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Water Rights and Conflicts in an Inter-Andean Watershed: The Achamayo River Valley, Junín, Peru

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Introduction

What happens in a valley with clear blue skies and an idyllic landscape when new crops are introduced, a fish-farming operation expands and the population swells? The Achamayo River watershed's famous blue valley in Peru's central highlands is renowned for the beauty of its sky contrasting with the golden heights, the green eucalyptus foliage and the multicoloured patchwork fields of potatoes, artichokes and kitchen gardens. It is also the setting for an intense social conflict over water involving farmers, fish-farming operations, populated areas that are urbanizing, and even a hydropower plant. In theory, all of these disputes are covered and regulated by official water legislation that is binding on the authorities and all water users in the country. Therefore, conflicts ought to be processed by the bureaucratic system for water management, and users ought to abide by the dictates of official norms. However, an ethnographic approach to water conflicts reveals severe limitations and distortions affecting both the bureaucracy in charge of water management and the official regulations.

Accordingly, some observers have hastened to offer a gloomy assessment, depicting water landscapes characterized by lawlessness, ungovernability and irrationality. From this perspective, indigenous and other rural people are often viewed as among the main impediments to the creation of a unified 'water

governance' regime because they represent backwardness that needs to be transformed. This is undoubtedly a slanted, prejudiced proposition, but widely espoused by officials and international technocrats striving to impose a modern, comprehensive and homogeneous management system that ignores the broad diversity of water management systems that are alive and well in Andean watersheds (see Chapter 8 in this volume).

However, beyond the prejudice and ideological slants, the ethnographic record shows that such constraints and distortions in the official water management system are the outgrowth of a number of factors. These include the weakness of the governmental system itself, the strength of indigenous/rural water management systems and the inadequate norms, institutions and policies characterizing state–society relations in Peru. This situation creates fertile ground for legal and institutional experimentation in which indigenous and rural societies define and administer water according to their own way of thinking, in a tense dialogue with the state bureaucracy, authorities and norms (e.g. Mitchell and Guillet, 1994; Boelens and Dávila, 1998; Gelles, 2000; Trawick, 2003; Oré, 2005; Verzijl, 2007; Boelens, 2008).

To illustrate the interesting inter-legal dynamics unleashed by water conflicts (see Chapter 13 in this volume), this chapter will describe the gaping distances between governmental design and the local water landscape. Second, it will summarize water organization and management in the Achamayo River Basin. Next, it will offer an overview of the main conflicts portraying the growing inter-sectoral competition for water resources. It will then conclude with a brief reflection on the relevance of national water norms and the need to process social conflicts over water from a redistributive intercultural perspective.

Official design versus local reality

In Andean watersheds, the water laws enacted by the state have a limited and spasmodic presence and are subject to the conditions imposed by irrigators, other water users and the longstanding shortcomings of the Peruvian state. This situation illustrates the difference between the official design and the social life of water management in Peru (Hendriks and Saco, 2008; see also Chapter 8 in this volume). Theoretically, there are two main foundations: the government and user organizations.[2] The ideal complementarity and synergies that should emerge between public administration and user organizations, however, are nowhere to be seen (Verzijl, 2005). On the contrary, recurrent dysfunctionalities and poor coordination create multiple opportunities for semi-autonomous water management systems to reproduce or emerge (e.g. Gelles, 2000; Trawick, 2003).

