

The Historical Development of Equity in Irrigation: Changes in Water Distribution in Urcuquí, Ecuador

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Urcuquí: An ancient hydraulic territory in northern Ecuador

In Ecuador, the inter-Andean valley between the western and eastern cordilleras is made up of a series of large river basins. Over this whole mountainous area a complex hydraulic system of hundreds of canals has developed since time immemorial. Nowadays, it provides irrigation water for some 400,000 ha of land in the Andes.

The basin of the Mira river, in the northern part of the Ecuadorian Andes, is the location of one of the main groups of traditional canals. The history of water management here goes back to pre-Hispanic times, when irrigation was carried out by means of *camellones* (raised beds between water furrows) in the humid zones near to the numerous small lakes of the provinces of Imbabura and Carchi. The native populations, belonging to the Cara culture, lived in communities (*ayllus*) in an area around the volcanoes Imbabura, Cayambe, Cotacachi and Piñán. In 1646, the census of the town of Urcuquí, located on the western bank of the Andean valley on the slopes of the Yanahurco de Piñán volcano, refers to two *ayllus*: Urcuquiango and Yacelga. These correspond mainly to an area defined by the ridges of the Piñán hill, the river Cariyacu to the south, the river Ambí to the east, and the Pigunchuela gorge to the north.

Nowadays this area contains twenty canals that capture over four cubic metres per second from the rivers Cariyacu, Huarmiyacu, Ambí and Pigunchuela. These canals irrigate approximately 5,000 ha in the temperate and warm zones located between 1,500 and 2,800 metres above sea level.

One of these canals, which was probably constructed in 1582, is called 'Acequia Grande' (Grand Canal) or 'Acequia de Caciques' (Chieftains' Canal, see Figure 35.1). It irrigates approximately 320 ha between the altitudes of 2,000 and 2,500 metres a.s.l., benefitting 435 users. The canal is still an earth canal, 19 kilometres long, with a capacity of 200 litres/second. At present it is managed by a group of rural associations from two parishes, Urcuquí and San Blas, while the other canals still give irrigation service to large or medium-sized owners. Only one of twenty canals is state-owned, the Salinas canal, but it serves primarily the haciendas of the neighbouring zone of Tumbabiro and Salinas, with a few beneficiaries in the warm area of Urcuquí.

