

Competing for water
– conceptual and methodological framework for understanding conflict and cooperation in local water governance

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by

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1. Introduction

Competition for water is intensifying. Depending on the context, this is due to (i) the advent of new users (tourist enterprises, growers of bio-fuel crops or vegetables for exports, etc.); (ii) changing use patterns (changing diets, improved housing standards, etc.; (iii) more users; and (iv) climate change affecting the availability of water. Much of this competition plays out at the local level in the numerous districts and villages around the world, even when caused by global drivers as when rural dwellers in want of water for drinking, washing and bathing challenge the use of water for irrigation of tobacco for export.

Competition for water may lead to conflict as well as cooperation as when rural dwellers publicly protest against pump irrigation in the dry season or when agreements are made in a village to share a scarce water resource.

Water governance is essentially about addressing such competitive or potentially competitive situations of two or more parties seeking access to the same water resource. Such competitive situations can be addressed by (i) regulating access to and management of water resources and by (ii) developing new water resources. Water governance involves the processes through which decisions are made – including legislation formulated – implemented, contested and reaffirmed through political, legal, social, economic and administrative institutions at different levels of society. The issues that are addressed include who should have access to water, for which purpose, when, in which quantity and quality, at the expense of whom, which obligations should be met to maintain this access, and which sanctions should be in place in case of non-compliance.

Empirically, water governance can thus be characterized according to the way in which competitive situations are dealt with as well as their outcome. Useful descriptors of water governance include the extent to which competing claims for water lead to conflict or cooperation, and nature and intensity of water-related conflict and cooperation.

The perception that the number and intensity of local water conflicts are increasing has led to the impression of a water governance crisis. While this may be, current knowledge on local water conflicts is limited and tends to be based mostly on sporadic accounts of local water conflicts rather than on systematic empirical evidence. Therefore, we actually do not *know* whether the number and intensity of local water conflicts is growing as competition for available water resources intensifies or whether the increased competition rather results in increased cooperation between – certain – societal actors in their efforts to ensure secure access to water, nor do we know what is the exact nature of the water governance crisis. Lack of such knowledge jeopardizes current initiatives taken in many developing countries to ensure a more efficient and equitable water governance.

By ‘putting our ears to the ground’, the Competing for Water programme has as one of its principal objectives to develop inventories of water-related conflictive and cooperative water events having occurred since 1996 in five districts: Tiraque district in Bolivia, Douentza district in Mali, Condega district in Nicaragua, Con Cuong district in Vietnam and Namwala district in Zambia (Figure 1). In this way, we will assess the nature, extent and intensity of water-related conflict and cooperation in an effort to understand the type of competitive situations which local water governance deals with and the role played by various types of formal and informal institutions.

The Competing for Water programme is a three year (2007-2010) comparative and collaborative research programme which aims to contribute to sustainable local water governance in support of the rural poor and otherwise disadvantaged groups in developing countries. In addition to the development of inventories, the programme will conduct questionnaire-based household surveys and in-depth case-based qualitative studies to understand how poor people gain, maintain and lose effective access to water and the role played by water governance institutions at all levels in these processes. The programme receives funding from the research council of the Danish Ministry of Foreign Affairs and is conducted jointly by 10 research institutions, coordinated by the Danish Institute for International Studies (DIIS). For more information about the programme, please see www.diis.dk/water.

2. Conceptual framework

Water-related conflict and cooperation takes place in response to situations of actual or potential competition, i.e. situations in which two or more parties seek access to the same water resource. At times such conflict or cooperation is latent, while at other times, it is expressed as water events. Such water events consist of actions which challenge other parties’ access to or specific use of water, or confirm or enlarge own or other parties’ access to water.

The Competing for Water programme defines a water event as “an action (or a set of actions) that seeks 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 situation of competition for water between two or more parties. Such situations of water competition may entail a combination of cooperative and conflictive events, events where e.g. two or more parties agree to share the water resource in question or jointly develop a water infrastructure or events where e.g. one or more parties challenge other parties' rights to access the water resource in question.

We characterize a water event as “conflictive” when one or more parties challenge other parties' access to a particular water resource. This may range from (i) petty water ‘theft’, judged according to formal or customary law or to local customs and agreements, through (ii) excessive water use either in terms of quantity (depletion) or quality (contamination), to (iii) open violence and aggression or physical inhibition of other parties' water access. Thus, 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. A water event is characterized as “cooperative” when 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. This may range from verbal acknowledgement of the rights of others to the establishment of joint water management mechanisms.

