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Institutional Pluralism and Wetland Governance: Institutional Implementation, Participation, Compliance and Coordination in the Malagarasi–Muyovozi Wetlands, Tanzania

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ABSTRACT

Wetland governance depends not only on the existence of policies and institutions but also on how institutional arrangements are implemented in practice. This study examined institutional implementation and its association with stakeholder participation, regulatory compliance and institutional coordination in the Malagarasi–Muyovozi Wetlands, Tanzania. A cross-sectional mixed-methods design was used. Data were collected from 348 households, 27 key informants and 54 participants in six focus group discussions, supplemented by field observations and documentary review. Quantitative data were analysed using IBM SPSS Statistics software to compute descriptive statistics and a multivariate probit model, while qualitative data were analysed thematically. The findings showed weaknesses in monitoring and enforcement, limited financial and human resources, unclear institutional responsibilities and infrequent joint activities. The multivariate probit model showed statistically significant association between institutional implementation factors and stakeholder participation, regulatory compliance, and institutional coordination (Wald χ^2 (27) =159.88, $p<0.001$). Policy implementation ($\beta=0.655$, $p<0.001$), community awareness ($\beta=0.503$, $p=0.016$) and institutional collaboration ($\beta=0.069$, $p=0.008$) were positively associated with stakeholder participation, while institutional capacity was negatively associated with participation ($\beta=-0.169$, $p=0.029$). Regulatory enforcement ($\beta=0.664$, $p<0.001$), integration of formal and informal rules ($\beta=0.255$, $p=0.044$) and formal-rule shortcomings ($\beta=0.167$, $p=0.001$) were positively associated with regulatory compliance, whereas users' participation ($\beta=-0.532$, $p=0.017$) and institutional collaboration ($\beta=-0.105$, $p=0.017$) were negatively associated with compliance. Regulatory enforcement ($\beta=0.286$, $p=0.041$) and formal-rule shortcomings ($\beta=0.095$, $p=0.017$) were positively associated with institutional coordination, whereas coordination mechanisms were negatively associated with institutional coordination ($\beta=-0.863$, $p<0.001$). Although 67.5% of the respondents reported improved compliance and 67.0% reported reduced illegal activities, 64.9% perceived the wetlands to be deteriorating.

Keywords: Institutional implementation; wetland governance; stakeholder participation; regulatory compliance; institutional coordination; institutional pluralism.

1.0 INTRODUCTION

Wetlands are among the world's most productive ecosystems, providing essential ecological, economic, and social services that support biodiversity conservation, climate regulation, water purification, flood control, and the livelihoods of millions of people (Guan *et al.* 2025; Karimi *et al.* 2025; Suthar 2021). Globally, wetlands cover approximately six per cent of the Earth's land surface and make a significant contribution to sustainable development through the provision of ecosystem services (Davidson *et al.* 2018; Mumba & de Groot 2024; United Nations 2025). Despite their importance, wetlands continue to experience widespread degradation due to land-use change, agricultural expansion, urbanization, pollution, overexploitation of natural resources, and weak governance systems. Evidence from international conservation bodies indicates that wetland loss has occurred at a faster rate than that of many other ecosystems over the past century, raising concerns about the adequacy of existing institutional arrangements and governance mechanisms responsible for their management (Davidson *et al.* 2014; Materu *et al.* 2018; Marambanyika & Beckedahl, 2016; Marambanyika & Beckedahl 2017).

The increasing recognition of wetlands as strategic ecosystems has led to the development of international frameworks and agreements aimed at their conservation and sustainable use (Guan *et al.* 2025; Karimi *et al.* 2025). In particular, the Ramsar Convention on Wetlands has emphasized the importance of strong governance institutions, stakeholder participation, and integrated management approaches in ensuring the sustainability of wetland ecosystems (Karimi *et al.* 2025; Kadoma & Kibirige 2025). However, the existence of policies, regulations, and institutional frameworks does not in itself guarantee successful conservation outcomes. The quality of wetland governance largely depends on the extent to which institutions implement policies, coordinate stakeholders, enforce regulations, and facilitate collective action among resource users (Hayes & Murtinho 2024; Herzog *et al.* 2022). Accordingly, institutional implementation has emerged as a key determinant of governance outcomes in wetland ecosystems globally (Karimi *et al.* 2025; Hayes & Murtinho 2024).

