The Role of Cultural Institutions in Sustainable Management of Water for Production: A Case Study of Karamoja Sub-region in Uganda

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Abstract

This study examines the role of cultural institutions in sustainable water management for production in the Karamoja sub-region of Uganda. Water is crucial for human survival and sustainable development, intersecting with critical global challenges such as food security, health, and poverty eradication. Despite various government-driven models for water management, including Community-Based Management Systems (CBMS), Farmer Field Schools (FFS), and Public-Private Partnerships (PPPs), the exclusion of cultural institutions undermines the sustainability and operational efficiency of water management facilities. Drawing on a qualitative exploratory design involving 252 participants from nine districts, we investigated the reasons behind the exclusion of cultural institutions and the potential benefits of their integration into existing water management models. The findings reveal significant barriers, such as rigid administrative structures, profit-driven motives, and capacity limitations, which hinder the effective collaboration between formal institutions and cultural leaders. The study underscores the critical need for policy reforms and capacity-building initiatives to establish inclusive frameworks that integrate cultural institutions into formal water management systems. The researchers also highlight the

potential for enhanced community ownership, improved sustainability, and utilisation of indigenous knowledge. Future research should focus on developing integrative frameworks, conducting longitudinal impact assessments, and exploring successful cultural institution integration case studies in different regions to inform policy and practice.

Keywords: Cultural Institutions, Water for production management models, Karamoja Sub-region, Uganda

Introduction

Water is a crucial resource necessary for human survival and sustainable development. The United Nations (UN,2012) underscored water as a fundamental element that intersects with numerous global issues, such as energy generation, food security, health, peace, security, and poverty eradication. Sustainable water management ensures immediate and long-term viability in regions prone to agricultural challenges like drought and water scarcity. According to the UN (2012) report, responsible water resource management in agriculture is a key factor in guaranteeing global water security, given that agriculture currently utilises 70% of all water withdrawal. The sustainable management of water resources is critical for ensuring long-term availability and quality, particularly important for agricultural production, energy generation, and domestic use.

The role of institutions in managing water resources sustainably has gained increased attention due to the complexities associated with water governance, including diverse stakeholder interests, environmental challenges, and socio-economic factors (Gany, 2001; Fromageau, 2011; UN, 2012; Galvez & Rojas 2019; Heinrichs & Rojas, 2022; Santos, Carvalho & Martins, 2023). Institutions play a pivotal role in the sustainable management of water resources by setting policies, regulations, and frameworks that govern water use and distribution. Effective water management institutions, particularly those at the grassroots level, are essential for implementing Integrated Water Resource Management (IWRM) strategies to balance social, economic, and environmental needs (Loza et al, 2024). The UN (2012) reported that institutions are responsible for managing the uncertainties and risks associated with water resources, which include variability in water availability, climate change impacts, and the competing demands of different water users. For example, research conducted by Galvez & Rojas (2019), Santos et al (2023) and Heinrichs & Rojas (2022) revealed the significant influence of heritage on shaping water management practices. A qualitative study conducted by Ardana, Suparwata, Sudrajat, Chatun, & Harsono (2024) among the Subak farmers and water temple priests revealed that the Subak system in Bali plays a significance role in shaping cultural identity, fostering community cohesion, and preserving spiritual traditions. In the context of South Africa, Mbele and Mubangizi (2023). Established that effective water resource management strategies require a comprehensive understanding of local water resources, user needs, and environmental conditions, as well as solid partnerships and collaboration among

traditional leaders and other stakeholders. In combination, these studies underscored the vital role of cultural institutions in preserving historical traditions, engaging communities, and integrating cultural values into contemporary water management approaches.

Furthermore, historical water management systems, such as the Dujiangyan irrigation system in China, demonstrate how ancient engineering techniques and cultural rituals have sustained water conservation efforts over millennia (Galvez & Rojas, 2019; Eurpoe, 2017; Heinrichs & Rojas, 2022). The Dujiangyan system, which includes annual maintenance rituals honouring water deities, exemplifies the deep-rooted cultural significance of water in Chinese society and its contribution to sustainable water management. Similarly, the Subak system in Bali, Indonesia represents a unique blend of religious beliefs, communal cooperation, and traditional irrigation techniques (Gany, 2001; Eurpoe, 2017; Ardana et al., 2024). This system ensures equitable water distribution for agriculture and reinforces social cohesion and environmental stewardship through its adherence to the Tri Hita Karana philosophy, which emphasises harmony between humans, nature, and the spiritual realm. In many regions of Africa, researchers note the value of more holistic approaches to water governance and recommend that governments embrace traditional leaders and self-regulation through local-level management actions and governance systems (Pollard &Cousins, 2014; Awuku, 2016; Mubangizi, 2021)

The capacity of formal water management institutions significantly affects their ability to implement sustainable practices. Institutional capacity refers to the availability of resources, knowledge, and skills required to manage water resources effectively (UN, 2012). Often formal institutions are constrained by limited capacities. Literature on good governance suggest that public participation is crucial for the success of water management (Gany, 2001; Meinzen-Dick & Bakker, 2001; Fromageau, 2011; UN, 2012; Galvez & Rojas, 2019; Santos et al., 2023). Ardana et al. (2024) highlight the importance of acknowledging the interconnectedness of ecological, cultural, and socio-economic dimensions to foster collaboration among stakeholders. The authors argued that collaborative effort is essential for ensuring sustainable management of water resources and infrastructure. UN (2012) mentioned that good governance ensures that water policies are equitable and inclusive, addressing the needs of all stakeholders, particularly vulnerable and marginalised communities. The review shows that there are limited studies on how traditional cultural institutions are integrated with modern governance frameworks to enhance water management institutions' capacity to implement sustainable practices in Uganda specifically in the semi-arid regions.

