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Domestic Water Governance in Tanzania's Small Urban Centers: Roles and Practices of Formal and Informal Actors in Kabuku, Handeni District

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ABSTRACT

This study examines how formal and informal actors shape domestic water governance in Kabuku Small Urban Centre, Tanzania, addressing limited research on water governance in small urban centres situated between rural and urban institutional arrangements. A mixed-methods case-study design was employed, combining a household survey of 200 households, follow-up semi-structured interviews, 45 key-informant interviews, transect walks and field observations. Quantitative data were analysed descriptively using SPSS, while qualitative evidence was analysed thematically. The findings reveal a hybrid and service-polycentric governance arrangement in which informal providers play a central role in everyday water access. Individual water vendors were reported as the principal provider by 40% of surveyed households, followed by the Handeni Trunk Main Water Supply and Sanitation Authority (HTMWSA) at 28%, mobile vendors at 20%, communal vendors at 10%, and HANDENI RUWASA at 2%. Collectively, informal and community-based vendors served 70% of surveyed households. Water-access patterns also varied spatially, with peripheral households showing greater reliance on non-piped sources. The study demonstrates that multiple providers emerge as practical responses to infrastructure and institutional constraints, but actor plurality does not necessarily constitute coordinated polycentric governance. Strengthening institutional capacity, recognising informal providers, and improving coordination and proportionate regulation are therefore essential for equitable and resilient water services in rapidly urbanising small urban centres.

Keywords: Domestic water governance; local actors; small urban centres; Tanzania.

INTRODUCTION

Reliable access to safe and adequate domestic water is fundamental to public health, human well-being, livelihood security, and socio-economic development. Beyond meeting basic household requirements such as drinking, cooking, sanitation, and personal hygiene, reliable water services contribute to improved health outcomes, household productivity, social welfare, and broader human development (WHO & UNICEF, 2023; UN-Habitat, 2022). Consequently, universal and equitable access to safe and affordable drinking water remains a central international development priority under Sustainable Development Goal (SDG) 6, particularly Target 6.1, which calls for universal and equitable access to safe and affordable drinking water for all by 2030 (United Nations, 2023; WHO & UNICEF, 2023). Despite progress in expanding domestic water services, substantial inequalities persist between and within countries, particularly among low-income populations and communities experiencing inadequate

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infrastructure and rapidly changing settlement patterns. Recent global assessments indicate that billions of people still lack safely managed domestic water services, demonstrating that infrastructure expansion alone has not eliminated inequalities in domestic water access (WHO & UNICEF, 2023). These challenges are particularly pronounced across the Global South, where rapid population growth, urbanisation, infrastructure deficits, financial limitations, and institutional weaknesses interact to constrain reliable and equitable domestic water service delivery (UN-Habitat, 2022; WHO & UNICEF, 2023). In Sub-Saharan Africa, rapid urban transformation is placing increasing pressure on domestic water infrastructure and governance institutions, particularly in small and intermediate urban centres where service expansion frequently fails to keep pace with demographic and spatial growth (OECD/SWAC, 2020; UN-Habitat, 2022; WHO & UNICEF, 2023). Consequently, contemporary debates on domestic water provision increasingly emphasise not only infrastructure investment but also the importance of effective institutions, inclusive governance, institutional coordination, and locally appropriate service-delivery arrangements for achieving sustainable and equitable water access.

Small urban centers represent a critical but often overlooked component of this urban transition. Situated between rural villages and large urban centres, they exhibit characteristics of both environments and frequently operate under overlapping administrative and institutional arrangements (OECD/SWAC, 2020; Agergaard et al., 2021). Such hybrid characteristics create governance complexities that are not adequately addressed by conventional rural or urban domestic water management policies (Brown, 2021; Agergaard et al., 2021). At the same time, these settlements provide opportunities for innovative and locally adapted governance arrangements capable of responding to context-specific challenges. The ongoing rural–urban transformation across Sub-Saharan Africa has accelerated the expansion of small urban centres, positioning them as important nodes for economic growth, service provision, and regional development (Agergaard et al., 2021; UN-Habitat, 2022). These settlements increasingly function as centres for trade, employment, and public services while linking rural production systems with urban markets. In Tanzania, small urban centres, generally accommodating between 10,000 and 100,000 inhabitants have experienced rapid population growth over the past decade (URT, 2022). This demographic expansion has substantially increased demand for domestic water and other essential urban services, often outpacing the capacity of existing infrastructure and institutional arrangements (URT, 2022; OECD/SWAC, 2020).