In Sub-Saharan Africa, wetlands play a crucial role in supporting food security, water resources, biodiversity conservation, and rural livelihoods (Barakagira & de Wit 2019; Nakiyemba *et al.* 2020; Twinomujuni *et al.* 2024). The region contains extensive wetland systems that provide vital ecosystem services to rapidly growing populations. Nevertheless, many wetlands across Sub-Saharan Africa are under increasing pressure from agricultural encroachment, livestock grazing, deforestation, mining activities, infrastructure development, and climate variability (Kusena *et al.* 2025; Masese *et al.* 2025). Although governments have established policies and regulatory frameworks for environmental management, challenges such as limited institutional capacity, inadequate funding, weak enforcement mechanisms, overlapping mandates, and insufficient stakeholder participation continue to undermine sound wetland governance (de Oliveira *et al.* 2024; Falayi *et al.* 2026; Musasa *et al.* 2023; Mdleleni *et al.* 2025). These challenges suggest that governance outcomes are not solely dependent on policy formulation, but also on the extent to which institutions are able to implement governance arrangements in practice (de Oliveira *et al.* 2024; Newig *et al.* 2023).

In Tanzania, wetlands form an important component of the national natural resource base and contribute significantly to ecological sustainability and socio-economic development (Mkonda 2022; Ngowi 2024). The country has introduced various environmental policies, legal frameworks, and institutional structures aimed at promoting sustainable wetland management. These include environmental management legislation, wildlife conservation policies, water

resource management frameworks, and community-based natural resource management initiatives (URT 2004; URT 2009a; URT 2009b; URT 2014). Despite these efforts, many wetland ecosystems continue to experience degradation as a result of unsustainable resource use, agricultural expansion, illegal activities, population pressure, and weak institutional coordination (Masese *et al.* 2025; Mkonda 2022; Ngowi 2024). Existing studies have highlighted challenges related to policy implementation, enforcement, stakeholder engagement, and institutional capacity, suggesting that governance outcomes vary considerably across wetland systems (de Oliveira *et al.* 2024; Falayi *et al.* 2025; Mdleleni *et al.* 2025; Newig *et al.* 2023).

The Malagarasi–Muyovozi Wetlands are among the largest and most important wetland systems in East Africa and support biodiversity, hydrological functions, and the livelihoods of surrounding communities through fishing, agriculture, livestock keeping, and other activities (Musika *et al.* 2021; Lynch *et al.* 2016). Their management involves several institutions and resource users operating at different levels. Uvinza District Council, the National Environment Management Council (NEMC), Tanzania Wildlife Management Authority (TAWA), Tanzania Forest Services (TFS), and the Lake Tanganyika Basin Water Board have responsibilities related to local administration, environmental management, wildlife conservation, forest management, and water-resource management. Non-state organisations, such as Nature Tanzania, contribute to wetland governance through community-based conservation, environmental awareness, capacity building, and species and habitat monitoring, while village governments and customary institutions influence local resource use through by-laws, traditional practices, and customary norms. Local farmers, fishers, and livestock keepers are also central to wetland management because they depend directly on wetland resources. Management therefore requires interaction among these actors through consultation, implementation of policies and by-laws, monitoring, enforcement, information sharing, and coordination. Nevertheless, agricultural expansion, resource extraction, settlement development, and competing land-use demands continue to affect the wetlands (Kashaigili & Majaliwa 2010; Materu *et al.* 2018). The persistence of these pressures, despite the presence of several institutions, points to the need to examine how institutional arrangements are implemented in practice and how institutions coordinate, enforce regulations, and involve local communities in wetland management.

