

History of the irrigation, the constitution of water rights
and the role of the State and peasants' communities
in Ecuadorean Andes.

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*introducción al debate
sobre el marco legal y el papel
de las organizaciones campesinas
y del estado en el manejo del agua.*

1. The appropriation and management of water resources by communities of users.

1.1 The training of water rights

Ancient irrigation systems are the result of the local social organisation that has mobilised itself, with free or forced manner, under the action of knowledgeable people in hydraulic schemes who were able to organise works in concrete situations.

In fact, the technical idea and the plan of construction of an infrastructure constitute the beginning of a social process that places the access to the water in the center of the socio-economic relationships between water users and those ones who are not recognised as such. It is necessary to consider that the group of founders of a canal had to appropriate a resource, indeed by means as the work of the water intake, but also through the general recognition of other people who reside in the region. It means holding a title to defend from additional demands and to prohibit all new work of intake that could modify the flow caught by the first canal (Ruf, 1993a).

In addition, the distribution of the water between recognised users had to be structured and accepted by all founders, that anticipated ways to struggle against those who would not respect the initial agreement.

Even if the central administration of the State was non-existent concerning agricultural hydraulic, systems of irrigation were strongly organised and governed according to strict rules to reply to next questions: who has access to the water, in what quantity, to what moment and how? Founders of the canal took coherent and complementary decisions by defining:

- forms of distribution of the water, with only one distributed flow shared in time units between users, or different continuous flows;
- hydraulic blocs attributed to a widened family under the authority of a cacique;
- the division of the water between blocs, that defines endowments of each;
- the irrigation basis flow named "main d'eau", "regador", "molino", etc;
- the time of basis watering for an area; (what gives a water allocation applied on each watering)

- the anticipated frequency of irrigation; (what corresponds to the consumption of the usable reserve in the soil)

All these elements depend on the type of soil, the chosen agriculture (plantations, perennial crops, annual crops), the available work force by unit of area, the device of application of the water.

Thus, for instance, a cacique could hold weekly a day to use a definite part of the flow of the canal that it had contributed to found. It does not concern only a question of technical adjustment between the offer and the demand in water. Judicial elements of the appropriation of the water are essential. In addition, in cases of conflict on the access to the water, witnesses could deny or confirm that since immemorial times, such person employs the water this day of the week, and that its ancestors benefit from the water in the same conditions (Ruf, Nuñez, 1991). This right, originally oral, now asserts by a public handwriting.

1.2 Increasingly numerous conflicts

In the 17th and 18th century, communities were defined by their membership to an ethnic group, and have political structures dating the Inca administration. The ayllu is a territorial and social entity: it is the centre from where exerts the power of the main cacique on the totality of families caciques or dependent. Each person holds a social position according to the family status and the situation in the kinship (Freile Granizo, 1981). The caciques natives were masters of water. They organised the management of the canals that they controlled. From the 16th century until nowadays, the 1200 water trials identified by ORSTOM in the historical archives signal early several divisions of flow by sharing the flow and by distributions of the water by days with a weekly frequency. The maintenance was insured by collective works (the "mingas").

Little by little, the caciques natives have lost the unit of their management, because they knew themselves serious conflicts all the long of the process of land and water concentration in few hands, and the metis evolution of villages (Ruf, 1993b).

Users of a canal sought beside public authority ways to defend their rights. It was the case when others persons modified water intakes and acted on the feeding of others intakes downstream. It was also the case when some users did not respect a common rule, stealing the

water or, sometimes, selling their right to a third party, despite the disagreement of the other users (Coronel, 1987).

These conflicts can therefore occur to various levels, between various types of users (table 1). Besides, confrontations are frequent on problems of maintenance, especially when a canal serves several perimeters of villages and haciendas. To understand them, it is necessary to know who appropriate the water all along the chain of transfer of water resources (Ruf, Le Goulven, 1987).