Interestingly, the gaps in the government system help to create this plural scenario. Supposedly, the country's 106 main watersheds are administered by the National Water Authority (ANA), which is under the Ministry of Agriculture. To manage these watersheds, the country has been divided into 68

water districts, under the same number of local water administrations (ALAs).[3] The Mantaro Water District, for example, is handled by a local water administrator (ALAM), who is the water authority in that jurisdiction. The problem is that this water district is huge, covering four regions (Lima, Junín, Huancavelica and Ayacucho), 20,000 square kilometres (twice the size of Lebanon and equal in area to El Salvador), and ranging from 5800m altitude down to 500m. To do their work, the ALA for the Mantaro Water District (DRM) has a staff of only 17 people, including administrative personnel. Moreover, the facilities, equipment and infrastructure for water management in one of the country's most important watersheds are grossly inadequate. This situation is not exceptional. In fact, most local water administrations are ill equipped to perform their functions.[4]

As for water user organizations, the law provides for a pyramid structure comprising a National Board of Users in Irrigation Districts (JUDRP), irrigation district user boards, user commissions and user committees. In the Mantaro watershed, although the irrigation district board (JUDRM) is officially recognized, as of 2007 only one of the 20 user commissions (previously irrigator commissions) had a water use licence and only one other had managed to file with the public register. The rest had not established their legal status or obtained a water use licence, prerequisites for defending their rights against other social sectors and stakeholders. Furthermore, in the Mantaro Valley, both the board and the commissions are weak, fragile organizations, with little public credibility, limited economic means and poor institutional development. In this basin, since the commissions are not duly operating, user committees (previously irrigation committees) for micro-watersheds and irrigation sub-sectors regulate and administer water on a day-to-day basis (see Verzijl, 2005, 2007).

This situation, clearly critical from the standpoint of the state and the official user organizations, can lead to different assessments: the water management crisis, social anomy, expanding informality and, in general, the failure of the state and official law to apply to local communities (e.g. Morales, 2002; Perú, 2004, p9; del Castillo, 2008a, p46). By using legal anthropology tools, this reality can be studied as an example of legal pluralism and inter-legality. This calls for abandoning the idea that the state is the only producer of law, and for recognizing the diversity of normative frameworks operating in a society. When we do this, we see how official law faces a series of competing normative systems (whether indigenous, rural, local or customary)[5] that are enforced as much or more than state law. The important thing, in any event, is to analyse the local socio-legal context, the role of state law in different social universes, and to determine how people reinterpret their norms and use them in local contexts.

Thus, studying law through anthropology reveals the great structural tension between the state and local societies, and the social, political and cultural pressures that produce such phenomena as inter-legality and legal plurality (Santos, 1995; Hoekema, 2002; see also Chapter 13 in this volume).

This is where official norms, policies and institutions for water acquire a different meaning from the role assigned by the state. The meaning is diverse and defined by the way in which local arrangements metabolize the influence of official law and, depending on their inner strength, affirm a set of standards based on their own norms, penalties and procedures.

To illustrate how legal plurality and inter-legality arise, this chapter will offer some ethnographic references on water organization, management and conflicts in an inter-Andean watershed of Peru's central highlands. In this scenario of tension and conflict, farmers, a fish farm, urbanizing areas and a hydropower plant compete for water use. Each basin is unique socially, politically, geographically and hydrologically. However, the organization, processes and conflicts identified here are illustrative of the dynamics of legal pluralism, inter-legality and the social life of state water law.

Water organization and management in the Achamayo River Basin

The Achamayo River Basin is a typical inter-Andean valley of Peru's central highlands. It is located in the province of Concepción, region of Junín, and its waters flow east to west, from the snow caps and lakes of the Andes range (4500m altitude) down to its mouth, on the left banks of the Mantaro River, near the town of Matahuasi (at 3262m). Local folk divide the basin into two parts: upper and lower. The upper basin comprises gullies and dry steep land. Dryland agriculture there (potato, *oca*, fava beans, barley) is complemented by irrigation using water from springs and wetlands. The lower basin begins at Ingenio and flows through the districts of Quichuay, Santa Rosa de Ocopa (3376m), Santo Domingo and Concepción (3290m). The river's volume is highly variable, ranging from 120 cubic metres per second during the rainy season to 1.5 cubic metres per second from June through August. The basin's total area is estimated at 248 square kilometres and its waters are used for municipal water supply, agriculture, fish-farming and hydropower (Antúnez de Mayolo, 1990, pp2–15). Irrigation is intensive, controlled by a local irrigators' organization during the dry season, but free for all during the Andean winter.