Tanzania has established several policies, laws, and institutional arrangements for wetland management. However, degradation of the Malagarasi–Muyovozi Wetlands continues (Materu *et al.* 2018; Mwakalila 2006). This points to the need to examine how existing institutional arrangements are implemented in practice and whether different aspects of implementation are associated with stakeholder participation, regulatory compliance, and institutional coordination

Despite the existence of institutional arrangements for wetland management in Tanzania, concerns remain regarding the extent to which these institutions successfully implement governance mechanisms within the Malagarasi–Muyovozi Wetlands. Available studies have largely focused on ecological conservation, biodiversity protection, livelihood dependence, and environmental threats affecting wetland ecosystems (Kashaigili & Majaliwa 2010; Lynch *et al.* 2016). Relatively less attention has been given to understanding how institutional implementation is associated with governance outcomes through mechanisms such as stakeholder participation, regulatory compliance, and institutional coordination. Consequently, there is limited empirical evidence on the relationship between institutional implementation

and governance outcomes in the Malagarasi–Muyovozi Wetlands (Barakagira & de Wit 2019; Kusena *et al.* 2025; Masese *et al.* 2025; Ostrom 2009; Twinomujuni *et al.* 2024). This gap is particularly important, as sound governance depends not only on the existence of institutions, but also on their capacity to translate policies and regulations into practical outcomes. Without a clear understanding of the role of institutional implementation, efforts to improve wetland governance may fail to address underlying institutional weaknesses that constrain conservation and sustainable resource management (Agrawal & Ribot 1999; Díaz-Pinzón *et al.* 2024; Langensiepen *et al.* 2022; Ostrom 2017; Langensiepen *et al.* 2022; Reed *et al.* 2009). There is therefore a need for empirical investigation into the extent of institutional implementation and its contribution to governance outcomes in the Malagarasi–Muyovozi Wetlands.

Accordingly, this study examines the role of institutional implementation in wetland governance in the Malagarasi–Muyovozi Wetlands, Tanzania. Specifically, the study: (i) assess the level of institutional implementation in the Malagarasi–Muyovozi Wetlands; (ii) evaluate governance processes in the area; (iii) analyse the association between institutional implementation and stakeholder participation, regulatory compliance, and institutional coordination in wetland governance; and (iv) assess broader wetland governance outcomes associated with institutional implementation.

In this study, institutional implementation is operationally defined as the extent to which institutional arrangements translate wetland policies, regulations, and management frameworks into practical actions through policy implementation, stakeholder coordination, regulatory enforcement, institutional capacity, and the facilitation of collective action within the Malagarasi–Muyovozi Wetlands.

The findings are expected to contribute to the growing body of knowledge on environmental governance and inform policy and practice aimed at strengthening institutional arrangements for sustainable wetland management in Tanzania and in similar contexts.

2.0 THEORETICAL REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Theoretical Review

The Institutional Analysis and Development (IAD) Framework and the Institutional Theory provide a sound theoretical basis for examining wetland governance in the Malagarasi–Muyovozi wetlands, as the study focuses on institutional implementation, governance processes, and interactions among actors operating within structured rule systems. The IAD Framework, developed by Elinor Ostrom, explains how institutional arrangements, rules-in-use, and interactions among actors shape governance outcomes in common-pool resource systems such as wetlands (Ostrom 1990; Ostrom *et al.* 1994; Ostrom 2011). It conceptualises governance as an action arena in which various actors engage under formal and informal rules to produce particular outcomes (Ostrom 1990; Ostrom 2005). In this study, the framework is useful in explaining how institutional implementation shapes patterns of interaction among stakeholders, including government agencies, local communities, conservation authorities, and resource users, and how such interactions influence governance outcomes such as compliance, coordination, and participatory management.

In this study, the IAD Framework supports the analysis of how institutional arrangements function in practice within the Malagarasi–Muyovozi wetlands. It provides a lens for examining the action arena in which wetland governance decisions are made, particularly the interactions

among institutional actors responsible for policy implementation, enforcement, and coordination (Ortiz-Riomalo *et al.* 2023; Srigiri & Dombrowsky 2022). The framework further enables an examination of how rules-in-use shape stakeholder behaviour, influence compliance with wetland regulations, and determine the extent of cooperation in resource management (Kadoma & Kibirige 2026). It also allows consideration of how the biophysical characteristics of the wetland and community attributes influence institutional performance and governance processes. In this way, the IAD Framework offers a structured explanation of the relationship between institutional implementation and governance outcomes in the wetland system (Hayes & Murtinho 2024; Ortiz-Riomalo *et al.* 2023).