Existing scholarship therefore leaves three related gaps. First, much of the water-governance literature examines either rural community systems or large urban utilities, giving limited attention to settlements that are simultaneously experiencing rural and urban institutional arrangements (Marks et al., 2020; Fielmua, 2021). Second, studies that acknowledge informal water provision often treat vendors primarily as coping or market actors rather than examining how their routine practices interact with public institutions to constitute governance (Munro & Kweka, 2021; Dery & Bisung, 2022). Third, limited empirical evidence explains how these interactions shape spatially differentiated domestic water access within small urban centres (Marks et al., 2020; Fielmua, 2021). Kabuku is analytically important because its rapid demographic and spatial transformation brings formal utility provision, rural water institutions, community arrangements and informal vending into the same governance arena. This study contributes new empirical evidence by conceptualising these relationships as a hybrid and polycentric governance system and by showing how formal and informal actors jointly sustain, but also differentiate, domestic water access. It addresses three questions: (1) Which formal and informal local actors participate in domestic water governance in Kabuku, and what practices do they perform? (2) How do interactions among these actors influence household

access, service continuity and pricing? (3) What institutional constraints and opportunities shape more coordinated and equitable governance? The following section reviews the legal, empirical and theoretical literature that frames these questions before presenting the methodology and findings.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Tanzania's domestic water sector has undergone reforms intended to decentralise responsibilities, broaden stakeholder participation and strengthen accountability. The National Water Policy (2002), National Water Sector Development Strategy (2006–2025), Water Resources Management Act No. 11 of 2009, and Water Supply and Sanitation Act No. 5 of 2019 collectively distribute responsibilities across national ministries, basin institutions, local governments, water authorities and community organisations (URT, 2002, 2008, 2009a, 2019). Although this architecture creates multiple centres of action, its effectiveness depends on how mandates are coordinated in practice. In small urban centres, administrative transition can create institutional ambiguity because rural water arrangements may coexist with expanding urban utility functions. The resulting governance problem is therefore not simply the absence of legislation, but the capacity to coordinate overlapping responsibilities, finance infrastructure, regulate diverse providers and respond to uneven service coverage.

Within this framework, the Ministry of Water provides national policy direction, Basin Water Boards regulate water resources, Local Government Authorities coordinate local implementation, RUWASA oversees rural water-service functions, and Water Supply and Sanitation Authorities provide regulated urban services (URT, 2019). In a transitional settlement such as Kabuku, however, these formal mandates intersect with communal standpipe operators, household resellers, mobile vendors and household self-provision. Where formal network coverage is incomplete, these actors can complement public provision; where relationships are undefined, they may also produce weak accountability, inconsistent regulation and fragmented responsibilities. The legal framework is thus best understood as the formal layer of a wider governance system rather than as a complete description of how water is actually accessed and managed. Domestic water governance scholarship increasingly recognises that service delivery is produced through interactions among state, market, community and household actors. Polycentric governance emphasises multiple centres of decision-making that can perform complementary functions while retaining some autonomy (Lubell & Morrison, 2021; Srigiri & Dombrowsky, 2022; Sida et al., 2022).

Adaptive governance emphasises adjustment to changing environmental and institutional conditions, including the capacity to respond to uncertainty, coordination problems and changing service demands (Pahl-Wostl et al., 2020). These perspectives are particularly relevant to small urban centres, where hybrid arrangements emerge from the coexistence of formal rules and informal practices. Studies in African small-town and urban settings show that informal and community-based providers frequently extend access where formal networks are incomplete, while their contribution may remain only partially recognised within regulatory systems (Fielmua, 2021; Munro & Kweka, 2021; Dery & Bisung, 2022). The analytical gap concerns not whether multiple actors exist, but how their practices and interactions produce governance outcomes. Accordingly, this study uses a conceptual framework linking: (i) formal institutions and their mandates/resources; (ii) informal and community actors and their service practices; (iii) institutional interactions, including coordination, regulation, financing and exchange; and (iv) governance outcomes expressed through accessibility, reliability,

affordability, equity and service continuity. This framework guides the interpretation of the empirical evidence from Kabuku Small Urban Centre.

RESEARCH METHODOLOGY

Research Site

The study was conducted in Kabuku Small Urban Centre in Handeni District, Tanzania, a settlement that exemplifies the rapid rural-urban transformation experienced by many small urban centres across the country over the past decade. This transformation is reflected in sustained population growth, increasing settlement density, spatial expansion, and the growth of commercial activities and social services, all of which have intensified the demand for domestic water services (Agergaard et al., 2021; UN-Habitat, 2022). As a result, Kabuku Small Urban Centre provides an appropriate setting for examining local actors' practices in domestic water governance. Kabuku is located within Kabuku Ndani and Kabuku Nje wards in Handeni District, Tanga Region (Figure 1). According to the 2022 Population and Housing Census, the settlement had a population of 34,921 people (URT, 2022). Administratively, Kabuku comprises three sub-wards: Kabuku Ndani, Kabuku Mjini, and Kabuku Nje, and six villages: Majani Mapana, Chogo, Kwedibago, Kabuku Kaskazini, Kwedikwazu Magharibi, Kwedikwazu Mashariki. The settlement's rapid demographic and spatial transformation, coupled with increasing pressure on basic infrastructure and water services, makes it a suitable case for investigating interactions between formal and informal actors in domestic water governance (OECD/SWAC, 2020; Fielmua, 2021).