Table 1: levels of conflict on water

Scale	Problem	Groups in conflicts	Institution arbitrates
Basin	Problem of dependence uphill / down the river	Regions, sometimes country	Regional authorities and central Governments
Unit basin: Dependent intakes	Problem of dependence uphill / down stream	Other canals of irrigation, industrial and urban usage	Institution judicial local, regional and central as last authority
canal	Fragility, protection of works, landslides in chain, etc.	Groups managing parallel canal segments	! ! !
Allocations between perimeters	Inequality of water allocations	villages / haciendas or villages / other villages	Difficult frontier to establish between authorities
Distribution between blocs of a perimeter	Inequality of water allocations	Quarters, wide family groups	! !
Distribution between users of a same bloc	Inequality of water allocations, too long wait between two watering, water robbery, illicit market of the water	peasant families	Local authorities founder of irrigation canals (communities, parishes, governor of village).
Exceptional distributions	Inequality of endowments	peasants' families	

These conflicts become increasingly important in the course of the time, as the water rarefies. Demand in water increases constantly, is by the agricultural area extension, is by the intensity of the agriculture, or by the arrival of new actors in the society, who request their share in the access to resources.

1.3. Associations of users

Nowadays, the users' association of an old canal has to assume the water management to give an effective service to all users. Its authority expresses through clear attributions to establish rules, to define and recognise water rights, to control the transmission of these rights (in the kinship of users or to the opportunity of trades, sale), to organise a "police of the water" that watches to the realisation of the division of the water conform to recognised rights, to insure the hydraulic work maintenance, to distribute costs in work and costs between users (Sabatier & *al.*, 1991). The action of the association entered in a limited framework: the direction of the association holds a power for a determined time, and it is revocable if the meeting of users (or elected representatives) decides it.

In Ecuador, the creation of associations of water users is a contemporary phenomenon. Firsts "common water users' groups" are born at the end of the 19th century in the province of the Tungurahua, when some great landowners have proposed to concern the small shareholders to the construction of new canals of irrigation. Judicial forms of communes and associations or "juntas de aguas" appear in the first half of the 20th Century. In many cases, the administration had to provok the organisation of communities, to have legal structures and to apply there agrarian policies.

In the main traditional irrigation systems (30 to 50 kilometers of canal and a thousand of users), one can observe currently a tendency to the rupture of the "juntas de aguas" in parish local associations that accept less in less the submission to a central authority, and reject sometimes any collaboration with others associations. In the province of Tungurahua, on the north slope of the volcanos Carihuayrazo and Chimborazo, reigns a climate of competition between half-caste and Indian communities, between the different villages, watersheds, groups cultivating high lands and groups cultivating low lands. By acting with autonomous manner on each groups, nongovernmental or governmental organisms can emphasize dissensions and favour a certain social rupture.

1.4. The regulation of an ancient "juntas de aguas" as that of Urucuquí (In the basin of the río Mira, northern Ecuador).

The example of Urucuquí demonstrates that statuses of a water users' association are the product of an historical process in the village. After an extremely long conflict between villagers and two big lanowners, the village finds in 1944, on public expropriation decision of the haciendas, the control of the canal Grande o de Caciques (Anonymous, 1946).

Statuses of 1945 rule the distribution of the water to the different parts of the system. They integrate particular rights of some families of the village, told rights of caciques and special rights told "tercero" for some haciendas (but nothing for the twoexpropriated haciendas). This regulation leans on social peace principles, equity, regulation, the respect of the service, integrity, works and rights conservation acquired for users (Junta of aguas of Urcuquí, 1973).

Waters are presented as a common good. The regulation precises rules of access, practical dispositions for daily management. It includes some element suppleness to reply to unforeseen situations, as the resumption of the distribution after the interruption of the service, the correction of some irrigations non realized at the anticipated day, or the installation of more supple rules some seasons (review in Gilot 1994). Generally, the concentration of water rights is limited to maintain the community character of the access to the water. This is the case when the water right is attached to the peasant field, with prohibition of selling it or use it out of the considered field.

The water demand can change by the development of new crops, or by changing the vegetative cycle. Social demand in water can evolve with new actors : heirs of users, buyers of irrigated fields. The urban development is accompanied also by a strong increase in use of water resources, non negligible in situation of strong density of population. The offer in water can also decrease, for climatical reasons, because of problems of water transfers efficiency or by adjustments modifying upstream available flows. Rules of access to the water have therefore to include procedures of renovation and equitable forms (or recognized such) of division of the deficit in water. It is in the situation of water scarcity that appear the real institutional capacities of the "junta de aguas".

