



Conflict and cooperation in local water governance – inventory of local water-related events in Tiraque District, Bolivia

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ABSTRACT

Recent years have witnessed an increasing focus on water as a source of conflict. So far, much of the focus has been on the risk for transboundary water conflicts. Our current knowledge on local water conflicts is however more limited, and tends to be based on sporadic accounts of local water conflicts rather than on systematic empirical evidence. At the same time, the extent and nature of local water cooperation is often overlooked, just as we know little about the particular role of the poorest in water conflict and cooperation.

The lack of such knowledge jeopardizes current initiatives taken in many developing countries to ensure a more efficient and equitable water governance. To fill this gap, the Competing for Water research programme developed a conceptual and methodological framework for developing comprehensive inventories of local water-related conflict and cooperation. This report documents the results of applying this framework in Tiraque district, Cochabamba, Bolivia, and discusses the implications.



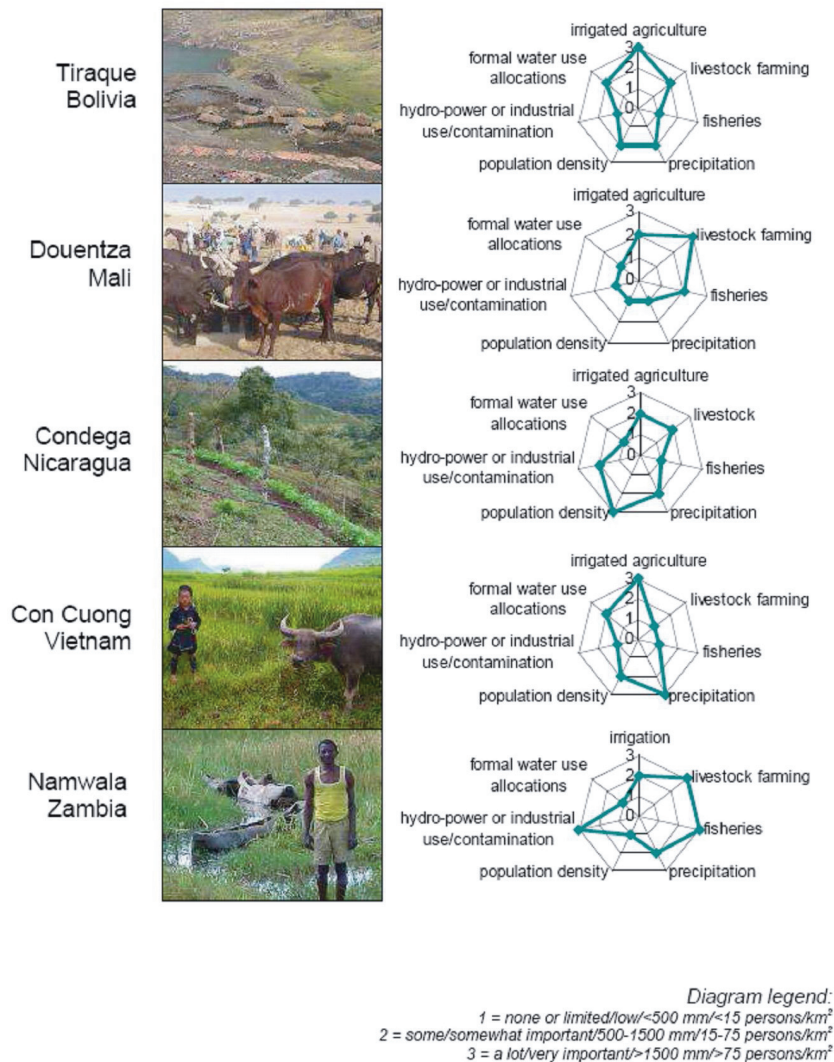
Images from Tiraque district, Cochabamba, Bolivia

I. INTRODUCTION

This document reports the findings of an inventory of water conflict and cooperation events developed in Tiraque municipality, Cochabamba-Bolivia, one of the research areas within the programme ‘competing for water: understanding conflict and cooperation in local water governance’.

The aim of the competing for water programme is to contribute to sustainable local water governance in support of the rural poor and otherwise disadvantaged groups in developing countries by improving the knowledge among researchers and practitioners of the nature, extent and intensity of local water conflict and cooperation and their social, economic and political impacts,

Figure 1. Competing for water research locations and their characteristics



Source: Ravnborg et al., 2008

and how this may change with increased competition for water. Beyond its cognitive importance, such empirically-based understanding has significant implications for the water policy, legal and administrative reforms currently taking place in many developing countries, which – if poorly informed on the relationship between competition for water, conflict and poor people’s access to water – may cause such reforms to be ineffective and may exacerbate rather than reduce rural poverty.

Research is being carried out in collaboration with national and international partners in five countries in Africa (Zambia and Mali), Asia (Vietnam) and Latin America (Nicaragua and Bolivia). A summary of the districts considered in each country and their characteristics can be observed in Figure 1.

There is an increasing focus on water as a source of conflict. Growing attention has been paid to transboundary water conflicts and collaboration, and more recently also a spreading perception that the number and intensity of local water conflicts are growing (Carius et al., undated; Thomasson, 2005). However, while transboundary water conflicts are quite well documented (Wolf et al., 2003), the perception of growing local conflicts is based mostly on sporadic accounts of local water conflicts rather than on systematic empirical evidence.

Furthermore, there is also an idea that increased competition for water leads to increasing conflict among users within as well as among different sectors. However, there is little empirical basis to support firm conclusions on causal relationships between increased competition for water and the emergence of conflict and subsequently about their nature, intensity and impact.

Inspired by Wolf and his colleagues (2003), we identify several shortcomings associated

with the current evidence of the relationship between water competition and conflict:

- *Sporadic events.* So far, our understanding of the relationship between water competition and conflict has been based upon reports from sporadic events, rather than upon systematic overview of the complete range of water-related events within a given locality. Thus, the widespread sense that the number and intensity of water-related conflict is increasing may just as well be a reflection of improved means of registering and communicating such conflicts, rather than a reflection of the number and intensity of the conflicts themselves.
- *Excludes cooperative events.* Conflicts tend to be more spectacular and thus easier to identify than events of cooperation. Moreover, as norms, rules, and interests tend to be more explicit during conflictive situations than during times of cooperation, focusing upon conflict often entails methodological advantages. However, excluding cooperative events implies that conclusions about causality between increased competition for water and conflict are, at best, incomplete. Accentuating this, and contrary to prevailing wisdom, Wolf and his colleagues (2003) found that there was no causal relationship between water stress and the likelihood of conflict in transboundary basins and that often water acts as a unifier.
- *Lack of a temporal dimension.* Conflicts do get resolved. Over time and often through efforts of mediation and negotiation, conflicts, disputes and tensions get resolved and agreements to share or cooperate with respect to given water resources are reached. Snapshots of sporadic events – most commonly conflicts – fail to capture such processes of conflict resolution.

- *Loose definitions.* Terms such as conflict, dispute, tension and war tend to be used interchangeably and without clear definitions with respect to nature and intensity.

The identification of these shortcomings has informed the need to carry out an inventory of water-related events that:

- develop comprehensive inventories of water-related events within each of the selected sites for the research;
- identify conflictive as well as cooperative water-related events;
- include a temporal dimension so that inventories of conflictive and cooperative water-related events are developed for a 10-year period (1996-2007); and
- define a water-event intensity scale, as an initial programme activity, ranging from violent conflict, through milder conflicts in the form of discontent expressed through formal, e.g. legal or informal but legitimate channels to signing a formal agreement.

Another gap in studies about conflict refers to how the poor, women and otherwise disadvantaged groups fare in such local conflict and cooperation, and, in general, how they are affected by increasing competition for water (UNDP and IFAD, 2006). The lack of better insight into these issues limits the ability of Governments and donors to ensure that water policies are consistent with Poverty Reduction Strategies and with the overall objectives of poverty reduction and equal access to resources for men and women as well as for different ethnic groups.

As competition for water increases between users and uses, the poor and otherwise disadvantaged groups tend to do less well than others in securing their access to water. To include this in the analysis of conflict and

cooperation, two further activities were considered within the programme:

- Case studies selected on the basis of the inventory of conflict and cooperation events which will allow more detailed analysis of the conflicts and cooperation occurred and of the role and impacts of water-related events on the poor and women.
- A household survey that relates poverty and access to water.

The issue of competition leads also to think about water availability in terms of the natural offer and in terms of the infrastructure and management agreements developed to supply water to different areas. There is a dominant image that more conflicts will occur in areas with more water scarcity as competition for water is bigger in those areas, but again, there is no consistent information about this.

To consider this aspect, the programme includes a water allocation modelling of the study areas in order to correlate the occurrence of conflict and cooperation events with water availability in different sectors of the study areas.

Considering the issues described, the water conflict and cooperation inventory presented here gives a first view on conflicts and cooperation, their nature and main characteristics in the whole study area. It will later be complemented with the above-mentioned studies to fully understand the aspects involved in conflictive and cooperative events, consider the role and impacts on the poor and women and the relationship between water availability and occurrence and nature of conflictive and cooperative events.

After a description of the study area, the report presents the concepts and methodology developed by the project to carry out the inventory. Further it describes the findings in

relation to the distribution of events in space and time, the range between conflictive and cooperative events, their intensity, what the main issues of the events are about, who the main actors involved are, and what kind of outcomes the events have. Finally, on the basis of these results we draw up some conclusions for the Bolivian case.

2. DESCRIPTION OF STUDY AREA

According to the recently approved Constitution (January 2009), Bolivia is a “Lawful Unitarian, Social, Pluri-national, Communitarian State...” (Art. 1 CPE) located in the heart of South America. With a population of approximately 9,427,219 inhabitants (INE, 2010); 63% living in urban areas and the remaining 37% living in rural areas; the country has a diversity of indigenous nationalities¹ “with a right to autonomy, self government, own culture and the recognition of their own institutions and territorial entities” (Art. 2). This in fact is the recognition and formalization of a pre-existing situation: One where the lack of presence of the State allowed the development of local management practices based on cultural principles and values, usually known as “uses and customs”.

The result of the latter in relation to water management, particularly in the rural areas, has been that the local water organizations (irrigation, drinking water, etc.) still are the ones controlling water resources and their management. Rural water management is usually very autonomous and independent, practically without the intervention of external agents (except for the case of a few development projects). The high diversity (cultural, social,

ecological, etc.) of Bolivia is hence also expressed in local water management practices and it is very difficult to make generalizations about it, although some broad characteristics can be mentioned. Up to now local water organizations only allow the intervention of the State as long as it implies investment (for instance in infrastructure), but not in relation to management or control. In spite of constitutional rules, there are still a lot of communities where management is based on ethnic claims to the territories and natural resources, and who thus do not recognize the State and the dominion over water resources given to it by the Constitution. In recent years there have been some attempts from the State to re-gain the control through legislation and a process of formalization of water rights, but the issue of control remains contested.

A lot of attention has been given to Bolivia lately (mainly since 2006) because of the many institutional reforms made in relation to the water sector, such as the creation of the Water Ministry and the enactment of the new Irrigation Law, just to mention some of the central ones. These reforms are the result of a process initiated with the conflicts caused by neo-liberal policies being implemented in the country since the mid 80's reaching their highest point in the mid 90's. The effects of implementing these policies led to social protests and conflicts such as the globally known ‘water war’ in April 2000, that according to many analysts was the starting point for the ‘process of change’ that Bolivia is facing these days. The ‘water war’ and some of the later water conflicts highlighted some of the central issues that had to be sorted out in order to ensure a ‘well functioning’ water management in the country. One of them was the control over the water sources, which now is being formalized through a process of registering water rights (collective and individual)

¹ Some of them prefer to be called first people's (*pueblos originarios*) in a direct reference to their ancestral origin.

for irrigation and human consumption purposes. The outcomes are still to be seen, but the process has created a sense of uncertainty among water users and communities, because although they wish to protect their sources, to do so they have to register these under their name which may in fact decrease the flexibility of existing agreements or exclude others that may be using the same source or live in the territory where the source is located. According to the Law, agreements should be made to solve this situation, but that is not as easy as it may seem.

2.1 General characteristics of the study area

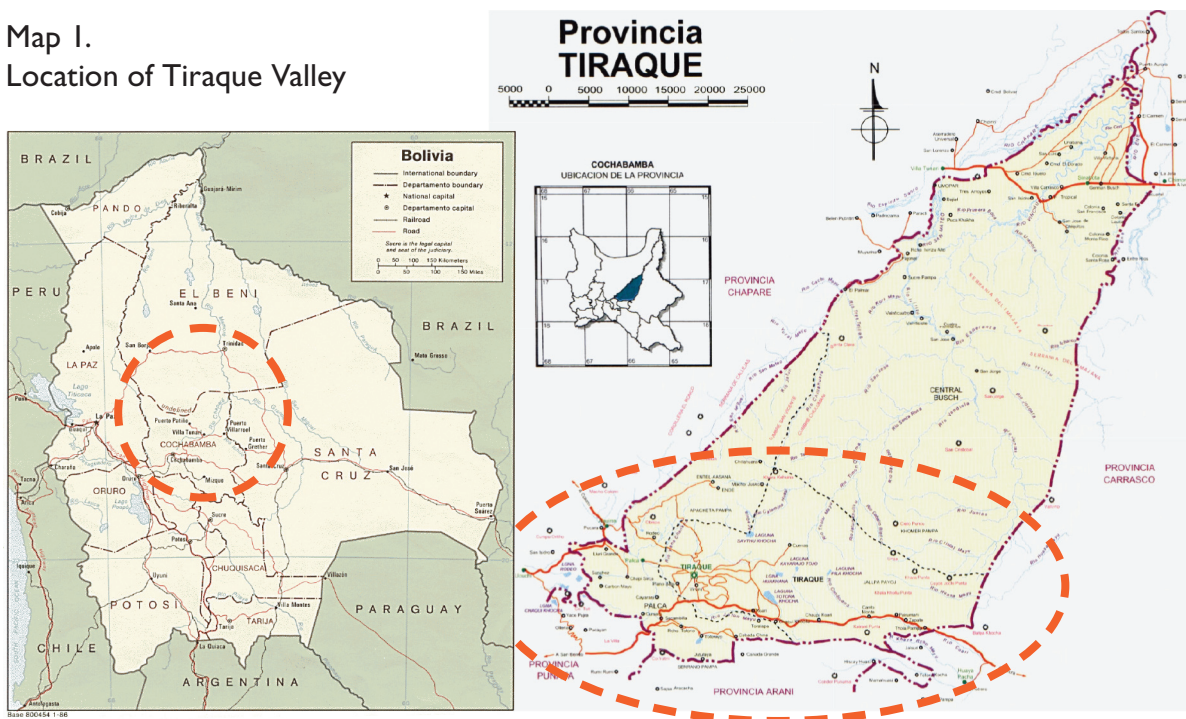
The province and municipality of Tiraque (see Map 1) covers an area of approximately 2,740 Km² (Ministerio de Decentralización),

and has 35,017 inhabitants (INE, 2001). The municipality has two main ecological zones:

- Tropical zone, in the northern part of the province / municipality
- Semi-arid zone – Valley of Tiraque.

Since its foundation in the XVI century and up to the agrarian reform (1953), the main economic activities in Tiraque were: agriculture in the Valley and coca production in the Tropical zone (Yungas de Vandiola). In 1940 a new road was built to travel from Cochabamba to Chapare, where the coca production became more and more important, and the road passing by Tiraque was slowly left as a secondary route to Chapare. This has had an impact on the coca production of the area, decreasing the importance of Yundas de Vandiola and Tiraque.