Despite its analytical strength, the IAD Framework does not fully account for how institutional structures, norms, and organisational arrangements shape implementation processes. Although it provides a detailed understanding of interactions and outcomes, it pays comparatively less attention to how institutions are structured, how legitimacy is established, and how institutional norms and regulatory systems influence implementation capacity (Herzog *et al.*, 2022; Morrison *et al.* 2023). In the Malagarasi–Muyovozi wetlands, challenges such as weak enforcement of regulations, limited institutional coordination, inconsistent policy implementation, and capacity constraints indicate the need for a complementary theoretical perspective that places greater emphasis on institutional structures and organizational behaviour.

The Institutional Theory, therefore, complements the IAD Framework by explaining how formal and informal institutional arrangements influence governance processes and institutional implementation (North 1990; Scott 2021). The theory emphasizes the role of rules, norms, organisational structures, and regulatory systems in shaping behaviour within institutional settings (Agrawal 2001; North 1990; North 2005). It further explains how institutional legitimacy, coercive pressures, and normative expectations influence how organisations implement policies and carry out governance functions (Agrawal & Gibson 1999). In the context of the Malagarasi–Muyovozi wetlands, the Institutional Theory is particularly relevant for explaining how government policies, environmental laws, decentralised governance structures, and organisational arrangements shape the implementation of wetland management strategies (Agrawal & Ribot 1999).

The theory also provides insight into how institutional capacity, administrative structures, and regulatory enforcement mechanisms influence stakeholder behaviour, levels of compliance, and coordination among actors involved in wetland governance. Variations in enforcement strength, resource availability, and organizational coordination may account for differences in the extent to which wetland policies are implemented across local governance structures. Similarly, institutional pressures and normative expectations may shape how different actors respond to conservation regulations and engage in governance processes (Agrawal & Gibson 1999).

However, the Institutional Theory alone does not adequately capture the dynamic interactions among actors in specific governance settings, nor does it fully explain how outcomes emerge from such interactions within a resource governance context. It places greater emphasis on institutional structures and organisational behaviour, while giving less attention to action situations, stakeholder interactions, and feedback processes within governance systems (Morrison *et al.* 2023).

The integration of the IAD Framework and the Institutional Theory, therefore, provides a more comprehensive analytical approach for this study. The Institutional Theory explains how institutional arrangements, norms, and organisational structures shape implementation processes, while the IAD Framework explains how these arrangements operate in practice through interactions among actors within the action arena. The combined use of the IAD Framework and Institutional Theory, therefore, enables a fuller understanding of how institutional implementation is associated with stakeholder participation, regulatory compliance and institutional coordination, and how these processes relate to broader governance outcomes in the Malagarasi–Muyovozi Wetlands.

2.2 Conceptual Framework

The conceptual framework draws on the Institutional Theory and the Institutional Analysis and Development (IAD) Framework to explain the relationship between institutional implementation and wetland governance in the Malagarasi–Muyovozi Wetlands. The Institutional Theory explains how formal and informal rules, institutional structures, resources and enforcement arrangements shape institutional implementation, while the IAD Framework explains how these arrangements shape interactions among actors involved in wetland resource use and management. As shown in Figure 1, institutional implementation is the main explanatory component and refers to the extent to which existing institutional arrangements are put into practice through policy implementation, regulatory enforcement, institutional capacity, stakeholder coordination and support for collective action. These dimensions are represented by nine variables: policy implementation, community awareness, regulatory enforcement, integration of formal and informal rules, coordination mechanisms, users' participation in wetland management, institutional collaboration, institutional capacity and formal-rule shortcomings.

The framework identifies stakeholder participation, regulatory compliance and institutional coordination as the main governance processes. These processes were selected because they capture three central aspects of wetland governance: the involvement of stakeholders in management, adherence to rules governing resource use, and cooperation among institutions responsible for wetland management. Stakeholder participation concerns the involvement of resource users and other stakeholders in planning, decision-making and wetland management activities. Regulatory compliance refers to adherence to policies, laws, by-laws, wetland boundaries and restrictions governing resource use, while institutional coordination concerns cooperation among responsible institutions through information sharing, joint planning, enforcement activities and conflict resolution. Within the IAD action arena, these processes involve interactions among local communities, farmers, fishers, livestock keepers, village and district authorities, government agencies, customary institutions and civil society organisations. Their interactions are shaped by formal arrangements, including policies, laws, regulations and by-laws, as well as customary rules and practices. Formal and informal institutions may, therefore, complement one another, although differences in rules, responsibilities and authority may affect participation, compliance and coordination.

