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Polycentrism and pitfalls: the formation of water users forums in the Kikuletwa catchment, Tanzania

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Catchment forums have to address the reality that river catchments typically cover several administrative districts and have overlapping arrangements of state-led and locally created institutions. Institutional nesting has been proposed to integrate local arrangements. However, the creation of a polycentric or nested governance system raises questions of coordination. This paper describes and analyzes the process of creating a catchment forum in the Kikuletwa catchment in Tanzania. Resolving the problem of administrative boundaries and institutional fit while integrating customary arrangements with the state-led governance structure requires careful analysis of local structures.

Keywords: catchment forum; polycentric governance; water users association; water conflict; participation; river committees

Introduction

A basin or catchment is considered to be closing when commitments for domestic, industrial, agriculture or environmental uses cannot be met for part of a year and closed when these commitments cannot be met over the entire year (Molle, Wester, & Hirsch, 2010). This situation often intensifies competition and sometimes leads to violent conflict over water (Komakech, Van der Zaag, & Van Koppen, 2012b). For such catchments, institutional arrangements that can coordinate the use of water across scales and levels are needed. Scale here is defined broadly as the spatial, temporal, quantitative or analytical dimensions used to measure and study objects and processes (Gibson, Ostrom, & Ahn, 2000). The concept of integrated water resources management places the participation of water users in decision making high on the agenda because it is thought to lead to better decision making and coordination.

Catchment forums have been proposed to provide spaces that allow water users to engage in meaningful dialogue and participate in decision making (Faysse, 2006; Robinson & Smith, 2010; Warner, 2005). They are multi-stakeholder platforms that involve representatives of different use sectors (agriculture, domestic use, hydropower etc.), as well as upstream and downstream actor groups. As platforms, they structure an arena where actors with competing interests meet and seek consensus on issues such as water allocation, negotiation of new rules and resolution of conflicts (Swatuk, 2008; Warner, 2005).

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Although catchment forums and stakeholder platforms are now important catch phrases for many international donors and governments, their implementation has fallen short of expectations (Faysse, 2006; Manzungu, 2002; Waalewijn, Wester, & van Straaten, 2005; Wester, Vargas-Velázquez, Mollard, & Silva-Ochoa, 2008). South Africa and Zimbabwe have experimented with catchment management agencies and catchment councils, respectively, but so far these institutions have failed to achieve stated policy goals (Dube & Swatuk, 2002; Goldin, 2010; Kemerink, Méndez Barrientos, Ahlers, Wester, & Van der Zaag, 2013; Manzungu, 2002).

The challenge is how to better organize catchment forums in practice. Scholars have proposed that large catchments be decomposed into smaller, distributed, autonomous decision-making sub-units that constitute simultaneously a whole and a part (Andersson & Ostrom, 2008; Lankford & Hepworth, 2010; Ostrom, 2010). The assumption here is that collective-action problems faced by large groups are decomposable into smaller problems solvable by small, semi-autonomous groups (Marshall, 2008). Water allocation and conflict can then be resolved within the sub-units and between them (Lankford & Hepworth, 2010). Modularizing catchments in this way simplifies monitoring, in that only a few points need to be checked. In addition, the sub-units can be based on locally pre-existing institutional arrangements. As multiple and overlapping decision-making centres retain considerable degrees of autonomy, this creates a nested polycentric governance structure (Marshall, 2008; Ostrom, 1990, 2010; Ostrom, Tiebout, & Warren, 1961). The feasibility of nesting is inspired by the positive evidence available on local capacity to self-organize and craft effective institutions for solving collective-action problems (Komakech & Van der Zaag, 2011; Ostrom, 1990, 1993; Wade, 1988). Even if this is possible, however, a number of serious concerns arise. There is no guarantee that a polycentric system will be able to find optimal combinations of rules at the various levels they operate at (Ostrom, 1999); though local institutional arrangements may be enduring, they are not necessarily equitable; and polycentric systems may in fact provide an opportunity for powerful actors to strengthen their networks, sustaining or even increasing inequity in water access.

Catchment forums have been a feature of recent water management reforms in Tanzania. Committed to decentralization by devolution, Tanzania formulated a Water Policy (2002) and enacted a new Water Act (2009) that provide for active participation of water users (Tanzania, 2002, 2009). Nine basin boards have been created, which are overseeing the establishment of lower-level structures, including catchment forums and water users associations. In the Pangani Basin, the basin water board and development partners (local and international NGOs) are piloting catchment and sub-catchment forums. The establishment of these lower-level structures aims to address emerging water conflicts.

This paper explores the process and formation of a catchment forum in the Kikuletwa catchment of the Pangani Basin. It considers the challenges that are faced in designing catchment forums following a nesting approach in a river catchment with a diversity of actors and institutional arrangements.

The following section provides a review of the concepts of catchment forum and polycentric governance. The next section introduces the case-study catchment and describes the institutional environment, focusing on state-led and locally evolved arrangements. The next presents the process and formation of sub-catchment water users associations in the Kikuletwa catchment. In the discussion section, some of the challenges and pitfalls are highlighted. The final section draws conclusions on the feasibility of a catchment forum as well as that of polycentric governance.

Conceptual review of catchment forums

The concept of a catchment forum draws from collaborative and communicative rationality theory and concerns a process whereby two or more actors pool their appreciation and capacities to address a problem that they cannot solve individually (Waalewijn et al., 2005). Three characteristics of a forum can be identified: voluntary participation of the actors; direct, face-to-face interactions among the representatives; and mutual consensus and agreement on action strategies by all affected parties (Brody, 2008). The concept is based on the assumption that as actors start talking, a process of learning takes place in which power gaps and institutional hindrances are broken down; as a result, actors' perceptions and definitions of the problem change, and converge (cf. Poncelet, 2001). Actors may revise their preferences in light of new information made available to them (Neef, 2009). Thus the belief is that once a catchment forum is established, equitable allocation and management of the water resources can be realized, because it provides an arena where users have equal opportunity to debate, rationally consider and reach consensus on water management problems at stake (cf. Brody, 2008). This would make it suitable for water-stressed catchments.

