greater value than water for farming, even though agriculture consumes more water. If fees are charged per unit of volume, a mine producing gold would pay the same as a small farmer.

The easiest way to provide an AWMA with enough funding is to assign each hectare (or surface unit) of the watershed a given percentage of the assessed value of that unit of surface. This is the same process currently employed in urban areas to charge a property tax. *For other uses, current practices of assessing value would be used*.

In general, the way to revenues are generated would have to be the most viable option for the particular context. Fees would continue to aim to pay the direct operating costs of the water supply systems.

Since the contributor base of the AWMA would be broadened, the percentage of the assessed value required to provide sufficient funding can be a very small percentage of the property value or some other measurement of value for companies, in the case of industries, mines

and such. It should be reiterated that the tax base of the AWMA now includes not just agricultural and municipal interests, but also industries based on natural resources, such as mining, lumbering and electrical production.

> For example, the autonomous authority of the Mochica-Chavín watersheds collects revenues from the city of Trujillo as follows. In that city there are 500, 000 home owners with properties valued at US$10,000 on average. There are 5,000 businesses, valued at an average each of US$100,000. The rate for residences is US$0,216 on each US$1,000 of property value, and the rate for businesses is US$0,430 on each US$1,000 of property value. Thus, annual collection is: (a) residential: 10 x 0,216 = US$2,16 per owner; 500,000 ownerspropietarios x US$2,16 = US$1,080,000; and (b) businesses: 100 x 0,430 = US$43,00 per ownen 5,000 owners x US$43,00 = US$215,000. In total, the city of Trujillo would contribute US$1,295,000,0 per year. To this would be added contributions from all the other lands, cities and industries in the territorial area of that AWMA.

Collection of fees based on property assessments -or on the value of the business- from all owners in the watershed area would be carried out by establishing agreements with existing tax collection authorities. For example, if a municipality has already established a tax collection system for the territory of the watershed, the yearly bill sent customers could also include their fee for water service. The AWMA would later receive this amount from the municipality. The irrigation districts could also act as AWMA agents for collecting the fees from its customer base. In the case of industries and operations not under any particular tax collection agency, the AWMA would collect these fees directly.

Intermediate steps

Creation of an AWMA for a specific geographic area can take one to two years. During this period, appropriate planning of the sequence of necessary steps is required:

a. Compile all hydrological information available and all infor mation on water quality in the watershed area.
b. Analyze the information compiled and prepare a list of concerns to be discussed and "sold" to potential customers and govern ment authorities as reasons for creating an AWMA,
c. Justify the formulation of the AWMA, prepare proposals and deliver them to potential customers; create associations among watershed users.
d. Implement the Water Rights Registry.
e. Plan and set up the meteorological network and the water dis tribution network (ensuring suitable quality and amounts) that the AWMA considers necessary.
f. Improve existing models on water quality and quantity that may be applicable to the Autonomous Authority

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Promoted by the interest and with collaboration of Carlos Amat y León, Minister of Agriculture, the proposal became a bill in May 2001. Involved in this achievement were the members of Peru's National Technical Water and Soil Commission (CTNAS), consisting of :

Julio Guerra, Director General of Water; Matías Prieto, Head of the National Institute of Natural Resources (INRENA); Alejandro Seminario, Executive Secretary of the Special Commission on Land Privatization (CEPRI-Tierras); Carlos Emanuel, Executive Director of the National Institute of Development (INADE); Efraín Franco, Executive Director of the National Program for Watershed Management and Soil Conservation (PRONAMACHCS); Jorge Escurra, Technical Director of CEREN; and Milton Von Hesse, at the Ministry of Economy and Finance. In this project, CTNAS received collaboration from Laureano del Castillo, Doctor of Law at CEPES and advisor to INRENA; and Lucia Ruiz, a lawyer at INRENA.

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1 From here on, these organizations will be referred to without distinctions as "autonomus authority", "autonomus water management authority, "watershed authority", and the acronym AWMA

2 Neil S. Grigg, Head of Civil Engineering and Professor of Water Resources Planning and Management, Colorado State University, Fort Collins, Colorado, USA. Letter dated March 5, 2001.

3 Part of an amendment to the Constitution of the State of Texas. Article 16, Section 59.

4 Fredd Mann, Professor Emeritus of Iowa State University, Ames, Iowa, USA Communication of February 2001, regarding the proposal for the creation of Autonomous Water Management Authorities in Peru

5 "ATDR" are government employees and represent the National Water Authority