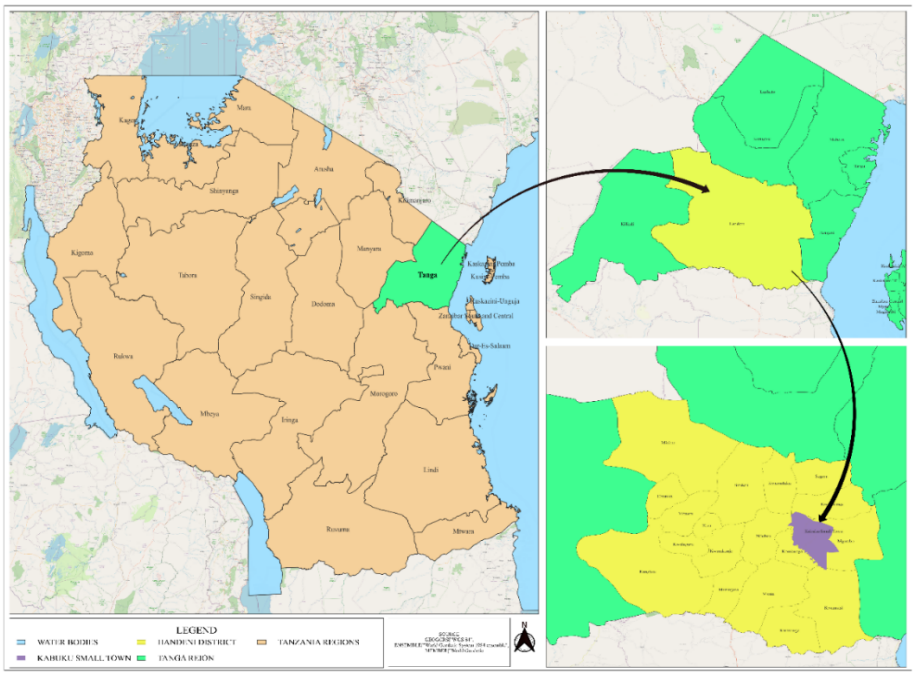


Figure 1: Kabuku Small Urban Centre in Handeni District, Tanzania
Source: URT (2022) and 2020 satellite imagery

3.2 Research Design, Sampling, Data Collection and Analysis

The study adopted a pragmatic mixed-methods case-study design because the research questions required both the measurement of household water-access patterns and an explanation of the institutional practices underlying those patterns (Creswell & Creswell, 2023; Creswell & Plano Clark, 2025). A stratified random sampling approach was used to obtain an achieved sample of 200 households from the central and peripheral settlement areas of Kabuku

Small Urban Centre. The sample was distributed across selected villages and sub-wards to facilitate comparison of household water-access conditions and service arrangements between the two spatial contexts. The household questionnaire generated categorical and descriptive data on domestic water sources, principal providers, accessibility, reliability, payment arrangements and governance-related challenges. The 2022 Population and Housing Census is used in this article to provide updated demographic information on the study area and not as a retrospective sampling frame for the 2020 fieldwork.

Qualitative inquiry complemented the household survey. Follow-up semi-structured interviews were conducted with the 200 surveyed households to clarify questionnaire responses and capture governance experiences, including domestic water-access constraints, coping strategies, relationships with providers and participation in local water governance. In addition, 45 key informant interviews were conducted with HANDENI RUWASA and HTMWSA officials, communal water-point attendants, individual water-point operators, mobile vendors, village and ward leaders, and district water officials. The qualitative component was used to provide explanatory depth rather than statistical representation. Methodological rigour was strengthened through triangulation across household survey responses, follow-up interviews, key-informant accounts and direct field observations. Because the questionnaire variables reported in this article were primarily factual or categorical (for example, water source, provider type, accessibility, pricing and service conditions), internal-consistency measures such as Cronbach's alpha were not applicable to the principal variables analysed.