However, despite the idea of stakeholder participation having been known in the water management domain for some time, actual cases of meaningful participation, especially by poor water users, remain rare. Many scholars report that actors' participation in decision making and management often remains limited to consultation (Clever, 1999; Neef, 2008; Wester, Merrey, & De Lange, 2003). Warner (2005) argues that although actors do acquire new information and ways of thinking from participating, collaboration does not necessarily follow. Collaboration implies situations where decisions are made jointly, power is shared, and actors undertake collective action and accept the outcomes of their decisions (Brody, 2008). Catchment forums face an additional challenge, namely that catchments are often relatively large areas drained by several tributaries and falling in different administrative areas. Some tributaries may experience higher seasonal variability than others, and may not connect with the main stream during some months in the dry season. In such cases it is more difficult for users in different tributaries to acknowledge their hydraulic interdependencies.

Hence, nesting new catchment forums with lower-level self-organized arrangements has been proposed to overcome some of the coordination problems faced by many groups of users dispersed over a large area (Andersson & Ostrom, 2008; Lankford & Hepworth, 2010; Ostrom, 2010). In theory at least, this should allow the smaller, self-organized groups to become part of a larger system without losing too much of their identity and autonomy. However, the success of this approach depends on the identification of suitable sub-units and the mechanisms and services needed to support water dialogue within and between the sub-units (Neef, 2009). This is by no means simple in catchments with many diverse actors who have also developed different systems of water allocation and management.

Despite the perceived potential benefits of polycentrism, empirical evidence is lacking to demonstrate its success. The biggest challenge is the effective coordination of fragmented organizations that lack a central focal point (Sovacool, 2011). As each sub-unit may make its own distinctive rules, it is likely that a variety of governance arrangements will emerge to interact horizontally (across the same level) or vertically (across different levels of organization) (Marshall, 2008). It is unlikely that all these arrangements will be consistent with government policy objectives.

Case study: the Kikuletwa catchment

This section introduces the Kikuletwa catchment and then describes the attempts by the Pangani Basin Water Board and its collaborating partners to institutionalize a catchment forum.

Research methods

This paper is based on research conducted between August 2008 and September 2010 in the Kikuletwa catchment in Tanzania. Data on local institutional arrangements are derived from related research conducted on the emergence of river committees in the Themí sub-catchment (Komakech & Van der Zaag, 2011), cooperation between estates and small-scale irrigators in the Nduruma sub-catchment (Komakech, Condon, & Van der Zaag, 2012a), and on water right enforcement in the Weruweru sub-catchment. Information on the catchment forum process was collected through interviews and discussions with key actors (farmers, the Pangani Basin Water Office [PBWO], Pamoja Trust and SNV Arusha), field visits, mapping, and observations of the catchment forum process. The first author participated in seven workshops organized by the PBWO on the catchment forum. The paper also draws from grey literature obtained from the PBWO and from Pamoja Trust and SNV Arusha (a local and an international NGO, respectively).

Biophysical and socio-economic context

The Kikuletwa catchment covers the north-western part of the Pangani River basin (Figure 1a). The catchment area measures approximately 6650 km². It covers parts of six administrative districts and comprises 80 administrative wards. It is drained by 15 major rivers originating from Mount Meru and Mount Kilimanjaro. These rivers join to form the main Kikuletwa River before entering the Nyumba ya Mungu reservoir downstream.

The water users include small-scale subsistence farmers, two cities (Arusha and Moshi), a number of small towns, large-scale export/commercial farms, pastoralists, mines and tourist facilities. Kikuletwa River is the main source of water for the Nyumba ya Mungu reservoir, which regulates water for electricity production further downstream.

With the increase in population, people living along the slopes of Mount Meru and Mount Kilimanjaro now intensively farm their land. Farmers utilize most of the waters from streams and rivers originating in the highlands. As a result, the volume of water flowing from the Themí, Nduruma, Malala, Usa, Sanya and Kware Rivers has decreased drastically. Some sections of the main Kikuletwa River now periodically dry out.

There are many large-scale users, including the Tanzania Electric Supply Company (TANESCO), estates (coffee, horticulture and flower companies), and cities. TANESCO owns five hydropower facilities on the Pangani River, contributing about 17% of the electricity in the national grid.

The spiralling water demand is a source of competition and conflict between users within and outside the catchment. Tensions and sometimes violent confrontations occur between smallholder farmers and cities within the catchment (Komakech et al., 2012b), and between large commercial farmers holding government water use permits and smallholder farmers relying on customary water access rights (Komakech et al., 2012a). Every year, TANESCO attributes drops in its power production to wasteful water use by smallholder farmers. So far, attempts by the basin water board to regulate water use through issuance of water permits and construction of diversion gates have not solved the water-allocation conflicts (Komakech, Van Koppen, Mahoo, & Van der Zaag, 2011). Many of the diversion