The structure of the users organization has to respect groups, quarters and social affinity blocs. On this subject, there is not only one model. It can be useful to establish institutional distinctions for some sectors, villages or quarters depending a canal secondary or tertiaire (as to Urcuquí since 1959). This distinction can nevertheless also prove ominous to the totality of the irrigation system if it entails a definitive institutional separation. Concerning management of a canal of irrigation, it is necessary to have a global approach of the system, a capacity of action to maintain operational the transfer of the water. Cases of atomisation of the central association in several independant associations risk to go on with a failure for all groups of users (ex: Canal Casimiro Pazmiño, Tungurahua).

2. Public administration of water by the ecuadorean State

We will examine here the evolution the role of the State, in the resolution of conflicts, management of the resource at the national level and the creation of schemes, before and after the nationalization of the water resource.

2,1 Procedures of conflict resolution before 1972.

As we have signaled in the paragraph 1.2., conflicts for the utilization and the appropriation of the hydraulic resource are numerous. Each users' group seeks to convince authorities, by beginning with those of the village, but also those of the provincial power. Sometimes they address directly to national authorities.

In Ecuador before the nationalization of waters, the institutions in charge to rule these problems were ordinary courts (to the difference of the case of Spain for example that has the specialized court of Valence: Fernandez, 1994). The procedure was regular: complaint, reply, call to witnesses of the two parts, field expertise, other audition of witnesses so as to establish ancient respective rights, analysis and rendered judgement (figure 1). Resolutions depended on relationships of force established between the parts in conflict, they also depend on the manner to interpret legal texts, since each authority judged according to its own criteria concerning management of natural resources. Thus, in many opportunities, judicial decisions favored peasants and rejected demands of proprietors of haciendas. However, it makes sure that several resolutions have never been applied after many years of legal procedure years.