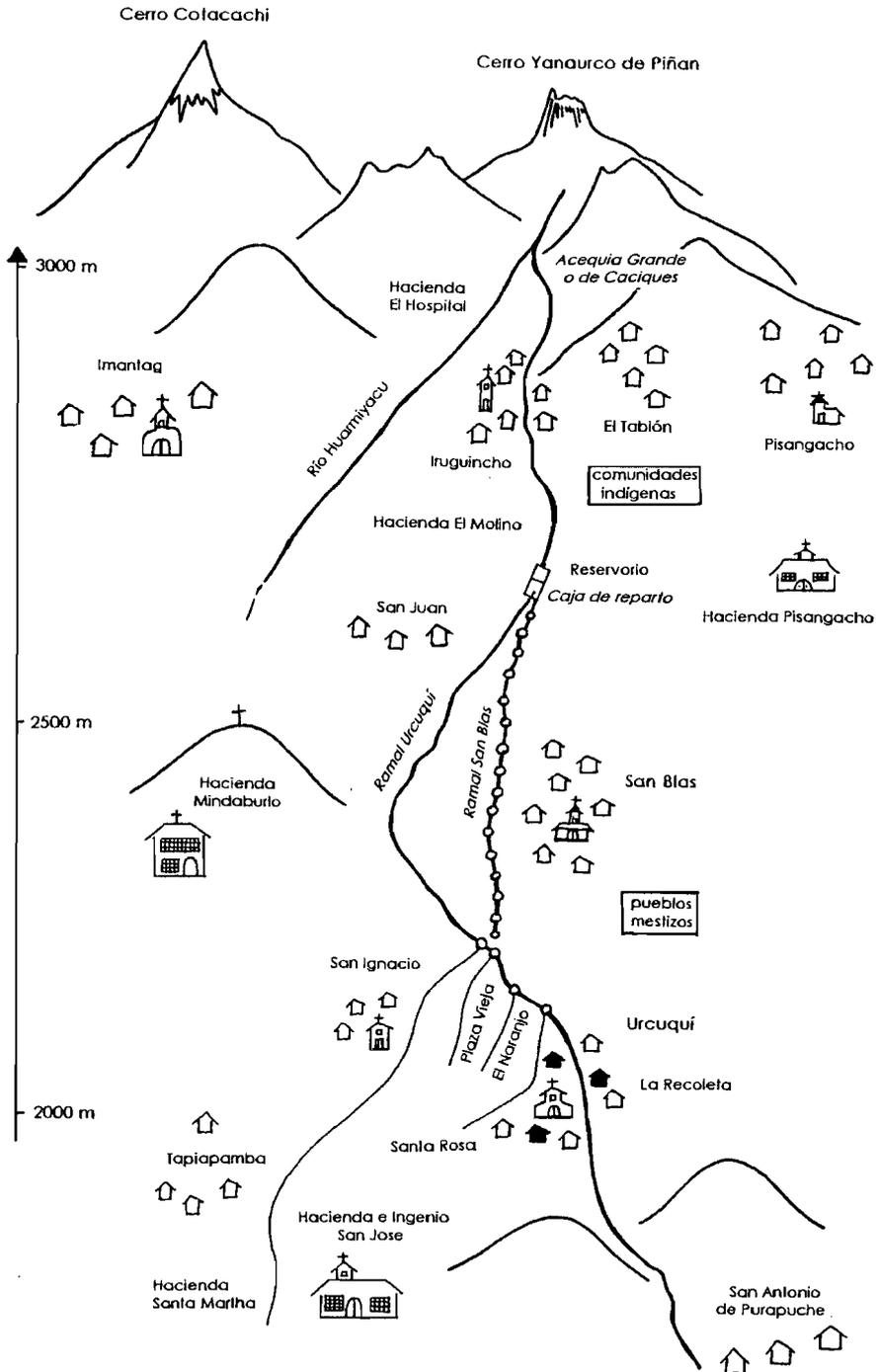


Figure 35.1: The Acequia Grande or Acequia de Cacicques. Source: CICDA

How was this network of canals established historically? What historical agreements have permitted access to and distribution of the water resources? How was the current severe inequity of water distribution among hacienda-owners, small private owners and communities finally established?

History and equity: the shaping of an inequitable water distribution, 1500 - 1945

The history of irrigation in colonial times was linked from the start to explicit notions of equity concerning the distribution of water. In the text of the *Leyes de las Indias*, King Carlos V already refers in 1536 to distribution of water between natives and Spaniards. For example, Law xj states that the lands, now distributed among Europeans, should be irrigated according to the order established by the indigenous people and that the latter themselves should be in charge of doing it. If someone disobeyed this order, water would be withdrawn from this person, until all the irrigators in the lower part had finished watering their lands.¹

This legal document does not specifically refer to the situation of Urucuquí, nor even to the current area that now forms Ecuador. But historical research on Urucuquí, based on a fundamental source of information, the water trials², demonstrates the repeated attempts by all local and regional, royal and later republican authorities, throughout the four centuries to put forward and to implement regulations and agreements among the different actors concerning the allocation of water. We try here to summarise the facts and analyses already published about the history of the foundation of these twenty canals from the 16th to the 20th century.³ Specific to the area of Urucuquí is the fact that the indigenous *caciques* (chieftains, the original authorities, local power owners) retained power over the water during the whole of the 16th century in spite of rivalries among themselves and in the face of the arrival of the Spanish *hacendados*.

At the beginning of the colonial period, the indigenous groups of Urucuquí, Tumbabiro and Cahuasquí typically employed a form of vertical control from the heights of Yanahurco de Piñán, at over 4,500 metres, to the lowest part of the basin. The plain of Coambo takes up most of this hotter stratum, which lies between 1,600 and 1,800 metres a.s.l. According to the first trials in the years 1550-1580, these warm lands have two main uses: the highlands received irrigation water from ten derivations from the Pigunchuela gorge, and were used for the cultivation of coca and cotton; the lands below received extra salt water (Cachiyacu) and were used for salt extraction. A sign of times past, this sector is still called Salinas ('salt mines' in Spanish) today.

There was not enough water for the agricultural requirements of the Coambo plain. The summer flow was not sufficient to allow equitable distribution of water among the ten derivations and intakes. From 1550, conflicts escalated between various

actors such as the chieftains of Urcuquí, who cultivated the lands on the right (south) bank of the gorge, and the other chieftains of Tumbabiro, who were on the left (north) bank.

In addition to these conflicts between chieftains, the Spaniards also demanded water from both the chieftains and the colonial authorities. It is worth mentioning that people called 'Spaniards' actually constituted a very heterogeneous group: certain people have a Spanish last name but may be the sons or daughters of Spanish fathers and indigenous mothers of chieftain-level families. This issue of the origin of the families of future landowners is very important: in the following centuries, for both hacienda owners and peasants, having indigenous blood could be used to justify privileged access to natural resources, while 'being white' had an immediate social and political function. *Throughout history, the concept of equity in the distribution of water resources has been managed this way, at times privileging the access to water by historic (and in this case indigenous) rights, and at other times through the power of appropriation of and priority accorded to the 'whites'.*

In the 1580s the chieftains of Urcuquí adopted a totally new strategy to deal with the problems of water scarcity. They constructed a new canal which diverted the water of the Huarmiyacu at the 2,700-metre line. The water was conducted to the 2,600 metre line above the settlement located in the temperate zone, and the principal objective of the new irrigation works was the irrigation of the plain of Coambo below the 2,000-metre line. The canal which today is called 'Grande de Caciques' or 'Grand Canal of the Chieftains' has been functioning since 1586, the year of the first conflict concerning water distribution.