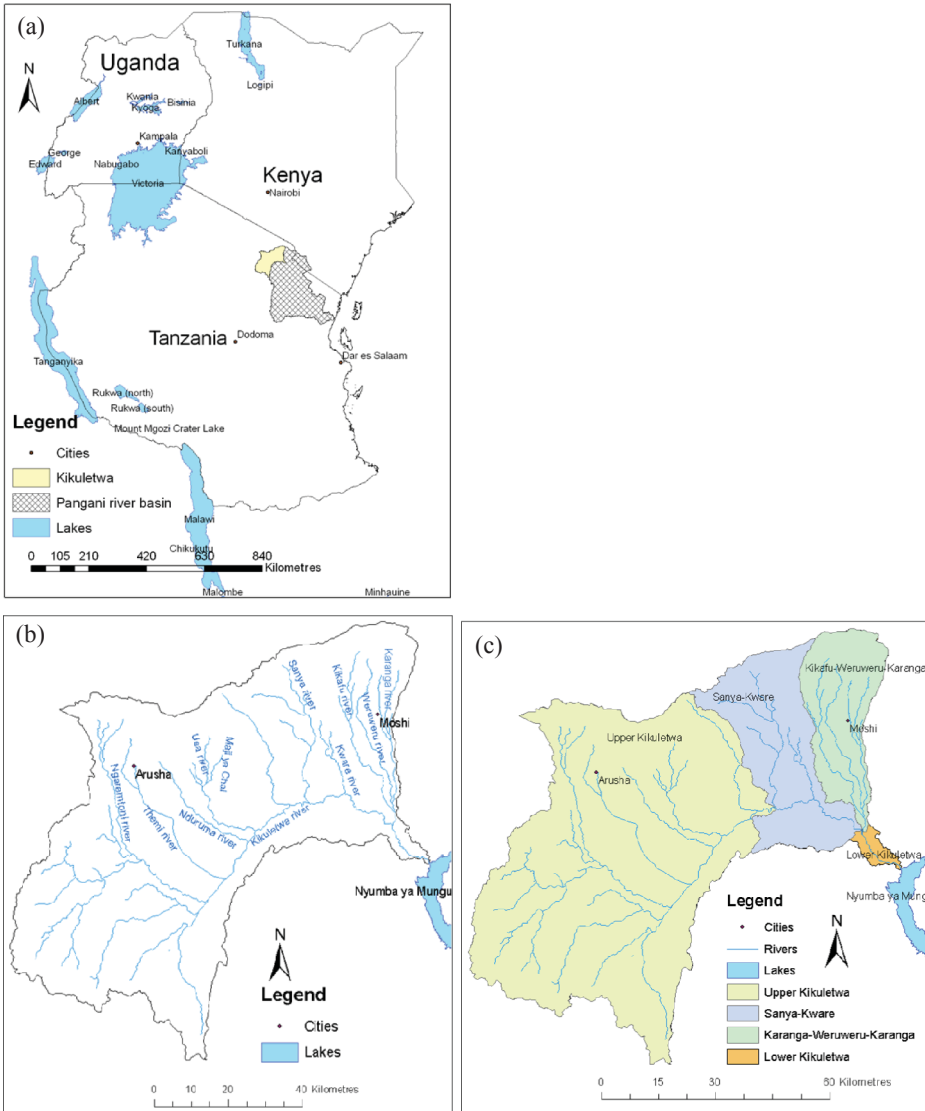


Figure 1. Kikuletwa river catchment: (a) regional location of Pangani River basin and Kikuletwa catchment; (b) major tributary rivers and Nyumba ya Mungu reservoir, located downstream; and (c) the four sub-catchment WUAs.

gates constructed between 1994 and 1997 have been sabotaged. Recently, smallholder irrigators have started using mobile water pumps, making it even more difficult for the PBWO to regulate water use. Water pollution from the two fast-growing cities is also increasing. These challenges, and the government policy of decentralization by devolution of management responsibilities, provided the backdrop for the PBWO’s introduction of catchment forums.

Kikuletwa catchment institutional environment and actors

The Kikuletwa institutional environment is a mosaic of locally evolved arrangements and state-led and NGO-created forms of water management. In addition, a variety of actors

have interests in the water resources of the Kikuletwa catchment. The existing institutional arrangements are here categorized as either state-led or locally evolved. However, this description is far from complete and should be seen as a preliminary sketch of a complex situation.

State-led water institutional arrangements

State water law was first introduced in Tanzania (then Tanganyika) by the German and British colonialists (Komakech et al., 2011). This state-led water law has since evolved to include water licenses, permits and rights issued by the competent government authority (in this case the Pangani Basin Water Board) to water users. All users now have to pay a mandatory one-time registration fee and an annual economic water use fee in proportion to the volume of water allocated and dependent on the type of use.

Tanzania's water policy and associated legislation provide for the establishment of formal catchment and sub-catchment water committees, and water users associations (Tanzania, 2002, 2009). The committees and water users associations are meant to coordinate and harmonize integrated water resources management plans, resolve water conflicts, and perform other delegated functions. A water users association (WUA) may be formed by agreement of the majority of users of a common stream to allocate water, acquire a water use permit, resolve water conflicts between its members, and collect water use fees on behalf of the basin water board (Tanzania, 2009).

The PBWO has created some WUAs, but very few remain functional (see Box 1). According to Pamoja (2006), most of the WUAs created were single-purpose user associations of irrigators. Some of the WUAs were registered as cooperative societies with the Ministry of Agriculture, Food Security and Cooperatives, while others were registered as associations with the Ministry of Home Affairs. The unclear registration process has made some of the registered users consider the water user association not "legitimate enough" to sanction their claims for water.

Box 1. Tegemeo water users association.

Tegemeo operates in Rundugai ward (Hai District). The association covers 5 villages (Rundugai, Kawaya, Mkalama, Chekimaji and Chemka) and represents about 900 households. It is reported that initial attempts by the Tegemeo WUA to collect water user fees led to a misunderstanding between the management of the WUA and the village governments. This is because in the past each village had its own way of collecting revenue. The village governments felt that the WUA leaders did not have the authority to collect a water user fee. Attempts to prepare a seasonal calendar showing which types of crops might be produced in which seasons of the year also failed. In the cropping calendar, paddy cultivation was prohibited in the dry season. Paddy rice farmers rejected the calendar because dry-season paddy fetches high market prices. The issue was brought to the government court but was never resolved.

Source: adapted from Pamoja (2006).

Local self-organized institutional arrangements

Alongside the state forms of water governance coexist locally evolved water-sharing arrangements that draw on local norms, customs and traditions. Many irrigation canals (locally called “furrows”) are managed by smallholder farmers (Komakech et al., 2011). Furrow leaders regulate water access for different users and arrange for periodic maintenance. In many cases they constitute the main link between the farmers and the state-led WUA and the village government. Individual farmers’ access to irrigation water from a particular canal is based on access to land in the command area, provision of labour for maintenance, affiliation with social networks and, in some cases, payment of entrance fees (Gillingham, 1999). Some of the furrows share river intakes and head canals and have formed water user groups to manage water allocation between them (see Box 2).

Box 2. Olbuso water users association.