Literature also suggests that the governance and management of water for production in Uganda involves a complex interplay of policies, institutions, stakeholders, and practices aimed at balancing water demand with supply while maintaining ecosystem health and ensuring equitable access. Achieving sustainable water management necessitates participatory decision-making processes (Rogers & Hall, 2003), clear allocation of water rights and responsibilities (Meinzen-Dick & Pradhan, 2002), and the enforcement of water

regulations and standards (Saleth & Dinar, 2004; Saleth, 2018). Additionally, implementing water pricing and tariffs that reflect the true cost of water (Rogers et al., 2002) and providing financial incentives for water-saving technologies and practices (OECD, 2012) are crucial. These practices align with best practices observed in Kenya and Australia, Kenya, South Africa and Mexico.

In Australia for example, the Murray-Darling Basin Authority (MDBA) oversees the management of water resources in the Murray-Darling Basin (UN, 2012). The MDBA implements policies and plans to ensure sustainable water use, environmental protection, and economic development. The governance framework of the MDBA includes mechanisms for stakeholder engagement, transparent decision-making, and adaptive management to respond to changing conditions. Similarly, community-based water management initiatives in Kenya have effectively promoted sustainable water use and enhanced local resilience (UN, 2012). These initiatives involve local communities in decision-making processes, capacity building, and the implementation of water conservation practices. Further, Wester, Merrey and De Lange (2003) have shown that Mexico and South Africa are putting democratic stakeholder representation in river basin management into practice. Drawing on lessons from the Lerma Chapal river basin in central Mexico, and the Olifants river basin in the North East South Africa, Wester *et al*. (2003) show that, through policy and legislation, the two countries have committed to the ideals of equitable, productive and sustainable water management and stakeholder participation.

In Uganda, the government employs various models to manage Water for Production (WfP), including public-managed, public-private partnerships, community-based, and hybrid farmer-based systems. These models oversee all management, operation, and maintenance levels for irrigation schemes and valley tanks (MWE, 2020). Despite these efforts, numerous challenges persist, such as inadequate technology, ineffective management structures, limited community participation, and constrained financing (MWE, 2020; MWE, 2023). These issues result in poor maintenance and operational inefficiencies, impacting the effectiveness of water management facilities. In the semi-arid Karamoja sub-region, where water is crucial for pastoralism and agro-pastoralism, the government and development partners have constructed 133 WfP facilities. However, these face similar challenges, with only two reported fully operational (MWE, 2023). A significant research gap exists in integrating traditional cultural institutions with modern governance frameworks to enhance water management capacity tailored to Uganda's unique socio-economic and environmental contexts, particularly in the Karamoja region. Addressing this could improve the sustainability and resilience of water resource management in Uganda.

Statement of the Problem

Water is essential for life, economic activities, and social development, necessitating sustainable management incorporating a diverse range of social, cultural, economic,

technological, legal, and environmental considerations. In Uganda, the Ministry of Water and Environment has implemented various management models to enhance water production facilities' sustainable use, operation, and maintenance nationwide. In the Karamoja sub-region, models such as the Community Based Management System for earth dams and boreholes, the Farmer Field School Management Model for valley tanks, and the Farmer-Based Management Organization model have been adopted to improve irrigation management. Despite these efforts, while defining stakeholders' roles effectively, the Farmer-Based Management Organization model fails to integrate cultural institutions like the region's Council of Elders and Kraal leaders. This omission has led to significant challenges in the sustainability and maintenance of water facilities, evidenced by issues like poor operation and maintenance practices, low funding, failure to monitor water quality, vandalism, and delayed repairs, as reported by the Ministry in 2023. Consequently, this paper investigates why cultural institutions have been excluded from government water management models in Karamoja and explores the potential benefits of their inclusion, aiming to identify and refine water management practices in the region.

Methodology

The research was mixed in nature and utilised an exploratory research design. This approach was chosen due to the limited understanding of why cultural leaders were excluded from water production management models in the Karamoja subregion. According to Miles, Huberman & Saldana (2020), exploratory research allows for flexible methods and approaches to gain unexpected insights. Therefore, the research focused on exploring and understanding the reasons behind the exclusion of cultural institutions from water for production management, as well as identifying the benefits of involving cultural leaders, without seeking definitive answers or testing hypotheses. The study included nine districts from the Karamoja subregion: Karenga, Napak, Moroto, Amudat, Abim, Kotido, Nakapiripirit, Kaabong, and Nabilatuk. The respondents and participants were stakeholders with vested interests in water for production. Some were government political and technical leaders responsible for managing water-for-production facilities, while others were water users.

In each district, one sub-county and one water-for-production facility (WfP) were purposively selected to take part in the study. At the district level, the study involved participation from the District Chairperson, Secretary for Production, Chief Administrative Officer, two staff members from the Production department, Community Development Officer, District Water Engineers, and one cultural leader who was purposively selected. One sub-county was chosen per district, especially those with the majority of the WfP facilities in a given district, with the WfP facility being functional at the time of the study. The study involved the participation of the LC3, Sub-County Chief, Subcounty Agricultural Extension Officer, and Sub- County Community Development Officers. In addition, one Kraal leader close to a selected WfP facility and a caretaker for the facility were

conveniently selected. The selection of cultural leaders aimed to assess the willingness of cultural leaders to participate in management of water for production facilities.

For each WfP facility chosen, a Water User Committee (WUC) comprising 5-7 and 8-10 pastoralists/water users were conveniently selected to participate in the Focus Group Discussion (FGDs). The focus group targeted pastoralists/ water users who had brought their animals to access water at the WfP facility. The primary data collection instruments consisted of open-ended questionnaires and an interview guide. Secondary sources focused on published documents and archival records, particularly the Policies, Projects, Initiatives & Strategies (PPIS) obtained from web-based platforms. PPIS data encompassed government reports, organisational documents, and program evaluations. Emphasising the wide availability, versatility, and reliability of PPIS data, Komakech, Namara, Kaguhangire-Barifaijo, Kyohairwe, Nabaho & Bigabwenkya (2024) noted its ability to provide comprehensive information and insights into specific issues or problems. Data collected from Key Informants using open-ended questions and Focus Group Discussions (FGDs) were coded in thematic themes and then analysed using frequencies and percentages. Similar responses were aggregated under one theme to avoid generic and uncoordinated information, following Tracy's advice (2013). The analysis involved interpreting and making sense of qualitative data rather than complex statistical analysis.