Inspired by the event intensity scale developed by Wolf and his colleagues to characterize the intensity of water events in transboundary water basins (Wolf *et al.*, 2003) and by Thomasson (2005), the Competing for Water programme has developed a scale according to which to assess the intensity of local-level water events (Table 1).

Table 1
Local-level water event intensity scale

Description	Intensity	Example
Engage in organized collective violence/warfare	-7	Communities are in de facto war over a water body
Engage in unplanned collective violence, riots	-6	A fight develops between angry parties during a public meeting
Undertake collective large-scale violation of other party's access rights	-5	A party continuously and extensively overrides the water use rights of another party
Stage public protests/demonstrations (peaceful)	-4	A party organises a public rally to protest against upstream water users
Denounce to authorities and/or third party (formal or customary)	-3	A party complains formally to the Headman. A party files a court case.
Engage in sporadic/small scale violation or sabotage of other's access rights	-2	A party brings their cattle to a waterhole during a drought although they have no access rights
Engage in informal verbal dispute/expression of discontent	-1	During a project planning meeting one party complains that other parties are using too much water
Express casual verbal recognition of each other's access rights	1	Parties express part or full recognition of other's rights during public meetings
Engage in sporadic/occasional joint activities	2	Parties work together to build a weir for irrigation
Commit to written or verbal agreements and plans that are not sanctioned by a third party	3	Parties make an agreement on water sharing but without third party witnesses
Commit to written or verbal agreements and plans that are sanctioned by a third party	4	Parties make an agreement on water sharing in the presence of a local headman or arbitrator
Establish joint organisational forum	5	Parties establish a Water Users Association for debating water use and/or lobbying for joint interests
Joint decision-making authority and/or rules development for water use and allocation	6	Parties establish joint elections for a water allocating body, or develop joint rules for water resource use
Merge formerly individual access rights	7	Parties with previously separate cattle watering points decide to allow each other mutual access rights

3. Methodological framework

Selection of research locations

The five research locations where field work is undertaken as part of the Competing for Water programme are selected through a process of purposeful sampling based on a maximum variation criterion. Thus, apart from being located at different continents, the five research locations constitute a set of highly different situations with respect to features such as precipitation; population density; presence of hydro-power infrastructure or major industrial water use; rural livelihood sources; irrigation; hydrological location and

importance of formal water use allocations (Figure 1). By undertaking empirical research in these different research locations, the Competing for Water programme aims not only to produce detailed understanding of the nature, extent and intensity of water-related conflict and cooperation in these five locations, but also through comparative analysis to explore the existence of important shared patterns in the nature, extent and intensity of water-related conflict and cooperation across the five locations. Therefore, the wider – and more global – significance of the results from such comparative analysis owes among other things to emerging from the analysis of water competition in these highly heterogeneous locations.

Public and private water-related events

Water events take place at many different scales, ranging from events taking place between two neighbours or between husband and wife to events taking place between groups of water users within a community or between an industry or large-scale farming enterprise and upstream or downstream water consumers. The Competing for Water programme distinguishes between ‘public’ and ‘private’ water events. By ‘public’ water events we understand events which either (i) involve two or more parties of which at least one party represents a social group of individuals from more than five households, or (ii) involve at least three different types of parties, e.g. fishers, companies or institutional actors. ‘Private’ water events, on the other hand, are those taking place e.g. between a couple of neighbours who agree to develop or share a water resource or between a husband and wife who disagree whether a scarce water resource should be used for livestock or for vegetable growing. Only ‘public’ water events are included in the water event inventories developed by the Competing for Water programme.