Map 1. Location of Tiraque Valley



Source: Elaborated on the basis of information of: Comisión para la Gestión integral del Agua en Bolivia-CGIAB (<http://www.aguabolivia.org/situacionaguaX/Riego/mapas/cbba/tiraque.htm>) and the Bolivian Embassy in Argentina (<http://www.embajadabolivia.com.ar/images/mapa01gde.gif>)

The Tiraque Valley is part of the Cochabamba's 'high valley' region. According to INE (2001) there are 21,000 inhabitants living in an area of 688 km². Tiraque Valley is organized in 141 communities (Municipalidad de Tiraque, 2008). Each one of these communities has a peasant union, called *sindicato*, grouped in *sub-centrales* related to specific localities and a *central*, top level peasant organization of Andean zone of Tiraque (Tiraque valle). This organizational structure was created in 1953 with the agrarian reform, when the *haciendas* were dissolved and communities were formed based on this territory and constituted by the former semi-slave workers of the *haciendas*.

At a higher level, this peasant *central* is part of the departmental Federation and finally of the national Confederation. The *sindicato* is the most important local organization at community level and decides in regular assemblies on different matters, including every so often water management for irrigation and drinking purposes.

In the Valley of Tiraque, there are four specific agro-ecological zones:

- Valley, with a mild climate.
- The plains, where the provincial capital Tiraque is located. Most of the population lives in this zone.
- Transition zone, hilly zone between the plains and the highlands.
- Highlands, where the weather is cold, humid and windy. Most of the lagoons providing water for the other zones are situated in the highlands.

People of Tiraque usually grow crops in two different seasons: during the rainy period and in the dry season if they have access to a water source. To have access to irrigation also allows planting early and protecting the crops

from the frost. The most important crops in the Andean zone are: potatoes, leguminous (broad beans, peas) and cereals (maize, wheat, barley, oat). Farming can be very unpredictable because of the frost, with the exception of the valley area.

Less central than agriculture, but equally important for the families, is livestock – mostly sheep for meat and wool as well as poultry and pigs, but also cattle, mainly oxen used for agricultural work.

Transportation (of both people and agricultural products) became an important economic activity which grew considerably after the weekly agricultural market – the *feria de Tiraque* – was established in the 60's. This is the main market for the agricultural production of the peasant communities of the Tiraque Valley and is very important for the whole department of Cochabamba; most of the potatoes and beans bought by merchants here are sold in the cities of Cochabamba, Santa Cruz and Sucre.

2.2 Water management and use

Water in the area is mainly used for irrigation and domestic purposes. No hydropower or industrial water uses exist in the area.

Irrigation

The Tiraque valley has a long tradition of irrigated agriculture and many both old and newer irrigation systems exist in the area. The most commonly used water sources for irrigation in the area are springs and lagoons. The springs have a big variation of discharge, each irrigating relatively small areas varying from fractions of communities to up to three communities. The various lagoons located in the highland of Tiraque are often part of larger irrigation systems that generally benefit more than one community. Two of the lagoons

situated in Tiraque also irrigate large areas located in the neighbouring municipality of Punata. Rivers and ravines have relatively less importance as they are used mainly during the rainy season in periods with lack of rain.

NGOs, Prefecture, Municipalities and government programmes have been executing irrigation infrastructure projects (building dams and concrete canals) in the area. However, in spite of the many irrigation projects executed, there is still a large demand for improvement of the irrigation infrastructure in Tiraque.

The irrigation systems are managed by local autonomous water users' organizations. These organizations have a strong linkage to the peasant organizations in the area and in some cases the communal *sindicatos* manage the irrigation systems directly. In some cases irrigation system associations were formed to represent several irrigation systems of an area that includes several communities.

As in most parts of Bolivia, irrigation water rights are to be understood both at collective and individual levels. Each irrigation system has collective water rights over specific water sources, which traditionally have been used by farmers of one or several communities. This type of water rights are often referred to as rights founded in "uses and customs". At the same time each individual, within the group of users, has the right to use a specific portion of the water of this collective source. The constitution of Bolivia recognizes the 'uses and customs' as legitimate ways that allow peasant and indigenous communities to use the water according to their own regulations. The new irrigation law issued in 2006 promotes the register of irrigation systems as a means of State recognition to (uses and customs) rights of existing collective irrigation systems.

One important aspect in relation to the individual irrigation rights is that rights are

assigned to the person not to the land, this means that the peasant can use the water where he/she chooses to irrigate, limited only by the existence of the irrigation infrastructure and management agreements.

The agrarian reform of 1953 marks an important change for distribution of both land and water leading to changes in water rights. Most irrigation systems in Tiraque were built before 1953 by the haciendas with the labour of indigenous people. After the agrarian reform, land and water was transferred to the peasant communities formed on the basis of the hacienda. Since 1953 the peasants have obtained their water rights through inheritance within the families and new users were incorporated into the systems through purchasing of water rights and the contribution of labour and cash for new irrigation projects which generally increased water availability.

Drinking water

Drinking water systems are relatively new in relation to irrigation systems. Most drinking water systems in the municipality of Tiraque have been built on the initiative of community-based organizations with the support of NGOs and/or state organizations. Sources for drinking water systems are different in each one of the agro-ecological zones. In the highlands, water for drinking comes mainly from springs. In the plains, a few systems use spring water while the majority use water from rivers. It is, however, important to note that although the majority of communities have developed drinking water systems, many families still depend on fetching water from small springs for domestic use.

Most drinking water systems use cement tanks for water storage and water is delivered to the households through plastic pipes. Drinking water systems in Tiraque do not have water treatment plants.

Similar to irrigation, there are collective and individual rights to drinking water sources. The users of drinking water systems have the right to use water from a source collectively and each person has the right to use water from the system only when he/she has made an investment to build the system and accomplish the duties imposed by the community. Thus, not all the members of a community have the right to use water from the systems.

3. METHODOLOGY

A main component of the competing for water programme is to develop a comprehensive inventory of all public events of either conflict or cooperation between social actors, covering the period 1996-2007. Only 'public water events' are included in this inventory, that is to say, events that:

- involve one or more actors from at least three different 'types of parties' (fishers, companies or institutional actors), or
- involve 'two or more parties' (actors) of which at least one party represents a social group of individuals from more than five households.

This means that we did not record water events taking place between a few individuals whether from the same household or from different households of the same type, e.g. water competition between a wife and a husband or between e.g. a Headman and a community member. Only if such events take a public expression, e.g. wives get together to challenge the water use of their husbands or the Headman in a specific event represents and acts on behalf of the community, such events are included in the inventory.

3.1 Definitions

To carry out this research we have defined a set of concepts that were used as a methodological guide to deal with issues of conflict and cooperation, the object of our study. The main concepts are the following:

- A 'water event' is an action (or a set of actions) seeking to secure one or more parties' access to water by (i) challenging other parties' access; (ii) confirming own or other parties' access; or (iii) collaborating with other parties to secure access. Some water events stand alone while others are mutually related as they form part of a common water situation.
- 'Conflictive and Cooperative events'. An event is 'conflictive' if one or more parties challenge other actors' access to a particular water resource. The 'challenge' may concern the amount of water being withdrawn, the quality of water left available for others, the location of water, or the basic right to access water in the first place. An event is 'cooperative' if one or more parties engage in jointly coordinated actions with other actors to secure shared water access or to acknowledge other parties' access to water. The 'sharing' does not necessarily mean joint ownership – it can also include individual/private water allocation. General co-existence may involve some form of passive recognition of the other party's water access motivated by a real intention to cooperate or a situation of high inequality that does not allow the weaker to challenge the more powerful. We consider an action or a set of actions as an event only if it involves some form of 'active cooperative or conflictive behaviour' vis-à-vis other parties.
- A 'water situation' is a social situation where two or more parties have competing inter-

ests in the same water resource. The competition takes place through water events. Water situations may be cooperative when parties manage to negotiate and/or sustain agreements for water use, or they may be conflictive when water access and use of one or more parties is contested. Competitive water situations can be characterized as 'mainly cooperative', 'mainly conflictive' or an equal mix of both.

- 'Reported events of water-related events of conflict or cooperation' means events which have been registered with formal, public institutions such as (i) agreements on water-related issues, registered with the formal legal system, e.g. a water agency; a notary public; local government etc. or using a government or non-governmental organization or programme as witness or intermediary, e.g. in the case of a domestic, irrigation or livestock water supply project; (ii) complaints or denunciations registered with formal as well as informal institutions perceived to form part of water governance, such as the environmental or water attorney, the environmental or water ministry, local government, the water directorate or agency, the water supply agency, irrigation committee, pastoral committee, village headmen, customary dispute intermediaries, government or externally funded projects engaged in water supply or management; and (iii) media reported events, e.g. events reported to or by local or national newspapers, television and radio broadcasting companies.
- 'Unreported events of local water-related conflict or cooperation' are events which have not been reported through formal channels outside e.g. the community, the borehole committee, the irrigation committee.

- 'Reported and unreported events of local water-related conflict or cooperation'. Some events will be both reported and unreported, meaning that information has been obtained both from institutional sources outside the location of the event, and from sources at the location of the event.

'Organizations considered external or internal in relation to water management' may be different from one country to another. In the case of Tiraque, drinking water committees, irrigation committees, irrigation associations and community committees are normally considered internal organizations in relation to water management, while local, provincial and state government, and 2nd or 3rd level peasant organizations are considered external organizations.

3.2 Sampling strategy

The semi-arid area of the municipality of Tiraque, known as *Tiraque Valle*, was selected as the study area. The area has a large agriculture and irrigated agriculture tradition. Water use and management, within the area and in relation to other municipalities, has led to several conflicts and the establishment of many agreements especially in relation to irrigation water.

The collection of information about reported events in the area was made gathering information from the following sources:

- Publications of the main ten newspapers of Cochabamba city for the period of study (1996-2007)
- Documents of complaints and denunciations made in the local police station of Tiraque, specifically those related to water issues.
- Court documents about water-related cases (judicial files).

- Documents of agreement between groups of water users or among groups of water users and other actors.

To collect information about unreported events, 10 communities in the study area were selected following a stratified random selection procedure:

1. Two basic criteria were used to stratify and select communities for the inventory:
 - a. The agro-ecological zones in which communities are placed. Considering the micro-climatic diversity existing in the study area, four agro-ecological zones were identified according to altitude and physiographic characteristics that influence the kind of agriculture practiced in each zone. The defined zones are: (1) Valle, (2) Cabecera de Valle, (3) Transición and (4) Puna.
 - b. The number of families of each community

The number of communities in the municipality and families in each community was taken from the Plan de Desarrollo Municipal de Tiraque (Municipality Development Plan of Tiraque) elaborated in 2003. The data from last population census (2001) from the National Statistics Institute of Bolivia (INE) was incomplete for Tiraque at community level.

2. Each community was classified according to the defined agro-ecological zones resulting in:
 - a. Valle: 4 communities
 - b. Cabecera de Valle: 31 communities
 - c. Transición: 68 communities
 - d. Puna: 22 communities

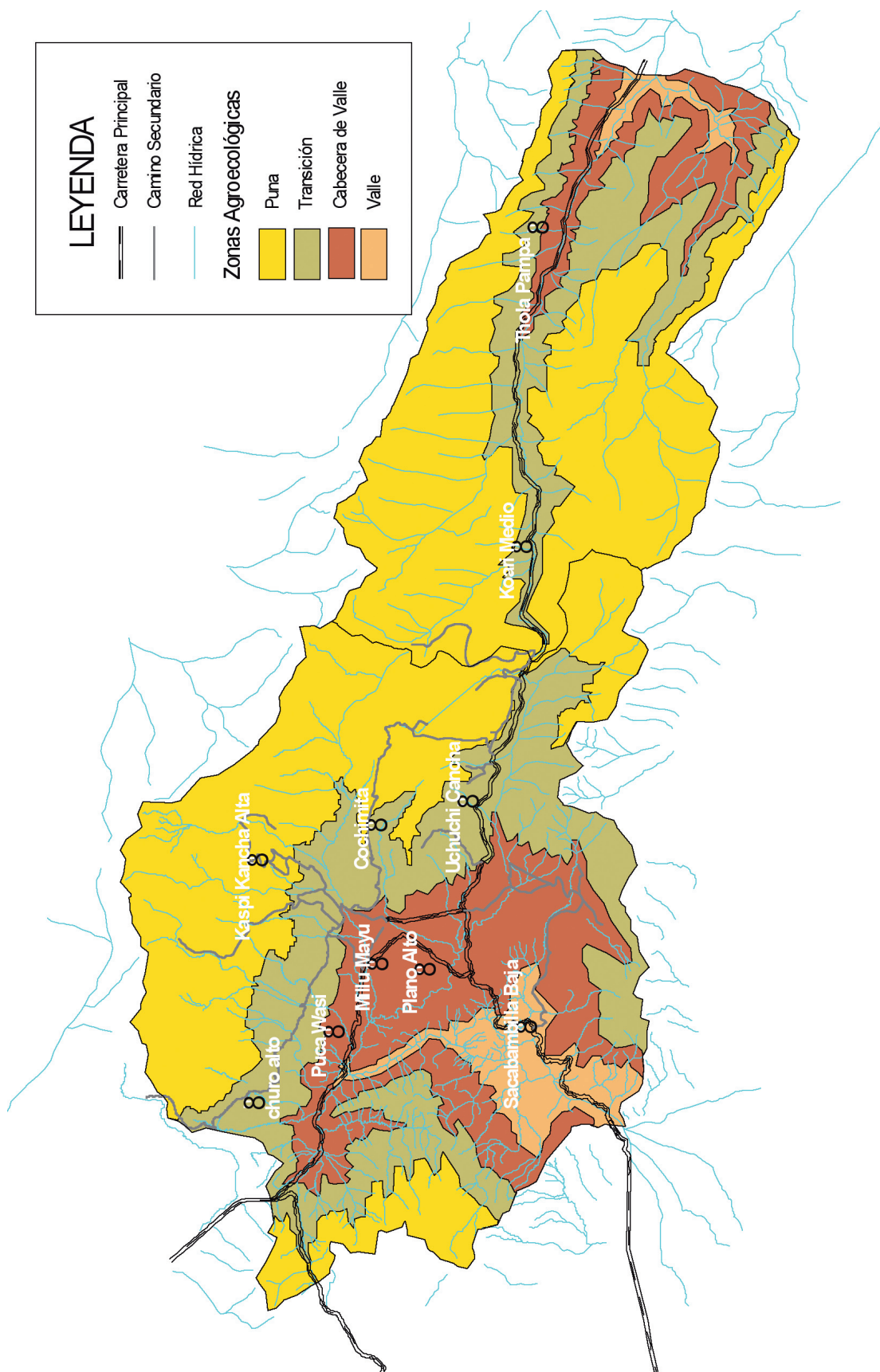
3. Finally, considering the number of families for each agro-ecological zone, 10 communities were randomly selected, distributed as follows according to agro-ecological zone:
 - a. Valle: 1 community
 - b. Cabecera de Valle: 3 communities
 - c. Transición: 5 communities
 - d. Puna: 1 community

Some communities originally selected were changed because they chose not to be part of the study. In two cases, villagers had doubts about the use of the information obtained by the research and expressed worries about the political position of the project team (the political situation in Bolivia was delicate in this period, making people suspicious). Another community was changed because their decision whether to participate took too long. Thus three of the originally selected communities were substituted by other communities in the same agro-ecological zone and with similar characteristics. The communities where the inventory was carried out and their locations can be seen in Map 2.

Within the selected communities, most information about water-related events and situations was collected through individual interviews, but some group interviews were carried out too. The interviewed persons were selected first considering their gender and age and then their knowledge and experience about water and community issues.

In order to clarify and evaluate some of the events found, walks along drinking water and irrigation systems were carried out, in some cases with representatives of those systems.

Map 2. Agro-ecological zones and communities sampled for the inventory, Tiraque district



Source: Elaborated by Vivian Alfaro and Rodolfo Cruz (GIRH and Competing for Water projects Centro AGUA).