The framework links institutional implementation and governance processes to broader wetland governance outcomes, including improved compliance and reduced illegal activities, reduced conflicts and stronger stakeholder collaboration, improved wetland condition and livelihood sustainability, and improved wetland management and governance. It also recognises contextual factors such as education, occupation or livelihood, years of residence, farm size, proximity to the wetland and dependence on wetland resources. These factors may

shape resource use and how stakeholders interact with institutions and respond to governance arrangements. The framework, therefore, connects institutional implementation, interactions among actors and governance processes with broader governance outcomes, while recognising the socio-economic context within which wetland governance takes place. The arrows in Figure 1 indicate the conceptual relationships examined in the study and should not be interpreted as causal pathways, given the cross-sectional design.

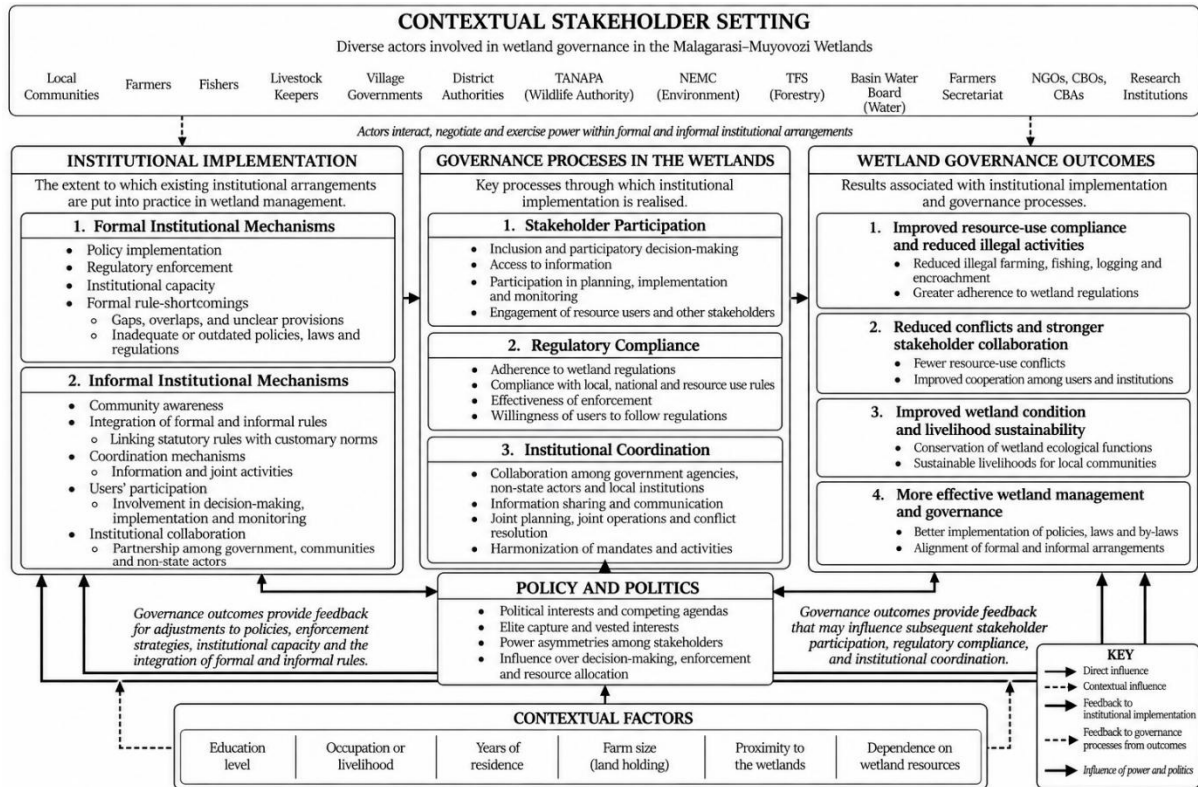


Figure 1

3.0 MATERIALS AND METHODS

3.1 Description of the Study Area

The study was conducted in the Malagarasi-Muyovozi Wetlands located in Uvinza District, western Tanzania (Figure 2). The study covered six villages within the wetland landscape, namely Chagu, Ilalanguru, Itebula, Kasisi, Malagarasi, and Mpeta. These villages fall within Mtegowanoti, Itebula, and Mganza wards in Uvinza District, Kigoma Region. The area represents a typical wetland-community interface where human activities are closely interlinked with wetland ecosystem dynamics.