The Olbuso water user group comprises three villages (Shambarai Burka, Shambarai Sokoni and Olbili) that share the Olbuso main furrow. The furrow serves an estimated 9000 people, roughly 3000 per village. The group applied for a water right in 1997 and was granted a collective right of 200 L/s by the Pangani Basin Water Office. Each village is represented in the water users association by its village water committee, village chairman and village executive officer. In total there are 75 representatives. Every three years, the 75 members elect a new management committee (general manager, deputy general manager, treasurer and secretary). All the village chairmen and village executive officers are also members of the management committee.

The Olbuso water user group is responsible for water allocation to the villages, arranging for maintenance and conflict resolution, payment of a collective water user fee to the PBWO, and representing the interest of the three villages at the Kikuletwa river committee level. They meet once a week (normally on Thursday) during the dry season. The water users contribute money for canal maintenance, a water user fee, and allowances for the general manager to attend the river committee meetings. The users’ contributions are collected by the village water committees.

Water conflicts are solved in a graduated manner. It is first tried by the water distributor of each village furrow, then by the village furrow water advisors (normally elders); if they fail, the case is forwarded to the chairman of the village furrow, then the village water committee, the village chairman, the water user group and eventually the river committee. If all these fail to resolve the conflict it is forwarded to the division secretary, the District Council or the PBWO.

Source: adapted from Pamoja (2006).

Some furrows have federated into a WUA and then registered as a cooperative society with the Ministry of Agriculture, Food Security and Cooperatives (Box 3). The registration allows them to access bank loans, apply for collective water rights and operate as an institution for credit and saving (Pamoja, 2006).

River committees have emerged to manage water allocation and resolve conflicts between groups of users, both large and small, using the same river source (Komakech & Van der Zaag, 2011). In total, seven river committees have been identified in the

Box 3. Mbukita water users association.

Mbukita is an association of the three villages (Mbuguni, Kikuletwa and Msitu wa Mbogo) served by the Kikuletwa, Msitu wa Mbogo and Kambi ya Tanga Mama furrows. The main intake supplying the three furrows is at Kambi ya Tanga and is referred to as Mbukita furrow. The association was first established in 1997 and was registered in 2001 as a cooperative society with the Ministry of Agriculture, Food Security and Cooperatives. The farmers applied for a water use right in 1997 and were granted a collective water right of 200 L/s by the PBWO. The association is managed by an elected board of nine members. Under the board are three committees: the finance and planning committee, responsible for accounting and development planning; the construction committee, responsible for maintenance; and the irrigation management committee, responsible for water allocation and conflict management.

The board's primary responsibilities are water allocation, conflict resolution and payment of water user fees. All members must pay a one-time registration fee of TZS200; buy five shares, each worth TZS5000; and pay an annual membership fee of TZS1000. In total there are 1000 users, but only about 300 have registered with the association. An elaborate procedure has been put in place for members and non-members of the association to access water. Non-members in Mbuguni ward using water must pay an irrigation season fee of TZS37,000 per hectare. Non-members who live in other wards but farm in Mbuguni pay an irrigation season fee of TZS120,000 per hectare. Association members who have rented land outside Mbuguni ward but use water pay an irrigation season fee of TZS12,000 per hectare. Members of the association pay a water distribution fee of TZS500 per irrigation season. Water theft is fined at TZS50,000. In addition, the association represents the interest of its members at the Kikuletwa river committee. The WUA works through the river committee for conflicts with other users of the Kikuletwa River. The Mbukita board is represented by the chairperson and vice chairperson in the Kikuletwa river committee. (The Mbukita chairperson was the general secretary of the Kikuletwa river committee during the period of field work.)

Source: adapted from Pamoja (2006).

catchment (four in Themis and one each in Nduruma, Weruweru and Kikuletwa). Most river committees in the catchment operate independently and do not presently communicate with each other (Komakech & Van der Zaag, 2011). Nor do they formally interact with the basin water board or office; however, they do work with local government institutions, i.e. district departments and ward and village offices. The local government institutions consider these self-initiated river committees legitimate and valuable in the local water management hierarchy.

Process and formulation of Kikuletwa sub-catchment WUAs

In 2003, the International Union for Conservation of Nature (IUCN, an international NGO), Pamoja and the PBWO entered into a partnership to implement a so-called dialogues project. This project, under the IUCN's Water and Nature Initiative (WANI), sought to mainstream the ecosystem approach in catchment and river basin management. In the Pangani it sought to contribute to efficient water resource management by building local

capacity to negotiate equitable solutions to water conflicts. A number of pilot activities in five sites in the Pangani River basin were carried out between 2003 and 2004. They involved improving irrigation infrastructure, creating dialogue platforms and facilitating negotiated agreements between local water users. Through a basin situational analysis study, several key challenges for water management were identified. One of the most significant of these challenges affecting water allocation in the basin was the rapidly increasing water demand due to population growth and economic activities. Based on the experiences gained, the partners initiated a new project to improve water governance in the Pangani River basin using the concept of integrated water resources management. A component was the establishment of catchment and sub-catchment forums. It was argued that water rights allocation to individual users would be better debated and resolved at the catchment and sub-catchment level. Other issues, such as releasing water from an upper catchment to a lower catchment (e.g. to meet downstream needs related to hydropower and environmental flow requirements), would be best analyzed and debated at the basin level.

The PBWO and the development partners then embarked on designing catchment forums, and the Kikuletwa catchment was selected as a pilot case. In 2005 a road map for the design of the Kikuletwa catchment forum was developed, and SNV, a Dutch development organization, was contracted to coordinate the forum process. Figure 2 presents the timeline of the Kikuletwa catchment forum project.

However, there were delays in the implementation of the project. The inventory phase was only completed in 2007, and thereafter things were stalled for nearly a year. Overall, the project turned out to be more complex than anticipated by the partners. First, there was the lack of a common understanding of what the forum was supposed to be. A complicating matter was that the catchment forum concept was not explicitly mentioned in the National Water Policy (2002). The National Water Sector Development Strategy 2006–2015 and the Water Act of 2009 only made mention of catchment and sub-catchment committees, as autonomous bodies financed from user charges that can be created to carry out functions delegated by the basin water board (Tanzania, 2002). The committees were foreseen as modest offices with a small, part-time staff and minimum administrative expenses. In contrast, the IUCN conceived the catchment forum much more ambitiously, as an arena where competing actors or their representatives could meet and dialogue on conflicting issues and find common ground. As a result, the partnership became locked in theoretical discussions of what a catchment forum was supposed to be and how it should be established.