Table 1. Sources of information for the inventory of conflict and cooperation events

Sources of information	Frequency	Percentage (%)
<i>Newspaper</i>	2	1.0
<i>Internet</i>	10	5.1
Local lawyer/judge	2	1.0
<i>Document of agreement</i>	8	4.1
<i>Judicial file</i>	37	19.0
<i>Inspection report</i>	2	1.0
<i>Police report</i>	2	1.0
<i>Judicial memorial</i>	3	1.5
Village government	7	3.6
Drinking water committee	12	6.2
Irrigation committee	65	33.3
Water committee	2	1.0
Community leader	25	12.8
Irrigation association	11	5.6
Drinking water users association	3	1.5
Male citizen	89	45.6
Female citizen	35	17.9
Group of Male citizens	4	2.1
Group of Female and Male citizens	5	2.6

Source: Own elaboration on the basis of the Inventory of conflict and cooperation water events data base, Competing for Water programme

3.3 Sources of data on events

Information for the event inventory was obtained through two main kinds of activities: Revision of written information (see Table 1 in italics) and interviews with different kinds of actors at the local level (see Table 1 in bold).

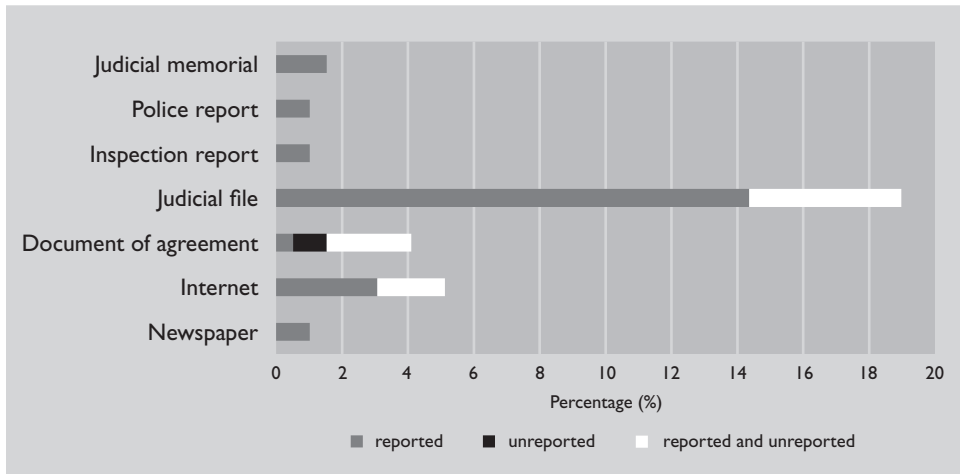
Different kinds of written information were found, mainly in organizations considered 'external' to local water organizations in Tiraque. As can be seen in Figure 2, mainly 'reported' and 'reported and unreported' events were identified through written information.

Most types of documents (judicial files, police reports, inspection reports and judi-

cial memorials) were obtained from reviewing court case files in relation to water. These were found reviewing recorded files in the courts of Punata and Tiraque and on the internet (supreme court of Bolivia). Court cases were also mentioned during interviews in the selected communities, but not all cases mentioned could be found in the recorded files of the mentioned courts.

Other organizations contacted in order to gather written information were the Police Office of Tiraque and the National Institute of Agrarian Reform (INRA). Documents found in these offices did, however, not contain information about water situations or water-related events.

Figure 2. Written sources for information in reported and unreported events



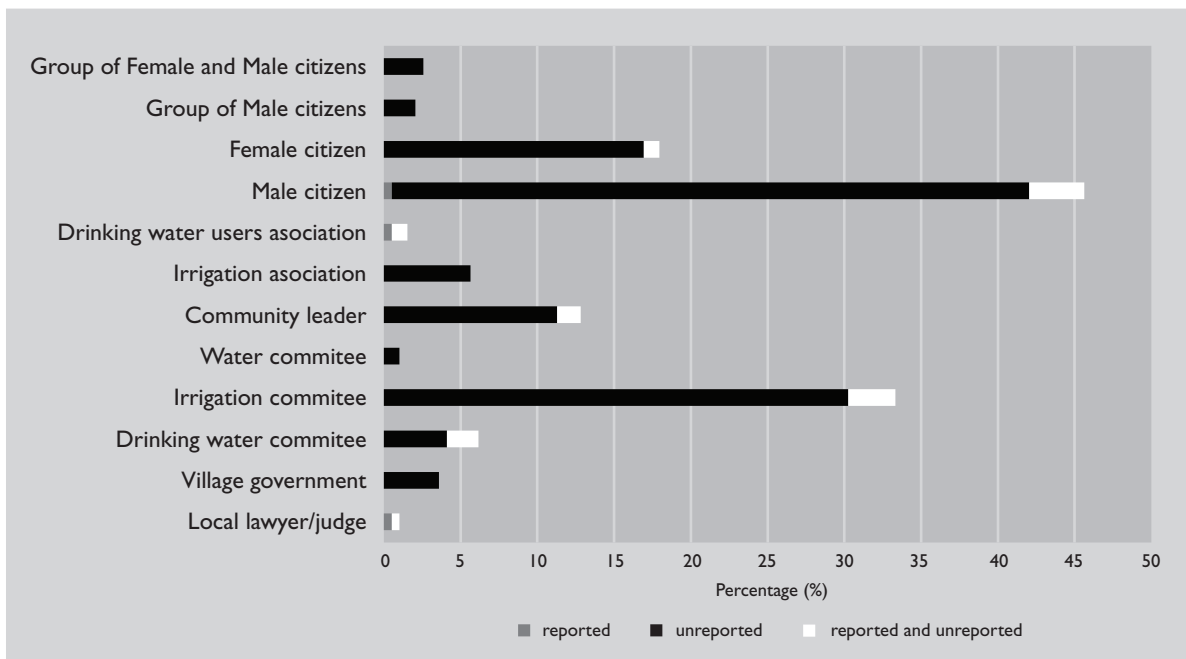
Tiraque is a rural area located 60 km from the main city and does not have local newspapers. This might be the reason why only two water events from the area were reported in the Cochabamba newspapers.

Documents of agreement are the only written sources not obtained through external organization but through contacts with local

water organizations. As can be seen in Figure 2, these are also the only written files that gave information about unreported events.

Interviews were carried out with different kind of informants. These can be grouped in organizational sources; representatives of water and ground-based organizations; and common male and female citizens (see Figure 3).

Figure 3. Oral information sources for reported and unreported events



Both men and women were interviewed, but most unreported events were mentioned in interviews with male citizens. Conflicts and agreements about collective use of water are normally dealt with in communal or water organization meetings. These organizations have relatively small participation of women especially in the boards; members of boards of communal and water organizations are almost exclusively men.

Another important source for unreported events were the irrigation organizations, irrigation being the most important water use in the area and the use involved in most of the events, as will be discussed below.

Community leaders are important sources of information in water-related issues, especially in communities with small-scale irrigation and drinking water systems. A relatively low number of events were mentioned by drinking water committees, though drinking water is the second most important water use in the area. This might be due to the strong linkage that exist between the latter and the communal organizations. Though these organizations were formally created to manage most drinking water systems, in practice in most cases the community organization or one person within the organization is in charge of drinking water management.

Other potential sources of information were the teachers in the community schools. Consulted about water events they rejected to give information, stating that we should talk about water issues with leaders and other members of the community.

3.4 Discussion of possible biases and limitations in the data

In relation to methodological issues that arise from the analysis, the following themes can be discussed.

One methodological difficulty was related to the sources used for collecting information about events. Written information about situations, e.g. judicial files, contains detailed and precise information allowing identification of most of the events within a situation. It was difficult to reach the same level of detail through interviews.

To avoid this bias, events identified through interviews were sought, verified and elaborated through written information found in records in the local organizations, especially for situations with many events. However, as local community organizations and local water organizations in the area did not appear to have very systematic records of meetings and other issues dealt with, most written information found in these records turned out to be documents of agreement.

Considering this problem, more detailed information about situations and events was sought through interviews with several individuals and groups about the same events, thus triangulating information about the events. This has led to acceptable results in most situations except for some situations concerning water theft, which have imprecise information about the yearly number of events, the actors involved and the number of people affected. The team perceived that more events of this kind happened during the study period than identified, but it was not possible to get more detailed information about each of them, especially because the lack of written records.

On the other hand, due to the long tradition of water management in the area, especially in irrigation, many water systems are managed based on agreements established in early 90's or even in the 60's or 70's. Thus the understanding of some situations and events implied the identification of several conflictive and cooperative events occurred before

the period defined for this inventory (1996-2007). However, these situations and events are not recorded in the data base.

In relation to the comprehensiveness of the inventory, it is our impression that cooperation within water management is less visible than conflict. The interviewed talked more easily about conflicts than about cooperation (agreements), which is considered implicit in water use and management, as it is part of what is understood as normal everyday management. To mitigate the risk of not registering the cooperative events during the interviews, specific attention was put on existing agreements, leading to the discovery of several more events.

4. MAIN RESULTS

Results of the inventory of water-related conflictive and cooperative events are described based on different themes addressed in the inventory format used for the study.

4.1 Reported and unreported events

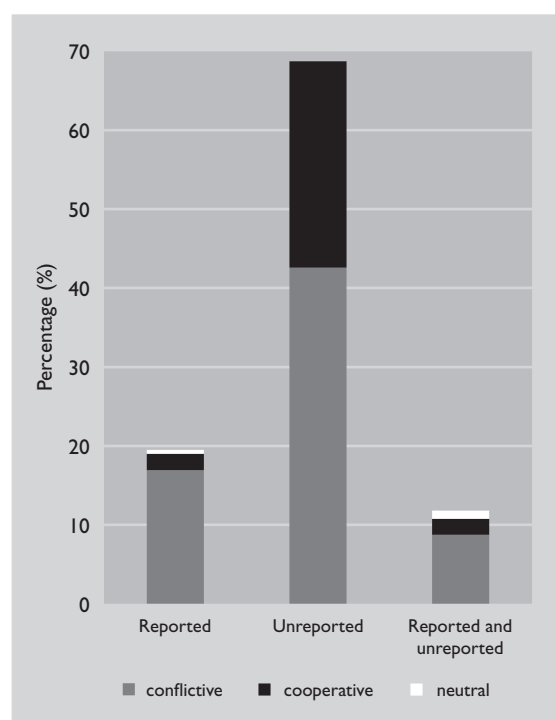
The larger percentage of unreported events (Figure 4) indicates the higher involvement of local organizations in water management issues in relation to the involvement of governmental organizations. National, provincial and municipal institutions do not participate in local water management and support agreements and conflict resolution only when they are called upon by users or local organizations.

'Reported' and 'Reported and unreported' events have a higher proportion of conflictive cases. This indicates a characteristic of the study area, namely that conflicts are discussed first within local institutional framework and

are submitted to authorities only when they cannot be solved locally.

In cases of cooperation third parties are called mainly to support important agreements reached to solve conflicts.

Figure 4. Reported and unreported events according to character of the event



4.2 Distribution of events in space and time

Distribution of events across communities

Of the 195 events identified, 43 (22.1%) have occurred outside the study area. Events occurred outside the study area are mainly reported events (see Table 2) and relate in most cases to claims and denounces made to external authorities, mostly conflictive events. The remaining 152 events are distributed in 33 communities, 88 of these events (45%) occurred in the 10 inventory communities (shaded in Table 2). The existence of large ir-

rigation systems that involve several communities, explain the relatively small number of events identified in some sampled communities (i.e. Millu Mayu and Plano Alto). Though interviews in these communities gave infor-

mation about many events, they may also have occurred in neighbouring communities that are part of the same water systems or in communities where irrigation water sources are placed.

Table 2. Events identified in sampled and non-sampled communities (shading indicates sampled communities)

No.	Community	Frequency	Percentage
1	Tiraque (pueblo)	12	6.2
2	Paycomayu Alto	1	0.5
3	Paycomayu Bajo	1	0.5
4	Millu Mayu	1	0.5
5	Plano Alto	2	1.0
6	Puca Huasi	4	2.1
7	Toralapa Alta	1	0.5
8	Sank'ayani Bajo	14	7.2
9	Cotani Piqueria	1	0.5
10	Sank'ayani Alto	17	8.7
11	K'aspi cancha Alta	14	7.2
12	Cochimita	11	5.6
13	Colque Khoya	1	0.5
14	Villa Flores	3	1.5
15	Kañacota	3	1.5
16	Churo Alto	11	5.6
17	Churo Bajo	1	0.5
18	Huaylla P'ujru	6	3.1
19	K'aspi Cancha Baja	1	0.5
20	Parra Rancho	1	0.5
21	Chullcu Mayu	2	1.0
22	Koari Bajo	1	0.5
23	Koari Medio	5	2.6
24	Rodeo	1	0.5
25	Rodeo Chaupisuyu	1	0.5
26	Koari Alto	2	1.0
27	Zapata rancho	1	0.5
28	T'ola pampa	15	7.7
29	Rodeo Alto	2	1.0
30	Pucara Grande	1	0.5
31	Uchuchi Cancha	12	6.2
32	Sacabambilla Alta	1	0.5
33	Sacabambilla Baja	13	6.7
	Outside Tiraque	43	22.1

The relatively large number of events identified in the communities of Sacabambilla Baja, T'olapampa, Sank'ayani Alto, Sank'ayani Bajo and K'aspi cancha Alta relates to the existence of several different water sources (lakes, springs) found within the territory of these communities. The water sources are used mainly by these communities and in some cases also by neighbouring communities. Two large dams that exist within Sank'ayani Bajo and Sank'ayani Alto – Pachaj Qhocha and Llusk'a Qhocha, respectively – are used by other communities placed in Abanico de Tiraque and the Punata Valley. A substantial amount of 'inter-community' events in relation to water sources and water infrastructure placed in these communities was found.

Tiraque (town) is the main town of the municipality where offices of local authorities and large water organizations are located. Consequently, many events related with conflict negotiations and denounces to local authorities have taken place here (see Table 2).

Events occurred within a single or between several communities

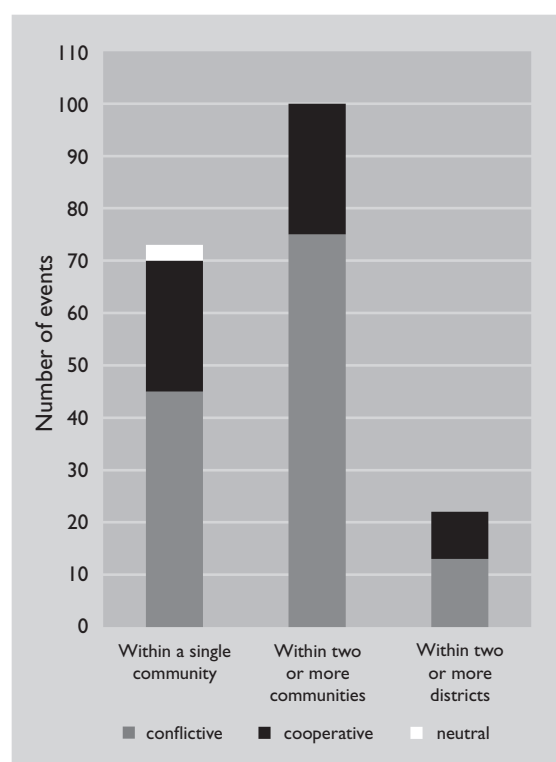
Figure 5 shows an important difference in the number of inter-community events (2nd and 3rd columns from the left) in relation to intra-community events. It seems that more conflicts (and cooperation) can be expected in bigger water use systems which include several communities or several municipalities, than within communal water systems. This may be related to the degree of complexity of the systems.

A higher number of conflictive events occurred among two or more communities. In relation to cooperative events, Figure 5 shows that almost the same number of events occurred “within a single commu-

nity” and “within two or more communities”.

Inter-community events are often related to water source disputes between the communities in which the water source is placed but not actually used, and communities who use the water (an important issue in this zone). Most big irrigation dams located in the area are involved in this kind of situation.