Transect walks and direct field observations documented domestic water infrastructure, collection practices and interactions among governance actors, allowing reported experiences to be compared with conditions observed in the study area (Hofmann, 2021; Rojas et al., 2021). Quantitative data were analysed using SPSS to generate frequencies, percentages and cross-tabulations. The analysis was primarily descriptive and focused on patterns in domestic water sources, principal provider categories, pricing arrangements and differences between central and peripheral settlements. Qualitative material from household interviews, key informant interviews, observations and field notes was coded and organised thematically around actor roles, institutional interactions, service constraints, pricing arrangements and household adaptation strategies (Braun & Clarke, 2021). Triangulation across survey, interview, key-informant and observational evidence was used to examine convergence across data sources and to explain differences between formal institutional mandates and everyday water-governance practices (Creswell & Creswell, 2023). Inferential statistics are not reported because the archived dataset available for preparation of the present article contains aggregated rather than case-level observations; the spatial contrasts are therefore interpreted descriptively.

3.3 Ethical Considerations

Ethical principles were observed throughout the study. Research permission was obtained from Ardhi University and relevant authorities in Handeni District, including HTMWSA and RUWASA. Participants were informed about the purpose of the study and provided informed consent before participation. Participation was voluntary, and anonymity, confidentiality and privacy were maintained throughout data collection, analysis and reporting. Sensitive information was handled carefully, and research records were securely maintained to protect participants' identities.

RESULTS AND INTERPRETATION

Main Sources of Domestic Water

The survey findings reveal substantial variation in household domestic water-source combinations between the central and peripheral areas of Kabuku Small Urban Centre (Table 1). Overall, households rarely depended on a single source; instead, they combined piped water, communal water points, groundwater, shallow wells and rainwater. This pattern demonstrates the importance of water-source diversification as a household strategy for maintaining access under conditions of variable supply and spatially uneven service provision. A clear spatial pattern is evident in the use of piped water. Among the 100 central-area households, 30 (30.0%) reported combining tap water with rainwater, compared with 6 of the 100 peripheral households (6.0%). This represents the largest central-peripheral difference across the reported source combinations and indicates substantially greater access to the formal piped-water network among centrally located households. Nevertheless, the simultaneous use of rainwater suggests that proximity to the formal network does not eliminate the need for supplementary sources. Communal water points were important in both locations but were particularly prominent in peripheral settlements. Communal water points combined with rainwater were reported by 30 peripheral households (30.0%) compared with 24 central households (24.0%). Communal water points combined with shallow wells were reported by 24 peripheral households (24.0%) and 10 central households (10.0%). Similarly, shallow wells combined with communal water points and rainwater were reported by 18 peripheral households (18.0%) compared with 10 central households (10.0%). Groundwater combined with rainwater accounted for 10 peripheral households (10.0%) and 8 central households (8.0%), while rainwater combined with shallow wells was more common in the central area, where it was reported by 18 households (18.0%) compared with 12 peripheral households (12.0%). Taken together, these patterns demonstrate greater central reliance on piped-water combinations and greater peripheral dependence on communal and locally accessible sources.

Taken together, the findings reveal clear descriptive differences in domestic water-source combinations between central and peripheral areas of Kabuku Small Urban Centre. Households in central settlements showed greater reliance on piped water supplemented by rainwater, whereas peripheral households depended more heavily on communal water points, shallow wells and rainwater. These patterns indicate spatial differentiation in household water-access strategies. Because the available archived dataset is aggregated, the observed differences are interpreted descriptively and are not presented as statistically significant associations.

Table 1: Main Sources of Domestic Water by Residential Location (N = 200)

S/N	Domestic Water-Source Combination	Central Areas n (%) within location	Periphery Areas n (%) within location	Total n (%) of N = 200
1	Tap water + Rainwater	30 (30.0)	6 (6.0)	36 (18.0)
2	Communal water points + Rainwater	24 (24.0)	30 (30.0)	54 (27.0)
3	Groundwater + Rainwater	8 (8.0)	10 (10.0)	18 (9.0)
4	Shallow wells + Communal water points + Rainwater	10 (10.0)	18 (18.0)	28 (14.0)
5	Rainwater + Shallow well	18 (18.0)	12 (12.0)	30 (15.0)
6	Communal water points + Shallow well	10 (10.0)	24 (24.0)	34 (17.0)
	Total	100 (100.0)	100 (100.0)	200 (100.0)

Note: n = number of households. Percentages in the Central and Periphery columns are calculated within each residential location (n = 100 per location); percentages in the Total column are based on the full

sample (N = 200). Results are interpreted descriptively because case-level observations were not available for reproducible inferential testing in preparation of this article.