Second, the organizational landscape study carried out by Pamoja (2006) identified several users groups and institutions already active in the catchment. How these actors and institutional arrangements would be involved in the process remained unclear. The project partners perceived the forum as something that would first be designed and then subsequently be given to the water users to implement. Third, the large size of the catchment further complicated this design.

In 2008, the forum process regained momentum as the road map was revised. In the new approach, a two-person core project team was created to run the process; this team was also made responsible for the project output. A reference group was constituted to guide the overall process. Given the large size of the catchment, it was decided to divide it into sub-catchments, and the focus turned to creating sub-catchment forums in each of them. It was envisaged that the sub-catchment forums would later federate to form the Kikuletwa catchment forum. In 2009, Kikuletwa was zoned into four sub-catchments: the Upper Kikuletwa, Sanya-Kware, Kikafu-Weruweru-Karanga and Lower Kikuletwa (Figure 1c).

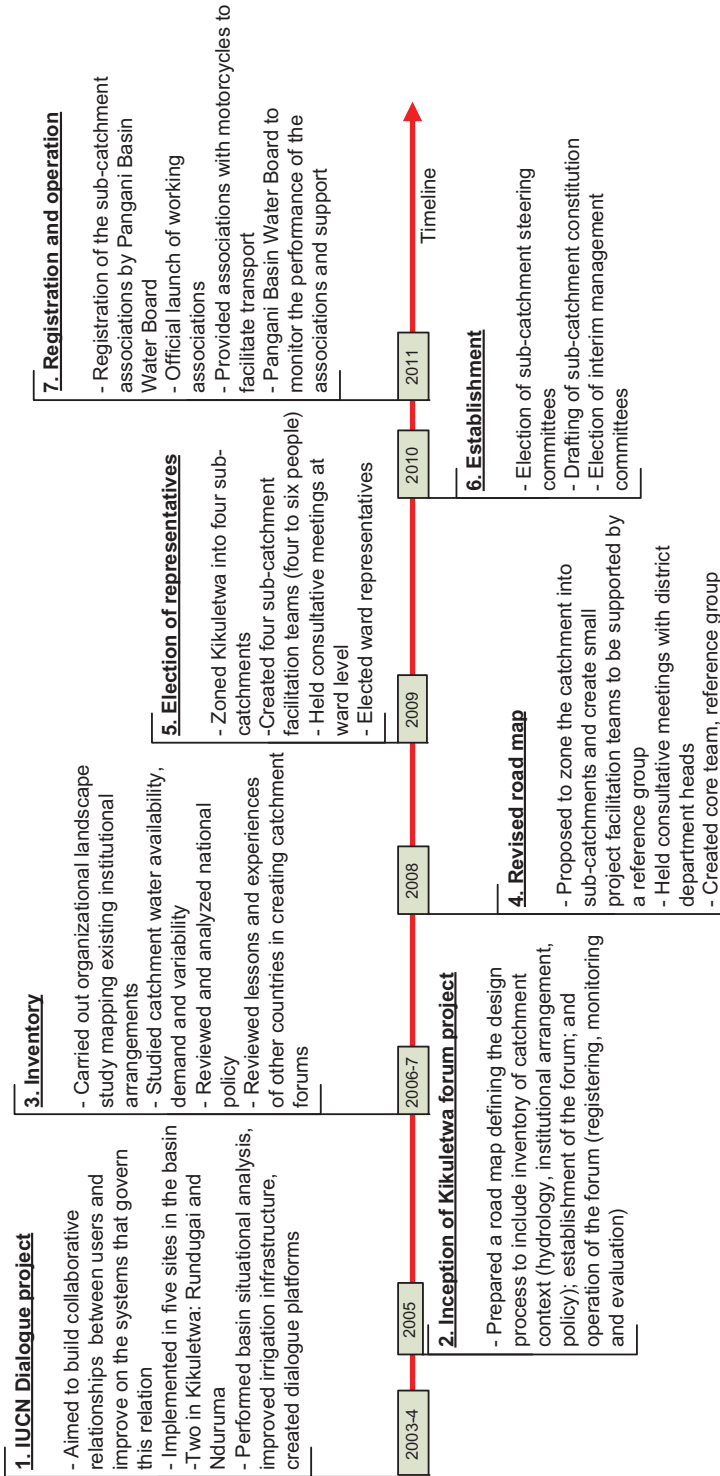


Figure 2. Timeline for the establishment of the Kikuletwa catchment forum.

However, in 2010 the sub-catchment forums were renamed sub-catchment WUAs. First, this was decided after the realization that in the Water Act of 2009 catchment or sub-catchment areas are declared by the order of the minister of water, which would entail a cumbersome administrative procedure. Second, the Water Act (2009) envisages catchment and sub-catchment committees as small entities – three to five members including the chairman, with at least one being a representative of major private-sector water users, up to two representatives of existing WUAs, and one from the local government authorities in the catchment area (Tanzania, 2009). Third, it provides that all catchment and sub-catchment committee members except the local government representative are to be appointed by the basin water board. Given the large number of different types of users (smallholder, commercial farmers, cities etc.) and districts in the catchment, it was nearly impossible to come up with meaningful representation. Thus, the “sub-catchment WUA” was created.

In creating the four sub-catchment WUAs, representatives were selected from each of the 15 tributaries of the Kikuletwa River. They were selected from elected ward representatives during several stakeholder consultative meetings conducted by the core team and four sub-catchment facilitation teams. In these meetings, each ward elected about 10 representatives. Over 70 wards elected representatives. Through four training workshops, the ward representatives were facilitated in electing from among themselves representatives for each of the 15 rivers to form the four sub-catchment WUA committees. Figure 3 shows the overlap and compromise between hydraulic and administrative entities; it depicts a complexity which is often overlooked in the discourse on catchment management and shows how people working in the Kikuletwa tried to resolve this.