Figure 5.
Inter- and intra-community events



As can be seen in Figures 6 and 7, most events identified in the selected communities occurred within a single community, while events identified outside the selected communities mainly are “inter-community” events that may include selected and non-selected communities. Most of the events occurred outside Tiraque are inter-community events.

Figure 6. Inter- and intra-community events occurred in sampled communities

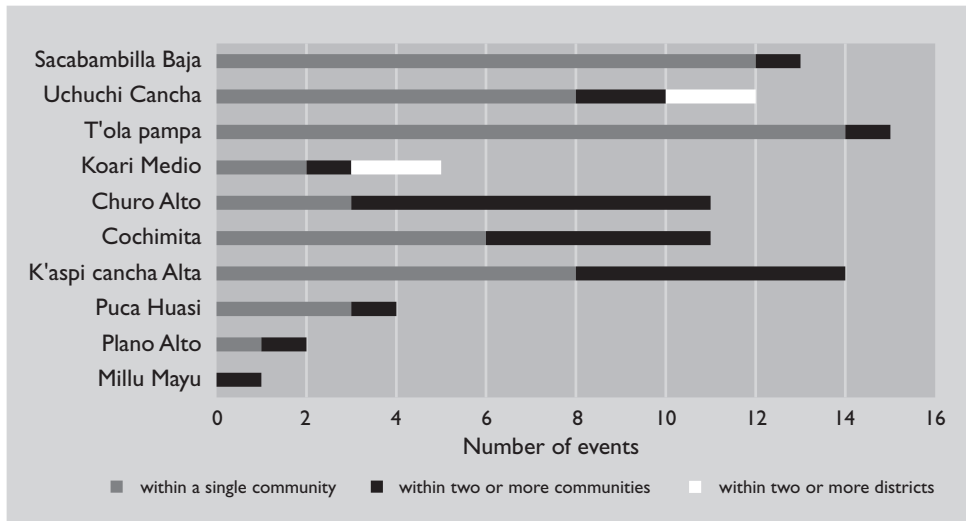
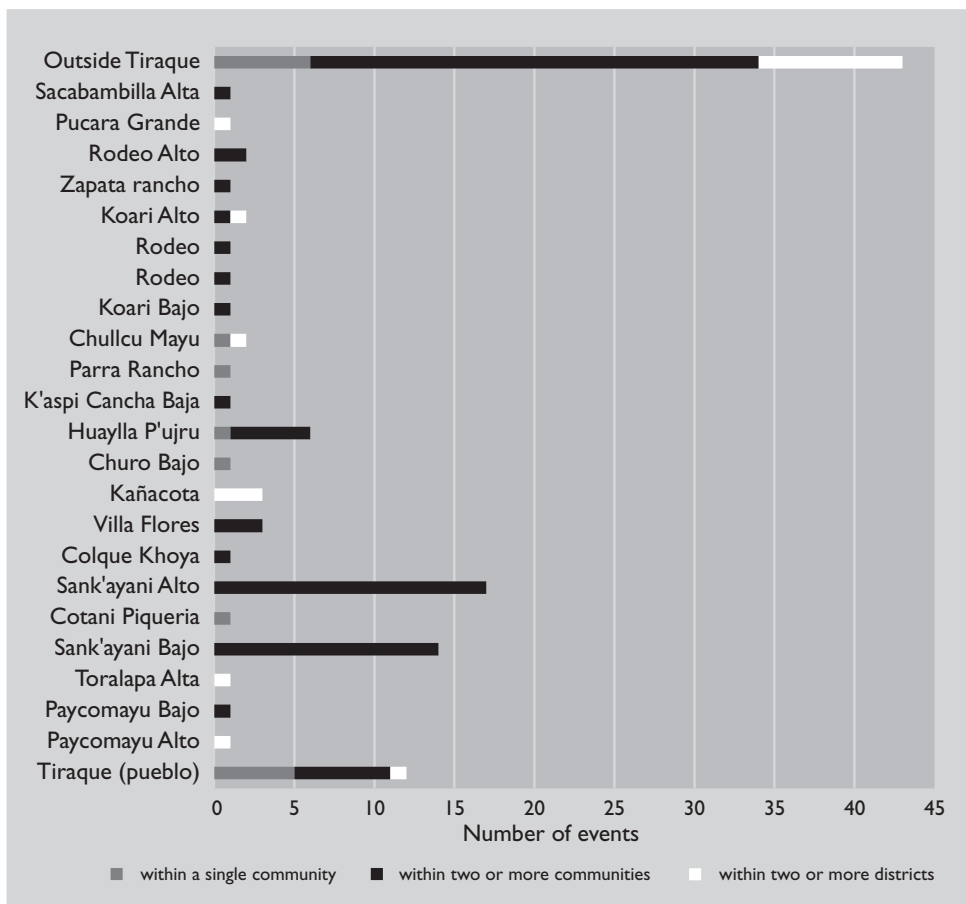


Figure 7. Inter- and intra-community events occurred in non-sampled communities



Furthermore, events identified in Sank'ayani Alto and Sank'ayani Bajo, communities with the highest numbers of events, are entirely inter-community events (see Figure 7). This leads to the conclusion that additional "unreported" intra-community water events might have occurred in non-sampled communities during the period of study.

Event year

As can be seen in Figure 8, a larger amount of the identified events occurred between 2003 and 2007 compared to the period before 2003. This could be related to the fact that people often talk more about the latest occurring events, and it seems that events older than five years are mentioned only if they are of great importance for people.

However, the larger number of events identified from 2003 to 2007 is also influenced by the fact that written archives used as sources for reported events were found for these years. This is especially impor-

tant for 2005 when 50% of the events were identified using documents obtained in local courts. The files gave very detailed information about the court cases resulting in many 'reported' and 'reported and unreported' events in this year.

Several events that have occurred before the period of study were also mentioned by the interviewed. These events mainly relate to important agreements established for water management, i.e. the agreements signed for the management of the Totorá Qhocha irrigation system in 1991, and to conflicts related to water rights or access to new water sources. The events that occurred in 1982-1983 and were mentioned in several communities are an example of the latter. A very hard drought occurred during these years forcing farmers in the area to seek new sources of irrigation water. This led to conflicts with users of those sources, and in some cases to the creation of new water systems through the establishment of new agreements.

Figure 8. Number of events by year during the study period

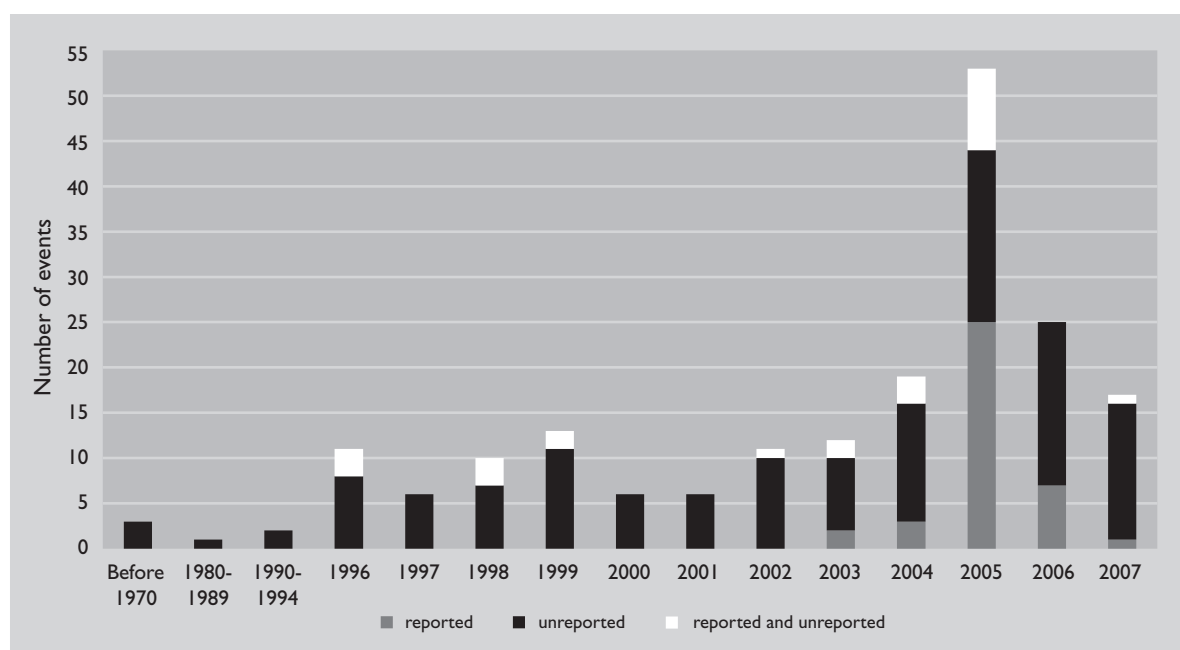


Figure 9. Seasonal distribution of conflictive and cooperative events

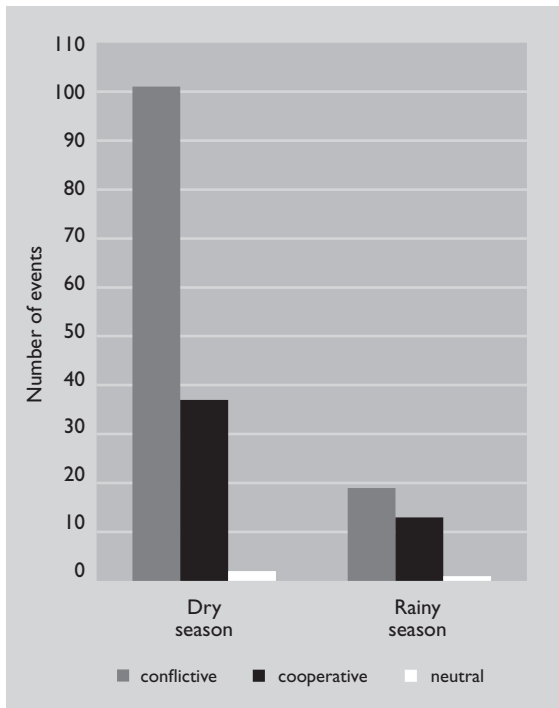


Figure 9 clearly shows that most identified events occur during the dry season when there is less and often shortage of water. Irrigation systems normally only function during the dry season and often this period also faces restrictions in using water for domestic and/or small-scale irrigation.

As Figure 9 shows, almost 70% of the events happened during the dry season and the main part of the conflictive events identified, almost 85%, occurred also in this season. There seems to be a significant relationship between water scarcity and the occurrence of events, specifically conflictive events.

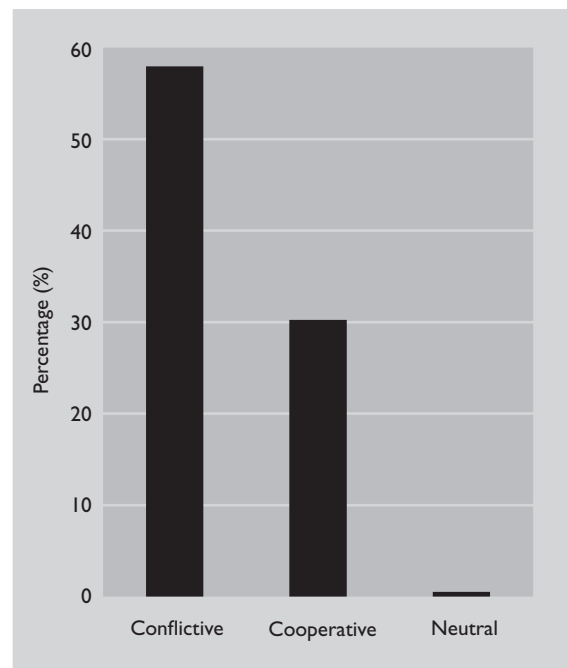
It is also important to consider that there are events without relation to the season but occurring at some point in the year because of the course taken by the situation, e.g. negotiation meetings to solve conflicts and/or hear demands.

4.3 Conflictive and cooperative events occurred in the study area

Character of events (conflictive/cooperative)

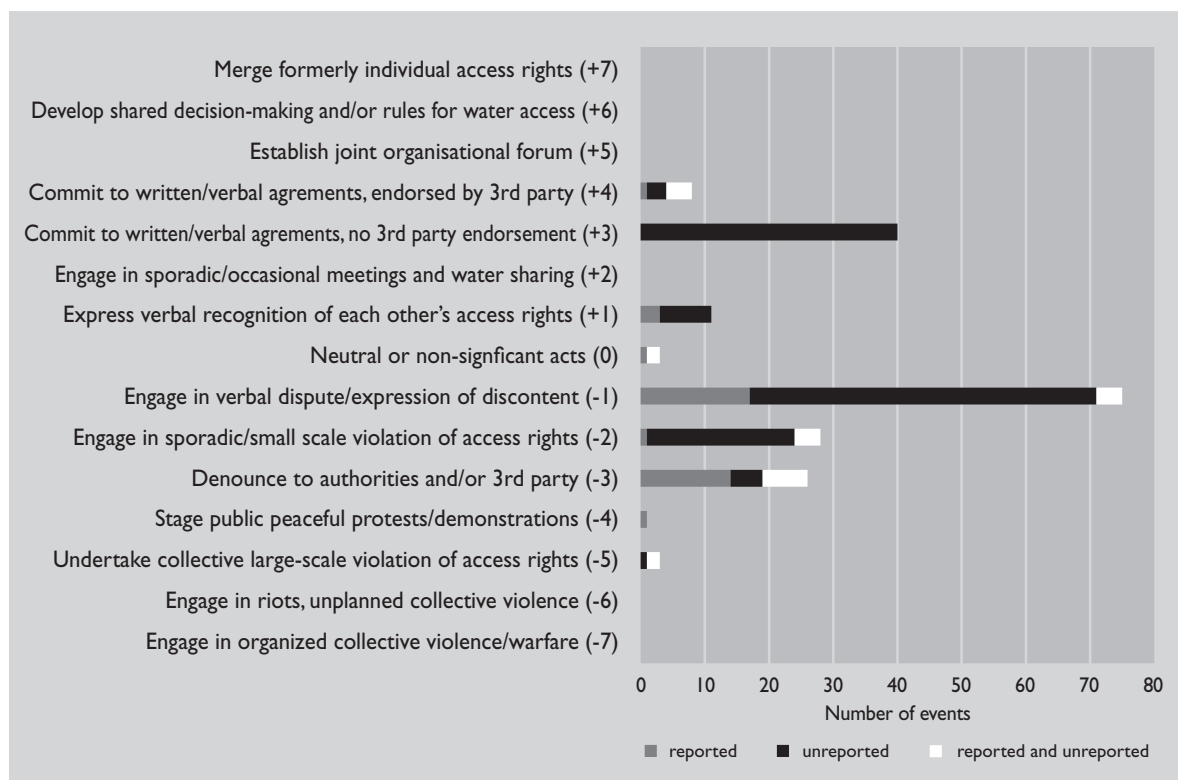
More conflictive than cooperative events were identified during the study period. However, conflictive and cooperative events may have different relative 'weight', e.g. several identified situations may contain many smaller conflicts ending up with one big agreement. An analysis of the identified situations in relation to the character of the events that are part of it may help to consider this issue.

Figure 10. Character of events



As conflicts are considered part of normal water management in the area, several procedures and arrangements were made for the resolution of conflicts, e.g. the establishment of fines for those who do not respect the water use rules of the system (water thefts and other illegal uses of water).

Figure 11. Intensity scale of reported and unreported events



Intensity scale of events

As can be seen in Figure 11, the intensity of the events identified does not reach the extreme levels at the intensity scale established for the study, neither for cooperation nor for conflictive events. The level of intensity of the events is between -5 (undertake collective large-scale violation of access rights) and +4 (commit to written verbal agreements, endorsed by third party), but 94% of the events are concentrated between -3 (denounce to authorities and/or third party) and +3 (commit to written/verbal agreements, no third party endorsement) in the scale.