According to state prescriptions, the Achamayo River Basin is an irrigation sub-district belonging to the larger water district of the Mantaro Valley. Its members are formally organized into a users' commission that represents them before the Users' Board of the Mantaro Irrigation District (JUDRM) and before government authorities such as the Local Water Authority of Mantaro (ALAM). Locally, irrigation water management is organized on the basis of the 11 canals fed from the Achamayo River. Each of these main canals has a users' committee, which is responsible for administering water use. Each committee has a president, treasurer, secretary and several intake officers who are elected every three years by the general assembly of the committee members. The canal system fed by the Achamayo River is estimated to benefit some 5000 irrigators, most of them small farmers (some farming just a few furrows).

Out of these 11 canals, this discussion will focus on the Quichuay–Santa Rosa de Ocopa–Huanchar–Huayhuasca Canal. This canal is 10km long and irrigates some 330ha (30ha in Quichuay, 150ha in Santa Rosa and another 150ha in Huanchar and Huayhuasca). The users' committees have established and coordinate a rigid sequence of daily turns to prevent water theft and violence among irrigators. Those responsible for enforcing the distribution system are the intake officers, or *tomeros*. These *tomeros* issue irrigation orders, set schedules on the basis of the land area to be watered and ration water when it is scarce.

Water use rights and access to irrigation infrastructure are generated by landownership and participation in collective work parties.[6] Everyone, man or woman, who contributes in these collective efforts is entitled to irrigate, regardless of the size of their farm. Additionally, to access their water allotment they must pay the local fee set in the general assembly by the committee members (different from the official fee set by the ALAM), apply for and respect the shifts assigned by the officer, and participate in committee assemblies.

Conflicts among irrigators are generally settled by the users' committee leadership, and problems among committees (e.g. Santa Rosa versus Quichuay) are settled by the water users' commission president for the entire Achamayo Basin. Decisions by these authorities are backed by fines and other penalties that may include suspending the irrigation turn or an obligation to purchase construction materials to maintain canals. Although no irrigator has been expelled for infractions, local water leaders request the national police and the governor's office to reprimand irrigators for waste and damage to others' property (e.g. failing to close gates and flooding a neighbouring field or home).

The most frequent problem among irrigators is 'water theft'. This often happens at night and, because such small plots are watered, sometimes the authorized irrigator does not realize that his or her flow has been reduced. Water theft makes it necessary to employ more people than technically required to monitor water use. One must control the main intake, while another must patrol the canal to detect leaks or theft. The irrigator himself must then actually distribute water on the land.

In addition to irrigators, the watershed has other important users. Demand for municipal water use has increased as the province of Concepción contains several growing towns, including the capital, with 15,000 inhabitants, and Matahuasi, with 8000. In general, the countryside is urbanizing, which generates a growing demand for water supply and sanitation services. Another major user is the privately owned Los Andes fish-farming operation. The third is the Ingenio Hydropower Station, which does not conflict with irrigation uses, because irrigation systems begin after the point where the power plant returns water to the river and it does not dramatically alter the river's flow regime. The hydropower station has, however, evidently altered upper basin water levels by transporting upstream

water through pipes to gain head and releasing it downstream of the upper basin through its turbines. Finally, government agencies, non-governmental organizations (NGOs) such as Cáritas (a Catholic Church charity organization) and a couple of agro-export companies growing artichokes have a limited but influential presence in the watershed. The state water development agencies have no major activities in the zone; but irrigators have received some support from Cáritas to improve their canals and participate in the recent boom in artichoke exportation.

Conflicts over water and legal pluralism in an inter-Andean watershed

A quick review of the main conflicts among water users will illustrate how legal pluralism and inter-legality work in the Achamayo Basin.

