

# **Institutional Aspects of Irrigation in South America: The Case of Peru**

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## **Irrigated Area in Latin America**

IN 1990, THE total irrigated area in Latin America and the Caribbean amounted to 15.7 M ha (see Table I). In five countries the irrigated area was larger than 1 M ha: Mexico (5.2 M), Brazil (2.7 M), Argentina (1.7 M), Chile (**1.3 M**), and Peru (**1.3 M**). Between 1965 and 1990 the annual increase of the irrigated area in all of Latin America and the Caribbean was approximately 220,000 ha. ~~Three~~ countries "provided" 71 percent of this increase: Brazil (83,000 ha per year), Mexico (57,000 ha per year) and Cuba (16,000 ha per year).

If we observe the recent development in the different countries we can see that, with the exception of Brazil, in those countries where irrigation plays a major role the total irrigated area has not changed significantly in the last years. Moreover, the degradation of many irrigation systems has led to a stagnation in the total area of irrigated lands. This stagnation has been attributed to a variety of factors, one of which is the inability of the existing institutional sector to provide the proper environment for sustainable operation and maintenance of the irrigation systems (Urban 1990).

## **Contemporary Water Management and Water Rights Systems in Latin America**

In water management in Latin America and the Caribbean, there are only very few genuine examples of institutions possessing a multipurpose viewpoint. This is not surprising in societies where the primary goal remains the raising of productivity. It is the force of this reality which has prevented the ideas of resource-oriented and multipurpose management from having a more than very limited influence in the Latin American Region (Lee 1990).

In spite of considerable variations from country to country we can identify three general categories of water management systems in the region (Lee 1990, 19–21):

1. Water management systems which are characterized by the existence of many active public and, in some case, private institutions with only weak central coordination (Argentina, Bolivia, Chile, Colombia, Guatemala, Paraguay, Uruguay and Venezuela)
2. Water management systems which have central coordination of policy, but with institutional dispersion of responsibilities for the specific uses of water (Brazil, Costa Rica, El Salvador, Panama and Peru)

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3. Water management systems with centralization of authority and with little or no dispersion of responsibilities either for individual uses or by regions (Cuba, Ecuador, Honduras and Mexico)

*Table 1. Irrigated areas (in '000 ha) in Latin America (1965 – 1990)*

	1965	1970	1975	1980	1985	1990
<b>MEXICO</b>	3,750	3,950	4,479	4,980	5,285	5,180
<b>BRAZIL</b>	610	796	1,100	1,600	2,100	2,700
<b>ARGENTINA</b>	1,620	1,700	<b>1,440</b>	1,580	1,620	1,680
<b>CHILE</b>	<b>1,091</b>	1,180	1,242	1,255	1,257	1,265
<b>PERU</b>	<b>1,060</b>	<b>1,106</b>	1,130	1,160	1,210	1,260
<b>CUBA</b>	493	520	580	762	861	900
<b>ECUADOR</b>	450	470	510	520	540	552
<b>COLOMBIA</b>	235	250	300	400	465	520
<b>VENEZUELA</b>	225	284	212	240	251	<b>265</b>
<b>W.M. REPB.</b>	115	125	140	165	198	225
<b>BOLIVIA</b>	75	80	120	140	160	165
<b>GUYANA</b>	<b>109</b>	115	120	125	127	130
<b>EL SALVADOR</b>	20	20	33	<b>110</b>	<b>110</b>	120
<b>URUGUAY</b>	35	52	57	79	97	110
<b>HONDURAS</b>	66	70	80	82	85	90
<b>COSTA RICA</b>	26	26	36	61	110	118
<b>NICARAGUA</b>	<b>18</b>	29	67	80	83	85
<b>GUATEMALA</b>	43	56	60	68	75	<b>78</b>
<b>HAITI</b>	40	60	70	70	70	75
<b>PARAGUAY</b>	40	53	55	60	65	67
<b>SURINAME</b>	<b>15</b>	27	33	42	55	59
<b>PUERTO RICO</b>	39	39	39	39	39	39
<b>JAMAICA</b>	24	24	32	33	34	35
<b>PANAMA</b>	18	20	23	28	30	32
<b>TRINIDAD</b>	11	15	18	<b>21</b>	22	22
<b>ALL COUNTRIES</b>	10,228	11,067	11,976	13,700	14,949	15,772