Scholars such as Yin (2018) and Komakech et al. (2024) argue that incorporating multiple data sources in predominately qualitative studies improves data credibility. Therefore, the researchers ensured the reliability and validity of the data by focusing on establishing trustworthiness through conformability and flexibility in the research. Conformability was achieved by cross-checking collected data during interviews and the transcription process. The researchers double-checked the final analysed data against the transcripts to ensure the completeness of the information and to confirm that no significant findings were overlooked. Verbal consent was obtained from all study participants after clearly explaining the study's purpose. Pseudonyms were used to maintain the anonymity of the study participants in interviews and discussions. Furthermore, both interviews and focus group discussions were conducted in secure and safe locations to prioritise the safety and security of all participants during data collection.

Results and Discussion

Demographic Characteristics of Respondents

The study consisted of 149 participants fully engaged in water for production management in the Karamoja subregion. Table 1 presents the demographic characteristics of the respondents.

Table 1: Demographic Characteristics of Respondents

Gender	**Frequency**	**% age**
Male	105	70.5
Female	44	29.5
Total	**149**	**100.0**
Age (Year)		
20-30	9	6.2
31-40	40	27.6
40-50	48	33.1
50-60	28	19.3
61and above	16	11.0
Total	**145**	**97.2**
Category		
LG District Political Leaders (District Chairperson and Secretary for Production)	18	12.1
LG District Technical Leaders (1CAO, 2 Production Department staff, 1 Water Engineer, 1 District Community Development Officer)	45	30.2
Sub-Country Political Leaders (LC3, and Secretary for Production) 9 Sub-counties	18	12.1
Sub-Country Technical Leaders (Sub County Community Development, Agricultural Extension Officer, Sub County Chief)	27	18.1
Cultural Leaders per District	9	6.0
Kraal Leaders per Sub county	9	6.0
WfP Caretakers per Sub county	9	6.0
Water User Committee Leaders per Facility	6	4.0
Water Users (Pastoralist) per Facility	8	5.4
Total	**149**	**100.0**

Source: Primary Data

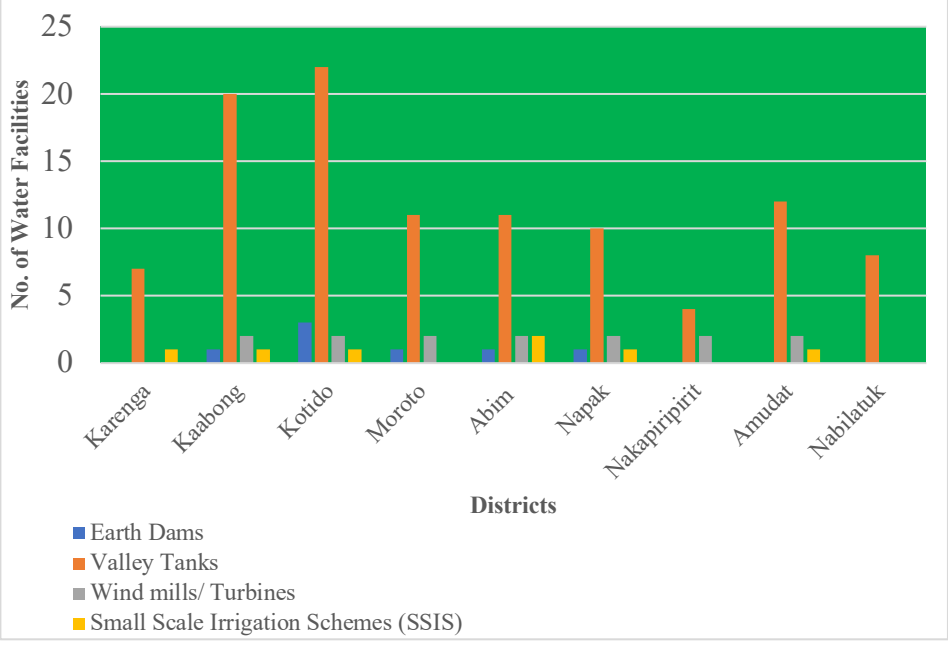
Of the 149 participants, 70.5% (105) identified as male and 29.5% (44) as female. These individuals were selected from a larger sample as part of the research that examined the reasons behind the exclusion of cultural institutions from the government-promoted water management models in the Karamoja subregion. It examines the potential benefits of incorporating these institutions into existing models and understands the existing water management models. This imbalance suggests that men are more actively involved or more accessible for participation in discussions related to water management and cultural institutions in Karamoja.

Among the participants, 12.1% (18) were District Political Leaders; 30.2% (45) District Technical Leaders, 12.1% (8); 0.7% (27) Sub County Political leaders while Cultural Leaders at the district, Kraal leaders and WfP Caretakers at the sub-country were represented by 6.0% (9) each; then 4.0% (6) were Water User Committee Leaders per Facility and 5.4% (8) Pastoralist water users. The involvement of technical and political leaders and cultural and community representatives highlights the need for a holistic approach to water management that integrates technical expertise, political will, and cultural knowledge. In terms of age, the largest proportion of participants fell in the 40-50 years old category 33.1% (48), followed by the 31-40 years old category represented by 27.6% (40), 50-60 years old was 19.3% (28); then 61 and above years old were 11.0% (16) and the minority 6.2% (9) were youth between 20-30. The age distribution underscores the value of experience and the need to engage youth in these efforts. However, the low participation of youth could affect the long-term sustainability of such efforts, as youth is critical for the continuity of these practices.