Existing Local Actors in Domestic Water Governance

The findings reveal a diverse configuration of providers involved in domestic water provision in Kabuku Small Urban Centre (Figure 2). When households were asked to identify their principal domestic water provider, individual water vendors were reported by 80 households (40.0%). Formal provision through HTMWSA was reported by 56 households (28.0%), while mobile water vendors were reported by 40 households (20.0%). Communal water vendors were the principal provider for 20 households (10.0%), whereas HANDENI RUWASA accounted for 4 households (2.0%). Collectively, individual, mobile and communal water vendors were reported as the principal provider by 140 households (70.0%), compared with 60 households (30.0%) reporting HTMWSA or HANDENI RUWASA. These mutually exclusive principal-provider responses show that alternative providers are not merely occasional supplements but form an important component of everyday domestic water access. The pattern supports an interpretation of Kabuku's water-governance system as hybrid and service-polycentric, combining formal institutions, community-based arrangements and informal market actors.

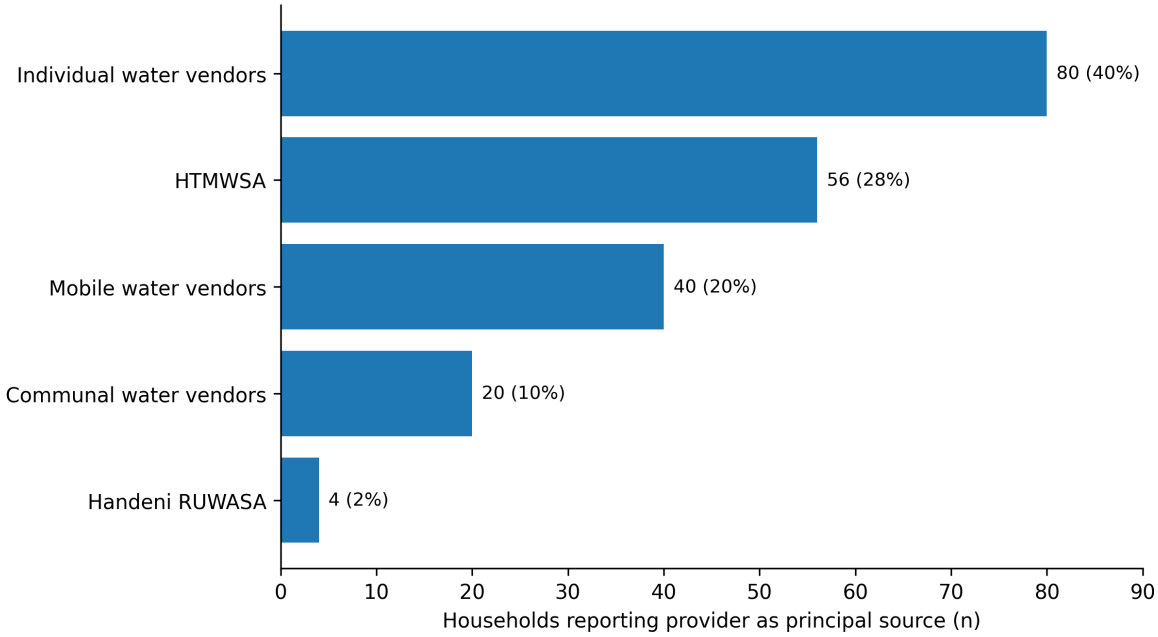


Figure 2: Existing Local Actors in Domestic Water Governance (N = 200)

Handeni Rural Water Supply and Sanitation Agency (HANDENI RUWASA)

The study identified HANDENI RUWASA as the principal government institution responsible for rural water supply coordination in Kabuku Small Urban Centre. Although only 2% of surveyed households reported HANDENI RUWASA as their principal provider, the agency performs key institutional functions, including infrastructure development, technical supervision, monitoring, maintenance, and capacity building. Interviews with community members and institutional representatives revealed that HANDENI RUWASA experiences operational constraints associated with inadequate financial resources, limited technical personnel, and insufficient transport facilities for routine field operations. Respondents further reported that monitoring visits to community water facilities were irregular, resulting in

delayed maintenance of damaged infrastructure. Budget limitations and delayed government disbursements were also identified as factors affecting implementation of planned activities. Overall, the findings indicate that HANDENI RUWASA provides institutional oversight of domestic water services, although its operational activities are constrained by financial and administrative limitations.

Handeni Trunk Main Water Supply and Sanitation Authority (HTMWSA)

HTMWSA was identified as the principal formal water utility serving Kabuku Small Urban Centre, with 28% of surveyed households reporting it as their principal domestic water provider. The authority is responsible for water production, transmission, distribution, operation and maintenance of infrastructure, customer billing, tariff administration, and monitoring service delivery. Despite these responsibilities, respondents identified several operational challenges affecting service provision. Financial constraints were reported as the major limitation, restricting infrastructure expansion, maintenance activities, and network extension. Institutional records further indicated that during the 2021/2022 financial year, HTMWSA received only 12.41% of its approved budget, increasing dependence on internally generated revenue for operational activities. These findings show that HTMWSA remains the primary formal provider of domestic water services despite experiencing considerable financial constraints.