The Malagarasi-Muyovozi Wetlands lie in north-western Tanzania, between 05°00'–06°00'S and 31°00'–32°00'E. The system forms a vast and complex mid-altitude riverine floodplain within the Malagarasi River basin, with an average elevation of approximately 1,200 metres above sea level. Covering about 3.25 million hectares, it is among the largest wetland systems in East Africa. The system is hydrologically sustained by several river basins, including the Malagarasi, Muyovozi, Kigosi, Gombe, and Ugalla rivers. The core wetland area comprises approximately 250,000 hectares of lakes and open water, alongside about 200,000 hectares of permanent papyrus swamps that persist throughout the dry season. The floodplain is highly dynamic, expanding considerably during periods of heavy rainfall and, in extreme cases, reaching up to 1.5 million hectares. This seasonal variability contributes to a mosaic of habitats

that together support a rich diversity of plant and animal species, including important fisheries resources and key wildlife habitats (Lynch *et al.* 2016; Materu *et al.* 2018; URT, 2022).

The surrounding landscape is dominated by extensive Miombo woodlands, mainly composed of *Brachystegia–Julbernardia*, and *Isoberlinia species (Fabaceae)*. These woodlands form part of a broader ecological continuum of interconnected forests and wetlands covering approximately 15 million hectares. The area experiences a bimodal rainfall pattern, with an average annual precipitation of 800–1,000 mm. Rainfall is concentrated in two main seasons, the short rains from November to December and the long rains from March to May. This rainfall regime strongly influences the hydrological behaviour of the wetland, particularly seasonal flooding and water distribution across the floodplain (2015; Lynch *et al.* 2016; Musika *et al.* 2021).

Ecologically, the Malagarasi–Muyovozi Wetlands perform important functions, including water regulation, flood attenuation, sediment trapping, and groundwater recharge. These ecosystem services are closely linked to the livelihoods of surrounding communities. The population within and around the wetlands relies predominantly on farming, fishing, and livestock keeping as their main economic activities. This high dependence on wetland resources has intensified pressure on the ecosystem, leading to agricultural expansion, over-grazing, unregulated fishing, and encroachment into ecologically sensitive areas, with consequent environmental degradation in several parts of the wetland system (Materu *et al.* 2018; URT 2022).

Management of the Malagarasi–Muyovozi Wetlands involves a range of actors, including local communities, village governments, district authorities, environmental management institutions, and conservation organisations. Although formal institutional and legal frameworks for wetland governance exist, challenges persist in relation to policy implementation, coordination among responsible institutions, enforcement of regulations, and stakeholder participation. These institutional constraints continue to pose significant challenges to sustainable wetland governance in the area (Emmanuel & Kweka 2024; Lynch *et al.* 2016; Musika *et al.* 2021).