In this period the allocation of water was ruled by 12 founder caciques, the chieftains belonging to the two *ayllus* of Urcuquí. Each chieftain had a one-day right over half of the diverted flow. This right began at midday and ended at midday of the next day, which meant that the 12 rights were distributed every week. Each seventh day of the week corresponded to the right of the priest's farm, someone who undoubtedly had a mediatory role in this new hydraulic organisation. Furthermore, every day the two chieftains who were each in charge of the management of half the flow of the canal, divided the flow into 12 subdivisions for internal distribution. Right from the beginning the Grand Canal had sufficient capacity to divert all the base-flow from the micro-watershed area of 17 square kilometres, i.e. 200 l/s. This meant that the basic irrigation field supply for the system corresponded to half the base-flow divided by 12, i.e. 8.25 l/s. For a complete day of 24 hours every week, this corresponded to a water endowment of 713 cubic metres per turn. This system of distribution and organisation found at the end of the 16th century reflects a basic notion of equity that is still employed to this day.

However, a few years after its creation, a series of conflicts surrounding access to water from the Grand Canal and the other water sources arose. In the 17th century, indigenous chieftains were confronted with orders from the Spanish demanding that

'indigenous waters should be handed over to them', arguing that the natives did not manage the water well and that 'they needed the water for their very dry haciendas'. Several lawsuits concluded with a kind of agreement of cession of a chieftain's complete right consisting of a whole day of half flow, in exchange for general maintenance of the main canal by the hacienda. This process represented the beginning of the loss of water control by the chieftains. It is important to note that the farmers in Urucuquí that still retain chieftain's rights today reject the idea of sharing the work of maintenance with non-chieftain farmers as a result of this ancient agreement.

Some families lost their historically acquired right as a result of purchase-sale processes despite the fact that most chieftains were against the cession of rights. As the society became increasingly mestizo during the course of the 18th century, two hacienda-owners became the major land and water-right owners, also managing and controlling an important part of the population, consisting of workers, peons or sharecroppers.

In the 18th and 19th centuries the management of all the basins of this territory was under the control of the haciendas. Nevertheless, this did not prevent the eruption of periodical conflicts concerning the construction of new canals throughout the process which resulted in the establishment of the present network of twenty canals. At the beginning of the 20th century the large canals were established (e.g. Salinas) that take water from the Ambi river canyon, and are characterised by their extensive hydraulic constructions (intakes, aqueducts, siphons and long platforms).

The indigenous chieftains who wielded authority over water and land at the beginning of the Spanish colonisation lost their power gradually. However, they did maintain one particular right throughout the whole process. This consisted, until the mid 19th century, of the right to one day of irrigation every week (from Saturday noon to the same hour on Sunday). This historically constituted right remains operative even today as a sign of the continuity of the history of the canal and of its conflicts and agreements.

Nevertheless, conflicts also arose in within the town between the chieftains and the mestizo peasants, who preferred to be called 'white'. The chieftains were obliged to share by alternating with the whites the only day of the week which remained under their control. Thus, under an agreement from 1855 a pattern was established of a fortnight for the chieftains and a fortnight for the whites.

Later, in the 20th century, a peasant struggle started in Urucuquí to recover the waters of the Grand Canal. After twenty years of tension, partial agreements and repression, the Urucuquireños achieved their goal in 1945 with the expropriation of waters from the San José hacienda.

Evidence from the water trials held in Quito, Ibarra and Urucuquí provides a means to understanding how the irrigation infrastructure in the zone has become established in a progressive though highly conflictive manner. Once the canal was

finished, rivalries, disagreements and fights, the purchase and sale of rights, and inheritances and quarrels among the inheritors all contributed to the broad current scenario: an area divided into tens of small and medium-sized irrigation perimeters with very different water allocations and a extreme inequity regarding the distribution of the resource. While the available water is monopolised by some, other families have very little or no water. Due to the increasing competition for water, the conflicts over access among land owners and communities continue to be manifold, and there is no doubt that, in the coming years, more cases will be added to the lawsuits of the previous four centuries.

Reconstructing this historic process of the hydraulic and social construction of the irrigation systems of this zone contributes to an understanding of the current rivalries in Urququí between the 'chieftain' users and the other 'white' users in the town. The chieftains defend their right of priority access to water, and as owners and founders of the canal they have always refused to participate in the maintenance of the canal. The history of irrigation in Urququí can thus be considered an element which is indispensable to understanding contemporary rivalry and conflicts.

The Grand or Chieftains' Canal: evolution of allocation rules and water rights over the last 50 years

The expropriation of waters of the hacienda-owners

In 1944, the political conjuncture of the time led to the total return of the waters of the Grand Canal to the town of Urququí. The Socialist Party formed the majority of the Constituent Assembly that took over political power that year. The urcuquireños residing in Quito who were linked to the party took advantage of these circumstances and got the Assembly to decree the expropriation of waters from the conservative leader Jacinto Jijón y Caamaño, a hacienda-owner in Urququí. This Executive Decree, issued in December of 1944, also stated that the Board of Water Administration should be established as a legally created agency.

Water was now to be managed by a Board of Users and not by the ancient group of chieftains, who still claimed to be, up to the present day, the only co-owners of the canal. In January of 1945, under the control of the urcuquireños living in Quito, the organisation of the allocation of water called 'normal turn' or *turno comuneras* began, in order to differentiate it from the water of the 'chieftains' turn', whose specific and historic right was not affected despite being contested by some residents.