Stationary Communal Water Vendors

Stationary communal water vendors were reported as the principal domestic water provider by 10% of surveyed households in Kabuku Small Urban Centre. They operate communal standpipes established by HTMWSA and are responsible for managing daily access to water collection points (Figure 3). Their duties include opening and closing communal taps, collecting payments from consumers, recording daily sales, and transferring revenues to HTMWSA. Vendors receive commissions ranging between 15% and 20% of total daily water sales. Household interviews revealed that communal water vendors have improved water accessibility, particularly in neighbourhoods without household connections. However, respondents reported operational challenges associated with the introduction of metered water systems. Many vendors indicated that they had not received adequate training on meter reading or water accounting procedures, resulting in frequent disagreements with revenue collectors regarding recorded sales and commission payments. One communal water vendor explained:

> *"We have not been trained on how the water meter works and therefore do not understand how to read it. Although we follow the instructions to prevent water loss, we still incur losses. This is very frustrating."*

The findings further show that limited technical knowledge among communal water vendors affects routine management of community water facilities.



Figure 3: Water Tap used by Stationary Communal Water Vendor

Mobile Water Vendors

Mobile water vendors were reported as the principal provider by 20% of surveyed households and operate primarily as informal distributors supplying households located outside the formal water network. Most vendors purchase water from private household connections, while others obtain water from communal standpipes or shallow wells before distributing it directly to consumers using bicycles, motorcycles, or handcarts. Approximately 70% of mobile vendors operate as retail suppliers delivering water directly to households. Men constitute approximately 75% of all mobile vendors, while women account for the remaining 25%. Respondents reported considerable variation in the prices charged by mobile vendors, with households paying between TZS 100 and TZS 500 per 20-litre container depending on travel distance. Vendors also identified several operational constraints affecting their businesses. High consumer complaints regarding water prices represented the most frequently reported challenge (44%), followed by poor road infrastructure (23%), interference from local government authorities (19%), and increasing demand for water (14%). These findings indicate that mobile vendors provide an alternative means of accessing domestic water, particularly in areas where formal water infrastructure is limited. Figure 4 illustrates existing mobile water vendors.



Figure 4: Mobile Water Vendors Using Bicycles and Motorcycles

Individual Water Vendors

Individual water vendors were the most frequently reported principal provider, accounting for 40% of surveyed households. These vendors operate from private household water connections supplied by HTMWSA and resell water to neighbouring households and mobile vendors. The survey found that approximately 70% of individual water vendors operate as household-based resellers serving nearby communities. Water is generally sold in quantities ranging between 20 and 100 litres per transaction, with an average vendor supplying around twenty households each day. Respondents indicated that water obtained from individual vendors is commonly preferred for drinking and cooking because consumers are familiar with the source of supply. Nevertheless, establishing an individual household connection requires substantial financial investment. The study found that installing a private water connection costs approximately TZS 300,000, while communal water points require approximately TZS 200,000. Mobile water vending requires comparatively lower capital investment of around TZS 100,000. Households further reported that financing these arrangements depends mainly on household businesses, agricultural activities, and user contributions. Although individual vendors expand local water access, respondents noted that limited financial resources constrain the ability of vendors to extend services beyond their immediate neighbourhoods. Figure 5 illustrates a water tap used by an individual water vendor.



Figure 5: Water Tap Used by an Individual Water Vendor

Domestic Water Pricing

The survey identified four principal domestic water supply arrangements operating within Kabuku Small Urban Centre, each characterised by different pricing mechanisms and service conditions (Table 2). Households connected directly to the HTMWSA network receive treated water through household connections and pay a fixed monthly tariff. Individual water vendors sell treated water supplied through private household connections at an average price of TZS 100 per 20-litre container, although consumers are responsible for collecting and transporting the water themselves. Stationary communal water vendors charge a similar unit price of TZS 100 per 20-litre container at communal collection points. Mobile water vendors provide door-to-door delivery services at prices ranging from TZS 100 to TZS 500 per 20-litre container. Survey responses indicate that pricing varies primarily according to the distance travelled between the water source and the consumer. The results demonstrate considerable variation in payment arrangements across providers, reflecting differences in service delivery methods, accessibility, and transportation requirements.