In nearly all of the Latin American countries the water rights systems are strongly influenced by the Spanish legislation. They show four common features (CEPAL 1980):

1. State ownership of water
2. Concession of water rights and permits through the state
3. Priority systems to regulate the water use
4. The existence of one law or legal body in water affairs

It must be noted, though, that the abovementioned water management and water rights systems have only limited influence in large parts of the mountainous regions of the Andes. Here,

small-scale community irrigation prevails—based on traditional water rights and traditional organizational procedures.

Recent innovations in water management policy are noted in some countries, e.g., Brazil and Chile. Though the innovations are, in themselves, very different, they point to the possible future creation of national water management systems based on the concept of integrated river-basin management (see Lee 1990, 25–27). In Brazil, the policy initiative has come from the Federal Government. The aim was the reorganization of the public administration related to water management. In Chile, although the policy innovations have come from the government, further institutional development will depend to a larger extent on user initiative. Here, the changes (privatization, creation of a market in water rights) reflect a complete reversal of the historical tendency in Chile which was, as in other countries of the region, oriented toward the centralization of water development and management in one or more public agencies. Also in Peru, the government has initiated steps towards a concept of integrated river-basin management. River-basin management committees have been established throughout the country. However, their real influence is still very limited, because of the limited funds available to make them operate effectively.

### **Institutional Arrangement: The Case of Peru**

Peru is one of the countries where we have a water management system with a central coordination of policy, but with institutional dispersion of responsibilities for the specific uses of water. Coordination is achieved through the existence of formal mechanisms at the interministerial level, reporting directly to the President. The coordination mechanisms are institutionalized through the Supreme Water Council (Consejo Superior de Aguas). Within the Ministry of Agriculture the General Directorate of Water and Irrigation acts as the secretariat for the Supreme Council.

Among the institutions involved in the management of irrigation systems the following play a major role:

- **Ministry of Agriculture (MA).** The Ministry of Agriculture draws up and executes irrigation projects. It participates directly in the planning, use and control of water resources for agricultural purposes. It carries out its activities through the General Directorate for Water, Soils and Irrigation (national level), the Regional Directorate for Water and Soils (regional level), and the Technical Bureau of the Irrigation District (local level). The Ministry of Agriculture also grants water rights according to the Water Law enacted in 1969.
- **National Development Institute (INADE).** All major irrigation projects, especially those financed through foreign loans, are carried out directly by “Special Project Agencies” organized under INADE. The “Special Project Agencies” are responsible for the construction, operation and maintenance of the major infrastructure of these systems until they are handed over to the regional authorities.
- **Water User Associations.** Following the 1969 Water Law, user organizations have been established at the regional (Juntas de Usuarios) and local levels (Comisiones de Regantes). The 1969 Water Law provided the conditions for a more thorough participation of the water users in the administration, conservation and distribution of the water resources. Together with the Technical Bureau of the Irrigation District they elaborate the Irrigation Plan (Plan de Cultivo y Riego) of the District.

- **Coordination Committees.** In situations of extreme water scarcity and conflict, special Coordination Committees decide on the reduction of the water provision and on how the different users are affected. The Coordination Committees are selected from representatives of the Regional Office of the Agrarian Ministry and representatives of the water **users**.

As mentioned above, this institutional setup is valid mainly for the “modern” irrigation sector in the coastal region of Peru. In the mountainous regions these institutions only play a role in a very few areas, especially in those where government-controlled irrigation schemes have been constructed.

As far as the management of the large-scale schemes on the Peruvian coast is concerned, the institutional arrangement described above has had a decisive impact on the implementation and operation of the schemes (see Urban 1990). It is very difficult to develop an overall strategy in the management of the projects because the responsibilities for the following lie in many different hands (see example in Figure 3).