For this normal turn, the rules are laid down clearly and explicitly in the Statutes: the water quantity has to be related to the extent of land; as a defence mechanism, the haciendas in general and all properties larger than 15 ha, are not considered in this allocation. By the same reasoning, no property has a definitely acquired right to a certain quantity or time of water; this may be modified according to the needs of the population. Furthermore, the water became property of the plot listed in the Registry, and not that of the owner.

In the period from 1945 to 1948, the Colonia of Quito drew up a distribution plan. The Urcuquí Water Board was little more than a passive agent in charge of receiving the registrations and keeping an eye on temporary allocations. The intensive communication between the leaders of the Board and the Colonia of Quito surrounding any administrative, economic or political decision gives an indication of the amount of influence the Colonia had over the Board. Moreover, analysis of the distribution plan of 1948 shows that they had a thorough knowledge of what was happening in Urcuquí and it can be asserted that without their help the accomplishments would have been minimal.

This Water Distribution Plan was a project of great complexity. A study of the different rights present in the irrigation zone was carried out under the supervision of the legal representative of the Directorate. At the same time a map was made by topographers of the Military Geographic Institute, which included all irrigable plots in Urcuquí, listing their dimensions and owner. The construction of distribution boxes was introduced by a hydraulic engineer, who also drew up plans for the first water allocation. Despite several attempts to implement the latter, there was no success in that direction.

From 1948 to 1953 a new process of plot registration to obtain water was introduced. This completely invalidated the Military Geographic Institute map and went even beyond the irrigated area. In 1949 a contradictory order was issued that water be allocated to all those with irrigable land, disregarding previous registration. During the same period the Board suffered continuous economic deterioration, which was evident from the imposition of new taxes, delayed registrations and the suspension of works. In addition to these factors, the Colonia of Quito, the intellectual force behind the project, now distanced itself from the whole process and this also contributed to the lack of decision.

Attempts to achieve a technical water allocation

Between 1950 and 1956 the irrigation system underwent some changes. Until 1953 the assigned time for each hectare was two hours. In this year the Board decided to modify the rules and to distribute the flow according to the volume of water. In 1957, after several attempts to obtain a technician from Central Government who could implement this allocation, a new model for distribution was installed and three hours were assigned to each hectare. However, members of the Board found several faults in this system of allocation. The information available indicates that this attempt to establish a Technical Allocation was not successful. The 1960s saw a number of changes within the irrigation organisation. In 1961, the Directory ratified that the waters should be distributed under the system of turns. Regarding water distribution, there is evidence that, in 1963, plots smaller than one hectare were fully irrigated while those between one and three hectares in size were assigned only three hours of water. In 1965 the Directory received complaints concerning unfair water distribution. It was once again confirmed that smaller parcels were being irrigated

until 'satiation'. Some users saw problems in this form of allocation and strong discussions arose about how to modify the form of distribution, especially in relation to the unlimited assignment of water to smaller plots, which appeared to be the cause of the stretching of the irrigation interval.

The intervention of INERHI and the impact of the nationalisation of water

The Ecuadorian Institute of Hydraulic Resources (INERHI) was created in 1966. However, its regulatory function did not become evident until 1973, the year in which water was nationalised. INERHI demanded that the Directorate hand over the allocation programme, together with its related co-owners, hectares, hours of irrigation and titles of ownership. In addition it demanded payment for water concessions and an annual use tax, which was only enforced a few years later.

Although INERHI did not intervene directly in the Water Board nor in its internal organisation, in many cases from this date the Board tended to lose power regarding rulings over conflicts, given the strong role assumed by the State authorities in the 'water courts'. State authority, backed by the law in settling conflicts through lawsuits, gained a position of increasing superiority over the traditional power of the Water Board.

The controversial 'Right of Chieftains'

As has been explained, the Right of Chieftains has a very ancient origin and is the product of the initial water distribution during the final years of the 16th century among the founding families of the canal. By the middle of the 19th century the only water available for the town was that obtained by this right (the other was the right accorded to the haciendas). In 1855 the Chieftains agree to rotate this right with the 'whites' of Urcuquí. Upon the return of all the waters to the town in 1945, the Chieftains' 'inheritors' became an obstacle to the implementation of the allocation as they refused to pay for their irrigation time. They considered that they had their 'own right' to the water and repeatedly refused to integrate their rights with the other villagers' water rights, which they called the *aguas comuneras*.

These rivalries were worsened by the fact that the contemporary Chieftains constituted a heterogeneous group: while some were descendants of the original families, many had acquired chieftainship by buying a plot with rights to chieftains' water. The 'chieftain' inheritance became not so much a question of lineage as a question of the history of land ownership in the area.

A similar conflict arose with the nationalisation of water: INERHI officials failed to recognise this type of right and in 1975 they sent a letter to the Directorate ordering that the Right of Chieftains be integrated with the general allocation. The response of the Board is unknown but this order remained unenforced and the chieftains reiterated that if they lost this right they should be compensated with supplementary

hours. In 1977 the discussion over this right was reactivated because the users of the *comunera* water demanded payment for maintenance and use from the chieftains.

