



Rethinking the Role of Institutions in Water Resource Governance in Tanzania: What is Still Missing?

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Abstract:

The question of how the government would ensure water supply for its people while protecting the environment remains a challenging endeavour. Emerging water resource management challenges have driven governments to reform governance policies. This includes the introduction of formal institutions of water management. Additionally, the Tanzanian government adopted Integrated Water Resources Management (IWRM) frameworks. However, evidence indicates that establishing formal institutions (which replaced the informal ones) has achieved little in improving water supply and

ensuring sustainable water management. This study asks what is still needed to achieve sustainable water management in Tanzania. Using a systematic literature review, the study examined the experience of water resources management in Tanzania, particularly the formal institutions. The study found that formal institutions have been unable to ensure sustainable water resources management; they have weakened the informal institutions and attracted water conflicts. The study calls for considering and integrating the informal institutions (that have been serving communities for generations) in water resources management initiatives.

Keywords: *Water resources management, Institutions, Sustainability, Tanzania.*

Introduction

The debate on water institutions and rights has gained global momentum in recent years (Mosha et al., 2016; Gudaga et al., 2018). According to the World Bank (2015), an institutional arrangement is important in enhancing effective water resource governance. Globally, both developed and developing nations have embraced decentralisation to increase equity, efficiency and sustainability in governing natural resources, including water.

Over the past 40 years, the evolution of water institutions responsible for allocating and distributing water has been enormous (Mosha et al. 2016). In Sub-Saharan Africa (SSA), many countries dramatically transformed the water

institutional framework after the International Conferences on Water and Environmental Issues held in Dublin and Rio de Janeiro, Brazil (1992). Since then, water policy reforms have been adopted by various countries and international programmes (e.g. Global Water Partnership) as a way to reduce the public financial burdens and promote sound management of water (Merrey and Cook, 2012;)

In Tanzania, sustainably managing water in vast areas for millions of people has become a major challenge. Prompted by increasing pressure on water resources, the government has been trying to establish formal legal systems, fixing property regimes and formalising informal arrangements related to using this resource (Kajembe et al.



2009). The government hopes that these measures will provide efficient and transparent institutional frameworks for managing water resources. These formal arrangements replace traditional or informal arrangements established by different cultural groups to manage and utilise water resources (Maganga et al. 2004). Tanzania has developed several state agencies to manage water resources. These include the National Water Board, Basin Water Boards, Catchments and sub-catchments Water Committees, Water Users Associations, Regional Secretariats and District Councils. The Ministry of Water and Irrigation supervises these organisations.

While water has been regarded as the most precious resource that all societies depend upon (Wolf et al., 2005), a critical challenge for the water sector has been on how to meet sustainable water management in a situation of competition over water access (Mosha et al., 2016). Consequently, the demand for water resources is increasing worldwide because of competing uses, including domestic use, irrigated agriculture, livestock, wildlife, hydroelectric power generation, recreation, fishing and environmental maintenance (Kabote and John. 2017). In the context of climate change and rapid population growth, how to meet water needs has become the hottest topic of discussion worldwide. Hence, to realise water-related benefits in different global countries, there should be well-built, interlinked, and arranged water institutions at the national, regional, and local levels (Grafton, Garrick, and Manero 2019; Speelman, 2009). Some governments and water authorities are reforming their governance frameworks and water management institutions to achieve convergence between water supply and demand and sustain freshwater ecosystem services (Grafton et al. 2019).

In this paper, institutions have been defined as “arrangements between people which are reproduced and regularised across time and space and which are subject to constant processes of evolution and change”. Institutions are the ‘rules of the game’ in a society, the formal and informal rules, values, norms and constraints which provide incentives for

individual action and reliability (Cleaver 2000). Institutions play a critical role in determining the nature of access people have to natural resources and in influencing decision-making related to natural resource use, both in terms of who makes decisions and what those decisions are (Nunan et al. 2015). Socially embedded institutions are those based on culture, social organisation and daily practices, commonly called informal (Mosha et al. 2016).

Available studies indicate that the introduction of formal institutions of water management has achieved little in improving water use and management in Tanzania (Maganga et al. 2004; Maho et al. 2015; Mosha et al. 2016; Kahimba and Niboye 2019). Mosha et al. (2016) noted that introducing water rights and cost recovery systems has not yielded an intended management goal. This attribute is confirmed by the fact that some farmers have constantly been trying to adapt, contest, or re-mould the formal rules based on their experiences and socially embedded institutions that fit with their local conditions.