The highest number of events has been identified as -1 (engage in verbal dispute/expression of discontent) accounting for 49.6% of the conflictive events. Thus most of the conflictive events do not result in severe ac-

tions. On the other hand, most of the cooperative events were identified as +3 (commit to written/verbal agreements, no third party involvement), accounting for 76% of the cooperative events.

The results thus show that verbal disputes are much more common in conflicts than are written denounces to authorities. On the other side, agreements without third party involvement are preferred in cooperative cases.

4.4 The issues involved in events

Type(s) of water use(s) in the events

The percentage of events in which irrigation and rural drinking water supply are involved, show the higher importance of these two types of uses in relation to other uses of water. While the number of cooperative events is

very similar for all these kind of uses, the next graph shows a higher number of conflictive events in rural drinking water and small-scale irrigation. The existence of more clear rules of use and management in large-scale irrigation systems might explain this difference.

It is important to note the small percentage of reported events identified for large-

scale irrigation in relation to small-scale irrigation and rural drinking water (see Figure 15). One difference between large- and small-scale systems is that the organization in large-scale systems includes more than one level which in most cases helps in solving conflicts and establishes agreements over water in the area.

Figure 12. Types of water use involved in conflictive and cooperative events

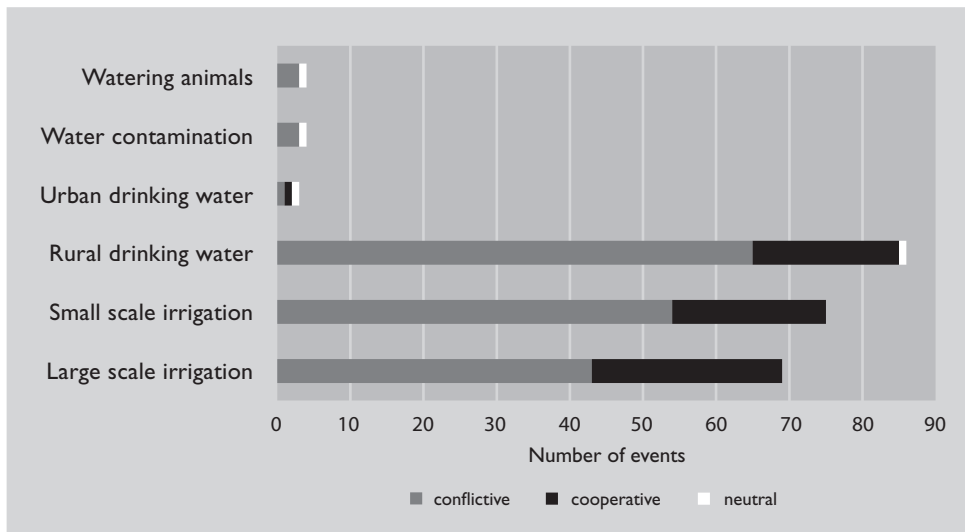
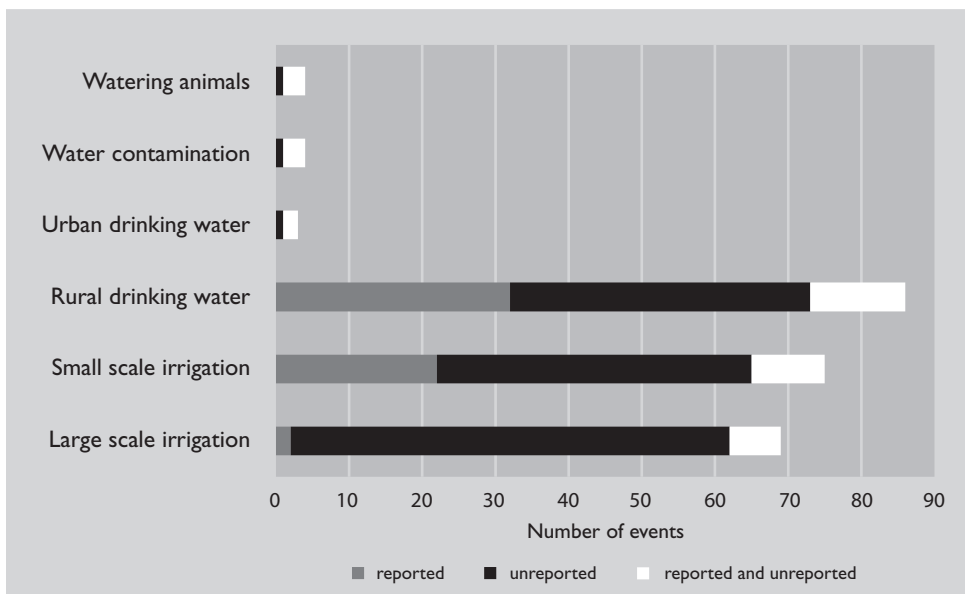


Figure 13. Types of water use involved in reported and unreported events



Just four events related to water contamination, which all form part of a single situation, were identified. However, the negative impacts of this situation might have reached other communities downstream the point of contamination. These might not be identified as events because interviews were carried out just in one community, i.e. the community where contaminants were discharged to the river. Communities downstream of the place of these events are out of the study as they are part of another municipality.

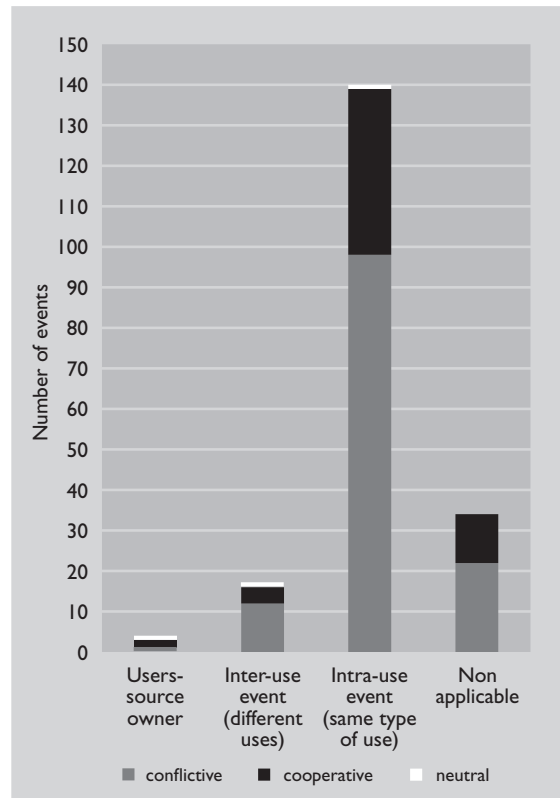
Intra-/inter-user events, and user/regulator events

As no water regulator authority or -agency exist at local level in Bolivia, none of the identified events involve water regulators.

A lot more intra-use events than inter-use events were identified. The existence of many sources of water (especially springs) spread over the municipality and the small proportion of land occupied by a concentrated population explain the low level of competition between the two main water uses in Tiraque.

One important issue is the existence of events, which involve one non-water user party (Not applicable in Figure 14). It shows the existence of water conflicts and cooperation which are not about competition for water. Issues of non-user claims for access to water to communal organizations and claims about mismanagement of water systems are examples of these kinds of events.

Figure 14. Number of events by water use type



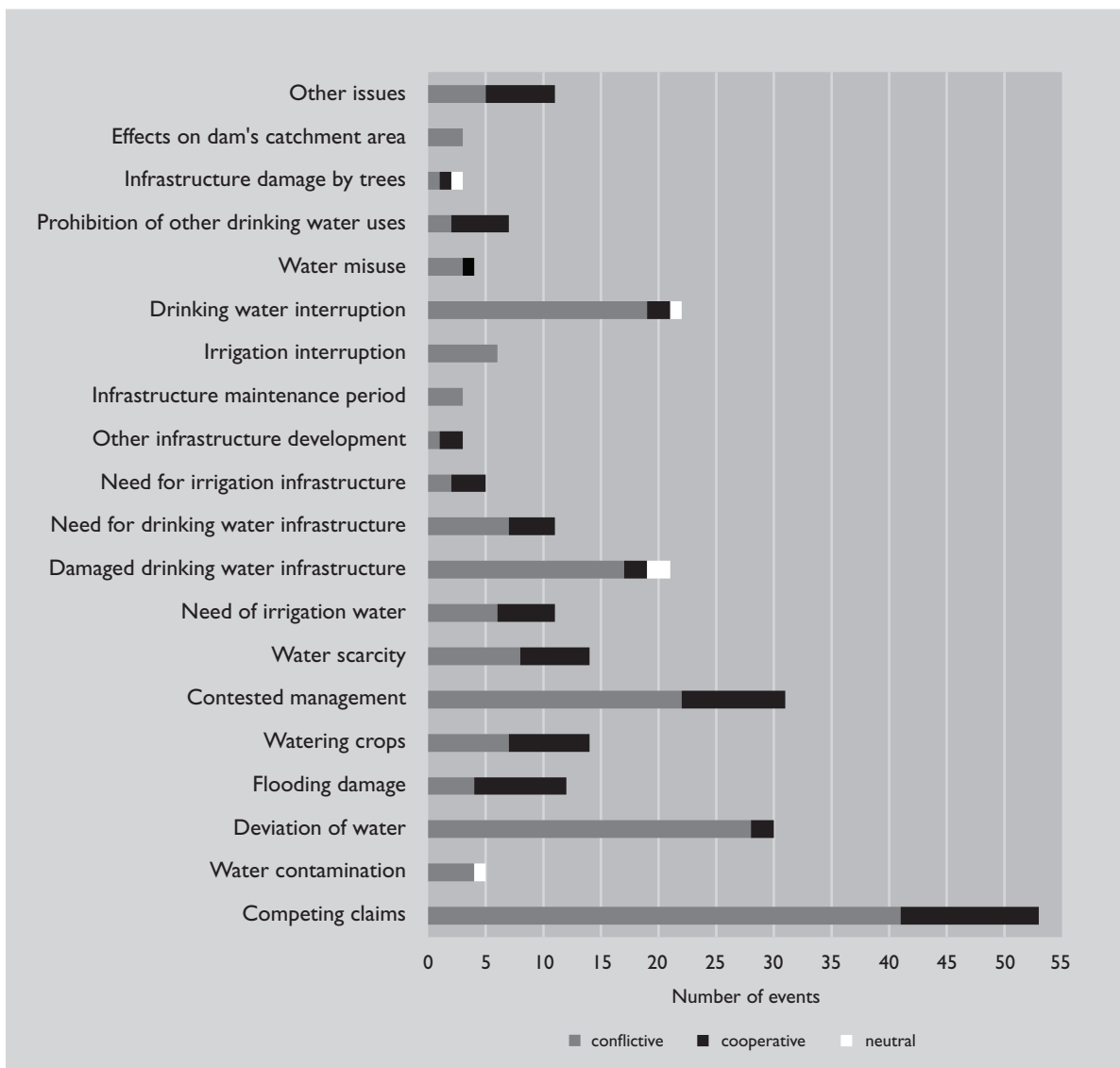
The main issues of the events

As can be seen in Figure 15, competing claims is the issue causing most of the events identified. These events are related to water access and water rights disputes, which reflect competition between groups. In the case of Tiraque, most of these events are related to disputes over water sources, particularly within large-scale irrigation systems, and involve claims from communities which have water sources located on their

land and thus consider themselves to have priority rights over the source, against the actual users of the source who live in downstream communities.

Deviation of water is an issue strongly related to competing claims (disputes of water rights). It reflects a manifestation of disagreement with the rights of other groups to use the water, causing mainly conflictive events, as can be seen in Figure 15.

Figure 15. Event issues by character of the events



Contested management relates mainly to management problems in irrigation and drinking water systems. Such events may include users and non-users of water not interested in competing for others' water rights, but in improving their own conditions of access to water, e.g. that water distribution rules are respected by all users and non-users or that water conveyance does not affect non-users' land.

Another set of issues, initially not considered in the format, but which are important in the study area, is the interruption of drinking and irrigation water supply. These actions are considered, by community organizations, as strong sanctions against irregularities committed by community members. This may lead to serious conflicts, as can be seen in the number of conflictive events related to these issues (see Figure 15).

Another issue, also not considered initially, is related to the 'multiple-use' characteristic of many drinking water systems in the area. Drinking water systems are also used for irrigation and for washing clothes, but these uses are, however, forbidden in several systems during the dry season (when the discharge of the water sources decreases) in order to avoid conflicts between users of the systems. However, these prohibitions also cause complaints, especially from women.

Types of water sources involved in events

Most water systems in the area take water from springs, which explains why most events are related to this kind of source (see Figure 16).

Lakes are less in number than the other sources, but a relatively high number of events occurred in relation to these. Lakes in the area are normally associated with dams used for irrigation for more than one community, which implies a complex management system with many agreements established and many

conflicts occurring. However, it is interesting to note that only few cases related to lakes were reported to external parties. Organizations associated with these sources (large irrigation systems) depend mainly on their own procedures to solve conflicts and to establish agreements, as opposed to small-scale systems depending on springs.

Most lakes are placed in the highest zone of Tiraque, but used by communities of other zones. During the last years communities located near these sources have started to manifest openly their disagreement with this situation, causing a high number of conflicts and in several cases the establishment of new agreements.

No source was involved in several events. In these cases the infrastructure was more important than the source of water (in all these cases there is some kind of infrastructure involved).

Figure 16. Type of water source involved in reported and unreported events

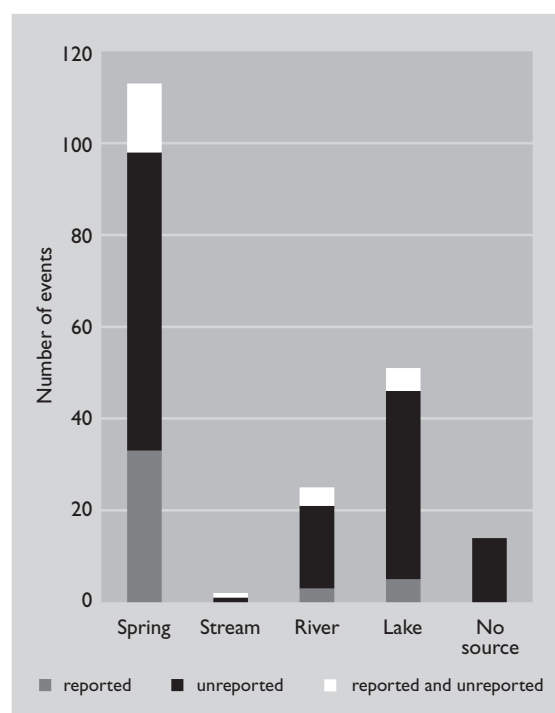
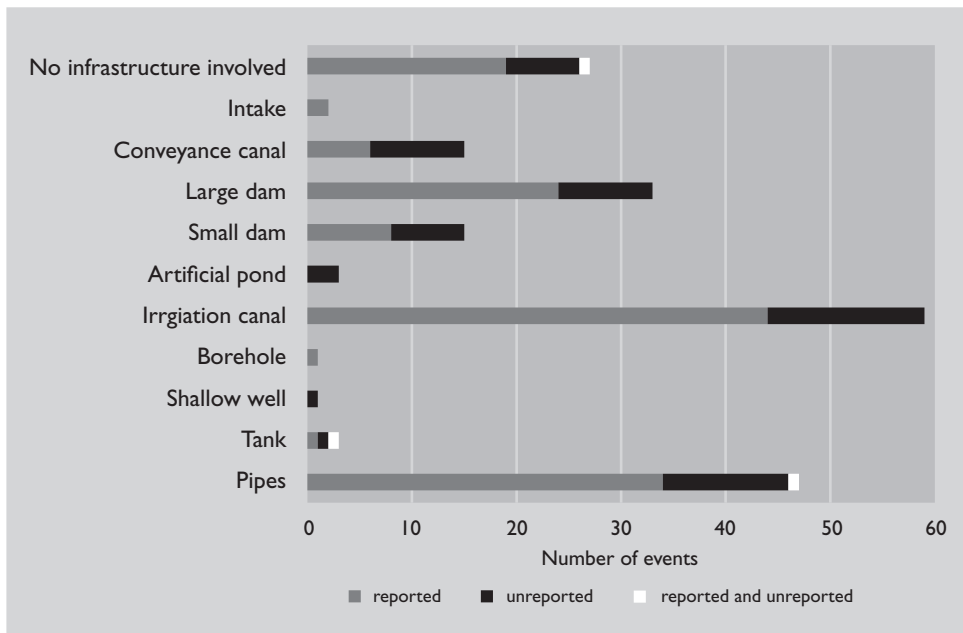


Figure 17. Type of infrastructure in conflictive and cooperative events



Type of infrastructure in the events

Though many identified events were related directly to water infrastructure (obstruction of canals, bad conditions of infrastructure, damage in pipes, etc.) almost 14% of the events do not involve any water infrastructure. These events are related directly to the water sources.