Table 2: Existing Domestic Water Prices

S/N	Local actor/water provider	Mode of access and service arrangement	Reported water quality	Payment arrangement / tariff
1	Handeni Trunk Main Water Supply and Sanitation Authority (HTMWSA)	Household connection to the piped-water network	Reported as clean	Monthly lump-sum/flat-rate payment
2	Individual water vendors	Households collect water from privately operated individual water connections	Reported as clean	TZS 100 (approximately USD 0.05) per 20-litre container

3	Mobile water vendors	Water transported and delivered directly to households	Reported as unclean and potentially unsafe	TZS 100–500 (approximately USD 0.05–0.25) per 20-litre container; price varies with distance from the source
4	Communal water vendors	Households collect water from communal water collection points	Reported as clean	TZS 100 (approximately USD 0.05) per 20-litre container

DISCUSSION

The Kabuku evidence advances the analysis beyond the observation that formal and informal providers coexist. It shows that the governance system is functionally interdependent: public institutions supply infrastructure, regulation and treated water, while communal, household-based and mobile vendors redistribute that water across spaces and times where network access is insufficient. This extends polycentric governance theory by demonstrating that multiple centres of action may emerge through necessity rather than deliberate institutional design. In Kabuku, polycentricity improves service reach but remains only partially coordinated, creating a tension between functional complementarity and weak accountability. The findings therefore distinguish 'service polycentricity' - multiple actors sustaining access - from 'coordinated polycentric governance', in which roles, standards and accountability relationships are explicitly organised.

Multiple Water Sources as Household Adaptation Strategies

The widespread use of multiple water sources reflects households' adaptive responses to unreliable and unevenly distributed formal water services. Although piped water remains the preferred source, particularly in central areas, limited network coverage and intermittent supply have compelled many households to combine piped water with rainwater harvesting, communal water points, shallow wells and groundwater sources. The greater reliance on communal and groundwater-based sources in peripheral settlements further demonstrates spatial inequalities in access to domestic water services. Comparable research in small towns and rapidly transforming settlements shows that households and local providers often assemble multiple service arrangements where networked provision is incomplete or unreliable (Marks et al., 2020; Fielmua, 2021; WHO & UNICEF, 2023). From a governance perspective, the observed diversification of water sources is consistent with adaptive governance, which emphasises the capacity of institutions and users to respond to changing environmental and service conditions (Pahl-Wostl et al., 2020). In Kabuku, households do not passively experience shortages; they actively combine available sources to maintain domestic water security. Household water management should therefore be understood as part of the local governance system rather than only as an individual coping response.

Hybrid Water Governance and the Role of Multiple Actors

A key finding of this study is that domestic water governance depends on interactions among multiple actors operating at different institutional levels. While HTMWSA and HANDENI RUWASA provide the formal institutional framework for water service delivery, individual water vendors, communal water vendors and mobile vendors perform complementary functions by extending access beyond areas adequately served by the public network. The fact that 70% of surveyed households reported a vendor category as their principal provider demonstrates the practical importance of these non-state and community-linked arrangements.

These findings are consistent with polycentric governance theory, which emphasises multiple centres of decision-making that retain some autonomy while performing potentially complementary functions (Ostrom, 2010; Lubell & Morrison, 2021; Srigiri & Dombrowsky, 2022). However, the Kabuku case also shows why actor plurality should not be equated automatically with effective polycentric governance. Multiple service centres exist, but their relationships are only weakly institutionalised, with fragmented responsibilities, limited coordination and uneven regulatory oversight. The study therefore distinguishes service polycentricity - the coexistence of several providers sustaining access - from coordinated polycentric governance, in which those centres are linked through recognised roles, information exchange, accountability and mutually understood rules. Similar evidence from African water systems shows that informal providers can be essential to service delivery while remaining only partially incorporated into formal governance arrangements (Munro & Kweka, 2021; Dery & Bisung, 2022). Accordingly, informal providers should be treated neither as invisible substitutes nor as competitors to public utilities, but as complementary actors whose contributions require appropriate recognition and proportionate regulation.

Institutional Capacity and Domestic Water Delivery

Although HANDENI RUWASA and HTMWSA remain central to domestic water governance, their effectiveness is constrained by financial and institutional limitations. Respondents consistently identified inadequate funding, shortages of technical personnel, limited transport facilities, and delayed maintenance of water infrastructure as major constraints affecting service delivery. The financial challenges reported for HTMWSA, including dependence on internally generated revenue following limited government budget allocations, illustrate the broader difficulties experienced by many small urban water authorities in developing countries. Limited financial resources restrict infrastructure expansion, reduce maintenance capacity, and constrain service improvements despite increasing water demand associated with urban growth. These findings reinforce previous studies arguing that improving water governance requires strengthening institutional capacity alongside infrastructure development (Pahl-Wostl et al., 2020). Investments in physical infrastructure alone are unlikely to improve service delivery if implementing institutions lack sufficient financial, technical, and administrative capacity. Effective domestic water governance therefore depends equally on institutional strengthening, sustainable financing mechanisms, and improved organisational performance.