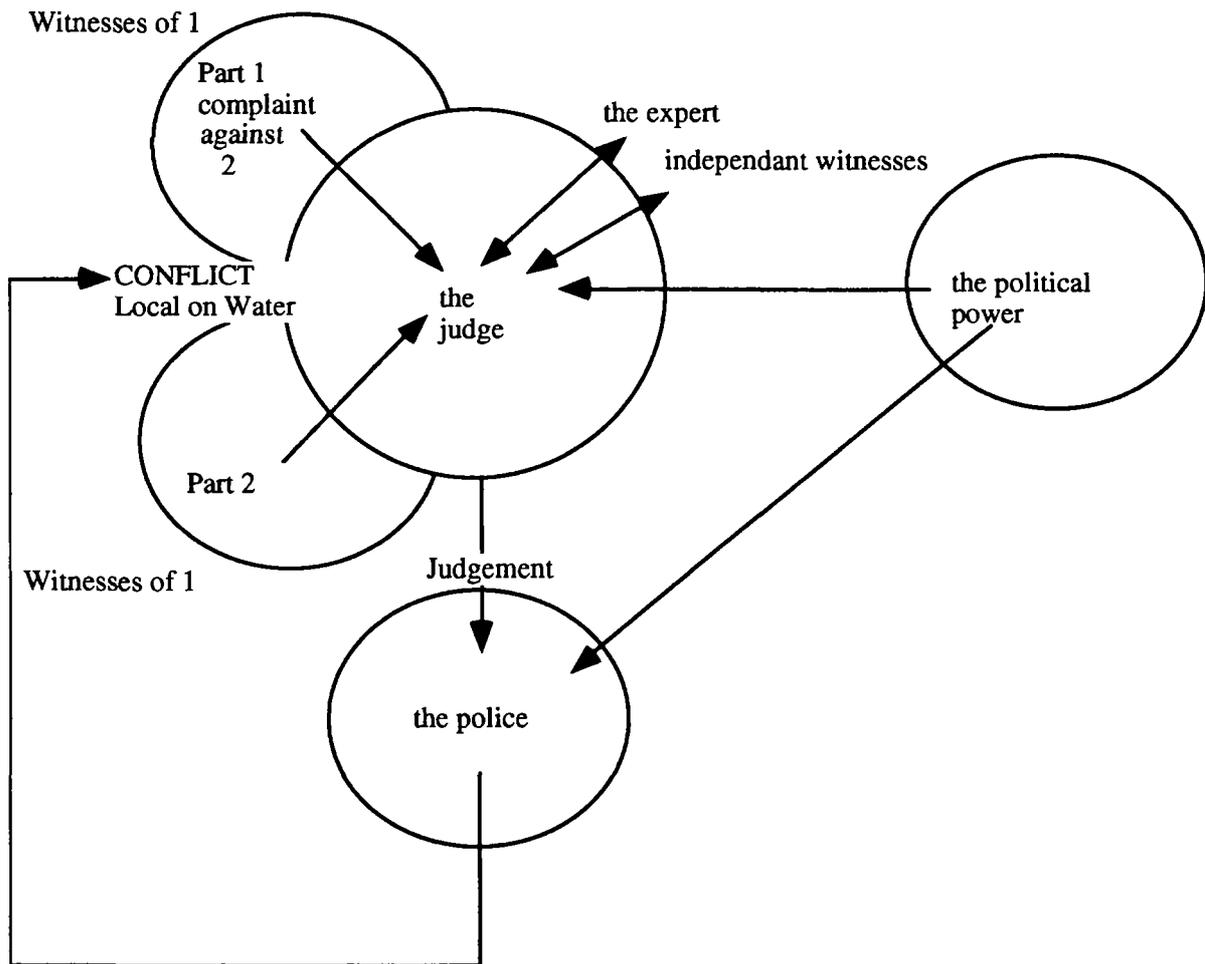


Figure 1. Arbitration and development of a water conflict before the nationalisation of water (1972).

2.2 The law on waters of 1972: waters and substitution nationalization of institutions.

In Ecuador, the intervention of the State (ancient with the judicial system), formalizes in years 1940 with the National Irrigation Bank (Caja Nacional of Riego) whose objective is building new canals. In years 1960-1970, with the Ecuadorean Water Resource Institute (INERHI), that regroups activities of creation of new schemes of the National Irrigation Bank and nex activities, such as administration and planification: to concede the flows for periods of 10 years (Gobierno del Ecuador, 1973). The text of the law on the water of 1972 puts indeed the State in possession of all continental waters of the country.

The creation of the INERHI does not modify the bases of conflicts between users and groups of users. Each ones begins then a sort of race to the concession, so as to hold a supplementary document testifying the ancient appropriation of the water, old sometimes for some centuries.

With the law of the water, the resolution of conflict becomes more bureaucratic (figure 2). The role of agents of the INERHI substitutes to the contradictory witness intervention. But, the mediation of attorneys remains a constant. Criteria of decision seem more technical than in anterior judgements, since the INERHI has norms of water requirements according to the ecological level and the cropping pattern. In facts, field measures, when experts of the INERHI could realize them, remain always punctual. Definitively, the final criteria of concession is the precedence of the appropriation of the resource, and the expert concludes that this situation agrees the technical norms of the Institute (Le Goulven *and al.*, 1989).