Irrigators' issues

One of the most significant conflicts is among irrigators, especially on the Quichuay–Santa Rosa–Huanchar–Huayhuasca Canal, and the Los Andes fish farm. The company usually uses more water than assigned by the Mantaro ALA because trout exports are booming and Los Andes has expanded its facilities. Overuse decreases flow for downstream irrigators, who get less than their share. The Mantaro Local Water Administration has mediated the conflict with only minor success. During the dry season the company and the farmers wage an ongoing furtive battle to get more of the Achamayo's water by nightly manipulating the rustic water gate that they share. Farmers complain about this pilferage and constantly confront fish-farm employees. Here, the rustic nature of the gates and lack of volumetric gauges make the conflict worse during the Andean summer.

During these dry periods, even the amount officially allocated in the fish farm's water-use licence is challenged because farmers need more irrigation water. In theory, no one can dispute the water rights granted in a usage licence and the fish farm should not have this sort of conflict if it has a licence and has paid up the water use fee set by the Mantaro ALA (del Castillo, 2008a, p41; Hendriks, 2008b, pp57–60). However, during these critical months, irrigators invoke their 'ancestral rights' and assert the strength of their local organization to challenge and reduce the water rights officially granted to the company. This forces the company to dispute and renegotiate its water allotment constantly. In this scenario, the rights assigned by the water authority are not fully enforceable but are mediated by social forces and local rights. So, farmers on the Quichuay–Santa Rosa–Huanchar–Huayhuasca Canal challenge the overriding primacy of the rights granted by the state, obtain a redistribution of the available flow, and affirm the current value of their water rights, above and beyond governmental regulation and administration.

In 2003, the introduction of artichoke farming triggered another intense conflict over water. This issue lulled in 2008 when the agro-export companies

decided to take their operations to the valleys and irrigation systems on the coast. The move, however, did not solve the water conflicts that they created.

At first the artichoke was introduced as a cash crop alternative to potatoes. It was very attractive because of its high commercial value, especially compared to the extremely low prices for potatoes. Since agrarian property is quite fragmented and companies could not consolidate large areas, they offered small farmers credit, seedlings and technical supervision to grow for them. The problem for small farmers was that the company did not adjust the purchase price as production costs rose (e.g. fertilizers and other chemicals; interest on loans), so the boom did not last long.

The problem is that artichokes need more water than other crops and this increases friction among irrigators on a single canal, among irrigators on different canals and between farmers and the Los Andes fish farm, as do other water-intensive crops with higher commercial value, such as alfalfa and maize/corn in other valleys (Guillet and Mitchell, 1994, pp7, 13). As an engineer from one company put it: 'an artichoke is a water pump'. Because agro-export companies do not grow the produce but only buy it from small farmers, they do not take part directly in the water conflict. But their actions do place extra pressure on water resources because farmers have to irrigate more frequently and with more water.

The pressure by agro-exports on water use has not been duly evaluated. It is clear that expanding artichoke farming has caused tensions for local water organizations, affecting the distribution of turns and the proportion of volumes assigned to land converted to the new crop. Although the law states that water scarcity must be faced by allocating water according to criteria of efficiency and equity, these notions end up slanted by the new commercial thinking that favours export crops over local food crops. In this case, the gravitational force of the market economy has made substantial changes in traditional distribution of water rights. In view of the minimal influence or concern of ALAM for local water management, water appropriation policy has evolved in a different direction than established by the official norm. Furthermore, the supposed enforcement of the Crop and Irrigation Plan, as a tool for organizing water management, did not prevent artichoke growers from expanding farms or intensifying irrigation.

Growth in municipal demand

Another important conflict in the watershed is due to growth in urban population in the province of Concepción and the large demand for water by the city of Huancayo (about 450,000 inhabitants). Municipal demand is placing strong pressure on available water resources. One project to relieve water shortages for Huancayo, for example, plans to take water from the lakes in the upper basin and pipe it to the city. This would severely affect water supply throughout the watershed and current water right allocations. There have also been conflicts among localities in the basin because some have attempted to get

water use licences for their water supply systems, but have faced tenacious opposition from traditional water users. Others have not only obtained such licences, but have begun water projects that were interrupted because of the unmoving opposition by communities who felt that these projects would negatively affect them.