After the four WUA committees were established, their members were trained to draft a constitution for their respective sub-catchment WUAs. The WUA constitutions, completed in August 2010, detailed their institutional structure, roles and functions (Figure 4).

The supreme body of each sub-catchment WUA is the general assembly of all river committees in the sub-catchment. The registrar role, performed by the Pangani Water

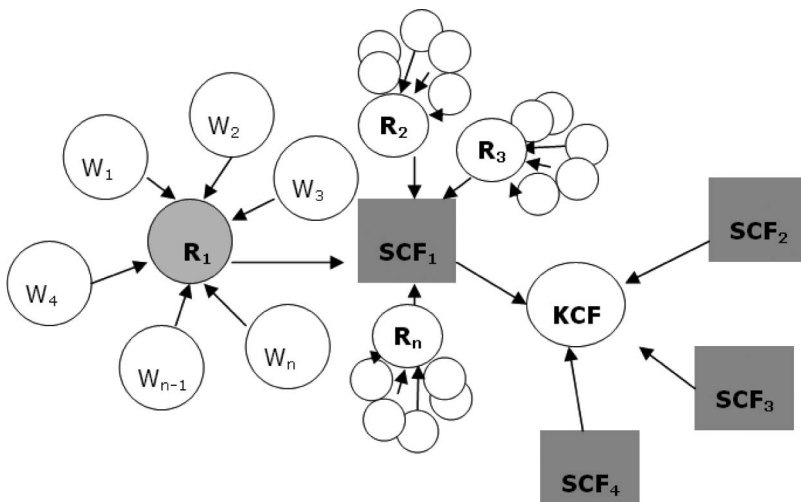


Figure 3. Schematic representation of the sub-catchment WUA committee selection process. W are elected ward representatives; R are elected representatives for the river systems; SCF are sub-catchment WUA committees; KCF is the Kikuletwa catchment forum to be formed by the four sub-catchment WUAs at a later stage.

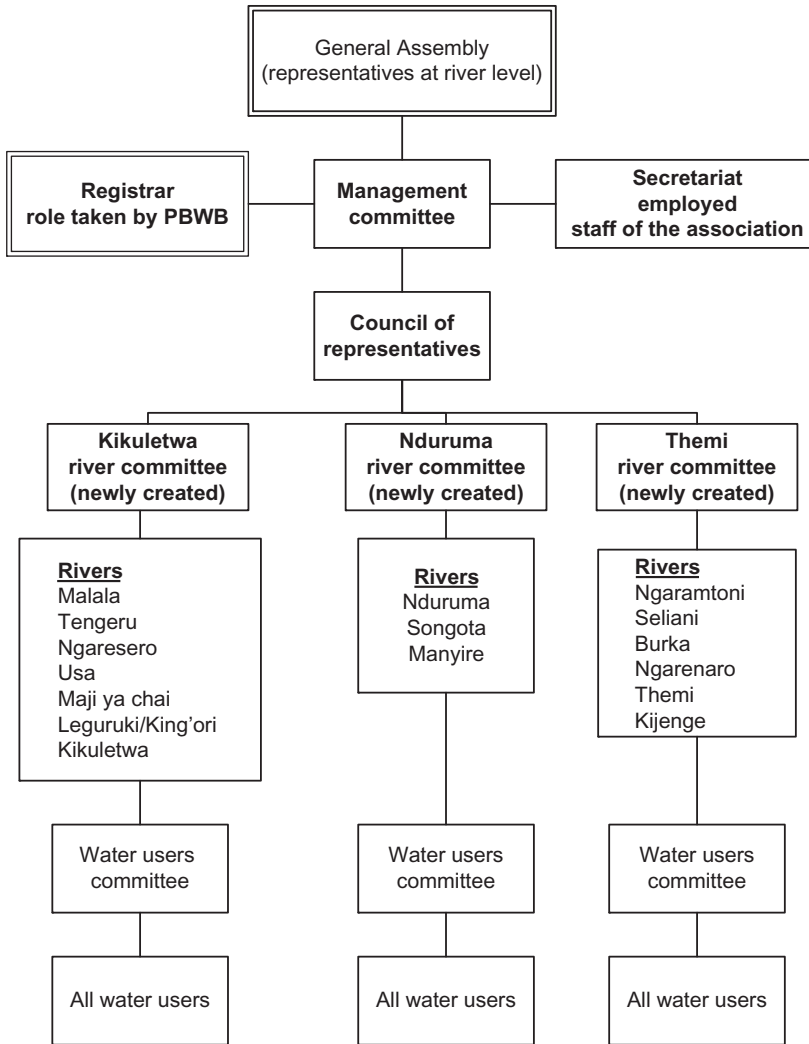


Figure 4. Proposed institutional arrangement of Upper Kikuletwa sub-catchment WUA. Source: PBWO (2010).

Board, includes registration of the association and technical support related to water resources planning and conflict management. The sub-catchment WUAs are expected to have offices and to employ a small staff to manage association records.

Attempts were made to integrate local arrangements; therefore, the local river committee was included in the WUA structure. However, the river committees mentioned in the sub-catchment constitutions are not the existing river committees created by the water users (Komakech & Van der Zaag, 2011). River committees were thus created afresh. In Them River, for example, a new river committee was created. Some members of the existing Lower Them, Seliani, Burka and Ngarenaro river committees were seconded as representatives to the new Them river committee. In Nduruma, too, a new river committee was formed, being a federation of the upstream and downstream water committees. The upstream committee was newly created, while the downstream was the existing Nduruma

river committee, originally created by the mid- and lowland farmers (see Komakech et al., 2012a). The sub-catchment WUAs were subsequently formally registered by the basin water board and inaugurated in early 2011. The Kikuletwa apex catchment forum had not been established by 2011. The PBWO stated that the apex forum would be created at a later stage when the sub-catchment WUAs are in full operation. The WUAs have been provided with office space and two motorcycles each and are encouraged to start registering water users in their areas of jurisdiction, implement water source protection laws, and resolve water conflicts.

However, the WUAs have encountered difficulties in exercising their authority over existing local arrangements. The authority of the Sanya-Kware sub-catchment WUA, for example, has been questioned by local resource users in the area, in particular those who rely on the Boloti wetland (Box 4).