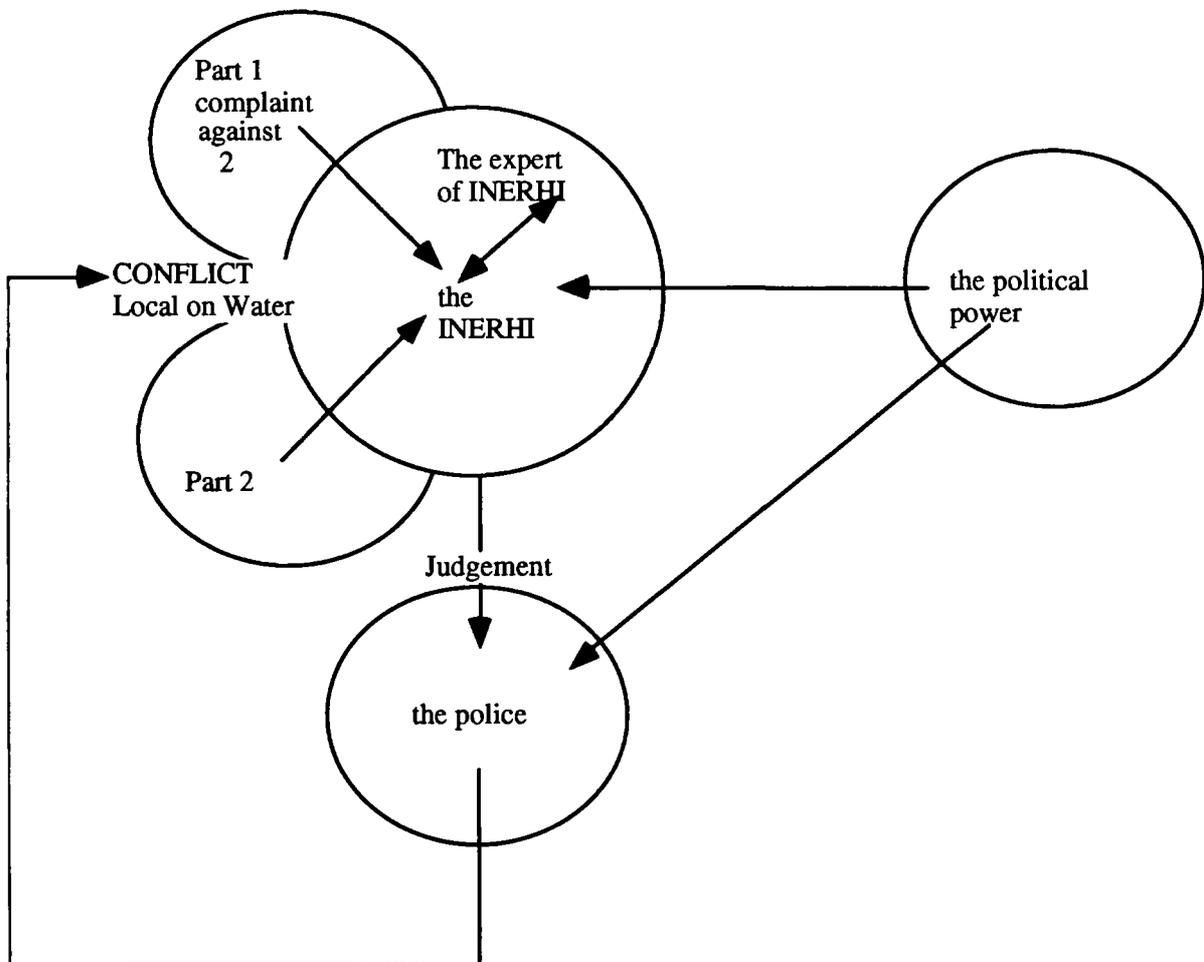


Figure 2. Arbitration and development of a water conflict after the nationalisation of waters (1972).

Thus, the central water administration does not create a revolution in the historical chain of creation and appropriation of water resources, but it offers a renovated framework that most ancient users accept. However, when it concerns social struggles to recuperate an abandoned irrigation network, as the canal of Guanquilqui (province of the Pichincha), the INERHI is

submitted directly to the influence of the political power, what does not favour deep changes in agrarian structures of the country (Cisneros, 1986).

2.3 The law of water of 1972: an attempt of technical optimization by the control of the State.

The law imposes on each groups of five persons or more sharing a water resource to form an association, with a board of directors appointed by the general user meeting. The legislator seeks to place under administrative dependence the water association, as shown in the attributions of the board of directors: respecting and executing administrative and technical dispositions defined by the INERHI.

In this perspective, the law imposes to the association to provide each year the cropping pattern data to the Institute, to allow it to calculate the most favourable water distribution schedules. Indeed, founders of the law thought that the public administration was able to manage the water until to the peasant plot level, in all irrigation systems. Furthermore, the board of leaders of the association has to send an annual activity report to the INERHI.

It is not truly necessary to insist on the bureaucratic character that these measures generated. In reality, the device of crop patterns and the calculation water scheduling have probably never been effective (some later years, the Institute no longer demand all these information). In irrigation systems studied by the project ORSTOM-INERHI, users underline the presence of employees of the INERHI to some meetings in the first years following the proclamation of the nationalization. With the time, they assisted less in less to meetings.

In fact, the INERHI met a lot of difficulties in judicial and administrative management of concessions on the water. Procedures were difficult, giving place to conflicts and complaints between peasants and land-owners. Because an isolated person, when he was opposed to his own association, could follow procedures of water concession for himself, the difficulties increase.

Today, the water association have their own clean register "legal" and submit it only rarely to the INERHI. The internal regulation, anticipated in the law, contains elements adapted to each situation and accepted by the vote of a general user meeting. It constitutes an important liberty margin to choose rules of management of the water and functioning of the institution "junta de aguas", rules conform to the social user organization.

In Urcuqui, tasks of the board of directors of the junta have been specified with the instauration of the INERHI. They are well different those anticipated by the law of 1972. It concerns dialogues to establish with agents of the administration and non of reverse obligations it. Especially, the idea to define a priori water scheduling based on crop patterns does not figure, because the organization of water rights is established in years 1945-1950.

2,4 The economic liberalism and management of the water, innovation or economic and social recession?