The community of Quichuay, for example, has confronted the town of Matahuasi regarding the installation of filter galleries on the banks of the Achamayo that border on their land. The project, authorized by ALAM and considered a high priority because it would supply water to a city, came to a stop because the community refused to authorize them to take 'their water' to Matahuasi and to use their land to access the river. After long, difficult negotiations involving the water authority, the community agreed to allow the work to continue in exchange for a series of benefits. Their position was vulnerable to pressure from government authorities because they were facing a more powerful societal stakeholder (a town) and a use (water supply) considered a top priority. Even so, they received compensation despite no mention of such restitution in official norms, which say that only the state can decide on water allocation.

In most less-visible conflicts, the parties negotiate directly rather than pursuing official water-use licences. Although the law states that all water belongs to the state and only the state can grant water use, residents of the watershed assume that the water sources located on their land belong to them. Under this socio-territorial concept of water rights, any use or diversion of water must be authorized by the residents and calls for compensation in return. This notion frustrates the local bureaucracy, but is so widespread that when communities and towns request them to participate in negotiations, they attend and even formalize these agreements. In such cases, the water authority (ALAM) waives jurisdiction and acknowledges local practices, playing a role quite unlike the one assigned by law.

Measurement issues

An interesting dispute also exists between the state and irrigators over the unit of measurement applicable to water use. Where the local water administration and the Mantaro District Irrigation Users' Board want to install volumetric gauges pursuant to law and neoliberal economics, farmers on the Achamayo consistently oppose this measure. They have already destroyed some gauges, stating that it is 'fairer' to measure by irrigation time and not by volume (for example, three hours to water 1ha). They argue that water is a natural resource and that the irrigation infrastructure was made by 'our grandparents' and 'neither the users' board nor the Ministry of Agriculture has ever spent a single penny to build it' (Walter Maraví, pers comm, 17 August 2002).

Interestingly, farmers, especially those on the Santa Rosa de Ocopa Canal, are the first to demand volumetric control for the Los Andes fish farm in order to prevent it from using more water than it is assigned. They refuse, however,

to let the water administration apply this measurement to them. This is a typical case in which logical coherence gives way to strategic and instrumental reasoning because what matters to them is to have access to more water. When it is strategically necessary, they resort to contradictions and inconsistency. In any event, since volumetric control is a keystone for official water management, the insistence on control by hourly scheduling highlights the way in which local management notions and approaches conflict with state policy but end up prevailing.

Resistance to fees

Another conflict between the state and farmers on the Achamayo results from differing outlooks regarding water fees. Theory says that fees are paid to the state, recognizing that water is a natural resource belonging to the nation and that the state administers it with exclusive sovereign authority (Guevara-Gil, 2006; del Castillo, 2008a). The fee, supposedly paid to the users' board, is the payment for the water that is granted to the applicant (e.g. for agrarian use). Irrigators have resisted and the users' board and the Mantaro Local Administration have been pressuring them to catch up on their fees.

Farmers have systematically refused to pay the fees, in some cases since 1992 or 1999, for a number of reasons. First, they do not recognize these prerogatives of the state because of their socio-territorial concepts and rationales. Second, the money charged for fees has not been used to improve infrastructure, as provided by law. Third, the users' committees themselves charge a 'local' or 'customary' fee for farmers who get their irrigation turns from their own intake officers in charge of distributing water from secondary canals. The amount collected from this local fee is used to finance maintenance and improvement of water infrastructure, to hire watchmen to prevent other committees from stealing water, and to pay *tomeros* to distribute water.