Studies indicate that the introduction of institutions in Tanzania that aimed at improving water management paid little consideration to customary arrangements of water use and management (Maganga et al. 2004; Mosha et al. 2016). Mosha et al. (2016) observed that with the introduction of formal water institutions, the clan and family heads that were traditionally responsible for managing and maintaining irrigation furrows and water resources were systematically eliminated in water management arrangements. Disregard of the informal institutions in water use and management has been linked to poor water management and the occurrence of water conflicts (Maganga et al. 2004; Kajembe et al. 2009; Mosha et al. 2016; Kahimba and Niboye 2019).

It is under these circumstances that the interest in conducting this study emerged. This study was interested in understanding the value of informal institutions in water management. This study asks how relevant informal institutions are in water use and control. What needs to be done to improve water management in Tanzania?

Theoretical Perspective

This study utilised a cultural perspective to analyse value systems in water use. Cultural perspective focuses on the fact that cultural values and social constructions of nature, including landscape, are at the centre of relationships between nature and communities (Schama, 1996; Posey, 1999; Li, Ying, Cheng, and Beeton, 2015). Local communities and indigenous people have value systems that link them to the natural world (Evans and Jackson, 2001; Awuah-Nyamekye, 2009; Infield, Mark and Mugisha, 2013). A study from Ghana, for example, demonstrates how the Akan indigenous religion and culture have been shaping how their community perceives the environment and how they have been relating to it (Awuah-Nyamekye 2009). Additionally, the environment in which people live is understood not only as a provider of food and shelter but also, as an identity (*ibid.*). Identity is understood as “all the different ways people construe themselves in relation to the earth as manifested in personality, values, action and sense of self which result in nature becoming an object of identification” (Zavestoski, 2007: 298).

Thus, culture is central if people are to understand the environment (Greider and Garkovich, 1994; Zavestoski, 2007). For example, Greider and Garkovich (1994) argued that people’s understanding of nature relies on cultural expressions defining them in this space. In other words, the natural environment in any given cultural group carries symbolic meanings and definitions that reflect the respective and often dominant cultural group. In turn, interaction with environmental resources such as water is shaped by the meanings people attach to the ecological resources (Greider and Garkovich 1994). Therefore, this study considers understanding cultural beliefs, values and social relations regarding water resources as central to improving water management.

To broaden our analysis to include an examination of power relations, this study applied Political ecology, which is also a key perspective in informing this study. According to Watts (2000), cited in Robbins (2004),

political ecology seeks to understand the complex relationship between nature and society through carefully analysing what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihood. Control over the use of natural resources and the capability to influence the actions of other actors vary between the actors, and this control is based on power. In this struggle, the powerful actors influence how weak actors can access and benefit from the resources (Bryant and Bailey (1997).

The power struggle over access and control of resources results in exclusion. Exclusion is defined as ways in which people are prevented from benefiting from things (Hall et al., 2011:7). Hall et al. (2011) discuss the power that facilitates exclusion; these are the power of regulation, force, the market and legitimisation. By regulation, exclusion happens by setting terms for the use of water resources within certain boundaries. The power of the market facilitates exclusion by setting price tags on resources and making them unaffordable for some (Myers, 2012). On the other hand, the power of force expresses instances where punitive measures will be taken against those who try to access resources. Legitimation is used to describe the techniques by the state to justify the exclusion of some resource users.

This study considers this theory useful to inform this study because it examines the fact that access to resources such as water resources is based on a power struggle. As demonstrated in this study, arrangements related to water access and management tend to put some groups into advantaged positions while others are disadvantaged. In return, this may attract further struggles between competing interest groups.

Methodology

This study applies a systematic review of the literature. The process entails reviewing the existing evidence in water resources management. This review focused on relevant studies of sustainable resource management in

Tanzania. Several steps were involved in this review, including a comprehensive literature review. In this stage, the researchers identified the research problem. They selected the main themes to focus on, such as water use, sustainable water management, and formal and informal institutions in water management.

An extensive literature search was conducted from databases such as Google Scholar, Web of Science, Research for Life, EBSCOhost, and Emerald. The accessed studies were then filtered to obtain the most relevant ones about the study's objective. A total of 20 studies were then selected out of 45 accessed studies. Analyses used in this study were only those published. These include books, book chapters, dissertations, articles, papers and reports. Unpublished materials were excluded from this study.

Finally, the selected studies were organised, analysed using content analysis, synthesised and then a report was prepared to answer the research question.