Box 4. The Sanya-Kware sub-catchment WUA struggles to gain control of the Boloti wetland.

The Boloti wetland is located within the Sanya-Kware sub-catchment. The wetland receives water from the small Kishenge River, and its outlet drains into the Sanya River. It is being used by the Bondeni estate and two villages (Munguishi and Kyuu, of the West Masama and South Masama wards, respectively). Irrigation water is extracted from the wetland using pumps and buckets. The farmers mainly grow coffee, maize, banana, yams, tomatoes and vegetables. Both the Bondeni estate and the two villages have encroached on the wetland. In April 2010 the villagers formed an environmental group called Green Guard to manage and protect the wetland. They planted 2000 trees to demarcate the wetland area.

In March 2011, the chairman and secretary of the newly created Sanya-Kware WUA went to Boloti and ordered farmers to vacate the wetland area. They also told the farmers that all water users must register with the WUA and pay a membership fee of TZS20,000 to the WUA. This angered the Kyuu villagers and members of the Green Guard, who petitioned the environment secretary of Masama West ward. The environment secretary wrote a letter to the Pangani Basin water officer informing him that members of Sanya-Kware WUA wanted to own the Boloti wetland. He said that the WUA was not known to the villages. He also explained that the WUA represented only a few people in the Kware and Sanya areas and none from the villages using the Boloti. When a staff member of the PBWO went to confirm that the WUA was indeed responsible for water management in Sanya-Kware sub-catchment, including the Boloti wetland, the villagers again challenged the WUA's authority and legitimacy. The matter was taken to the government police by the WUA for settlement. After consultation with the villages, the PBWO and the WUA, the police advised the parties to solve the conflict outside the court.

The PBWO later organized a meeting with the villagers and leaders of the Sanya-Kware WUA. In the meetings, the PBWO informed the villagers that the WUA has been created following consultations with Hai District and wards within Sanya-Kware between September 2009 and March 2010. The PBWO cited the Environment Management Act of 2004 and the Forest Act of 2002, stipulating that wetlands were

Box 4. (Cont).

water sources that needed to be protected, and further that according to the Water Resources Management Act of 2009, all water users must acquire a water use permit. The villagers said they had never heard of any meetings or elections of the WUA. They saw the WUA as representing only a few people and noted that the awareness campaign on water resources management carried out by the PBWO had reached few people and even those who attended the workshops never provided feedback to the rest of the villagers. The villagers also claimed that they had never seen the draft constitution of the WUA.

Source: PBWO.

The Upper Kikuletwa sub-catchment WUA started with registration of water users within its area of jurisdiction, but progress was hampered by the large area of the sub-catchment. The existence of the WUA remained unknown to most of the water users. The Lower Themis furrow committees report that they are not aware of the existence of this WUA and its role. Although some members of the Lower Themis river committee have attended the Upper Kikuletwa sub-catchment WUA meetings, they have not provided feedback to the furrow committees. The Kikafu-Karanga-Weruweru and Lower Kikuletwa sub-catchment WUAs have not functioned since their establishment, despite being given motorcycles. By the conclusion of field work they had yet to start registering their members.

All four sub-catchment WUAs are facing financial difficulties. The sub-catchment WUAs were envisaged as being financed through member registration fees, annual contributions and fines. According to the PBWO, the water users should finance the operations of the sub-catchment WUAs since the associations were created in their interest, while it would provide technical support. However, none of the WUAs have yet been able to collect such monies. Currently all the sub-catchment WUA leaders themselves finance operational costs. This has affected their operation. The motorcycles have run out of fuel and have been parked.

Discussion: water institutional design pitfalls

There is a general belief that users' participation in dialogue and decision making over water allocation and management will reduce conflict in a catchment (Jaspers, 2003). But this requires creating an institutional structure that has legitimacy and is so recognized by all relevant actors. The catchment forum concept may be a good idea for effective participatory management of water-stressed basins; but its implementation in the Kikuletwa catchment has faced many problems. This section highlights some of these challenges.

First, Kikuletwa is a large and complex catchment, spanning 6 districts and a total of 15 tributary rivers. Some of the rivers are dry for most of the year due to overuse. It is therefore difficult to define the most appropriate hydrological management unit for decision making, especially if it also has to fit with the political-administrative territories.

Second, the actors with interests in Kikuletwa are diverse and extend far beyond its hydrological boundaries to include international NGOs, development banks and governments. Selecting representatives has proved difficult. Large users in the catchment, such as the large commercial farmers and TANESCO, never participated in the forum. The

hydropower stations of TANESCO are located downstream of the catchment, but the parastatal company is able to influence decisions at the basin water board.

Third, the institutional arrangements in the Kikuletwa catchment are messy, with overlapping jurisdictions between state-led and locally created institutions. The national government has attempted to restructure the spaces for participation through establishing the basin water board, the catchment and sub-catchment committees and the WUAs. However, these state-led arrangements are being layered on top of pre-existing local institutional arrangements. At the level of tributaries of the Kikuletwa River, water users have organized themselves into furrow committees, WUAs and river committees. Furrow committees work closely with the local village governments to allocate water and manage conflicts among individual farmers. Where two or more furrows have formed a joint WUA to manage water allocation between furrows sharing one river intake, the association is often registered as a cooperative society to secure loans from banks. River committees manage the allocation of water between the users of a part of a river and appear to be able to solve the coordination challenge experienced by upstream and downstream, large-scale and small-scale farmers (Komakech & Van der Zaag, 2011; Komakech et al., 2012a). These locally created water institutions can succeed because they are considered legitimate by the water users and the local government institutions.

Recognizing the complex environment in Kikuletwa, the Pangani Basin Water Board and partners chose to first form four sub-catchment WUAs and create the apex organization later. The apex organization has so far not been established. It can be argued that the modularization of Kikuletwa into sub-catchment WUAs allows polycentric governance that nests local arrangements. In practice, however, the new Kikuletwa sub-catchment WUAs are like islands of association, not well integrated with the existing arrangements. Water users do not see how the WUA is linked to their own governance arrangements (e.g. furrow and river committees) and constantly ask, "How do we benefit from paying memberships and annual fees to the WUA?" This is not surprising, because the process of forming the sub-catchment WUAs was highly centralized and can at best be described as a top-down approach that was branded as bottom-up. The forums were designed in the office, rolled out from the centre, and later handed over to the users. Although an organizational landscape study identified several local institutions (Pamoja, 2006), the forum designers were more interested in designing new structures.