- Construction (Special Project Agency)
- Operation (technically: Special Project Agency; administratively: Technical Bureau of the Irrigation District and Coordination Committees)
- Maintenance (main system: Special Project Agency; tertiary system: Users)
- Administration and Control of Water Use (Technical Bureau of the Irrigation District)

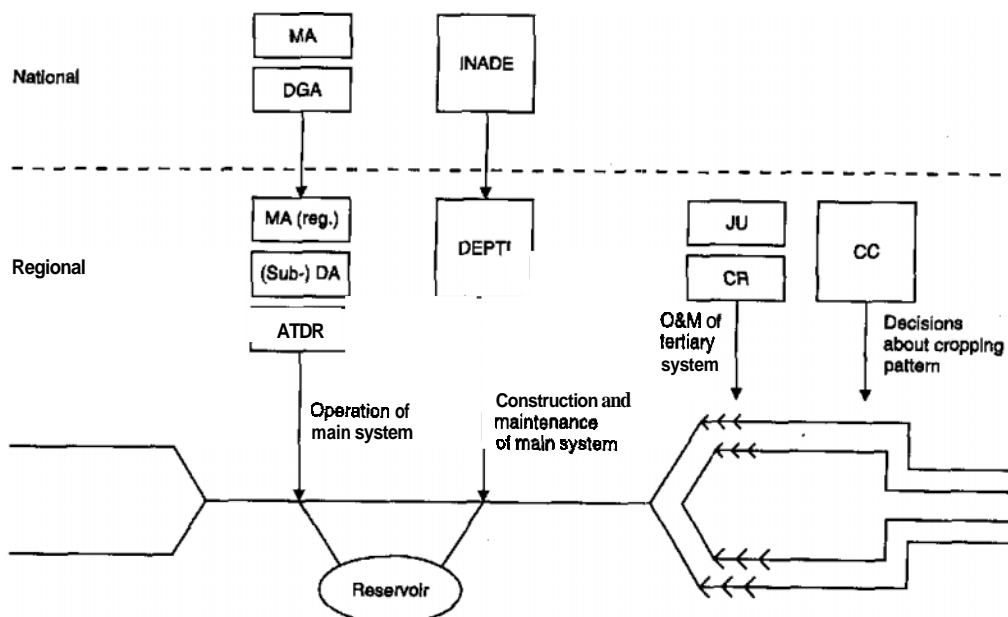
The consequences of such an institutional dispersion for the management of the irrigation systems can be severe. The Tinajones Irrigation System on the northern Peruvian Coast is a clear example of this (see Urban 1990, 98–114; 157–182). The system was designed to regulate the irrigation of approximately 80,000 ha in the Chancay **Valley** in the Department of Lambayeque. For this purpose a 300 M m<sup>3</sup> reservoir and a new distribution system were constructed. The construction of the reservoir and main parts of the new lined canal system was completed in 1967. The aim of the project was to regulate and stabilize the irrigation of the existing irrigated area. Unfortunately, this aim could never really be met.

As a result of the Agrarian Reform promulgated in 1969 the irrigated area in the Chancay Valley was thoroughly expanded. About 20,000 ha of additional land and the respective water rights were granted to “new users,” mainly small farmers. As a consequence—since the new irrigation system had been planned to serve a smaller area—the needs of a large number of users could only be met in years with abundant rainfall. As dry years, especially those between 1975 and 1982, were extremely dry, severe conflicts arose. In those years, the reservoir was usually emptied completely in the initial phase of the season (November – December). If, later in the season, at least some additional rainfall in the Andes brought water to the valley, a larger part of the farming community could at least save their crops. However, if there was no significant rainfall from January to April, as in most years between 1975 and 1982, a large number, sometimes more than 50 percent, of the farmers lost their crops.

To some extent, the disappointing experiences in the years between 1975 and 1982 have to be attributed to the decision of the political authorities to expand the total number of water users to be served by the system. However, the impacts of the droughts could have been drastically reduced, and the efficiency of the system significantly improved, if an effective water management had been applied. An effective management of the Tinajones System, especially in the **dry** years, would have implied, above all, the adoption of a well-balanced cropping pattern and the restriction of the water use on sandy soils. However, in spite of various attempts, the representatives of the Technical Bureau of the Irrigation District were unable to implement an

effective water management policy, not only in the dry years, but even in the years with sufficient rainfall.