Results and Discussion

Policy Environment for Water Management in Tanzania

The social and economic circumstances prevailing today have made particular demands upon the country's water resource base and the environment, and its sustainability is threatened by human-induced activities (URT 2002). Over the past 20 years, these demands have intensified with the increase in population and concurrent growth of economic activities requiring water as an input, such as hydropower generation, irrigated agriculture, industries, tourism, mining, livestock keeping, domestic, fisheries, wildlife and forestry activities (URT 2002). Many people in the world rely on rain-fed agriculture, which is highly vulnerable to changes in climate variability, seasonal shifts, and precipitation patterns. In Tanzania, agriculture is the foundation of the Tanzanian economy since it accounts for about half of the national income, three-quarters of merchandise exports, and is the source of food, providing employment

opportunities for about 80% of Tanzanians. About 70% of Tanzania's crop area is rain-fed (Mahoo et al.2015).

In Tanzania, water management institutions have undergone various changes, reflecting changes in socio-economic, political and ecological conditions, as well as changes in international donor trends and pressure (Maganga et al. 2004). The changes have altered the institutional framework from clan and kinship-based (informal) to legal and regulatory frameworks. Major alterations have been made in water policies, legislations and related administrative structures that are judiciously established following formal requirements (Mosha et al. 2016).

Since the 1970s, several water institutions responsible for allocating and distributing water have evolved. This evolution has not yet provided a sustainable solution in water management and use since misunderstandings between the administration organisations and poor cost recovery from water fees are still common(Mosha et al. 2016). Under the new institutional Act No. 42 (1974), the Government of Tanzania owned the country's water resources and was fully entitled to charge its citizens. Formal rules and government departments/units officially regulated access and use of water. These initiatives weaken the informal rules and norms (Mosha et al. 2016).

Amendment Act No. 10 of 1981 set the foundation for water management along hydrological boundaries, and mainland Tanzania was divided into nine river basins (Sokile et al., 2003). A-Basin Water Office and Basin Water Boards manage each basin. As one of the measures of regulating competing water use and ensuring water resource sustainability, the government has introduced and strengthened the use of formal water-use permits (URT, 2009). Formal water-use permits are written certificates that state the purpose(s) for which water is sought, source from which it is to be drawn, proposed point of diversion, volume to be diverted, nature of existing and proposed hydraulic structures, and drainage and treatment (Caponera, 1992).

Integrated Water Resources Management (IWRM) was introduced in Tanzania in the early 1990s and was then incorporated into the national water policy in 2002 and water law in 2009 (Van Koppen et al. 2007). Among other things, the IWRM framework led to the introduction of Water User Associations (WWUAs). These associations will be responsible for local-level management of allocated water resources, mediation of disputes among users and between groups within their areas of jurisdiction, collection of various data and information, participation in the preparation of water utilisation plans, conservation and protection water sources, and catchment areas, efficient and effective water use and ensuring return flows, enforcement of the law and implementation of conditions of water rights, and control of pollution (URT 2002). This implies that users such as domestic users of water resources need to be members of a water user association, which, among other things, has a water user right and pays for the use of the water. In other words, using water resources without a water-user right is illegal. The Water Resource Act, 2009 stipulates that;

any person who diverts, dams, stores, abstracts or uses water from surface or underground water source, or for any such purpose constructs or maintains any works, shall apply for a Water Use Permit in accordance with this Act". (URT 2009: 382)

Challenges Associated with Formal Institutions in Tanzania

Studies demonstrate that the introduction of formal institutions of water management has achieved little in improving water use and management in Tanzania (Maganga et al. 2004; Maho et al. 2015; Mosha et al. 2016; Kahimba and Niboye 2019). Available evidence from Tanzania demonstrates that formal water management has failed to provide equitable service and meet human needs. A study by Kahimba and Niboye (2019), for example, noted that the system of water-use permits in the Ruaha sub-basin, Tanzania, failed to guarantee smooth water accessibility to pastoralists. The system of water permits has created more

tensions and conflicts between pastoralists (exempted holders of water permits) and farmers (holders of water permits).

Studies have also noted that the WRM framework facilitates the phenomenon of water grabbing. A study by van Eden et al. (2016) in the Wami-Ruvu River Basin in Tanzania noted that IWRM directly or indirectly facilitated water grabbing. This has been the case in Tanzania as policies have been attracting actual commercial investments. As a result, land and water grabs have led to new forms of water and food scarcities for local communities, and how land deals have been implemented has meant that some communities that used to have access to water and other resources connected to the land are now excluded from using these resources (Van Eeden, 2014). IWRM, as implemented in the Wami- Ruvu River Basin, cannot allocate water among water users fairly and equitably. Rather, water is being allocated to 'priority' users, namely commercial agricultural companies and investors, with detrimental outcomes for small-scale users. The study further noted that major power disparities among the water users in the basin, coupled with the physical and political complexities of water allocation that are rarely addressed through IWRM, the various new alliances have led to acts of dispossession that have excluded local water users.