Various Water Facilities in the Karamoja Sub-Region

The following statistics on water facilities were generated during Focus Group Discussions (FGDs) conducted in each district of the Karamoja sub-region and were subsequently verified by published records from the Ministry of Water and Environment (MWE, 2023). The findings in Graph 1 offer a comprehensive overview of the available water facilities across the nine (09) districts.

Graph 1: Grouped Bar Graph Showing the Major Water Facilities in the Karamoja Sub-Region



Source: Primary Data

The graph illustrates a noticeable imbalance in the distribution of earth dams across the Karamoja districts. Kotido leads with three dams, followed by Kaabong, Moroto, Abim, and Napak, each with one. This discrepancy in water storage capacity could impact the districts' ability to manage water scarcity. In contrast, valley tanks are more prevalent, with 105 tanks in the subregion. Kotido and Kaabong have the highest numbers, 22 and 20 respectively, indicating their reliance on these structures for water storage. On the other hand, districts like Karenga, Nakapiripirit, and Nabilatuk have fewer than 10 valley tanks, signalling the need for increased infrastructure development in these areas. Additionally, only 14 windmills/ turbines are distributed across the sub-region, with most districts having two turbines each. Notably, Karenga and Nabilatuk have none, suggesting an underutilisation of wind energy resources. The presence of only seven (07) Small Scale Irrigation Schemes (SSIS) in the sub-region, with Abim having two (02) and others having one (01) each, underscores the scarcity of such infrastructure. The absence of SSIS in Moroto, Nakapiripirit, and Nabilatuk highlights a potential gap in irrigation infrastructure, impacting agricultural productivity. The analysis underscores significant variability in the availability of water facilities across the Karamoja subregion.

The analysis underscores significant variability in the availability of water facilities across the Karamoja subregion. While Kotido and Kaabong are relatively well-equipped with valley tanks and earth dams, indicating better water storage and management preparedness, districts like Nabilatuk and Nakapiripirit lag behind. This calls for targeted interventions to enhance water management infrastructure in these areas. The limited number of windmills/turbines and irrigation schemes highlights the potential for development. Increased investment in these technologies could significantly improve water access and agricultural resilience, particularly in the more arid and infrastructure-deficient districts. Finally, while some districts in Karamoja are relatively well-equipped with water facilities, others require substantial infrastructure development to ensure equitable water access and sustainable agricultural practices. Targeted investments and policy interventions will be crucial in addressing these disparities and enhancing the overall water management capacity in the sub-region.

Water Management Models

Table 2 below presents empirical data obtained from various stakeholders in the Karamoja region through Focus Group Discussions (FGDs) and open-ended questionnaires on the water management models in Karamoja.

Table 2: The Water Management Models

Models of Water Management	Frequency	Percentage	Rank Order
Community-Based Management System (CBMS)	121	42.0	1
Farmer Field School (FFS)	99	34.4	2
Public Private Partnership (PPPs)	68	23.6	3

Total	**288**	**100.0**	--

Source: Primary Data **N=149**

- ***Community-based management system (CBMS)***

CBMS is a notable model utilised in water management in Karamoja, supported by 42.0% (121) of the respondents. This model focuses on local governance, where community members collectively oversee water resources. CBMS models involve farmer groups identifying their water needs and receiving support from the government or civil society organisations to develop and manage facilities (MWE, 2023; MWE, 2021; MWE, 2020; Meinzen-Dick & Bakker, 2001). Stakeholders partake in decision-making processes to guarantee that management practices align with local needs and priorities (MWE, 2020; Meinzen-Dick & Bakker, 2001). The beneficiaries form Water User Associations (WUA) to oversee water resources collectively. This approach fosters fair water distribution and encourages stakeholder involvement in decision-making (Meinzen-Dick & Bakker, 2001). The benefits of WUAs include enhanced water governance and heightened user responsibility.

Uphoff (1986) and Meinzen-Dick & Bakker (2001) note that the CBMS model is in line with sustainable development principles by promoting local participation and leveraging Indigenous knowledge for resource management. The benefits of CBMS include enhanced community ownership, better adaptation to local conditions, and increased accountability (MWE, 2023; Gany, 2001). Ardana, Suparwata, Sudrajat, Chatun & Harsono (2024) pointed out that Water User Committees under the CBMS are susceptible to challenges such as potential user conflicts, necessitating strong leadership for effective management. MWE (2023) also reported that they lack effective mechanisms for community participation, leading to diminished local ownership and sustainability. Conversely, MWE (2020) points out that CBMS lacks the technical and financial capacity to manage complex water systems effectively. This is supported by Meinzen-Dick & Bakker (2001), who found that the model necessitates efficient coordination and support from external agencies, which can be difficult to maintain. As a result, potential conflicts among community members and limited technical expertise may arise.

- **Farmer field school (FFS)**

The FFS model is the second most commonly used model, as reported by 34.4% (99) of respondents. This model emphasises experiential learning and farmer-to-farmer knowledge transfer. Under this approach, the government identifies a community's needs, establishes a WfP facility, and entrusts its management, operation, and maintenance to the beneficiary community. In the Karamoja sub region, Pastoral Water Facility Committee (PWFC) are formed to enable participation of pastoralists in water management. As per MWE (2023), the PWFC charges water service fees from users, which are then utilised to oversee and enlist technical services for operating, maintaining, and repairing structures at the WfP facility. Adding to this discussion, Gomes (2006) contended that PWFCs effectively address the specific needs of pastoral communities, ensuring water availability

for livestock, and easing conflicts over water resources. However, Ahouandjinou, Niang & Sene (2020) identified potential challenges, including the difficulty of integrating traditional pastoral practices with formal water management systems and the limited financial resources of pastoral communities. Through practical training sessions, this model strengthens farmers' ability to manage water resources effectively (van den Berg & Jiggins, 2007; MWE, 2020; MWE, 2021). FFS's advantages include improved agricultural practices, higher crop yields, and enhanced community cohesion. However, challenges faced by FFS include the ongoing need for funding and potential resistance to new practices from traditional farmers.