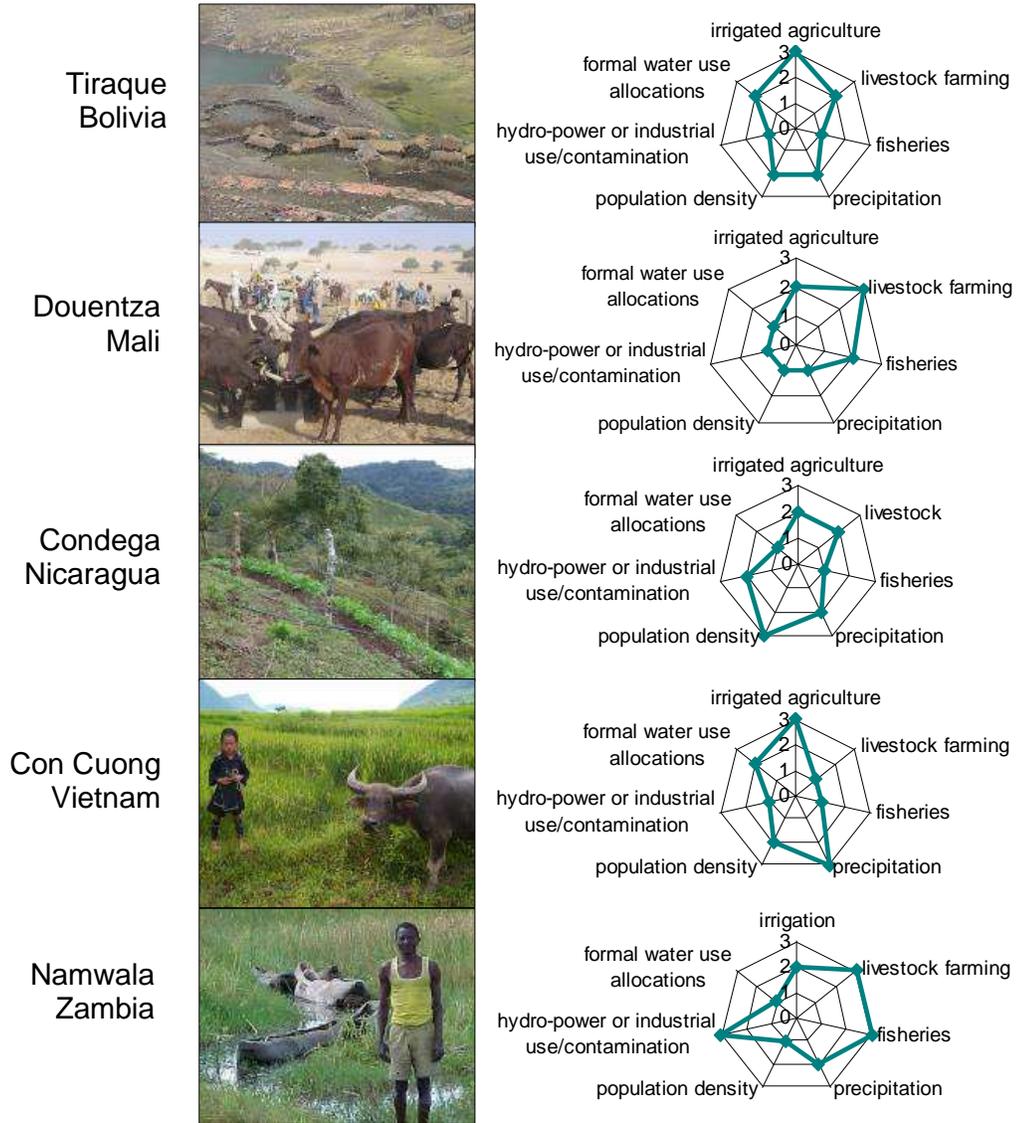


Diagram legend:
 1 = none or limited/low/<500 mm/<15 persons/km²
 2 = some/somewhat important/500-1500 mm/15-75 persons/km²
 3 = a lot/very important/>1500 mm/>75 persons/km²

Figure 1
Competing for Water research locations and their characteristics

Reported and unreported water-related events and their identification

Some water events get reported to institutions outside the location of the event, e.g. when a local television station documents a popular protest against irrigation which leaves the rivers dry or when the mayor mediates an agreement between the owner of land on which a water spring is located and a community wishing to establish a drinking water supply scheme using water from that spring. Other water events do not get reported outside the location of the event, as when farmers in a community agree with the domestic water consumers within the community to irrigate their crops only during night hours or when female community members file a complaint with the local headman against the men's use of water for livestock keeping. We refer to these two types of events as 'reported' and 'unreported' events. Both types are included in the inventories.

While 'reported' events are identified through interviews as well as archival research with institutions such as district and national authorities, the media, legal institutions, water agencies, NGOs, civil society organizations, etc., 'unreported' events can only be identified through interviews with community members and other actors at the location of the event. As our research locations contain between 56 and 427 communities (Condega and Namwala districts, respectively), it would be prohibitively expensive and practically impossible within a three-year time frame to visit all communities within the research locations to identify and register all events having occurred there. Therefore, for each research location, a sample of 10 communities was drawn through a geographically stratified random sampling procedure. To maximize the credibility that the results obtained from the 10-community samples reflect the nature, extent and intensity of water-related conflict and collaboration in the research locations, the number of communities to be selected from each geographical stratum was determined on the basis of the weight of each stratum calculated as its share of the total population of the research location. Finally, the indicated number of communities was randomly selected from each stratum. This sampling procedure has the further advantage of not entailing a bias with respect to community size.