Informal Water Providers as Governance Partners

The study demonstrates that informal water providers have become indispensable actors within the domestic water governance system. Individual water vendors, communal vendors, and mobile vendors collectively expand service coverage by supplying households that remain beyond the reach of formal infrastructure. Their contribution extends beyond simply providing water. Informal providers improve service accessibility, reduce travel time for consumers, respond rapidly to supply interruptions, and increase the resilience of local water supply systems. These findings indicate that informal providers perform governance functions by facilitating water distribution where institutional and infrastructural limitations persist. Nevertheless, the study also identified several operational weaknesses. Mobile vendors face poor transport infrastructure, inconsistent regulatory treatment, and consumer complaints regarding pricing and water quality. Similarly, communal water vendors experience technical difficulties associated with meter reading and revenue management due to inadequate training. These operational challenges suggest that the effectiveness of informal providers depends not only on entrepreneurial initiative but also on supportive institutional environments. Formal recognition, technical training, and regulatory guidance would improve accountability while preserving the flexibility that makes informal providers effective within local communities.

Domestic Water Pricing and Equity

The findings indicate that domestic water pricing reflects differences in service delivery arrangements rather than a uniform pricing system. Households connected directly to HTMWSA benefit from relatively predictable monthly tariffs, whereas consumers relying on informal providers pay according to the quantity of water purchased and, in the case of mobile vendors, transportation distance. Although many respondents considered prevailing prices generally affordable, households expressed concerns regarding tariff fairness during periods of unreliable water supply. Consumers expected payments to correspond to service reliability, water quality, and availability. Similar concerns have been reported in other developing countries, where willingness to pay depends not only on affordability but also on perceptions of service quality and institutional accountability (WHO & UNICEF, 2023). These findings suggest that water pricing should be viewed as an important governance instrument rather than merely a cost-recovery mechanism. Transparent tariff structures, consumer participation in tariff setting, and stronger accountability mechanisms are essential for balancing financial sustainability with equitable access to domestic water services.

Implications for Domestic Water Governance

The findings demonstrate that domestic water governance in Kabuku Small Urban Centre extends beyond conventional state-centred approaches to encompass a broader network of formal institutions, informal providers, and households. Water access is maintained through continuous interactions among these actors, each contributing different resources, knowledge, and institutional capacities. This study therefore contributes to the growing literature on hybrid and polycentric water governance by providing empirical evidence from a small urban centre in Tanzania. Unlike many studies that focus primarily on formal utilities, the findings illustrate how informal providers have become embedded within everyday governance arrangements and contribute significantly to service continuity. Rather than functioning outside the governance system, these actors constitute an integral component of local institutional arrangements through which households secure reliable water supplies. The evidence further suggests that sustainable domestic water governance in rapidly urbanising small urban centres requires moving beyond infrastructure-centred interventions towards governance approaches that strengthen institutional coordination, enhance organisational capacity, recognise informal service providers, and promote collaborative decision-making among all stakeholders. Such an integrated governance framework would improve service reliability, enhance accountability, and strengthen the long-term resilience of domestic water systems.

CONCLUSION, POLICY IMPLICATIONS AND FUTURE RESEARCH

This study contributes to water-governance scholarship by showing that domestic water provision in a rapidly urbanising small centre is neither adequately described as a rural community system nor as a conventional urban utility system. Kabuku operates through a hybrid, service-polycentric arrangement in which formal institutions retain statutory mandates while informal and community-based actors perform essential distribution and access functions. The prominence of individual vendors (40%) and the combined 70% share of vendor categories demonstrates that these actors are not peripheral exceptions to the system; they are embedded in its everyday operation. At the same time, centre–periphery differences in water-source combinations show that this governance configuration does not produce spatially uniform outcomes. The novelty of the study therefore lies in connecting actor plurality to differentiated household access and in demonstrating that polycentric service delivery can coexist with fragmented institutional coordination. Policy should consequently move beyond an infrastructure-only response. HTMWSA and HANDENI RUWASA require stronger

financial and technical capacity, but expansion of formal networks should be accompanied by mechanisms that recognise and govern the providers already filling service gaps. Practical measures include clear operating standards for communal and mobile vendors, training in metering and water accounting, transparent pricing and water-quality requirements, structured communication between utilities, local government and vendors, and targeted network expansion to peripheral settlements. Such measures would preserve the flexibility of local provision while strengthening accountability, affordability and service quality.

Future research should test the proposed distinction between service polycentricity and coordinated polycentric governance across several Tanzanian small urban centres and comparable transitional settlements elsewhere in the Global South. Comparative studies should use case-level datasets capable of testing associations between location, provider type, household characteristics, price, reliability and water quality, and should examine how regulatory recognition of informal providers changes equity and accountability over time.

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