The Ecuadorean State, through the "Caja Nacional de Riego" and then of the INERHI, has financed between 1940 and 1992 a twenty of irrigation projects representing approximately 75,000 hectares fitted. However, in Andes, the traditional sector represents always 75 to 80% of irrigated areas, with some 2,000 canals which provide water to 1/3 of the agricultural area : 325,000 hectares (Jimenez, 1986-Whitaker, 1990). Today, one has to distinguish three situations:

-traditional irrigation canals, managed by the associations before even the nationalization, function again on the basis of specific internal regulations.

-canals realized by the State and managed by the INERHI have the formal associations which do not have any effective power on the water distribution and the maintenance.

-some canals realized since 1972 by nongovernmental organizations, depend on peasant associations always supported by NGO, that know often difficulties of management, regulations, financings.

In the framework of ideas transported by technical assistance organisms depending on the World Bank and the IMF, the ecuadorean State seeks to limit its administrative role in irrigated systems: one hopes thus lead to reduce State expenses for this sector, judged too heavy for a low efficiency. As in most of the developing countries, the idea is to give the management of States' goods to associations of users. The law of 1972 will be therefore revised, and the principle of a complete privatization of the water is studied. Until 1995, this new orientation is only effective with the dissolution of the INERHI, and by its replacement by a lighter structure, called CNRH (Centro Nacional of Recursos Hidricos). The law itself remains in discussion for three years.

In recent systems, the transfer of management from the State to users supposes to build a new framework of rules for the appropriation of hydraulic schemes. It must ensure the maintenance of the system and the distribution of the water in good conditions.

It is hardly probable that laws of the market ensure with efficient manner the water distribution in the concerned systems, which are wide and ramified. In the absence of strong social structure that would authorize the establishment of a consensus on rights of each user, water robbery, under various form, are a current practice. It breaks the balance in the system, because some users monopolize the resource to depend them on others (review in Gilot 1994).

On the other hand, users who do not receive water do not appreciate to have to pay their share, while those that hoard the resource rarely tend to pay more than what is counted them according to their rights.

In the absence of an user consensus for the water division from both legal and practical points of view, transfers of management to peasants risk therefore to increase tensions, to increase the inequity in the water share, and to favor the progressive degradation of the works. The State no longer will have to pay the cost of the irrigation structures. But what means a policy that would produce a diminution of the agricultural production?

A privatization of the water would increase the risk of a disorganization of systems. If some richer land-owners are able to repurchase water rights of the peasant, one can have a rapid accumulation process. The concentration of rights on reduce areas encounters of course economic and social limits: an important work is necessary for the maintenance of the system. In a context of the economical liberalism, a such cost has to be related of the profit that results of it. However, it is not excluded to see growing a class of big "water-owners".

In systems already managed by peasants' communities, more solid institutions exist in the villages since sometimes several centuries and have judicial advantages through their own regulations. In Urcuquí for example, the water right of a plot (fixed to 3 hours/ha) is strictly attached to the earth and can not be used in an other field. Furthermore, it is forbidden to have an irrigated area of more of 5 hectares (15 hours of water). Even if these rules are not perfectly respected, they nevertheless constitute a serious protection.

3. Conclusion

Concerning water access, two logic confront and dominate alternately: the right of precedence of the use and the right of the strongest. It is the basis for the public authority to solve conflicts on the water. Then consider the water as a private good, means the increase of conflicts and ask for more arbitration, which leads to the need of a strong State authority on water. Would not it be necessary to shorten this loop by offering to users' communities

institutional, judicial and economical ways to distribute water and to maintain works. Would not it be necessary to give to the State more competent institutions skilled analyses and regulations of conflicts: a kind of court of waters, as it existed formerly in Spain.

The water association constitute a strong basis of the social life of the andean villages. The lack of relationships between the water associations, and between the State services and the local user organization appears as an empty space. An useful perspective is that superintendents of juntas of the water share their experiences and compare different management rule. Moreover, an external action with these organizations should begin with an analysis of the institution itself: manner to appoint the leaders and representatives, use of common fund for example. Indeed, it can be desirable to strengthen the organization in order to promote more liberty and competence (towards the intervening exteriors), but the senses that can take such actions depend on the respect carried to each person or group of persons, whatever its status in the society. The water association evolves always in a context of legality and has to find in an authority some references to answer to technical problems and to seek adequate solutions to internal conflicts.

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