- ***Public-private partnership (PPP)***

The PPP model was ranked third as mentioned by 23.6% (68) of respondents. This model involves collaboration between government entities and private companies to manage water resources. According to MWE (2020), PPP-managed systems use contractual agreements between the government and private entities, with the private party providing services to water users. This model harnesses the efficiency and financial resources of the private sector to improve water management (World Bank, 2010). The strengths of PPPs include enhanced infrastructure development and operational efficiency. The model features a well-defined organisational structure with clear roles for different stakeholders (Vermillion, 1997; World Bank, 2010). For instance, the government provides regulatory oversight, while private companies manage operations, maintenance, and investment. Despite its advantages, UN-Water (2012) has pointed out the challenges associated with the model, including potential conflicts of interest, prioritisation of profit over community needs, and limited inclusivity of local cultural practices (UN Water, 2012). In conclusion, analysing water management models in Karamoja reveals a spectrum of approaches, each with distinct effectiveness and challenges. The research highlights the critical need to understand and address the challenges of integrating cultural institutions into water management. While such integration is essential for developing effective and inclusive strategies, it comes with challenges that necessitate further research to comprehend and navigate fully. Below, we report on some of these benefits and challenges.

Benefits of Involving Cultural Institutions in Water Management in Uganda

The table below presents empirical data from various stakeholders in the Karamoja region through Focus Group Discussions (FGDs) and open-ended questionnaires. The data highlights the perceived benefits of involving cultural institutions in sustainable water management.

Table 3: Benefits of Involving Cultural Institutions in Water Management in Uganda

Benefits of Cultural Institutions in WM	Frequency	Percentage	Rank Order
Improved sustainability	139	27.6	1

Enhanced community ownership and responsibility	116	23.0	2
Cultural and social benefits	91	18.1	3
Preserving Indigenous Knowledge	76	15.1	4
Support and Capacity Building	47	9.3	5
Solving Disputes around Water Resources	35	6.9	6
Total	**504**	**100**	**--**

Source: Primary Data

- ***Improved sustainability***

Based on 27.6% (139) responses, it is evident that improved sustainability is perceived as the primary benefit of involving cultural institutions in water management. As one of the Key Informants noted:

> *"In Karamoja, Elders are decision-makers, and people listen so much to their opinions, so any intervention that ignores the elders and related structures tends to fail or not be sustainable. There are already existing traditional governance structures that should form part and partial of the implementation of development programs. This governance system has worked to manage resources and sustain livelihoods in these communities for a long time". KII2*

Incorporating traditional leaders into contemporary water management frameworks significantly enhances the acceptance of these models, fosters good infrastructure management practices, and bolsters sustainability through an emphasis on ecological balance and resource conservation. Research underscores that traditional water management practices align with sustainable development goals (Galvez & Rojas, 2019). Notable examples include the Subak system in Bali and the Dujiangyan Irrigation System in China, both of which foster a symbiotic relationship between humanity and the natural environment, thereby ensuring the long-term sustainability of water resources. Stakeholders recognise that cultural institutions can play an integral role in securing the sustainability of water resources, similar to their role in environmental stewardship and resource governance. Additionally, seminal works by Uphoff (1986), Pollard & Cousins (2014), Awuku (2016), and Mubangizi (2021) have highlighted the traditional practices and knowledge within cultural institutions that promote the sustainable use of natural resources. Integrating these indigenous practices into formal water management systems is posited to enhance the resilience and sustainability of these systems, as advocated by UN Water in 2012.

- ***Enhanced community ownership and responsibility***

The second most frequently mentioned benefit is the promotion of enhanced community ownership and responsibility, with 23.0% (116) responses. This suggests that involving cultural institutions can cultivate a stronger sense of ownership and accountability within communities. Integrating traditional practices with modern techniques can lead to more sustainable and culturally appropriate water management solutions. For instance, one of the key respondents maintained;

> *"If we want these water points to remain operational for a long time, then it is important to involve Elders. Elders will talk to their communities to avoid vandalism of water facilities and people will follow. Even coordination of government programmes is vested in the hands of the district, government officials might find it hard to convince the farmers to buy into any development intervention until the Elders speak to their followers. Even those elites in Kampala when they come to Karamoja they pay allegiance to the Elders's instructions and the traditions" (KII2)*

Meinzen-Dick & Bakker (2001) assert that cultural leaders often wield significant influence and garner respect within their communities, which can be utilised to promote responsible water use and maintenance practices. According to Svendsen & Ewing (2006), when communities feel a sense of ownership, they are more likely to adopt sustainable practices and contribute to maintaining water management systems. In support of this argument, scholars such as Eurpoe (2017) and Galvez & Rojas (2019) have recognised that the Subak system's incorporation of religious beliefs, communal cooperation, and traditional irrigation techniques ensures equitable water distribution and reinforces environmental stewardship through the Tri Hita Karana philosophy. Therefore, communal engagement is essential for sustainable water management as it fosters local participation and accountability.

- ***Cultural and social benefits***

A total of 18.1% (91) respondents identified cultural and social benefits as the third most significant benefit. Involving cultural institutions in water facility management is crucial in preserving cultural heritage and promoting social cohesion. Traditional ceremonies and rituals related to water management can strengthen community bonds and emphasise the cultural significance of water resources (Fromageau, 2011). For instance, and as noted by respondents, "Decisions related to water management, such as the construction of wells or the establishment of new water points, are often guided by spiritual leaders who perform rituals to seek ancestral approval and guidance" (KII11). Another one echoed:

> *"Semi-nomadic lifestyle of the Karamojong involves seasonal migration to access water and pasture for livestock. Access to water in areas controlled by different clans or communities requires negotiation and performing certain rituals to gain permission, fostering respect and cooperation among different clans" (KII15).*

Water management preserves the traditional governance systems and builds peaceful collaboration among different groups. Respecting roles of cultural leaders enhances community engagement and ownership of water management initiatives. These social benefits enable effective water management through collective action (Enserink et al., 2007). Therefore, water management practices that incorporate cultural values and rituals strengthen cultural identity and heritage (Eurpoe, 2017; Galvez & Rojas, 2019). For instance, the annual maintenance rituals in Dujiangyan ensure the system's functionality and reinforce cultural values associated with water conservation and respect for nature.