These problems with the chieftains remained latent until 1982, when INERHI pronounced judgement on the allocation of waters and established that the percentage to be paid by the chieftains for maintenance and conservation of the canal should be 7,8% of the total expenses. Ironically it was the Water Board which negotiated with INERHI in 1981 in defence of the permanency of their rights. In 1983 this body notified the Board that such rights would be maintained, thus respecting tradition and customs.

The history of the establishment of the canal plays a major role in the development the concept of equity or, more accurately the notion of 'equality' developed by some users of the normal turn of the *comunera* waters.

New regulations for water distribution: the process of insertion in the State bureaucratic framework

In the course of 1973, at a time when INERHI was carrying out the paperwork to legalise water, the Board proceeded to reform the statutes with the objective of '...providing the users with regulations that would ensure uniformity and good performance of all the shareholders'. The most significant modification in these new statutes was the establishment of three hours of irrigation per hectare, which although already in effect, only acquired a legal character in 1974 with the addition of a clause that the minimum size of plot with the right to irrigation should be 1/8 of a hectare, with a maximum period of half an hour. It was during the years 1974 and 1975 when this regulation for irrigation became implemented as discussions continued within the Board regarding the convenience of extending the irrigation times.

Under the 1973 reform, the Statutes regulated a 3-hour allocation of water per hectare; however, this ordinance was not followed and the irrigation interval period underwent a continuous expansion. While the minutes and accounts indicate the absence of additional registrations after 1973, the Allocation List was altered every year, which means that some users had a certain number of hours one year and a different amount the next year. These 'registrations' were obtained through various channels, including personal relations with successive members of the Water Boards, economic power, *viveza criolla* (local dodge) and, in a few cases, as a result of the financial needs of the same Directorate in periods of economic difficulty. The majority of these 'reassignments' or 'registrations' can therefore be regarded as irregular in relation to the Statutes of the Board. Throughout the 1980s there were continuous complaints from the users and the Inspector, but the respective Directorates did nothing to settle these problems, leaving them to accumulate.

Finally, concerning this period of organisation of the Board and definition of the user

rights and obligations for access to and use of water, it is worth mentioning three important points:

- First, it seems that the canal users have never arrived at a real agreement for technical allocation in spite of numerous attempts during the last 50 years, with the professional support of various institutions. Although the 1973 INERHI intervention was an attempt to oblige the users to decide upon and to try to apply a form of allocation, to this date a consensus has not been achieved nor at least an agreement by a majority of users; many of them continue irrigating on the basis of a right which is considered higher than the one stipulated in the Statutes of the Board and in the allocation list presented to INERHI.
- There is no doubt that the lack of established rules and agreements between the users about the allocation, and the weakness of several Boards in their position as 'hydraulic authority' has led to the development of a variety of plot irrigation practices outside the official guidelines of the Statutes. It is difficult to carry out the profound changes in the water distribution which would benefit the majority, because these practices have now become customs and traditions defended by some users.
- Finally, while the chieftains' rights are considered by some users to be a privilege from a time long past, the Board and even INERHI finally recognised these historic rights that permit, partly because of their antiquity, the recovery of water retained by the haciendas. The chieftains' right and the history of the foundation of the canal have become elements of defence of the rights of the Town, even if for some people, whether users or technicians, they reflect inequity in the allocation of rights.

The implementation of a new social contract for water distribution: in favour of a concept of consensual equity[†]

A conflict-ridden water distribution

The contemporary situation in Urcuquí and San Blas provides a good example of the deterioration of the functioning of various ancient rural irrigation systems in the Sierra: while the water concession is sufficient for the 320 irrigated hectares, the water allocation among users does not cover crop requirements. The economic environment and the opening of new markets have induced farmers to intensify their crop systems by growing two cycles per year of maize-beans mixed cropping, or introducing new crops such as vegetables and fruits. In addition to the agricultural problems (loss of soil fertility, phytosanitary problems, great heterogeneity of material used), water allocation undoubtedly limits the productivity of the crops.

In Urcuquí, for example, the irrigation allocations are high (35 litres/second) but the intervals between irrigations are too long (three weeks to a month in some neighbourhoods). This situation has arisen as a result of the over-registration of the amount of water hours by users over the last 50 years: while the number of registered

hours was 700 in 1945, according to present figures more than 950 hours are now allocated!

Besides the high production losses, this situation has led to intense rivalries and conflicts between different groups of users over the irrigation network as a result of robbery and neglect, illegally registered rights in the allocation lists, or merely attempts to enforce respect for specific rights, some of which are historically established as in the case of the chieftain users. There are also conflicts with the nearby haciendas and even with other towns that continue to compete for water access. In summary, these conflicts are leading towards an ever worsening degradation of the irrigation infrastructure due to a lack of standards, rules and agreements for the maintenance of the system among users or among the Water Boards. This could eventually threaten the entire agriculture of this area.

The irrigation system: rivalries and social cohesion

In spite of the above, the irrigation network is still the element that gives coherence to this agrarian space and water is still the one element that requires management and communal agreements for its exploitation. This holds for groups and people with distinct social interests and, especially now, those with distinct political and economic interests.