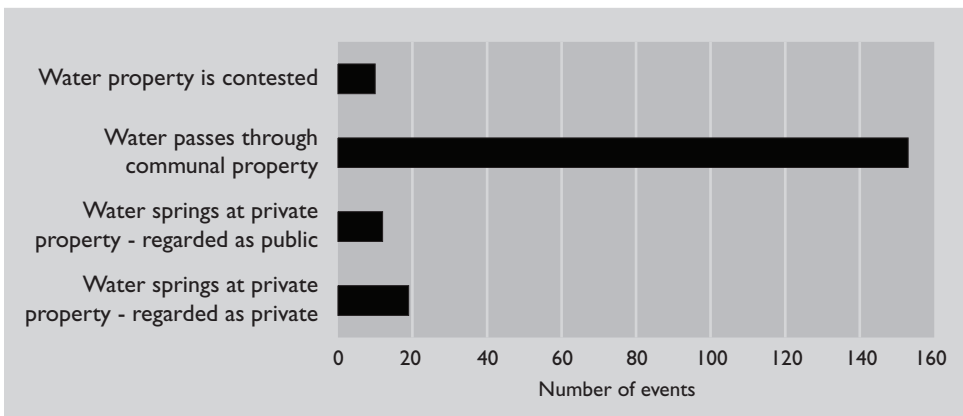
Pipes and irrigation canals are the two main types involved in the events. Pipes are directly

related to drinking water systems while canals and dams are related to irrigation systems. However, there are also an important number of events related to the need of drinking and irrigation water infrastructure.

Ownership of water source in the events

The methodology framework used for the study differentiates only two kinds of water ownership: public and private, however the

Figure 18. Water ownership in the identified events



term “right” is more precise than “ownership” in relation to water issues. Collective water rights – the most common in the study area – are considered here under the category of public ownership.

Most water sources are used under the collective rights regime, which explains that almost 80% of sources involved in the identified events are regarded as communal. It is also important to note that in a minority of cases (less than 5% of the events) the “water property is contested”, i.e. water rights and their basis are known by most of the people and communities in the study area (see Figure 18).

4.5 Event stakeholders and their actions

Direct parties to the events

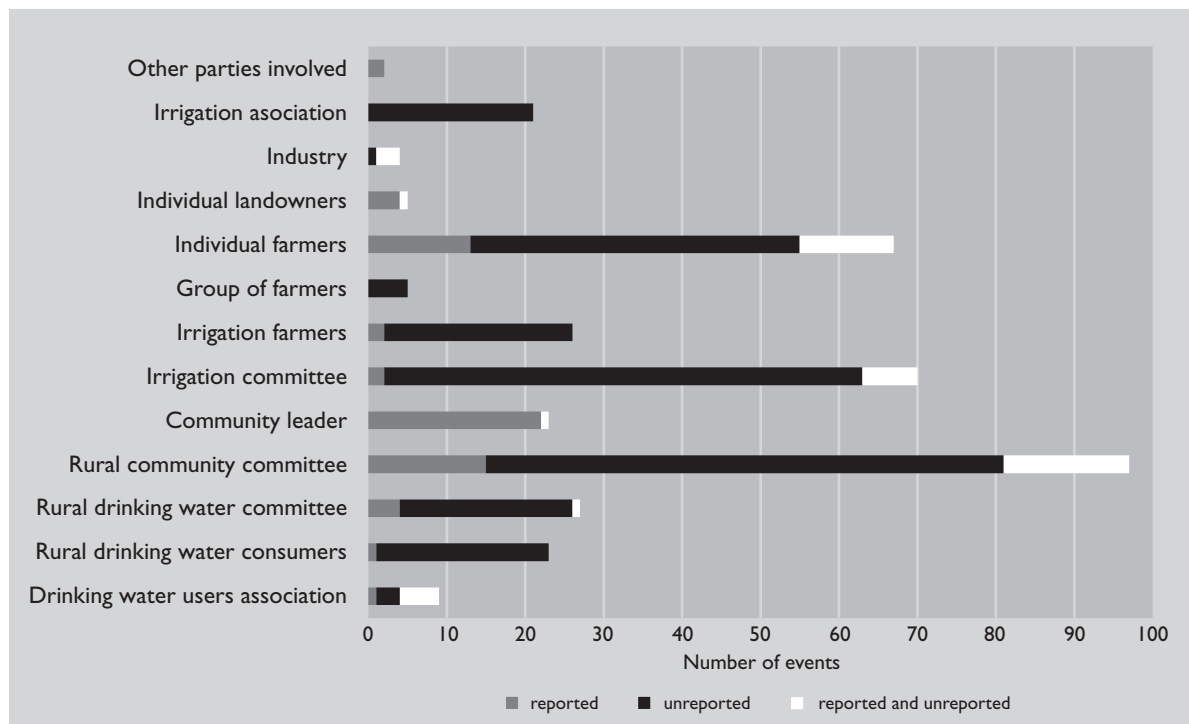
Community committees were involved in most identified events. This is partly due to

the current relationship between communal organizations and water organizations and to the direct involvement of community organizations in water management in several communities, especially related to drinking water supply. Furthermore, in many cases community committees also represent the interests of their individual members in inter-communal water issues.

Other important parties in events are irrigation water organizations (irrigation committee, irrigation association) and drinking water organizations (rural drinking water committee, drinking water users’ association), which in most cases are the organizations called to solve conflicts or to establish agreements about water. These water organizations were involved mainly in unreported events (see Figure 19).

Among individual actors, it was mainly individual farmers who were involved in most events. As seen in Figure 19, communal lead-

Figure 19. Direct parties in reported and unreported events



ers were involved mainly in reported events representing the interest of communities and individuals within the same communities. These events were mainly conflictive (see Figure 20).

As can be seen in Figure 20, “irrigation associations” and “individual landowners” have a relatively high involvement in cooperative

events in comparison with the other categories of actors. For the irrigation associations, this is related to their conflict resolution role. With respect to individual landowners, their high involvement in cooperative events relate to efforts to establish agreements with groups of water users allowing them to use water sources located in private land.

Figure 20. Direct parties in conflictive and cooperative events

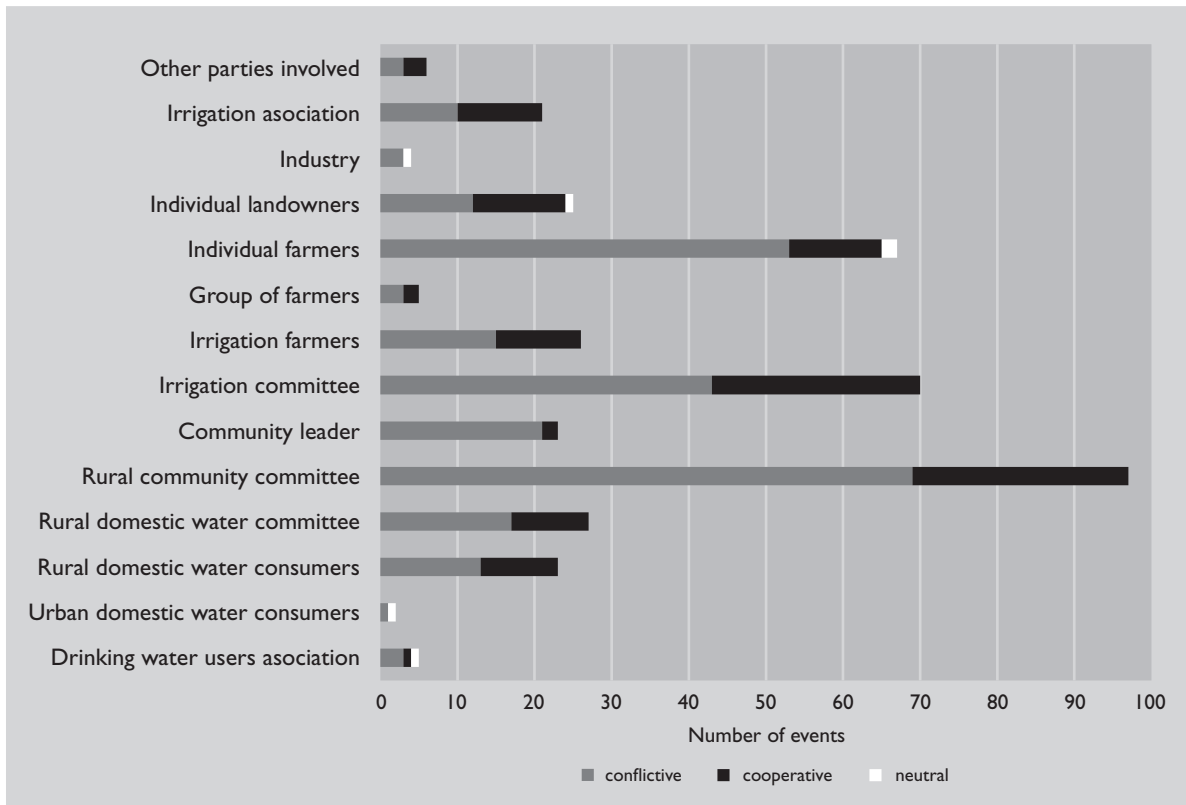
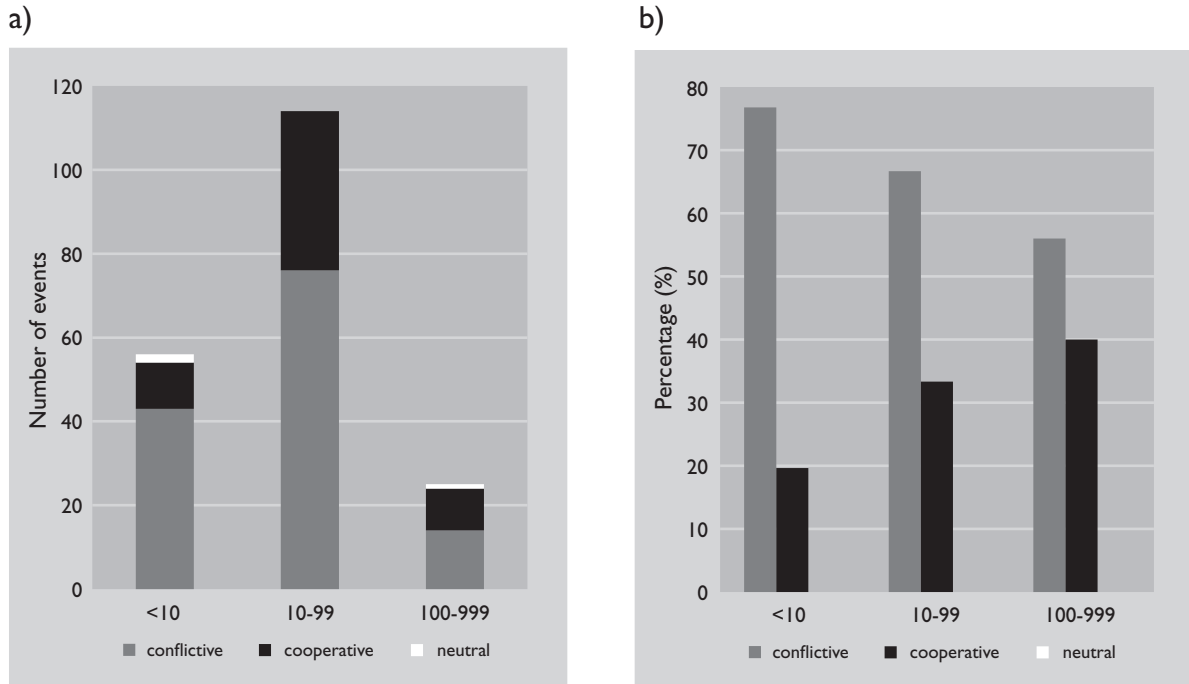


Figure 21. People involved in cooperative and conflictive events



Number of people affected by/benefiting from events

In most events the amount of people involved is in the range between 10 to 99 persons (Figure 21-a). Most conflicts and agreements are discussed in community or water organization meetings, in which typically between 10 to 99 persons would attend.

As can be seen in the Figure 21-b, a higher proportion of conflictive events involved less than 10 persons and the percentage decrease when events includes a higher quantity. It may be showing that when more people are involved in the events there is a trend for more cooperation and vice versa (see Figure 21-b).

As can be seen in Figure 22, the highest number of events affected from 100 to 999 persons. These would typically be events that affect all members in a community.

There are relatively few events involving more than 1,000 people. These are typically events related to large irrigation systems in the area.