- ***Preserving indigenous knowledge***

Indigenous knowledge preservation was emphasised by 15.1% (76) of survey participants. Cultural institutions play a crucial role in safeguarding and rejuvenating traditional knowledge, vital for sustainable water management (Gany, 2001; Eurpoe, 2017). For instance, certain water sources, especially springs, are considered sacred and are protected through traditional taboos and rituals. The Karamoja communities often conduct ceremonies to invoke rain, especially during drought periods. Elders and rain predictors lead these rituals, which may include sacrifices, dances, and prayers to ancestral spirits believed to control rainfall. This was echoed by KII1 that *"… often the majority of the community members are involved because their livelihoods collectively depend on rainfall and water".* Taking into consideration water management is crucial in the development and implementation of water management models. This is consistent with the Dujiangyan Irrigation System in China, which is recognised as a UNESCO World Heritage site, demonstrates ancient engineering methods and cultural customs that have facilitated water conservation for over two thousand years (Europe, 2017). According to UN Water (2012), conserving and integrating this knowledge can offer innovative solutions to modern water management challenges and ensure that time-honoured practices are upheld and preserved.

- ***Support and Capacity Building***

The benefit least frequently mentioned, with 6.3% (47) of responses, was support and capacity building for cultural institutions. Although still important, this lower ranking suggests stakeholders may view other benefits as more immediate or impactful. However, capacity-building initiatives involving cultural institutions can improve their ability to effectively participate in water management by providing them with the necessary skills and resources (van den Berg & Jiggins, 2007). These benefits highlight the significance of integrating traditional governance structures into formal water management systems to enhance efficiency and sustainability.

- ***Solving water disputes***

Finally, 6.9% (35) of the respondents ranked solving disputes around water resources as the sixth benefit of integrating cultural leaders into WMS. The argued that cultural leaders often play a key role in conflict resolution and their involvement can help prevent and mediate disputes over water resources. Customary rituals and laws often govern the

transhumance nature of communities in Karamoja; however, often, conflict is bound to arise due to the scarcity of water and pasture for the animals. The cultural institutions have positioned themselves to handle these conflicts through negotiations and use of cultural norms. Although the modern water management models by the government are often accompanied by conflict management guidelines and manuals, within the context of Karamoja, the traditional conflict management practices are often respected more. One of the respondents noted;

> *"In Karamoja, generally conflict management practices are deeply embedded in the cultural and social fabric of society. For every conflict, even those involving water usage, Councils of elders from the conflicting parties convene to discuss and resolve water-related conflicts. Trusted individuals in this case elders or spiritual leaders, mediate disputes and offending parties make amends. Reconciliation ceremonies are conducted to restore harmony between conflicting parties. These ceremonies involve rituals, feasting, and the exchange of gifts to symbolise the restoration of good relations" (KII1).*

Reasons for Exclusion of Cultural Institutions in Water Management in Uganda

The table below contains empirical data gathered from various stakeholders in the Karamoja region through Focus Group Discussions (FGDs) and open-ended questionnaires. This data highlights the reasons for cultural institutions' exclusion from water management.

Table 4: Reasons for Exclusion of Cultural Institutions in Water Management in Uganda

Reasons for Exclusion of Cultural Institutions	Frequency	Percentage	Rank Order
Potential Conflicts of Interest	135	16.9	1
Rigid administrative structures	117	14.6	2
Profit-driven motives	109	13.6	3
Benchmarking/ scaling localised practices	99	12.4	4
Low level of trust	88	11.0	5
Bureaucratic inefficiencies	85	10.6	6

Capacity limitations	71	8.9	7
Complexity of Integration	59	7.4	8
Maintaining relevance amid modernisation	36	4.5	9
Total	**799**	**100**	--

Source: Primary Data **N= 149**

- **Potential conflicts of interest**

Among the reasons for excluding cultural institutions, potential conflicts of interest received the highest number of responses at 16.9% (135). This highlights stakeholders' concerns about the risk of conflicts arising from the interaction between traditional and formal governance structures. As one of the key informants noted;

> *"You know, cultural institutions are there mainly to preserve culture and traditions while the Government is there to improve the livelihoods of people. So, the immediate need of a traditional leader might be to preserve the well for traditional rituals, while the government might think of excavating the well to create more volumes of water for animals. To harmonise these interests might take a long time" (KII7)*

Meinzen-Dick & Bakker (2001) point out that these conflicts may stem from varying priorities and interests between cultural leaders and government agencies. Such conflicts can potentially undermine collaborative efforts and result in inefficiencies in water management. The World Bank (2010) has also emphasised that public-private partnership models focusing on financial efficiency and profitability may clash with the inclusion of cultural institutions that do not necessarily align with profit-driven objectives. Balancing public interests with private profit motives can lead to conflicts and challenge policy enforcement.

- ***Rigid Administrative Structures***

The second most frequently mentioned reason is inflexible administrative systems, which received 14.6% (117) responses. Government-managed systems often feature rigid frameworks that do not easily accommodate traditional governance methods. One of the key informants noted;

> *"We are an elitist society, and we tend to think that the formal system is adequate. However, the Karamoja traditional structures is comprehensive and it includes those key decision makers, including the women, kraal leaders, Fortune Tellers, Kalicuna (reformed youth). In Karamoja, for any development to be successful, it*

must involve these groups. But often Government will do their things and these people will also continue to govern their society the way they see it fit" (KII 6).