At the same time, the equilibrium and identity of distinct social groups and towns are still based on the conflicts, especially those related to the control of the water, whether between Urucuquí and San Blas, neighbourhoods with different histories, groups of different users, or between chieftains, etc. Both towns of Urucuquí and San Blas are thus locked into perpetual rivalry in order to demonstrate and maintain their social, historic, and political differences: while San Blas is still a parish, Urucuquí has become an administrative and political centre as the head of the Canton. Within this context, water is an element through which these rivalries and conflicts are crystallised, resulting in the avoidance of an 'equality' which nobody wants.⁵

Even though they are much criticised by the majority of the users, some chieftain descendants of the founder families of the canal, originating in specific neighbourhoods of Urucuquí, strongly oppose the disappearance of the special turn to which they have the right every fortnight and which many consider a privilege that can no longer be justified. Arguing that they are the owners of this canal due to historical facts since they or their ancestors built it or got it by means of open deals, these families reject this idea of 'equity' proposed by other people, especially the younger ones.

In the end, water becomes an element of rivalries and conflicts which are indispensable for affirmation of identity and leadership within the communities and neighbourhoods, and for obtaining political power. It is thus confirmed that in rural irrigation practice 'although irrigation water is governed by the laws of hydraulics and

hydrology, when managed by peasants it obeys above all the laws and social rules of the group that uses it'.⁶

Searching for a new form of water distribution: from research to action

From the beginning of 1994, CICDA (the International Center of Co-operation for Agricultural Development, a French NGO) has been executing the project *Riegos* (Rehabilitation of the Irrigation Systems of Urcuquí and San Blas). One of the main objectives of this project is to support the Water Directorate of the Grand or Chieftains' Canal to improve water management and distribution among all the users, both in Urcuquí and San Blas to enable crop requirements to be met. As water is not only a means of production but also an element of cohesion and of social rivalry in this agrarian society, the principal objective is the implementation of a new social contract concerning water allocation in case of a conflict.

Furthermore, the project attempts to indirectly strengthen the administrative and economic capacities of the Board, especially for the maintenance and operation of the irrigation system and to strengthen its power as hydraulic authority in charge of the management and control of water distribution and conflict arbitration.

While some users or groups would like to see the disappearance of the chieftains' turn, the principal objective is the reorganisation of the normal turn. The integration of the chieftains' turn into the normal turn can only be achieved as the result of a majority decision by the users, chieftains and others, and in no way from the project's strategies and policies. Water distribution equity among all the inhabitants, without distinguishing between chieftains and non-chieftains, must be their own decision. Moreover, we should ask ourselves about the pertinence of bringing about the disappearance of an historic element that is a keystone in the defence of the water rights of the town.

The project staff and the irrigation leaders have developed several strategies and proposals to improve irrigation. Here we will focus on the proposal to change the irrigation turns. The most controversial proposal is:

- to adjust and redistribute the users' rights based on a 4-hour allocation per hectare (the present mean is 6 hours per hectare) so as to be able to return to a system of turns with 15-day intervals in Urcuquí,
- to create a sixth additional irrigation rotation unit (*regador*), thus decrease the flow by a number of litres in each of the sectors.

Some users, as a result of accumulated historical rights, had up to 24 hours per hectare while others had less than three hours, the minimum stipulated in the Statutes. This proposal should then result in the reduction of rights to some users and in the increase of water granted to others. To negotiate a new allocation is a difficult task and the key to its success is communication. Lack of communication and diffusion of information strengthens the existing conflicts, and rumours that emerge

are the source of new conflicts. Therefore, information and awareness building about the problem among the users was one of the main strategies developed by the project.

To develop valid and agronomically viable proposals, it was necessary to carry out *technical studies*, as well as *social and historical research* in order to test the validity of the proposal against the norms, traditions, customs and social rationales of the different Urucuquí user groups:

- Historical analysis of the Records of the Water User Board from 1945: as we have already stressed, this analysis showed that there never was a consensual and validated technical allocation in spite of several proposals developed by technicians over the last 50 years. These proposals were always rejected. Furthermore, this investigation confirmed that the reorganisation of the rights already had been implemented in San Blas in 1965 under the authority of a President of the Board who was able to impose a return to a turn of three hours per hectare, and a cancellation of all supplementary and illegal registrations made.
- The technical study of the practices of field irrigation: to propose eventual changes in the water allocation also required knowledge, evaluation and explanation of several irrigation techniques (flooding, furrows, etc.) utilised by the users of the irrigation system of Urucuquí, in diverse economic, social and rights situations. This technical work permitted demonstration of the feasibility of the proposal to readjust rights to four hours per hectare. This adjustment figure is derived from the experience of the same users that already possessed this right or less. Also it was possible to identify some workable proposals regarding the improvement of field irrigation techniques that have to accompany the reorganisation of irrigation turns.
- Analysis of the social use of the water: while the historical analysis permitted understanding of the reason for the rejection of previous proposals of allocation, and the technical work permitted the formulation or confirmation of technical proposals that were agriculturally feasible, it was essential to develop a deeper analysis of the social aspects of irrigation. The identification of the social practices related to the use of the water (swap, loan, etc.), as well as the social and economic determinants related to irrigation, led to the understanding of those factors that may influence the process of negotiation for the implementation of a new allocation (availability of labour, social status linked to the possession of rights, economic value of the rights of water, etc.).