Figure 22. People affected in conflictive and cooperative events

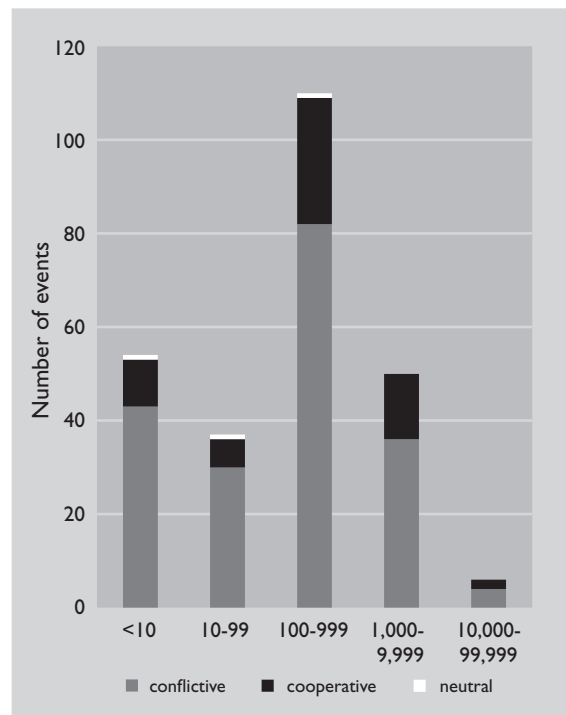
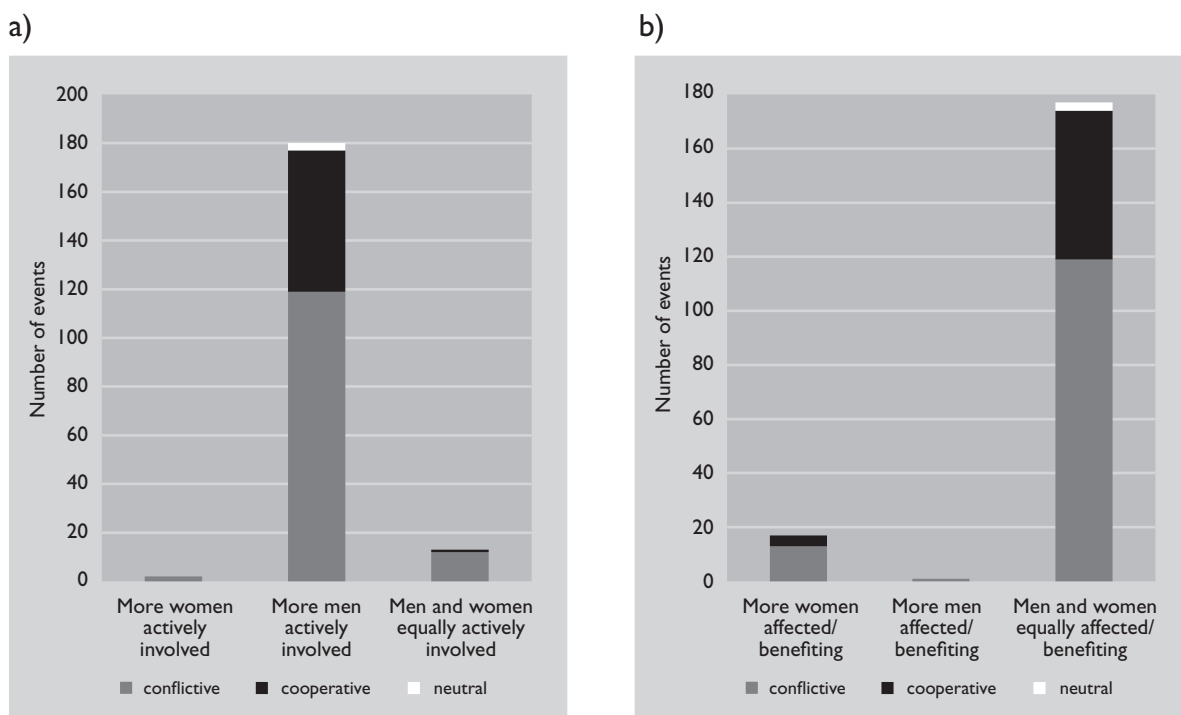


Figure 23. Number of women and men involved and affected in conflictive and cooperative events



Share of women/men involved and affected in events

Mainly men are actively involved in dealing with conflict and cooperation issues, even though most of events affect men and women equally and there are more events in which more women are affected in relation to events in which more men are affected (Figure 23).

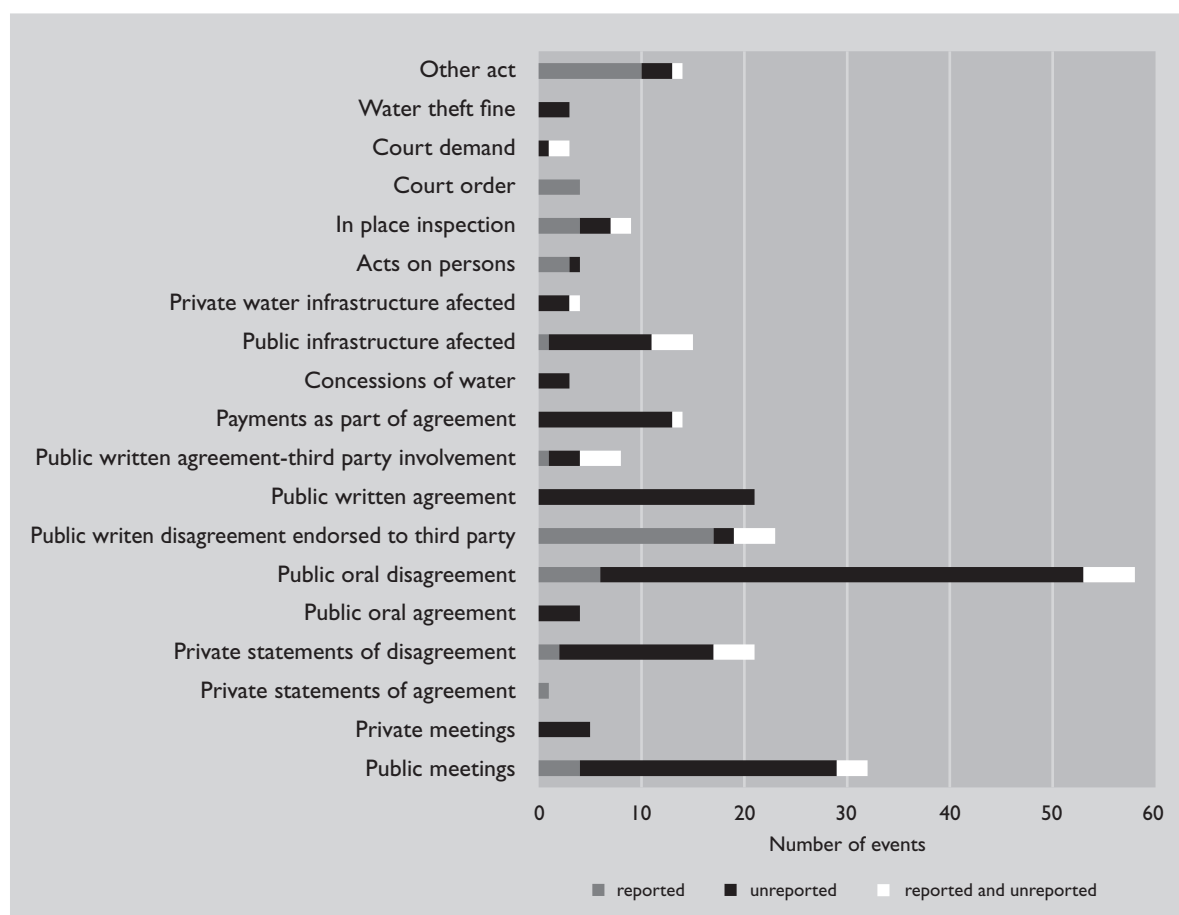
Most events are dealt with in communal or water organization meetings, where there are more men participating and assuming leadership, which may explain the pattern revealed in Figure 23. However, due to the mi-

gration of men, there is a tendency towards an increasing female participation in these kinds of meetings, though still few women are taking on leadership in community organizations.

Types of actions taken during events

As mentioned before, public meetings and public oral disagreements are related to the use of assemblies to deal with cooperation and conflict about water. This explains the higher number of this kind of actions compared to private actions (see Figure 24).

Figure 24. Actions taken in reported and unreported events



The events characterized as ‘public infrastructure affected’ relate to obstruction and destruction of infrastructure, which is an important form of protest in conflictive events.

Different types of actions are related to ‘reported’ and ‘unreported’ events, e.g. oral disagreements which are used mostly in unreported events, and written disagreements which are used mostly in ‘reported’ events (see Figure 24). Formal organizations require written communications, while customary organizations are more used to oral communication. Likewise different actions are related to conflictive and to cooperative events, e.g., agreements and disagreements, as was expected in the methodology definition.

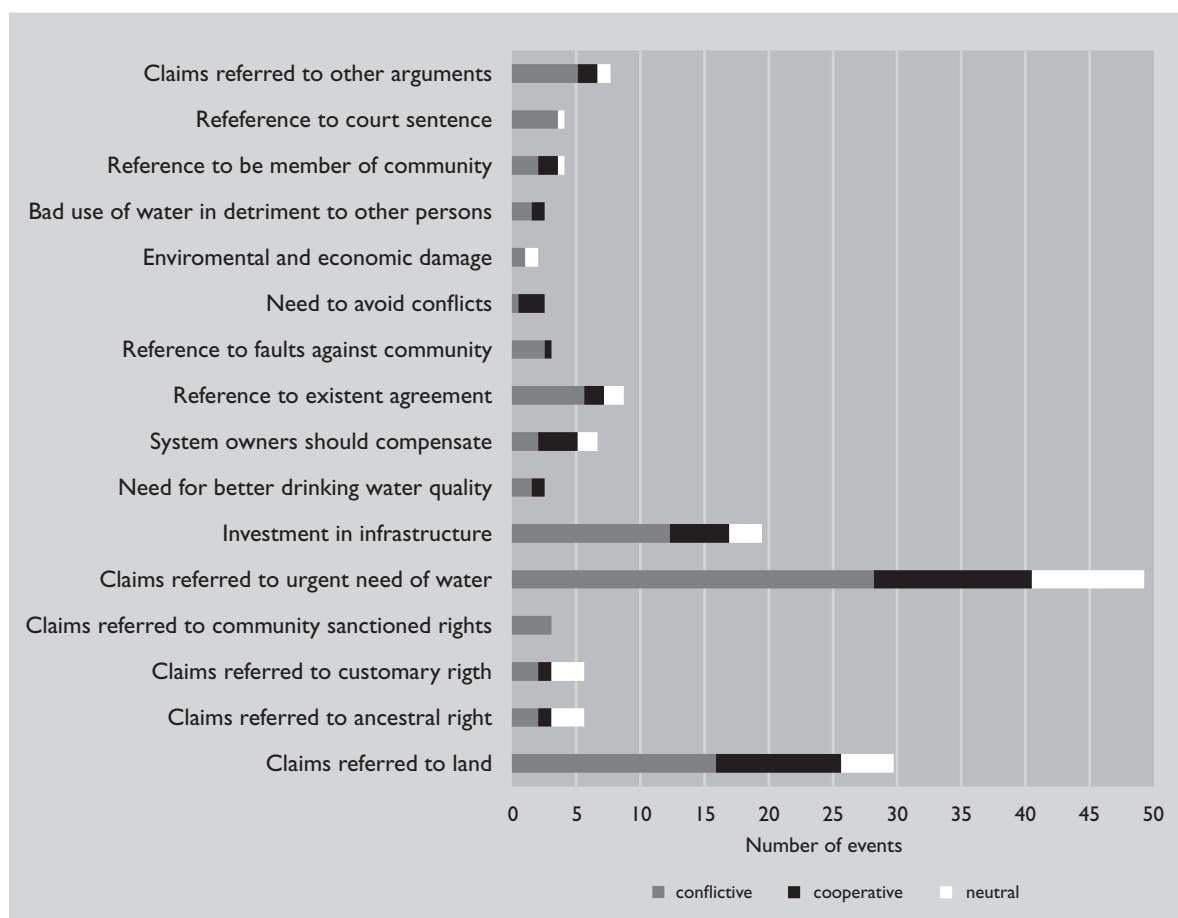
Often types of actions like ‘in place inspections’ seem to be important for both reported and unreported events.

Ways in which claims of access are supported

Although some communities have relatively good water availability, water scarcity, especially for agriculture, is a problem mentioned by any farmer in the study area. This feeling of water scarcity explains the number of events in which claims were made in reference to urgent need of water (see Figure 25).

‘Customary rights’ in relation to use of water and ‘investment in infrastructure’ (improvement or development of water systems)

Figure 25. Arguments to support claims of parties in conflictive and cooperative events



are two main issues in which water rights are based. Hence farmers use arguments rooted in customary rights to defend their positions in disputes about water rights over sources associated with water use systems.

Claims referring to land are important arguments for communities in which sources of water (especially springs and lagoons) are placed. They use this reference to claim priority rights over the water sources.

It is important to note that in almost 10% of the cases a reference to existing agreements was made. These are written agreements established between communities or groups of users, which however are constantly being questioned, thus leading to conflicts (see Figure 25).

4.6 Third party involvement

During the development of the inventory of events, two kinds of third party involvement were considered: Calling third parties; and demands to external authorities. As can be seen in Table 3, third parties were called upon in only 12.3% of the identified events and in only 20.5% of the cases formal demands to external authorities were submitted. This shows the importance of the role of local-traditional organizations and local water organizations (not considered third party) in development of agreements and conflict resolution. Considering both variables together, third party involvement took place in 32.8% of the identified events.

Table 3. Third party involvement in reported and unreported events

Third party involvement	Yes		No		Reported	Unreported	Reported & unreported
	Number	%	Number	%			
Third parties have been called upon	24	12.3	171	87.7	11	11	2
Formal demands submitted to external authorities	40	20.5	155	79.5	39	0	1

As can be seen in Table 3, most events with third party involvement are ‘reported’ events as was expected according to the applied methodological definitions of reported and unreported events.

Formal demands to external authorities

When people or organizations submit demands to external authorities, they delegate to them the power to deal with a conflictive situation. This means that they do not expect to solve conflicts by themselves based on their traditional institutions.

Figure 26 shows that almost all cases of denouncements to authorities relate to conflictive events. It also shows a predominance

of individuals in relation to organizations in submitting denouncements to external parties. In the case of individual farmers, it relates to situations in which farmers are fighting against organizations and do not expect to win, i.e. court cases of drinking water interruption. In the case of leaders, they make denouncements representing their communities. However, the course of some court cases compelled them to take actions also as individuals.

The cases in which organizations made denouncements were related to disputes over water rights between communities.

The preferred actors to whom denounces of water situations are given are local and dis-

Figure 26. Parties who made denouncements to authorities in cooperative and conflictive events

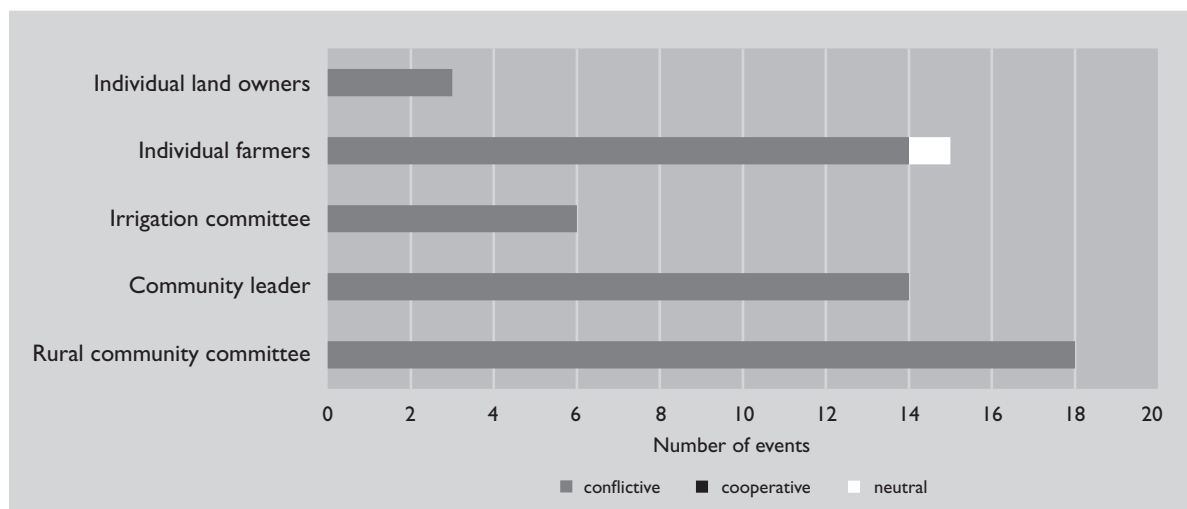
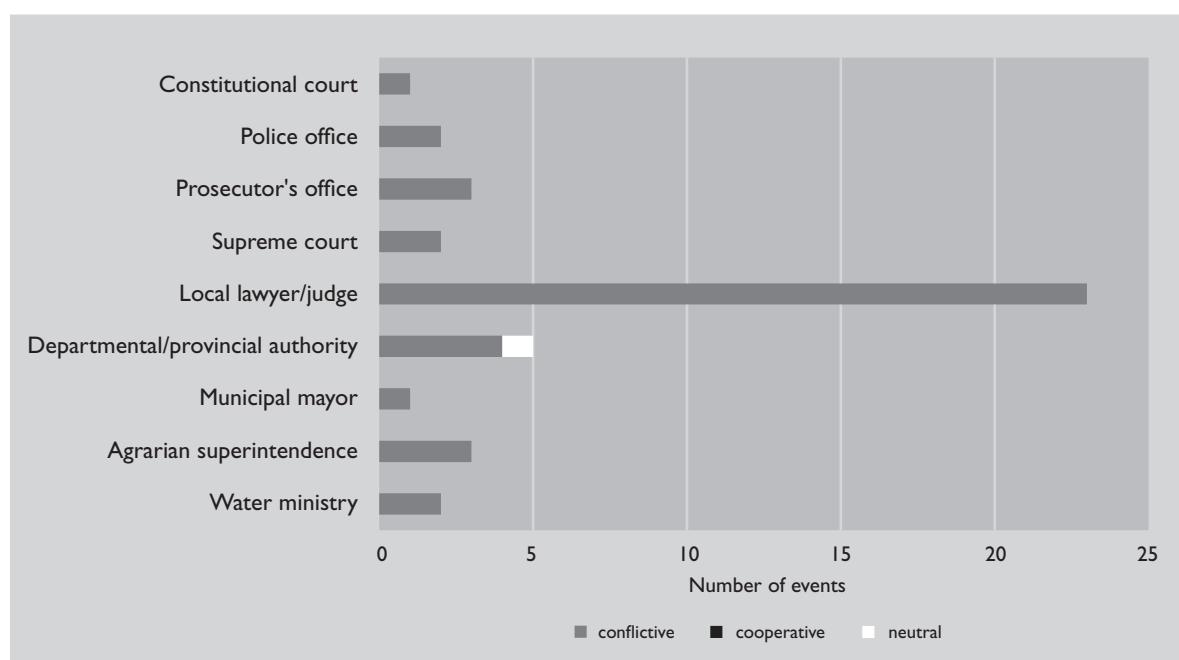


Figure 27. Authorities to which denouncements were made in conflictive and cooperative events



strict judges (see Figure 27). This involvement of the constitutional courts, police office, prosecutor's office and Supreme Court are mainly related to the initiation of legal court cases.