In each of the selected communities, comprehensive inventories of water-related events having occurred since 1996 are undertaken. The principal source of information for developing the inventories is interviews with people living or working – or having lived or worked – in the community. Two types of interviewees are interviewed, namely (i) key informants, i.e. persons who besides being inhabitants of the community take up formal positions in community-level institutions such as village government, drinking water committee, irrigation committee, or cultural groups or are health workers, teachers, traditional leaders, religious leaders, etc.; and (ii) inhabitants, i.e. persons who live – or have lived – in the community but do not take up any formal positions in community-level institutions. To ensure comprehensiveness, key informants from all community-level institutions are interviewed in addition to individual interviews with a sample of at least 12–15 inhabitants. Recognizing the information about and possible part-taking in water events often depend not only upon the individual's geographical location in a community, but also upon the individual's social, economic and political position in the community, the sampling of ordinary inhabitants is undertaken through maximum variation sampling considering (i) geographical location; (ii) age; (iii) sex; and (iv) resident/absentee water users.

Thus, the comprehensive inventories of water-related conflict and cooperation will contain (i) *all* reported water-related events having taken place since 1996 in the research location, and (ii) *all* unreported water-related events having taken place in 10 selected communities since 1996.

Registering water-related events

A shared format was developed for registering the water events. Besides event identification, location, and timing, the water event registration format includes issues such as water uses and users involved in the event, the issue of the event, the water source about which the event occurs, third party involvement, the magnitude and intensity of the event and the information sources to the event (Box 1).

Box 1

Summary of issues included in water event registration format

Identification & location

- Short narrative summary
- Event location

Users, uses, issues, timing and action

- Uses involved in the event
- Issue (e.g. quantity, quality, privatization, infrastructure, etc.)
- Direct parties to the event
- Timing
- Actions taken
- Character

Water source

- Type of water source involved in event
- Water availability

Third party involvement

- Type of third party involved
- Process of third party involvement

Magnitude

- Number of people directly involved in event
- Relative involvement of women and men
- Number of people affected by event
- Relative importance of women viz-à-viz men as affected party

Intensity and outcome

- Intensity of event
- Winners and losers

Information sources

- Sources of information for the event

4. Sketches of future results

The following section illustrates the types of insights which we will be able to gain on the basis of the inventories of water-related conflict and cooperation once they will be completed late 2008. Thus, it presents preliminary results from the identification and registration of *unreported* events in six out of the 10 communities selected in Condega district, Nicaragua and in five of the 10 communities selected in Con Cuong district in Vietnam, as well as an unknown share of *reported* events which have been identified through interviews and archival research at institutions outside the location of the event.

In total, the associated preliminary event databases for Condega and Con Cuong districts represent 202 and 116 water related events, respectively. For Condega district, a bit more than half (n=108) of the events identified so far, have been identified through inventory work in the communities while the remaining part has been identified through interviews

and archival research with a wide range of institutions working in the district, e.g. district government, ministry delegations, NGOs, legal institutions, local media, etc. Of the events identified through interviews in the communities, approximately 40 percent have been reported outside the location of the event (in Figure 2 labelled ‘unreported & reported’) whereas the remaining 60 percent of the events identified in the communities have not been reported to external institutions. For Con Cuong district, 90 percent (n=104) of the events identified this far have been identified through interviews in the communities and only about a quarter (n=21) of these events have been reported outside the location of the event. The remaining 10 percent (n=12) of the events currently contained in the Con Cuong event database are strictly reported events.