Given that many users insist that 'theory is one thing, practice another', or that they must 'see in order to believe', all proposals for improvement of the allocation must also be accompanied by demonstrations, trials, visits and interchanges with other farmers. Therefore, the trial phase of a new schedule became the fundamental strategy for achieving a socially accepted change, both by Urucuquí and San Blas people. This proposal and the trial results were discussed by users and leaders in several neighbourhood, community and inter-community spaces, until the new water allocation was finally approved in the General Users' Assemblies of 1996.

The activities that were implemented made that several proposals were approved by the Central Directorate and the Boards: opening of a supplementary rotation unit with a minimum though effective reduction in the flow to the old rotation units; regulation of the opening of the gate of the main reservoir so as to have the same flows for the rotation units of San Blas and Urcuquí during the morning and the afternoon; construction and placement of gates with locks in the main distribution structures, to avoid theft in particular.

Also, as the result of an initiative of the Central Directory and the Boards of Urcuquí, San Blas and Caciques, new rules of maintenance for the irrigation system have been installed, as well as rules for the 'good use of water'. This has been done to update the 1973 Statutes, to achieve better management of the irrigation system and to consolidate the hydraulic authority function of the Central Directorate. These rules were drawn up after thorough consultation with the users and ex-members of the Water Directorate. These are key elements and constitute the first achievements for the operation and maintenance of the irrigation system on a long-term basis and for a better definition of the rights and obligations of the users.

The compilation of the water distribution schedule: two distinct views of water and equity in irrigation

The basic criterion backing the development of this new allocation was that all the users must have four hours per hectare in order to achieve 'equity' for all. This is why it was decided to compile a new schedule. This task resulted in a decrease of rights for several users while others saw their rights increase. While the users of Urcuquí approved the introduction of this new schedule, the Assembly of December 1995 rejected it firmly, where the great majority of users were not even in favour of a future test. This rejection can be explained by three main factors:

- '*Water is what gives the land its value*'. The investigations of the social use of water and rights led to the conclusion that, among other factors, water is thought of by the users as an *economic good* that, although not able to be sold separately from the land, has a price and is 'capitalised'. This concept of 'water capitalisation' through rights was under-evaluated in the proposals put forward. The great majority of users considered the decrease in water rights as an economic loss (in terms if the amount of l/s and/or irrigation hours per turn), even after having been explained that this decrease would enable them to have water twice every month (since the frequency would be increased), and to improve the yield of cultivated crops. This economic criterion became still more important for the users given the current policy of the Municipality of Urcuquí, (i.e. to promote the urbanisation of the town) considering that the users with more water could sell their plots at a higher price. Furthermore, there is the example of the recent sale of a plot in a neighbourhood of Urcuquí to a rancher for a high price thanks to the many rights of water possessed.⁷ This example strengthens the rejection of the decrease in their water rights (in terms of the water flow rate; the water share

does not decrease). Although the project focused its action and reflection on considering water as both a means of production and also a social factor, it did not pay sufficient attention during this whole first negotiation phase to the economic value that water rights represent in these mestizo towns.

- *The project's erroneous concept of equity: 'to take from the poor to give to the rich'.* The second profound reason for this rejection is that, by according a right of four hours per hectare to all the users, some plots increased their rights, especially the large ones which, paradoxically, on average have a right that is less than four hours per hectare. Now, the majority of the users that are small owners see a decrease in their rights as the result of having small plots with high average rights. For these small owners, this change of allocation is summarised as 'taking from the poor to give to the rich'.
For these small farmers this change increases even further the inequity that exists at the level of the distribution of other resources, especially land. 'Equality' and 'justice' proposed by the project and by several members of the Directorate who supported the compilation of the inventory of waters thus became contradictory to the concept of equity used by the users themselves, and led to a rejection by most of them. For the users, this form of equity does not signify an equality of rights (in terms of irrigation hours or volume per hectare). Users could not accept the removal of water rights to favour others, much less if it was going to favour the 'richest'. For the users the new allocation was supposed to avoid in particular the 'monopolisation of water' in hands of a few; but many users also utilise this concept to block a decrease in their water rights, considering themselves as the least favoured and 'poorest' regarding rights and resources. On the other hand, many could not accept the decrease after realising that their own neighbours were not affected and, what is more, that they were increasing their rights. Here, the relation with the others was a determining factor. In brief, the concept of equity, as employed in Urcuquí, has much to do with customs. To reject the new allocation was to reject the modification of the collective irrigation uses and customs.
- *From a demand-driven distribution to a technical allocation.* The customs in the allocation and the use of water developed over the last fifty years have become the law for the users. This makes the process of change difficult. Historical studies and monitoring of current irrigation practice show that the present situation approximates a demand-driven distribution where every user can irrigate the plot until finishing, without major in-plot control and management of the water, whether it is because irrigators have rights that permit this or because they have the power to negotiate a longer irrigation turn with the water inspectors. While there is a consensus over the objective of an irrigation frequency of 15 days, some users were not willing to make a complementary effort to meet this goal. The same reasoning provides a better understanding of the first rejection of the new allocation: some users were afraid that the trial would also be soon converted into a custom and finally replace 'the current law'.