An important local actor to which denouncements are made is the 'sub-prefecto' (provincial authority), especially in cases of conflictive events.

Calls upon third parties

When parties of a water event call upon a third party, this is generally done to put more pressure on solving the conflict or to reach more respectful agreements, but with local organizations still in control of the situation.

Figure 28 shows that only in a few cases, all parties involved in an event agreed upon calling a third party. In most cases only one side of the involved actors were interested in calling a third party (see Figure 28).

In most events it was organizations (community and irrigation committees) who called a third party, and not individuals. The involvement of a third party was made in order to have more support to important agreements to be made and/or to have a legitimate mediation to solve cases that could not be solved by local organizations themselves. This explains the similar proportion of conflictive and cooperative events in which organizations called a third party (see Figure 28).

In the case of individuals calling a third party, it relates mainly to situations in which individuals confront communities or water organizations.

In contrast to the case of denouncements to authorities, an equally amount of cooperative and conflictive cases have involved third parties.

As in the case of denounces to authorities, the preferred organization as a third party are (local and district) lawyers and judges. How-

Figure 28. Parties who call a third party in cooperative and conflictive events

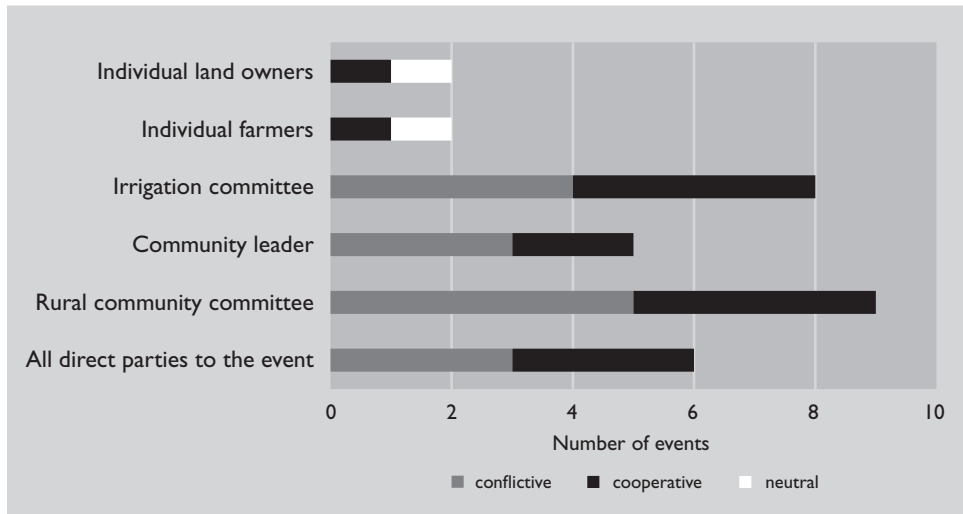
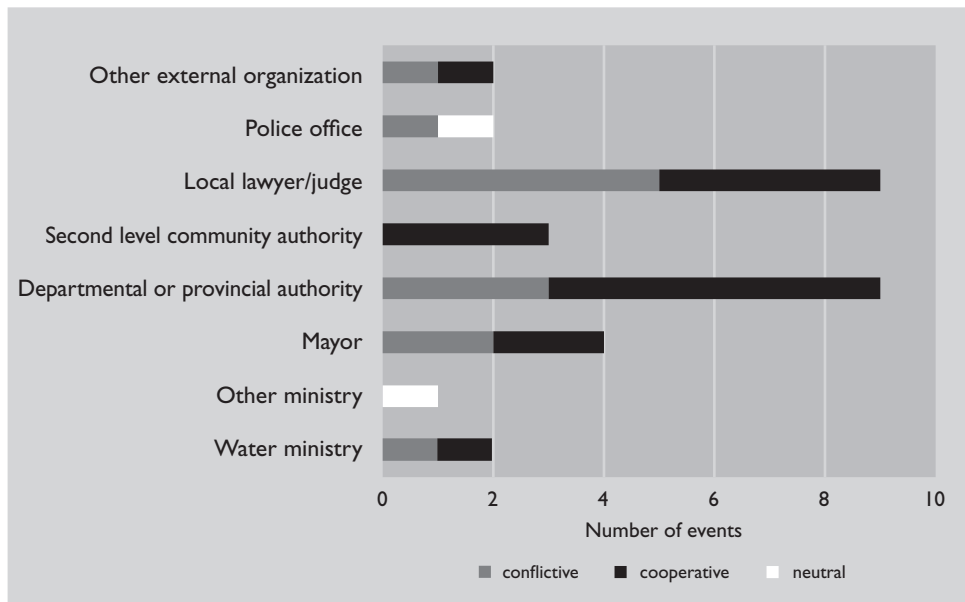


Figure 29. Actors called as third parties in cooperative and conflictive events



ever, most of these events are related to court cases within which there is a mix of judicial orders and attempts of courts to conciliate the issues between parties (mediation). In few cases lawyers and/or judges were called to mediate in a conflict or give support to agreements.

Important actors normally called for mediation are the *sub-prefecto* (provincial authority), the mayor and second or third level of communal organization structure (see Figure 29). They normally try to mediate in conflicts and to support agreements reached.

Figure 30. Parties that gained in conflictive and cooperative events

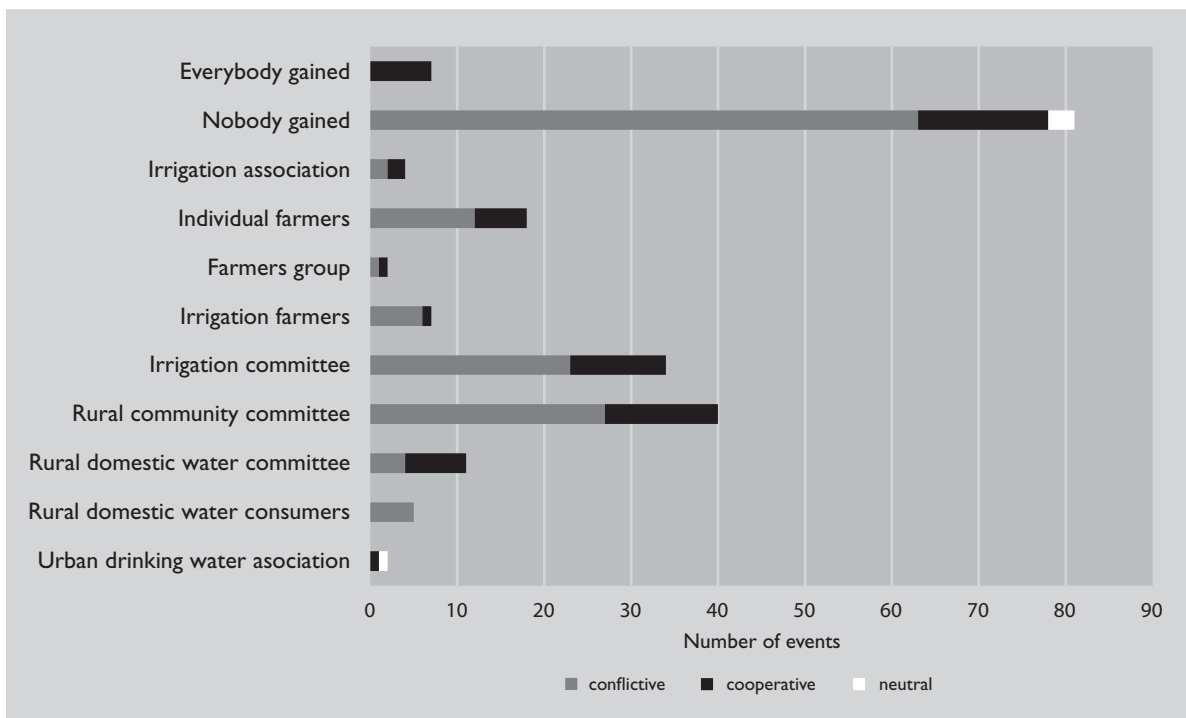
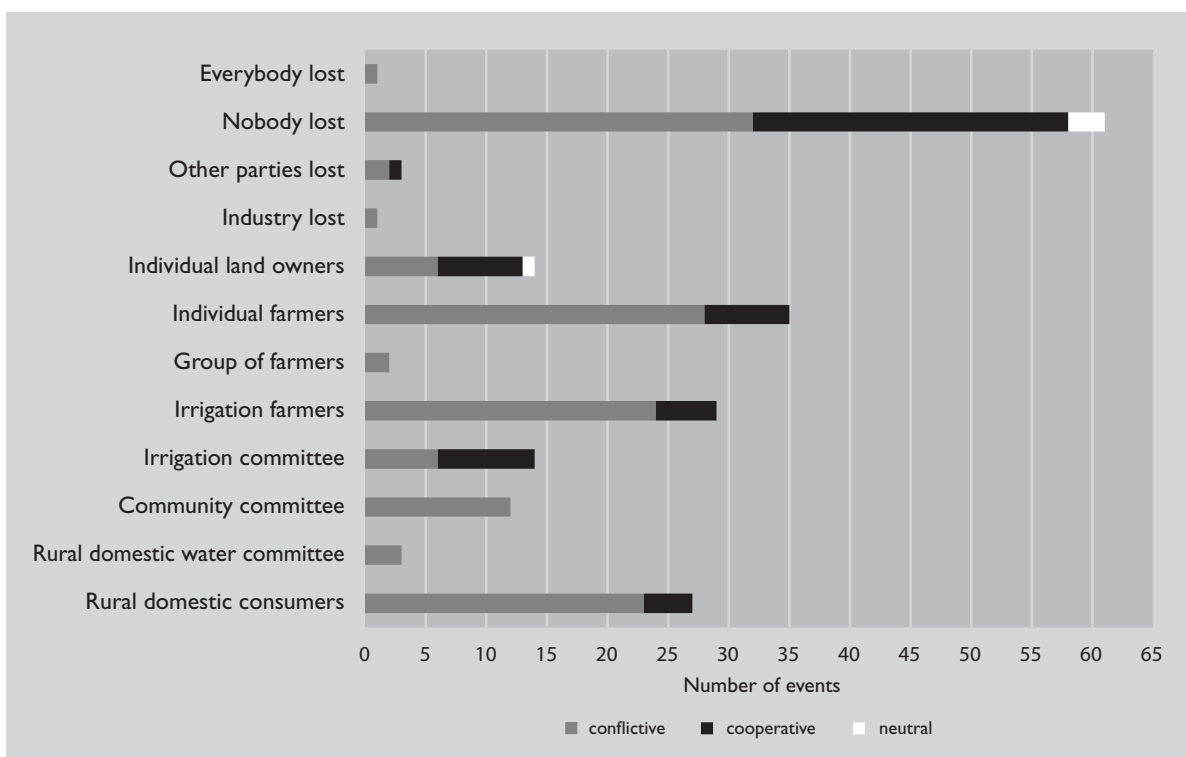


Figure 31. Parties that lost in conflictive and cooperative events



4.7 Event outcomes

Assessment of who gained and who lost in the events

Most events had no concrete result; they were events forming part of a process in which something was decided only towards the end. This explains the large proportion of conflictive events in which nobody gained (see Figure 30). That is the reason why in most events it was assessed that ‘nobody gained and nobody lost’.

In relation to the losers in the events, these were mostly individuals, who particularly in conflictive events were assessed to lose (see Figure 31).

As can be seen from Figure 31, communal and water organizations were assessed to have lost only in a few events and to a much lesser extent than individual parties.

Similarly to the assessment of who gained in the events, in most cases it was assessed that nobody lost in the events identified. However, there are a larger proportion of cooperative events in which ‘nobody lost’ as compared to in which ‘nobody gained’.

5. CONCLUSIONS

The conflictive and cooperative situations about water are not easily fixed in time and space. In the case of Tiraque, many of the situations registered include events which have occurred outside the period defined for the study, e.g. many of the important agreements which have been questioned in some of the conflicts had occurred more than 10 to 20 years ago. Likewise, the geographic boundaries within which cooperative and conflictive situations occur are often defined by the level and jurisdiction of the local organizations involved within the governance framework, as

well as by the local practices used for conflict negotiation and resolution, e.g. water conflicts’ negotiation meetings are carried out near the sources involved. Hence in many cases events occur outside involved communities and even outside the study area.

More conflictive than cooperative events were identified as part of the inventory. However, most of them were of a low intensity level, meaning that most conflicts did not reach levels of physical individual or collective violence and most cooperative events did not need registration or regulation beyond local water organizations. This indicates an interrelationship between conflict and cooperation; the intensity of the conflict sets the need for the interrelated cooperation as a solution to the conflict.

More inter-community than intra-community events were identified in Tiraque. This relates to the existence of large-scale water systems in Tiraque. These systems include several communities as beneficiaries which need to coordinate to use the system, and conflicts may occur between them. Furthermore, in many cases the sources of water are located outside the beneficiary communities which implies both agreements and occurrence of conflicts.

The main uses of water in the area are irrigation and drinking water. Hence most water events were related to these water uses. From the inventory it can also be seen that more intra-use events than inter-user events have occurred. However, in a small percentage of the events, the criterion of competition between water users does not apply. Some events are not about competition between users; non-users may also be involved.

Competing claims of access is one of the main issues of conflict and cooperation. Such claims are related to water systems’ rights questioned generally by users of the same use-

type (e.g. irrigation water rights contested by other irrigation farmers or farmers interested in irrigation water). However, complaints about management is also an important issue, for instance users of a system complain about the way the system is managed, or non-users complain about mismanagement of a system but without actually questioning the rights of the other parties to use and manage this water system.

The inventory does not show evidence of increment of conflict or cooperation over time due to competition. Several factors influence the occurrence of conflict and cooperation and it seems that no single factor may explain this.

In most events the involved parties adopted public actions instead of private ones, even when there might be individual parties involved. This is related to the collective water rights that apply to most water sources and systems, and to the traditional ways of discussion through community-based organizations.

The results of the inventory show evidence of the lack of involvement of the state in water management issues (no identified event involved state agencies or authorities as direct parties) and of the control of local water and communal organizations over water issues. Most events were dealt with by local and communal water organizations, and only in a minority of events denouncements were made to external authorities.

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