The formal mechanisms in public management may fail to acknowledge or leverage cultural leaders' local knowledge and authority (Uphoff, 1986). These structures can impede the flexibility required to integrate cultural institutions effectively, resulting in their exclusion (UN Water, 2012). Similarly, the MWE (2020) highlighted that local governments have not been incorporating the operations of WfP facilities into their work plans and budgets. This sentiment was echoed by Sub County Local Government officials, who admitted uncertainty about their responsibilities regarding the management and O&M of WfP facilities (MWE, 2020). This implies that the centralisation of control and decision-making processes within government agencies restricts the opportunities for meaningful participation by local cultural institutions.

- ***Profit-Driven Motives***

Profit-driven motives were identified by 13.6% (109) of the respondents as a significant reason for the exclusion of cultural institutions in water management. As noted by a key informant;

"You know, management of water infrastructure by private companies attracts money from the government to those companies. These companies view the process of bringing cultural leaders and cultural practices into formal water management systems to be costly and logistically challenging" (KII7).

This highlights a fundamental conflict between the profit-focused objectives of private entities in Public-Private Partnership (PPP) models and the community-centred goals of cultural institutions. Private companies involved in PPP models often prioritise financial returns and operational efficiency. As a result, they may give precedence to activities and practices that directly enhance profitability and economic performance (World Bank, 2010; MWE, 2021). This divergence in priorities can lead to the marginalisation of cultural institutions whose practices and values are centred around community welfare, environmental stewardship, and long-term sustainability.

- ***Benchmarking/- and Scaling up Localised Practices***

The data also reveals that with 12.4% (99) responses, scaling traditional practices to broader contexts is challenging for stakeholders. One of the Key informants noted;

"While Water for production facilities are often a shared resource. Karamoja has about 15 tribes which may not agree on location, utilisation and maintenance practices of different clans/ tribes if government does not dictate a model standardise water management practices. There are different cultures in Karamoja" (KII2).

Cultural institutions often rely on localised knowledge and practices, which may not be easily adaptable to larger-scale or different regional settings (Fromageau, 2011). While systems like Subak and Dujiangyan are effective within their specific cultural and geographical contexts, scholars such as Galvez & Rojas (2019) have argued that replicating these models in different regions may not produce the same results. The unique cultural, social, and environmental factors that contribute to the success of these systems are difficult to replicate on a larger scale.

- ***Low Level of Trust***

A low level of trust, cited by 11.0% (88) respondents, is a significant factor contributing to the exclusion of cultural leaders from water management in Karamoja. This skepticism between formal institutions and cultural leaders stems from historical marginalisation and differing governance styles. As one respondent noted;

> *"Management of water facility ought to follow the scientific way of O&M. Operation and Maintenance are scientific; one needs to know the level of desilting. For instance, one needs to know the best way to manage catchment areas, one has to have a scientific calendar to undertake maintenance of different facilities. We do not manage these facilities constructed using modern technologies by using traditional knowledge or fortune tellers. These need modern science and way of doing things" (KII10).*

Historically, cultural institutions have often been sidelined or undermined by formal government structures, leading to a legacy of distrust. This marginalisation can be traced back to colonial and post-colonial periods where traditional governance systems were frequently disregarded in favour of centralised government control (Gany, 2001). Cultural leaders, who play a crucial role in managing local resources and upholding community values, may view formal institutions as out of touch with the needs and practices of the local population. Conversely, formal institutions might perceive cultural leaders as obstacles to modernisation and standardised governance. These differing perspectives can create significant barriers to effective collaboration.

- ***Bureaucratic Inefficiencies***

Furthermore, 10.6% (85) of respondents identified bureaucratic inefficiencies as another reason that significantly impedes effective collaboration with cultural institutions in Karamoja. These inefficiencies manifest as excessive red tape, protracted decision-making procedures, and rigid structures that are ill-suited to traditional governance systems' dynamic and flexible nature (Svendsen & Ewing, 2006). The complex bureaucracy within formal institutions can create substantial barriers to the timely implementation of water management initiatives. Cultural institutions, which typically rely on more streamlined and community-centred decision-making processes, find navigating the formal bureaucratic landscape challenging. This misalignment in administrative practices can lead to prolonged

delays in project approvals, funding allocations, and policy implementations, thereby reducing integrated water management efforts' overall effectiveness and responsiveness.

- ***Capacity Limitations***

The results indicate that 8.9% (71) of the respondents identified capacity limitations as a significant factor for excluding cultural institutions from participating in water management in the Karamoja sub-region. Uphoff (1986) suggested that the lack of technical and financial resources within cultural institutions can hinder their involvement as viable partners in formal water management frameworks. One of the respondents noted;

> *"The literacy levels in Karamoja are very low let alone the technical capacities of operating the water infrastructure such as pumps, water gates, and valves. We need technical expertise which is not easily found among the cultural institutions. That is why we bring on board private service providers even when water user committees are in existence" (KII2)*

are often rooted in traditional governance structures, and cultural institutions typically operate with limited formal education and training in modern water management techniques. Similarly, Wester, et al (2003), observed that cultural leaders have different levels and kinds of education, speak different languages, differ in access to politics, and hold different beliefs about how nature and society function. This lack of expertise and capacity limitations may impede their ability to engage in and contribute to integrated water management systems, which require a sophisticated understanding of hydrology, engineering, and environmental science.

- ***Complexity of Integration***

A study found that 7.4% (59) of respondents stated that the complexity of integration poses a challenge for stakeholders, especially from the government, in merging traditional governance structures with formal systems. One of the respondents noted;

> *"In Karamoja to even reach to the cultural leader for negotiation and encouraging them to be involved, you need to follow the cultural route. You will need initiate contact through someone who is already trusted within the community. It is customary to bring gifts as a sign of respect and goodwill. These gifts should be culturally appropriate. You will need to include all relevant cultural leaders, including elders, spiritual leaders, and clan heads in such meetings to foster collective ownership. You will need to agree to incorporate traditional water management practices and knowledge into modern solutions. This process is not easy" KII3).*

This complexity stems from differences in operational styles, decision-making processes, and accountability mechanisms (UN Water, 2012). According to researchers (Europe, 2017;

Galvez & Rojas, 2019), one of the key challenges in integrating cultural institutions into modern water management models is the difficulty of combining traditional practices with contemporary technologies. They argue that traditional systems rely on methods and principles that significantly differ from modern engineering practices, making integration challenging. For example, aligning the communal decision-making and traditional rituals of the Subak system with modern regulatory frameworks and technological solutions can be particularly challenging.