The sub-catchment WUAs were envisaged as improving the active representation of water users in water management. As highlighted by the struggle over control of the Boloti wetland, the local farmers feel that the new associations benefit only a small group of users; in fact, the Boloti wetland farmers indicated that they are not willing to pay fees to an association that does not, in their view, have a mandate in water management. The PBWO and development partners, however, maintain that the sub-catchment WUAs do not diminish the legitimacy of locally established institutions. They argue that WUAs build upon these arrangements whilst allowing the local institutions to continue to function at a lower level (e.g. the furrow level) – and that the sub-catchment WUA committee members were not sufficiently trained in how to engage with existing local governance structures.

In addition, the sub-catchment WUAs may provide large water users an opportunity to strengthen their power network, sustaining inequitable water access and control. We observed this power dynamic in the struggle for control of the Boloti wetland. The current owner of the Bondeni estate claims that the wetland is part of his coffee estate, and in the past he has tried (but failed) to evict other farmers. The estate manager now supports the chairman of Sanya-Kware sub-catchment WUA. According to the estate manager, the farmers are encroaching on the wetland, thereby destroying its ecosystem, and should be

evicted. However, farmers interviewed said they were allowed to settle around the wetland by the first estate owner in the 1970s and that they have since made significant investments in the land.

The PBWO and its development partners appear to have missed the opportunity to up-scale locally evolved institutional arrangements. The locally created river committees could have been entry points for engaging meaningfully with the water users. The Kikuletwa project could have strengthened the river committees as forums where most if not all river users are represented. Currently most of the existing river committees only govern sections of rivers (see Komakech & Van der Zaag, 2011; Komakech et al., 2012a). But the river committees' objectives align well with ideas underlying the concept of integrated water resources management, for example those relating to managing water along hydrological boundaries and involving users in decision making. The river committees also integrate water management with local government institutions (villages, wards and districts). They are therefore able to transcend the problem of administrative boundaries and institutional fit (Ekstrom & Young, 2009; Young, 2003). The river committees could therefore become sub-units (cf. Lankford & Hepworth, 2010) in the catchment. The PBWO could see to it that the sub-units commit to transferring certain minimum flows downstream. However, this requires sound and detailed knowledge of local water resources. In the Kikuletwa catchment, the PBWO and partners tried to resolve the problem of administrative boundaries and institutional fit by selecting users' representatives at the river level from each of the administrative wards comprising a particular river. But this was insufficient to integrate customary arrangements with the state-led governance structure.

Conclusions

Active participation by the water actors is often considered to lead to better decision making and coordination. To engage actors in water dialogues, catchment forums have been proposed. Using the case of Kikuletwa, this paper highlights the difficulties of designing catchment forums in an African context. Creating a catchment forum in the Kikuletwa catchment was challenged by its large spatial coverage and its complex river system. The diversity of the actors with interests in the water resources made it difficult to find an appropriate representation model for water users. The multiplicity of institutional arrangements found in Kikuletwa complicated the problem of administrative and institutional fit.

This paper explored the relevance of a polycentric governance approach as a framework for integrating local and state institutions. The Pangani Basin Water Board and partners created four sub-catchment forums (in the shape of WUAs) that would later federate to form an apex Kikuletwa catchment forum. In so doing they tried to nest and up-scale institutional arrangements. But the sub-catchment WUAs were weakly linked to existing institutional arrangements, which made them ineffective.

An alternative strategy for promoting effective dialogue forums is to creatively strengthen local water management practices and organizations (Merrey, 2009; Merrey & Cook, 2012; Warner, Wester, & Bolding, 2008). This approach is based on the idea that institutions evolve through bricolage, a complex creative process where multi-identity actors adopt and adapt collective-action mechanisms from diverse sources, including existing rules, norms, styles of thinking, social relationships and social identities (Cleaver, 2002; Merrey & Cook, 2012). To succeed, any government, development organization or agency planning to create dialogue forums would need to understand the local water resource management context; that is, they should first invest in research to identify existing arrangements and understand their strengths and limitations. Subsequently, and

based on this understanding, a programme can be developed to strengthen the positive aspects of the existing institutional arrangements while attempting to minimize some of the negative aspects (such as gender inequity and power relations over water and control).

In the Kikuletwa, a pragmatic starting point for encouraging meaningful dialogue would have been to build on the existing river committees in each of the 15 major tributary rivers that comprise the catchment. Komakech and van der Zaag (2011) discuss the emergence of three river committees in a sub-catchment of the Kikuletwa. The river committees were all crafted using the existing principle of good neighbourliness, the rationale of local water allocation (e.g. an innovative, transparent and locally developed system of water allocation that is perceived as proportional and therefore equitable), and a traditional system of conflict resolution (e.g. the age-group system to guard and manage water adapted from the Maasai). The biggest challenge for this pragmatic approach would be to overcome one fundamental weakness of the water committees, namely that most of the existing river committees only manage parts of a river. Finding a way to motivate distant upstream users to agree to water-sharing arrangements would be key. The river committees would continue to manage water allocation between users within their river reach and could be issued a collective water use right on condition of ensuring some minimum outflow during the dry season for downstream use. This is already happening in other parts of the Pangani Basin (see Boxes 2 and 3). The Pangani Basin Water Board could then concentrate its efforts on monitoring the outflow from each river, and penalize committees if the minimum flow conditions were violated.

The Kikuletwa catchment forum process highlights the difficulties of crafting institutional arrangements that can coordinate activities at catchment and basin scales. The paper demonstrates the need of linking such larger-scale initiatives with existing, locally evolved arrangements. Resolving the problem of institutional fit while integrating customary arrangements with the state-led governance structure requires careful analysis of local structures.

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