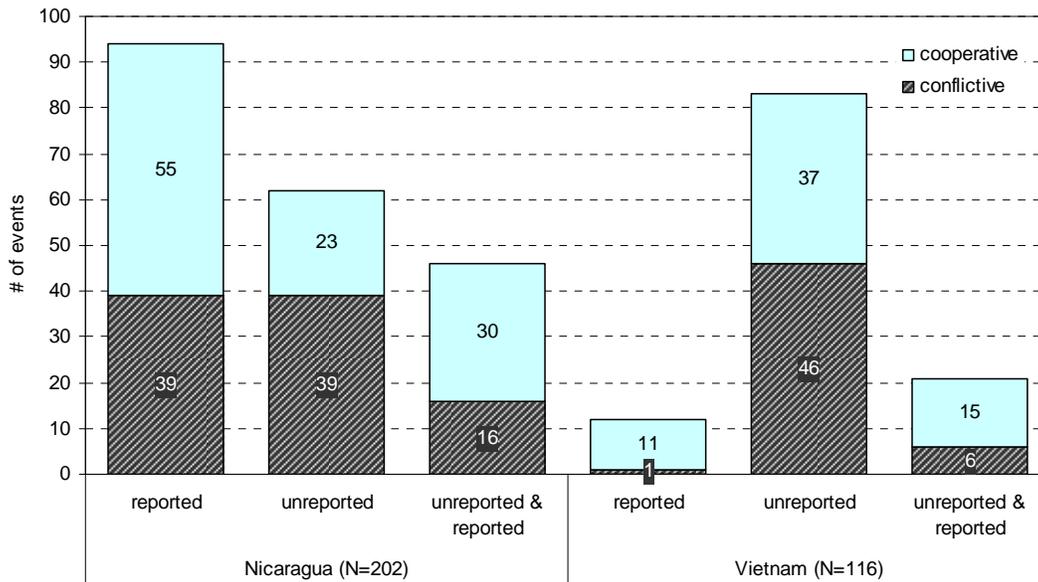


Figure 2
Source of identification of conflictive and cooperative water-related events, Condega district, Nicaragua, and Con Cuong district, Vietnam
Number of events

In both Condega and Con Cuong districts, the number of cooperative events balances the number of conflictive events, with conflictive events constituting 46 percent of the event identified so far in both districts.

The large majority of events are local in their spatial scale, taking place within a single community – this is the case for 85 percent of the events identified in Condega and 67 percent in Con Cuong district (Figure 3). One possible explanation is that that both sites are upstream districts, meaning that they are less affected by extra-community competition conflicts than downstream districts might be. However, this and other possible explanations (related e.g. to actual (water) governance, infrastructure, cultural features, etc.) needs further analysis once the inventories for all five research locations are completed.

Although intra-community events may outnumber events taking place at a larger spatial scale, it is worth noting that events that take place either between two or more communities or between two or more districts hold the potential of affecting larger numbers of people – positively as well as negatively. The preliminary inventory results from Condega and Con Cuong show a significant correlation between the spatial scale of events and their magnitude in terms of number of persons (potentially) affected by or benefitting from the event. In addition, but only in Con Cuong district, the geographic scale is also significantly associated with the number of persons directly involved in the event.

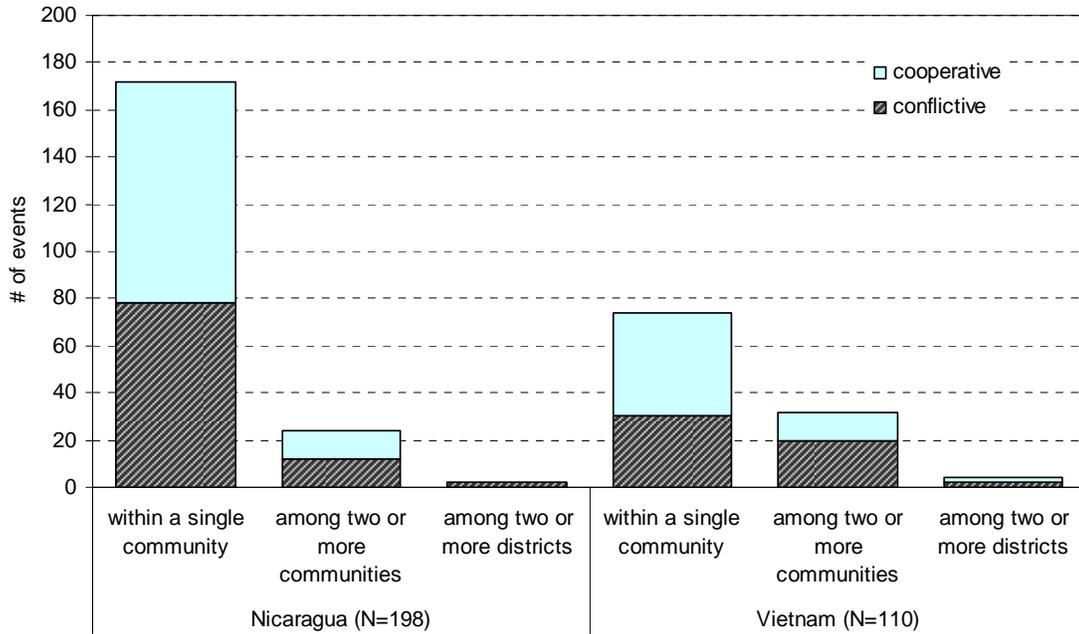


Figure 3
Spatial scale of conflictive and cooperative water-related events identified in Condega district, Nicaragua, and Con Cuong district, Vietnam

Number of events

Most conflictive and cooperative events in Condega as well as in Con Cuong district concern the ownership, use and management of natural springs (Figure 4). As shown in Figure 4, spring-related events are in Condega district closely followed by ground water related events, the latter being the subject particularly of cooperative events to solicit, construct and maintain wells and pumps used for drinking water and to a growing extent also for irrigation.