- ***Maintaining Relevance amid Modernisation***

The last mentioned reason was maintaining relevance amid modernisation, with 4.5% (36) responses. This points to cultural institutions' challenge in staying pertinent in light of rapid modernisation and evolving societal dynamics. This difficulty can result in their sidelining in current water management practices (Enserink et al., 2007). With modern societies, preserving traditional practices' relevance becomes progressively demanding. Rapid urbanisation, technological progress, and changing agricultural methods can undermine the effectiveness and acceptance of traditional water management systems (Galvez & Rojas, 2019). It is crucial to continually adapt and innovate to ensure these practices remain relevant and effective in the face of modern challenges. Finally, it is important to acknowledge that several factors drive the exclusion of cultural institutions from formal water management systems in Uganda. Addressing these issues requires a comprehensive approach encompassing policy reforms, capacity-building initiatives, and establishing inclusive frameworks that acknowledge and integrate traditional governance structures.

Conclusion

Among the primary reasons for excluding cultural institutions from water management in Uganda are potential conflicts of interest. Stakeholders express significant concerns about the risks of conflicts arising from the interaction between traditional and formal governance structures. Another major factor is the rigidity of administrative systems, which are often managed by the government and feature inflexible frameworks that do not easily accommodate traditional governance methods. Profit-driven motives further contribute to this exclusion, as stakeholders prioritise economic gains over the integration of cultural practices.

Additionally, the challenge of benchmarking and scaling localised traditional practices to broader contexts is a notable reason for the exclusion of cultural institutions. Low levels of trust also play a crucial role, stemming from historical marginalisation and differing governance styles between formal institutions and cultural leaders. Bureaucratic inefficiencies, characterised by excessive red tape, protracted decision-making processes, and rigid organisational structures, significantly impede effective collaboration with cultural institutions.

Capacity limitations are another significant factor, as cultural institutions often lack the resources and expertise necessary to participate effectively in water management. The complexity of integrating traditional governance structures with formal systems poses a substantial challenge, particularly for government stakeholders. Finally, the difficulty of maintaining relevance amid modernisation highlights the challenge cultural institutions face in staying pertinent in light of rapid societal changes.

Cultural institutions provide invaluable local knowledge, community trust, and sustainable practices. However, they are frequently sidelined due to rigid administrative frameworks, profit-driven motives in public-private partnerships, and capacity limitations in community-based models. Therefore, a more inclusive approach that recognises and integrates the value of traditional governance structures into formal water management systems is necessary. Such integration can enhance local ownership, improve operational efficiencies, and ensure that water management practices are culturally relevant and sustainable.

Implications of the Study

The study highlights the necessity for policy reform to create more flexible administrative structures that can accommodate the integration of traditional governance systems into formal water management frameworks. Addressing potential conflicts of interest is crucial, necessitating the development of mechanisms to harmonise traditional and formal governance structures to ensure effective coexistence and collaboration. Enhancing the capacities of cultural institutions through targeted support and training can enable them to participate more effectively, contributing their invaluable local knowledge and sustainable practices.

Building trust between formal institutions and cultural leaders is imperative, and it can be achieved through dialogue, recognising cultural institutions' contributions, and collaborative projects demonstrating mutual benefits. Additionally, reducing bureaucratic inefficiencies by simplifying processes and decision-making procedures can facilitate smoother collaboration with cultural institutions. Ensuring that these institutions are included in modernisation efforts can help maintain their relevance and leverage their traditional practices in contemporary water management strategies.

Adopting an inclusive approach that integrates cultural institutions into formal water management systems can lead to more holistic and sustainable practices, enhancing local ownership and operational efficiency. This integration is essential for developing culturally relevant and effective water management strategies that benefit both traditional and formal governance structures. By acknowledging and addressing the challenges identified in this study, policymakers and stakeholders can create a more collaborative and efficient water management system in Uganda.

Furthermore, a comprehensive analysis of various water management models provides stakeholders with invaluable insights, enabling informed decision-making considering each model's strengths and challenges. Stakeholders, including government agencies and NGOs, can develop customised interventions to address each model's specific needs and limitations, enhancing overall water management efficiency. For example, outlining the roles and challenges of different stakeholders, the study promotes enhanced collaboration and coordination among government agencies, private companies, farmer groups, CSOs, and educational institutions.

Finally, advocating for inclusive approaches underscores the empowerment of cultural institutions, recognising their role and potential contributions to sustainable water management. Therefore, promoting inclusive practices can increase community engagement and participation, fostering a sense of ownership and responsibility toward water resources. Integrating cultural institutions can bring traditional knowledge and sustainable practices to the forefront, contributing to more resilient and adaptive water management strategies.

Nonetheless. caution ought to be taken because, as Pollard and Cousins (2014) in their study of water governance in Southern Africa, inclusion of traditional leaders should be subject to scrutiny against the principles underscoring the democratic reform processes – especially those of equity and sustainability – since, like statutory systems, customary arrangements can entrench power relations at the cost of the vulnerable

Research Future Direction

Future studies should investigate frameworks that effectively integrate cultural institutions into existing water management models, ensuring that traditional knowledge and practices are utilised and respected. Moreover, it is crucial to analyse existing policies to identify barriers to including cultural institutions and propose policy changes to facilitate their integration. Furthermore, detailed case studies in different regions should explore how cultural institutions have been successfully integrated into water management and the outcomes of such practices. Finally, research on building the capacity of cultural institutions and community groups to manage water resources effectively within formal management frameworks is necessary.

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