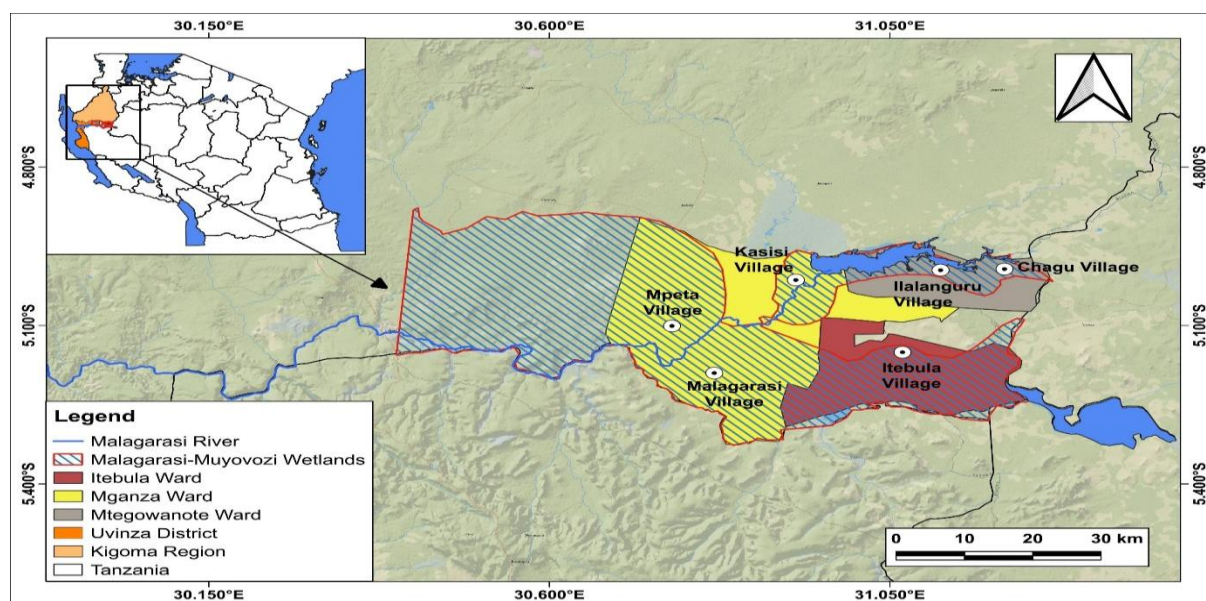


Figure 2: Geographic location of the study area

3.2 Research Design

This study employed a cross-sectional research design within a mixed-methods approach. The design facilitated the collection of both quantitative and qualitative data from different categories of respondents at a single point in time. A cross-sectional design was considered appropriate because it enables the assessment of existing conditions, perceptions, practices, and institutional processes within a specific context. It is widely applied in environmental governance research where the objective is to examine relationships among variables and obtain information from diverse stakeholder groups within a relatively short period.

The study adopted a convergent parallel mixed-methods design, in which quantitative and qualitative data were collected during the same phase, analysed separately and brought together during interpretation. This design was appropriate because the study required both quantitative evidence on institutional implementation and governance processes and qualitative accounts of how these processes operated in practice. Quantitative data from the household survey were used to examine institutional implementation, stakeholder participation, regulatory compliance, institutional coordination and broader governance outcomes. Qualitative data from key informant interviews and focus group discussions were used to examine institutional arrangements, policy implementation practices, stakeholder experiences and governance challenges. The quantitative and qualitative findings were then compared and interpreted alongside evidence from field observations and documentary review. This allowed the study to identify areas of agreement and difference across the data sources and to explain institutional implementation and wetland governance in the Malagarasi–Muyovozi Wetlands.

The study incorporated both descriptive and analytical components. The descriptive component was used to assess the level of institutional implementation and examine governance processes within the wetlands, while the analytical component explored the relationships between institutional implementation and key governance dimensions, namely stakeholder participation, regulatory compliance, and institutional coordination. The study was guided by the Institutional Analysis and Development (IAD) Framework and Institutional Theory, which informed the identification of variables and the analysis of institutional processes. Institutional implementation constituted the principal independent variable, whereas wetland governance served as the dependent variable. Stakeholder participation, regulatory compliance and institutional coordination were examined as key governance dimensions associated with institutional implementation. Socio-demographic characteristics, including education level, occupation, years of residence, farm size, proximity to the wetlands, and dependence on wetland resources, were treated as control variables during analysis.

The cross-sectional mixed-methods design therefore provided an appropriate framework for examining the role of institutional implementation in wetland governance and for generating evidence to inform policy and institutional interventions aimed at strengthening sustainable wetland management in the Malagarasi–Muyovozi Wetlands. However, although the design was suitable for assessing institutional conditions and governance processes at a particular point in time, it could not capture long-term changes in institutional arrangements or governance dynamics. Consequently, the study focused on existing institutional conditions rather than temporal changes in governance systems. Nevertheless, the design provided valuable insights into policy implementation, regulatory enforcement, stakeholder coordination, institutional capacity, collective action, and their contribution to sustainable wetland governance within the study area.