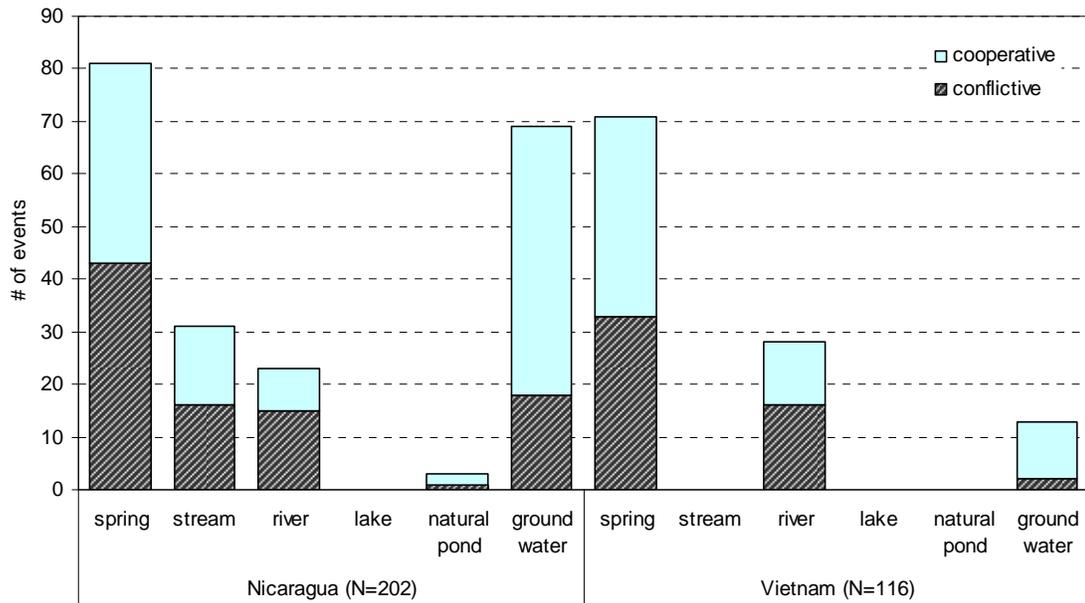


Figure 4
Type of water source as the subject of conflictive and cooperative water-related events, Condega district, Nicaragua, and Con Cuong district, Vietnam
Number of events

In addition to being primarily intra-community events, around two thirds of the events identified so far in Condega and Con Cuong districts take place among people using – or wanting to use – the water for the same use (intra-use events) while the remaining third of the events take place among people using – or wishing to use – the water for different purposes (inter-use events) or between users and regulators of water access and use, e.g. a drinking water utility, etc. as direct parties to the water event (Figure 5).