General opposition to state control

Disagreement with the notion of state ownership is a fundamental legal and cultural objection that underlies challenges to the legitimacy of the state's water fees, the imposition of a supra-local organization and the application of volumetric control over water. While the constitution, the General Water Law (Decree Law 17752) and all manner of norms (Legislative Decrees 1081 and 1083) state that all water belongs to the state, farmers on the Achamayo maintain that water is subject to local control and their own concepts about riparian and socio-territorial rights. They bolster their argument with the collective memory of the work that their ancestors did without government support on the infrastructure, and they assert the legitimacy of their ancestral rights.

As the following statement shows, their claims to historical rights and opposition to state interference are quite clearly defined:

> *How long have we defended this canal, because this canal was made before by the chieftains, the Sarapura and the Bendezú! How long ago were the chieftains! Back in 1800, in 1700. They built it with the whole community of Huanchar, beyond Huayhuasca, from all these places. When they began [setting up the users' board of] Mantaro, they wanted to register us; but we and our elders refused because this canal belongs to the people; it is ancestral! It is very old, and the state did nothing here – nothing, nothing. Now the state comes along, wanting us to sign up to pay the water fees and all that. But now the modern people are practically agreeing to that, although our ancestors refused, saying: 'You can kill me, but we refuse to register.' This is a very old canal, and is maintained to this day by collective work parties – the state doesn't contribute a single cent here, nothing, absolutely nothing, not even technical support; we do it all by our own commonsense judgement.*[7]

Any attempt to turn water into an economic commodity as promoted by neoliberal reforms backed by international agencies and much of the water bureaucracy (Perú, 2004; compare Hendriks, 2008b) will run up against this local concept of water rights. Even now, sporadic efforts by ALAM and JUDRM to levy fees do not even generate enough money to cover the costs of collection. Moreover, irrigators in the basin express their marked interest in maintaining this situation of 'lawlessness' and 'water ungovernability' – epithets used by neoliberal reformers – because it benefits both the 'rich' and 'poor'. Both groups of irrigators pay very little to use the water, the volume control system they use is flexible, and each uses its resources or social networks to maintain its water rights. Here, interests and concepts blur, strengthening the local organization's autonomy, and producing a normative clash that gives rise to legal plurality in water management.

Conclusions

As the examples outlined and the ethnographic record cited show, there are drastic gaps between official water laws and policies, and indigenous, small-farmer, local management systems. This is not a radical dichotomy where the two extremes have no contact. On the contrary, local system managers are keenly attuned to the pulse of national policies and laws and the demands of the market economy because these forces threaten their existence and reproduction as semi-autonomous social groups.

So, it is no accident for indigenous people, peasants and small farmers to be the first to oppose neoliberal prescriptions proposing privatized water rights and distribution. This opposition is not driven by ignorance or ideology. Rather, it is an affirmation of their own lifestyle and the threats that they perceive to their water rights and livelihood. Nor is it surprising that they

employ strategic inter-legal reasoning for day-to-day defence of their rights (such as against the fish farm) and invoke ancestral socio-territorial rights denied by official law in conflicts with other water users or with the state itself (such as in Matahuasi or in their opposition to pay official fees). If anyone is practising the 'inter-cultural' approach, which is the new buzzword in Peru's official discourse, it is precisely the indigenous people and small farmers who have decided to defend their livelihoods and well-being.

The problem lies, rather, in the deafness and blindness institutionalized by the state when preparing and enforcing its water laws and policies. The result is foreseeable. These norms and policies lack any social roots, fail to reflect the country's extraordinary diversity of water landscapes, and end up configuring a labyrinth that not even the water bureaucracy can fully understand or enforce. In view of the state's stubborn failure to recognize or value local collective systems to manage resources, indigenous people and small farmers develop their own ways of organizing, managing and resolving their water conflicts. Such a great investment of creativity, resources and time is possible only through collective action. This, in turn, is grounded in local criteria of equity and redistribution that set up a moral economy acceptable to the social group's members. Again, if anyone is putting into practice water management with redistributive criteria – another catch phrase in official discourse – it is the indigenous people and peasants who have decided to defend their way of life and welfare.