Nevertheless, the Usangu catchment in the Southlands of Tanzania is among the areas with many water conflicts despite the introduction of the IWRM framework. The Usangu catchment is mainly surrounded by indigenous communities such as the Wasangu, who used to keep herds of livestock and cultivate in the lower side valleys. (Kahimba and Niboye 2019). However, with time, there has been an increase in population and numerous economic undertakings, which have triggered the complex and diverse groups of water users. This situation has led to acute competition over available water resources. The area now has more than five major competing forms of water use, namely domestic use, irrigation agriculture, livestock watering, Ruaha National Park, and hydroelectric power generation in Mtera and Kidatu (Kahimba and Niboye 2019). As one of

the ways to regulate the competing water use and to ensure the sustainability of water resources, the government has introduced the use of formal water-use permits and formal institutions, particularly Water User Associations (WUA) (URT 2009; Ngowi and Makfura 2015). Despite many efforts made by the government in an attempt to improve water management in Usangu catchment and Tanzania in general, available evidence indicates that Usangu catchment is characterised by not only many water conflicts but also a recurrence of water use conflicts (Kajembe et al. 2009; Ngowi and Makfura 2015; Kahimba and Niboye 2019).

Some studies (Ngowi and Makfura 2015; Komakech and Zaag 2011) claim that water user associations are better institutions for improved management of water resources and managing water conflicts, while they see the formalisation of water allocation as can lead to the exclusion of specific water users and generate water conflicts (Maganga et al. 2004; Mosha et al. 2016; Richards 2019). Richards (2019; Mdee, and Harrison 2019) have noted that the water users' association (WUAs has become the recommended collective way for dealing with conflicts and managing the resources. However, evidence suggests that WUAs can, in contrast to their stated aims, be exclusionary and elite-dominated, absorb limited resources, cause conflicts (between competing WUAs, and undermine other cooperative arrangements.

Informal Institutions in Water Management in Tanzania

Informal institutions include cultural norms, values, customs, beliefs and traditions governing individuals' behaviour in society regarding water use (Kabote and John. 2017). Informal institutions are also understood as socially embedded institutions based on culture, social organisation and daily practices (Mosha et al. 2016). Informal institutions have roots in the local communities and are embedded in the existing customs, traditions, norms, beliefs, folklore and tales (Sokile and Koppen, 2004). Unlike formal ones, informal institutions are not purposively designed but evolve through continuous interaction (Saleth Dinar, 2004). This

implies that everyday interaction between members of a particular society shapes how they relate to natural resources. With time, such interactions become internalised and shape daily life.

In Tanzania, the introduction of institutions that aimed at improving water management paid little consideration to customary arrangements of water use and management (Maganga et al. 2004; Mosha et al. 2016). Mosha et al. (2016) observed that with the introduction of formal water institutions, the clan and family heads that were traditionally responsible for managing and maintaining irrigation furrows and water resources were systematically eliminated in water management arrangements.

The national water policy of Tanzania (2002) does not mention the role of informal institutions in water resource management. The policy mentions institutions for water management, namely, water basins, catchment committees, water user associations (WUAs or water user groups (WWUGs. All these are formal institutions. In many river basins in Tanzania, both formal and informal institutions exist. However, how they function is not well understood. In most cases,, the government ignores informal institutions, even though formal and informal institutions are closely linked and greatly depend on each other (Mahoo et al., 2015). Failure to consider the value of informal institutions in water use and management has been associated with increasing water conflicts (Maganga et al. 2004; Mahoo et al. 2015; Mosha et al. 2016; Kabote and John 2017).

This study finds that the Tanzanian government has made a lot in terms of efforts to improve water resources governance and use. However, little attention has been paid to including informal institutions in water management and water conflict mitigation. In the context of Usangu catchment, many studies have been conducted to understand water management and conflict (Sokile and Koppen, 2004) Kadigi et al. (2008) (Kajembe et al., 2009)(Ngowi and Makfura, 2015). However, there is a lack of understanding of what informal institutions exist

and their role in water resource management and mitigating water conflicts.