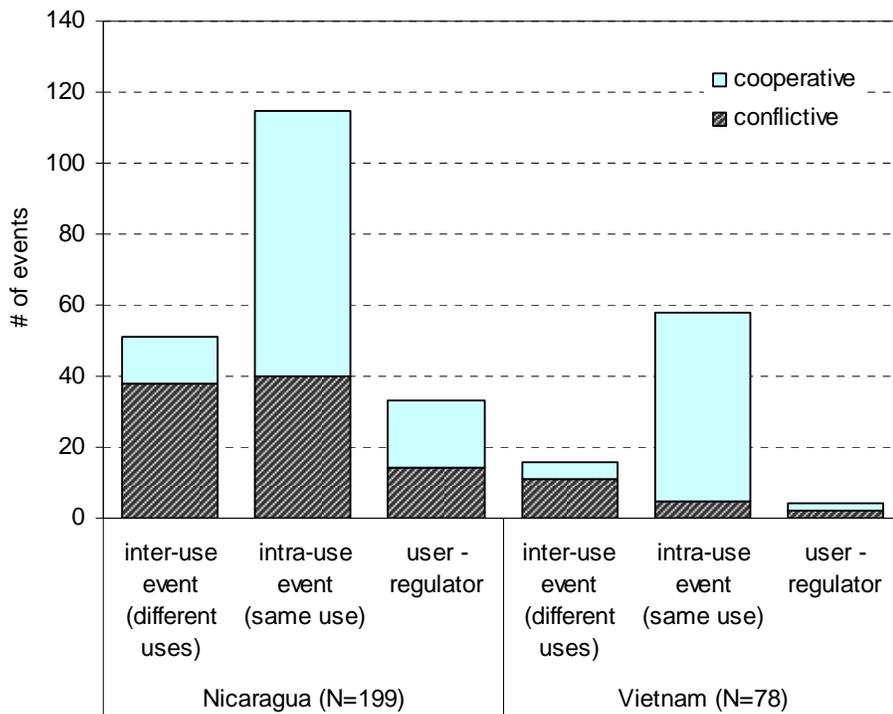


Figure 5
Use diversity of conflictive and cooperative water-related events, Condega district, Nicaragua and Con Cuong district, Vietnam
Number of events

In Condega district, where around a third of the rural households fetch domestic water in buckets from natural springs or from the river (Ravnborg, 2002), more than half of the events are about water for rural drinking water supply (Figure 6). This is followed by events that involve people using water for their animals and people using water for small-scale irrigation. In Con Cuong district, two types of uses dominate the events so far identified, namely small-scale irrigation and rural drinking water supply.

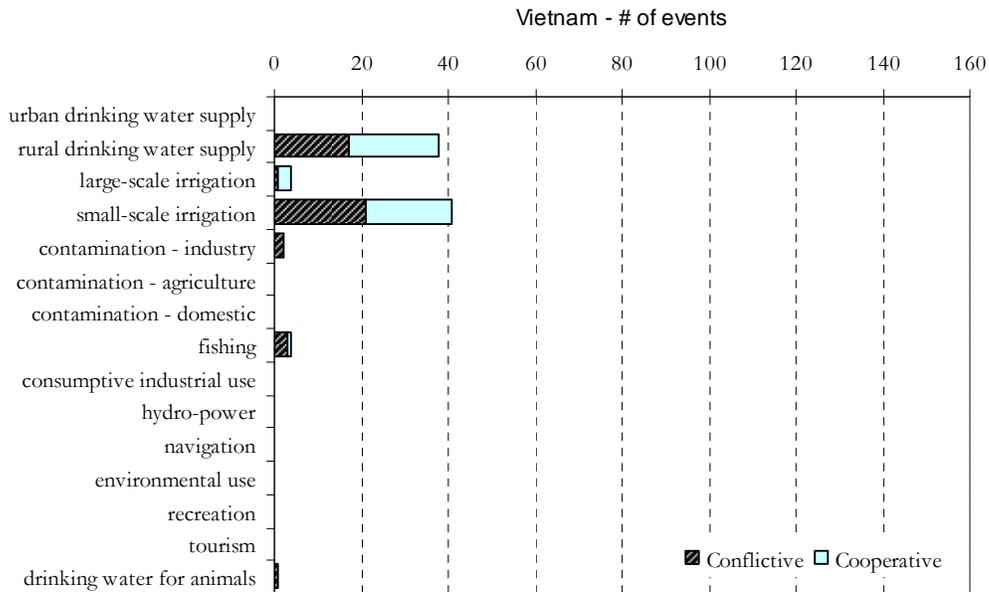
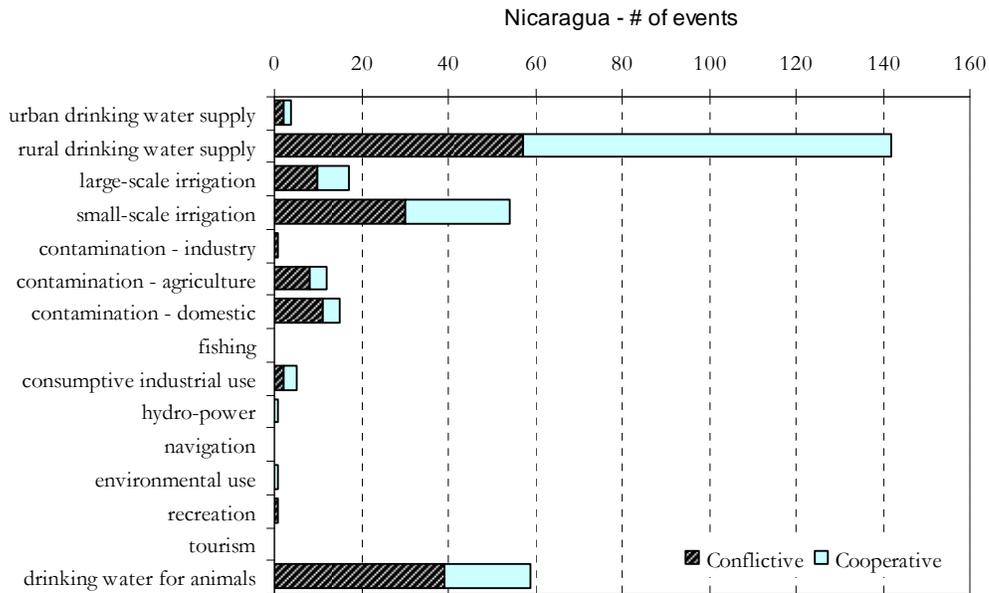