The trial phase: 'Let custom become law'

In view of the users' reaction in 1996, the project, through the new Water Directorate and CICDA staff, corrected the inventory of waters. This was done respecting the decision of the users themselves to receive four hours per hectare but without increasing water rights for plots (generally the larger ones) whose rights were less than this endowment.

Throughout 1996 the new inventory was tested. At the same time, the permanent monitoring of this trial in all the irrigation quarters permitted continued updating of the schedule, thus finally enabling the step from 'technical equity' to 'social equity', which would be agreed to by a majority of users. After four months of trying the new allocation, the staff of the project and Water Directorate were able to corroborate that in the areas being tested there was already a predisposition of the users to accept the change of rights and to recognise the validity of this allocation upon effectively returning to the 15-day irrigation interval for their plots. After two years of work and negotiation, the trial phase was beginning to succeed through a change of attitudes of the users that went surprisingly fast.

In December 1996, the trial finally resulted in the approval of this new distribution schedule by the General Assembly. Today, one year later, the new schedule has been fully implemented and has been approved of by the National Council of Water Resources. This is an important recognition for a distribution schedule that is not completely 'technical' if we take into consideration some of the application inequalities according to the land-water ratio. However, it is genuinely equitable from the users' point of view and consequently socially acceptable, applicable and sustainable.

Undoubtedly, however, some questions remain regarding the future of this process: will the Board be prepared to continue in its function as hydraulic authority, so that this new allocation continues to be implemented, which would mean dealing with complaints from some powerful users, and even lawsuits? If it is approved, what impact will the new Water Law (currently in preparation) have over this process of change in Urcuqui, in the face of a possible privatisation of water rights that would recognise those who were claiming the ownership of their rights as an argument against changes?

In spite of all this, this process of permanent dialogue between the actors involved has allowed the users to begin questioning water distribution modes, the previous allocation, the current administration and has finally created space for collective debate on very controversial and previously undiscussed topics. Users have begun to discuss, debate and defend certain criteria of equity and justice both relating to access to rights and to the obligations thereof. The rules produced, the decisions already taken by the users or the Boards, and the changes in allocation are the results and achievements of this process.

Moreover, these two years have demonstrated that the execution of new water distribution modes in peasant systems cannot be limited only to establishing standards and technical calculations based on number of users, surface area irrigated, concessions granted and crop requirements. This long process requires also a deep investigation of the history of the establishment of the irrigation system and the creation of distinct types of rights, and an understanding of the history of the rules, modes, traditions and customs of water allocation and the rights in the particular society, and the criteria supporting them.

In addition, it requires investigating and understanding the meaning of water in a rural society, which is not restricted to what engineers call a production medium but is a key element of social and economic strategies, very often unrelated to agricultural production. In the case of Urcuquí, this process of investigation finally led to an understanding of the concepts of equity, justice and democracy as they are managed by the members of this society even if these do not coincide with the classical mode of thought of the project technicians. It also enabled negotiation with the users to obtain a water allocation that contradicts neither with the social and economic strategies nor with the traditions and customs.

The challenge of achieving a new, more consensual allocation in Urcuquí required the implementation of these preliminary steps in order to manage a concept of equity that had the approval of the majority of the users, in a fair balance between the historical rights and the more recent notion of equality among all.

Notes

- 1 Summarised from: Emperor Charles V, the empress G. in Valladolid ... November 20, 1536. Ivlian de Paredes, 1681. Compilation of the laws of the kingdoms of the Indies. Ed. Cultura Hispánica, 1973, Vol. II, folio 113.
- 2 85 different trials were identified and analysed between 1550 and 1995 for the Urcuquí zone, in several archives in Quito, Ibarra and Urcuquí.
- 3 See the 1992, 1993 and 1994 publications by Thierry Ruf and Pablo Núñez.
- 4 This section is further developed in the forthcoming 'Rehabilitación del Riego Campesino Particular y Participación de los Usuarios: Cuatro Años del Proyecto Riegus' by Frédéric Apollin *et al.*
- 5 The rehabilitation of the main division structure in Urcuquí and San Blas, carried out by the project in 1995, is a perfect example of this phenomenon: although constituting a request from both Boards and having their direct participation, this work revived their ancient rivalries. While it was possible to know that the work did not include any hydraulic failure related to the allocation of waters, the division structure became a topic of much controversy. Also, this shows that the construction of such an irrigation structure is never socially neutral.
- 6 Frédéric Apollin y Christophe Eberhart, *Agricultura Campesina y Función Social del Agua en Tiquipaya (Valle de Cochabamba, Bolivia)*, PEIRAV-CNEARC, Dec. 1994.
- 7 Besides, this intrusion of an hacienda owner in the Urcuquí irrigation system represents a danger for the future of the system, already surrounded by haciendas; historically, there has been a struggle going on against the haciendas to keep their rights. This was precisely how the town lost its waters in past centuries.

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