Available evidence indicates that informal institutions are valuable in water use, management, and resolving water conflicts (Sokile and Koppen 2004; Strauch and Almedom 2011; Mosha et al. 2016). However, in Tanzania, informal institutions are undermined in water use and management (Sokile and Koppen 2004; Maganga et al. 2004; Strauch and Almedom 2011; Mosha et al. 2016; Mosha et al. 2016; Kabote and John 2017 Kahimba and Niboye 2019)

Nevertheless, evidence exists on the availability and successful stories of informal water management institutions. For example, Kahimba and Niboye (2019) noted that the Ruaha sub-basin was traditionally a grazing and cultivation area. The indigenous communities, such as the Wasangu, used to keep herds of livestock and cultivate in the lower side valleys. All the ethnic groups in the basin had some levels of customary arrangements for accessing and allocating water for their livelihoods and for conserving water resources (Maganga, 2003; Sokile et al., 2003).

The study by Solike et al. (2005) demonstrates the traditional institution for water management in the Mkoji Subcatchment; namely, *Njaanwa* had two ways of associating for implementing water rotations called *kamati ya zamu* and a duty-based canal cleaning committee called *nsaragambo* or *maendeleo*. These traditional institutions were able to manage water demand variations in dry and wet seasons. Additionally, in Mkoji substatement among the local ethnic group of the Wasafwa, an array of traditional leaders is called *mwene* (Pl. *mamwene*). *Mwene* is a chief to this ethnic group. Each *mwene* commands an area of roughly a new ward. The powers of *mamwenes* are more elaborate in water and natural resources management, where they enforce customs and traditions against cutting riparian trees, cultivating on water banks and polluting water bodies.

Studies in the Pangani and Rufiji basins demonstrated that access to land and water for irrigation for the majority of people is regulated

according to customary norms and rules Boesen et al. (1999). An example is given about the Musa Mwinjinga irrigation scheme, where an elder *Mzee wa mfereji* supervises the operation and maintenance of the scheme. The traditional irrigation scheme has been successful for years. The same has been reported about the Nyerere irrigation scheme in Usangu plains (Maganga et al. 2004).

A study by Strauch and Almedom (2011) in Sonjo ethnic group of northern Tanzania provides an interesting example of the traditional management of water resources. In this group, a prominent group of spiritual village elders called *mwanamijie* (*benemijie* singular) governs natural resources for the community. The *mwanamijie* protects forest and water resources, oversees water distribution, levy fees on people who violate local customs, and conducts religious ceremonies.

Evidence from the above studies suggests that customary arrangements related to water use and management (or broadly how communities interacted with the resources) have existed for generations. These arrangements have been vital since they were embedded in the norms and values of respective groups. These arrangements still prevail in contemporary society, as evidenced in several communities in Tanzania. These informal institutions can help improve water management. As evidence indicated, they have functioned well in cited examples. This study does not suggest that the informal institutions will address all water management challenges; rather, it will improve management and help mitigate water conflicts.

Conclusion

This study has demonstrated that the Tanzanian government has tried several ways to manage water sources. These efforts are presented in the evolution of water institutions. The evolution process of water institutions might be understood as an outcome of the government's efforts to address emerging challenges concerning increasing water demand and multi-use (Mosha et al. 2016). This evolution

represents a shift from ideas of collective provision to more liberal ideas in which water is viewed as an economic good. This shift implies that clan and family heads that were traditionally responsible for the management and maintenance of irrigation furrows and water resources, for example, became dysfunctions (Moshia et al., 2016; Maganga et al., 2004). The evolution, however, has not solved water management challenges and mitigated water conflicts. For example, despite many efforts done by the government in an attempt to improve water management in Usangu catchment and (as in many other parts of Tanzania) available evidence indicates that the Usangu catchment is characterised by not only many water conflicts but also the recurrence of water use conflicts (Kajembe et al. 2009; Ngowi and Makfura 2015; Kahimba and Niboye 2019). In some places, farmers in irrigated areas manoeuvred, contested, or re-mould the formal rules based on their experiences and socially embedded institutions that fit with their local conditions to continue benefitting the resource.

This study argues that the long-standing notion that the organisation of management as a solution to water management challenges needs to be avoided, and informal arrangements should be incorporated. As evidence suggests, socially embedded institutions are critical in natural resources management. Any attempt to formulate new institutions and organisations should take on board the experience and functionality of local norms that impact the grassroots level (Moshia et al. 2016).

The study calls for reconsidering the role of informal institutions in water resources management. As evidence indicated in this study, efforts by the government to introduce formal institutions for water resources have not managed to overcome all challenges related to water. Additionally, evidence has been provided on how informal institutions have been useful in water management for years; the need to rethink water resources management is critical, especially in climate change and increased competition of multiple users. This study argues that integrating formal and informal institutions would improve the current situation and thus

enhance sustainable water resources management.

Conflict of interests

No conflict of interest.

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