Figure 6
Uses involved in conflictive and cooperative water-related events, Condega district, Nicaragua, and Con Cuong district, Vietnam
Number of events

Given that so many water-related events and thus competitive situations appear to take place at a relatively limited geographic scale and involve a single use, it seems worthwhile to carefully consider the type of water governance, and particularly the organisational structure needed to address these competitive situations. Many countries, including Nicaragua and Vietnam are currently in a process of establishing new organisational structures for integrated water resources management (IWRM). In this context, it is worth noting that in about two-thirds of the conflictive events identified so far in Condega and Con Cuong districts, i.e. in situations currently without IWRM inspired local water management organisations, third parties have been called upon (Figure 7). Reflecting the localised character of the events identified so far in Condega and Con Cuong, it is particularly district government staff in Condega district and in Con Cuong district community government and district government representatives who tend to be called upon. In Condega, third parties are called upon both in conflictive and cooperative events, while the preliminary data from Con Cuong in Vietnam suggests that third parties tend not to be called upon in cooperative events. In the latter case, further analysis will be needed to establish the extent to which this is a result of e.g. particular governance structures, cultural norms or other features.

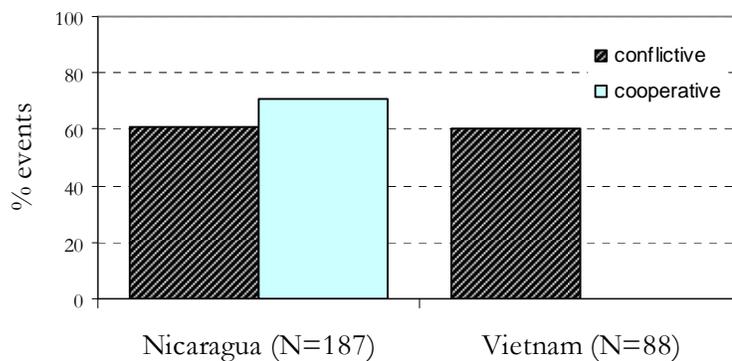


Figure 7
Third party involvement in conflictive and cooperative water-related events, Condega district, Nicaragua, and Con Cuong district, Vietnam
Percent conflictive and cooperative events in which third parties have been called upon

5. Concluding remarks

Knowledge of the nature, extent and character of local water conflict and cooperation can provide important lessons for sustained water governance, and yet little cross-cutting data exists on these issues. Our inventory work aims at filling this gap based on comprehensive empirical work in five highly contrasting research locations. While this work is as yet ongoing and will be complemented by further data collection (including in-depth studies of the more underlying and less quantifiable features), it seems clear that such data need to be given more attention at both policy-level and in specific water governance work. Two points for attention deserve mention at this point.

Firstly, insights into local water conflict and cooperation can help provide a better understanding of the types and issues of competitive situations that water governance regimes must be prepared to deal with. This is not least significant in the evolving context of development and climate change, where water needs and –availability are increasingly unstable and often unknown.

Secondly, such knowledge can help us understand better what is required to actually address the conflicts and cooperation that may develop from such competition. For instance, the extent to which most such conflicts and cooperation take place *within* rather than *between* communities (as indicated by our preliminary findings from Condega and Con Cuong districts) has important bearings for the way water governance mechanisms must be structured and developed. Likewise, the fact that already existing institutions such as community or district government institutions seem to play an active mediating or arbitrating role in water-related conflict (and in Condega also in water related cooperation), seems to suggest an important water governance role for institutions which do not necessarily have a strictly water-related mandate.

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