Figure 3. Institutional arrangement, Tinajones Project (Peru)



- MA = Ministry of Agriculture.  
 DGA = General Directorate for Water Development.  
 ATDR = Regional Agency for Water Administration.  
 INADE = National Institute for Development.  
 DEPTI = "Special Project" Agency.  
 JU/CR = Water User Associations.  
 CC = Coordination Committee.

How could that happen? Analyzing the situation throughout the years, we can see that the Technical Bureau of the Irrigation District was practically the only one of the role players involved that was really interested in implementing an effective water management policy. However, the Technical Bureau was politically too weak to have a decisive influence. When the representatives of the Technical Bureau tried to convince the other members of the Coordination Committee to reduce the areas of the highly water-consuming crops, they were outnumbered by the user representatives who had a majority in the committee. The situation worsened, when the Coordination Committee even accepted a significant rise in the amount of rice crops in the valley. Since rice consumed far more water than most of the other crops in the valley, this decision increased the scarcity not only in the dry years but in others. Unfortunately, the presence of the Director of the Regional Office of the Ministry of Agriculture as Head of the Coordination Committee did not help prevent the users from taking these decisions that were largely induced by short-term interests.

On the contrary, since the Director of the Regional Office of the Ministry of Agriculture pursued aims different from those of the Technical Bureau of the Irrigation District, the policy of his office even reinforced the users' tendencies. Since the main aim of the Ministry of Agriculture was to provide cheap grain to the larger cities, it adopted an overall policy in favor of rice production by granting a fixed price for rice and subsidies for its marketing. This policy counteracted the intentions and interventions of the Technical Bureau of the Irrigation District. The staff of the Technical Bureau of the Irrigation District was not only too weak to enforce the implementation of an effective water management strategy but even lacked the means (equipment, staff) to control the limited number of corrective measures that had been adopted (Urban 1990, 157-182).

As in the Tinajones example, in most of the large-scale irrigation schemes on the Peruvian Coast the dispersion of responsibilities, and even more important, the dispersion of the interests of the different participating parties, prevented efficient and effective water management strategies geared towards the needs of the specific systems (see Urban 1990).

## Water Rates in Peru

The water rates and fee regulations were formerly established in the General Water Law and its regulations. The rates and fees are based on three components: water use, service and amortization. In 1981, new water rate regulations were approved. They include different rates according to the type of use, i.e., agricultural or nonagricultural. The rate for water used for agricultural purposes is calculated on the basis of the Board of Users' income, the water rate and amortization.

The component of the Board-of-Users' income is that part of the rate used to cover overhead expenses and the cost of developing the water resource for irrigation purposes; this income is used to finance the budget at the level of the activities scheduled by the Board of Users. The funds collected are assigned as follows: a total of 10 percent is allocated for the execution of studies on the protection of hydrographic basins and the remaining 90 percent is used for the following (see Lee 1990, 110):

- Water management and distribution
- Conservation and improvement of waterways
- The costs of collecting water rates
- Operating and payroll costs of the Board of Users
- The costs of irrigation-water and/or groundwater studies
- The maintenance of a reserve fund for emergencies

The water-rate component is that part of the rate paid to the State as a tax on the use of water as a public utility. This revenue which consists of 10 percent of the component of the Board-of-Users' income goes to the public treasury. The amortization component is that part of the rate supposed to be paid back to the State as reimbursement for public investment in irrigation works and in works designed to improve irrigation and/or drainage; it is paid into the public treasury, and its value is established annually by the Agrarian Ministry.

Up to now, this system of water rates could not be applied effectively in Peru. In Tinajones, as in most other projects, the water rate applied does not provide a means of recovering the investments made; indeed the amount charged does not even cover the operation and maintenance expenses. Furthermore, due to the inadequate collection schedule and the delays in payments the

real value received is negligible and may be characterized as purely symbolic (Lee 1990; Urban 1990).

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