Therefore, the state and Peru's ruling elite would do well to learn some lessons from the indigenous and peasant societies in their own country. If they did so, this would open up true possibilities in policies and laws to process water conflicts under new perspectives, renewed by criteria such as inter-cultural relations and redistribution.

Notes

1 Based on Guevara-Gil (2008). I would like to express my appreciation for the support of the Water Law and Indigenous Rights (WALIR) programme (ECLAC and Wageningen University, The Netherlands) and the Pontificia Universidad Católica del Perú for conducting my fieldwork in the Achamayo River Basin, and my studies of water law in the Andes, from 2002 to 2006. My thanks, as well, to Cirilo Bendezú, a great irrigation leader and friend, and my *compadres* Walter and Consuelo Maraví for their generous hospitality in their town, Santa Rosa de Ocopa, which is now my town, too. Data on water management and conflicts in the basin come from my own ethnographic observations.

2 Del Castillo (2008a, 2008b) offers a very instructive overview of the legal system for water in Peru. Regarding indigenous and *campesino* rights versus official Water Law, see Guevara-Gil (2006).

3 Legislative Decrees 1081 and 1083 in 2008 have once again changed the institutional design governing water. Now the ANA replaces the Water Resource Superintendant of the Natural Resource Institute (INRENA), which was also under the Ministry of Agriculture, and the ALAs replace technical administrators

of irrigation districts (ATDRs). The term Water Districts is used instead of Irrigation Districts, although this last one has not yet been explicitly replaced but it seems it will (del Castillo, 2008b, p3; Hendriks, 2008a, pp108–110). Finally, in March 2009, after years of debate, Peru's Congress passed the Water Resources Law that repeals the above two norms due to political and social pressure from the National Board of Irrigation Users of Peru. The law declares that access to water is a human right, that water pertains to the nation and that it cannot be bought, sold or used as private property. However, it opens the door for the private sector to invest in, modernize and manage irrigation systems.

4 Similarly, the Cuzco Water District, including the river that has formed the famous Sacred Valley of the Incas leading to Machu Picchu, has just one administrator and seven employees (Verzijl, 2005, p56).

5 Debates on the nature, consistency and historicity of customary law have become endless. Here I take the position summarized by Wiber (1993, p24): 'I reserve the term customary law to refer to the transformed normative orders which result in local communities when indigenous law and state law interact over time.' Regarding the contingency and porosity of these state and local/customary 'systems', see, for example, von Benda-Beckmann et al (1997); regarding the hybrid nature of local, indigenous or customary law, see, among others, Santos (1995); Gelles (2000, p117); Hoekema (2002); and Boelens et al (2005, p7). As von Benda-Beckmann et al (2000, p11) put it:
Increasingly it is not so much the historical origin that counts, but rather the fact that people perceive regulations as belonging to them and based on local authority structures, rather than on external legitimate authority. Their 'local laws' are often hybrid legal forms that combine elements of state law and customary legal rules and principles.

6 Wiber (1993, p59) distinguishes between two models to explain the water–landownership relationship. Whereas in the 'Syrian model, irrigated land and irrigation water are inseparably linked', in the 'Yemeni model, land and water are kept distinct and each can be sold separately'. In the Andes, the correlation between landownership and access to water and to irrigation infrastructure is very tight. Moreover, collective work to build and maintain that infrastructure is essential to create and revalidate water rights (Boelens and Doornbos, 2001, p344; Beccar et al, 2007; Verzijl, 2007; compare Sodemba and Pradhan, 2000, p101).

7 Told by Pedro Maraví Aguilar, a farmer headed for a work party to clean the intake for the Quichuay–Santa Rosa–Huanchar–Huayhuasca Canal (pers comm, 17 August 2002). However, other versions, such as told by Cirilo Bendezú, indicate that the Quichuay–Santa Rosa–Huanchar–Huayhuasca Canal was built by the Santa Rosa de Ocopa monastery to set up a hydropower station (pers comm, 15 September 2008; see Tord et al, 1969, p44).

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