3.3 Sources of Data

The study used both primary and secondary data. Primary data were collected from local communities, including farmers, fishers and livestock keepers, village and district officials, traditional leaders, village environmental committees, government institutions, and civil society organizations' representatives, involved in wetland governance. These included representatives from NEMC, TAWA, TAFIRI, TFS, the Ramsar Secretariat, the Lake Tanganyika Basin Water Board, and staff of relevant district departments. The data covered institutional implementation, stakeholder participation, regulatory compliance, institutional coordination and wetland governance.

Secondary data were obtained from environmental policies, legislation, wetland management plans, district and village reports, institutional records, conservation programme reports and previous studies on wetland governance and management. These sources were used alongside the primary data to provide additional information on wetland governance in the study area.

3.4 Data Collection Methods and Tools

Data were collected through a household survey, key informant interviews, focus group discussions (FGDs), field observations and documentary review. The household survey used a structured questionnaire to collect quantitative data. Key informant interviews were conducted using a semi-structured interview guide with government officials and representatives of conservation institutions and civil society organisations (CSOs). FGDs were conducted with community members using a discussion guide to obtain their experiences and views on wetland governance.

Field observations were conducted using an observation checklist to record relevant activities and environmental conditions in the study area. Documentary review covered relevant policies, institutional reports, official records and academic literature. Using these methods allowed information from different sources to be compared and used to support the study findings.

3.5 Validity and Quality Assurance of Research Instruments

The research instruments were developed based on the study objectives, the Institutional Analysis and Development (IAD) Framework, the Institutional Theory, and relevant literature on wetland governance. Content validity was checked through expert examination to ensure that the household questionnaire, key informant interview guide and focus group discussion guide covered the main study variables: institutional implementation, stakeholder participation, regulatory compliance, and institutional coordination.

The household questionnaire was pre-tested in Ilagala village by interviewing 41 respondents who were not included in the final sample. The pre-test examined the clarity and order of questions, suitability of response categories, and time required to complete the questionnaire. Questions that were unclear or repetitive were revised before the actual survey. The questionnaire was translated into Kiswahili and back-translated into English to ensure consistency of meaning.

For the qualitative data, credibility was established through triangulation of information from key informant interviews, focus group discussions, field observations, documentary sources

and household survey findings. Information from these sources was compared to identify similarities and differences and to support interpretation of the findings.

3.6 Sampling Procedures and Sample Size

A multistage sampling procedure was used to select households for the study. In the first stage, Uvinza District was purposively selected because it encompasses a substantial portion of the Malagarasi–Muyovozi Wetlands and has extensive interactions between local communities and wetland resources. In the second stage, six villages; namely Chagu, Ilalanguru, Itebula, Kasisi, Malagarasi, and Mpeta; were purposively selected based on their proximity to the wetland system, dependence on wetland resources for livelihood activities, and involvement in wetland governance and management initiatives.

For the household survey, household registers which were obtained from respective village authorities served as the sampling frames. According to these registers, the six selected villages contained a total of 78,683 households. The initial household sample size was determined using Cochran's (1963) formula:

$$n_0 = \frac{Z^2 p(1 - p)}{e^2}$$

where n_0 is the required initial sample size, Z is the standard normal value corresponding to the selected confidence level, p is the estimated proportion of the population possessing the characteristic of interest, and e is the acceptable margin of error. A 95% confidence level ($Z=1.96$), a population proportion of 0.50 ($p=0.50$), and a 5% margin of error ($e=0.05$) were applied. The use of $p=0.50$ provided the maximum variability where the population proportion was not known. The sample size was therefore calculated as:

$$n_0 = \frac{(1.96)^2(0.50)(1 - 0.50)}{(0.05)^2}$$

$$n_0 = \frac{3.8416(0.25)}{0.0025} = 384.16 \approx 384$$

Therefore, 384 households constituted the initial survey sample. The sample was allocated proportionately among the six study villages according to their respective household populations using:

$$n_i = \frac{N_i}{N} \times n$$

Where n_i is the number of households allocated to village i , N_i is the total number of households in village i , N is the total number of households in the six villages (78,683), and n is the total sample size (384). In each village, households were selected from the respective household registers using simple random sampling, thereby giving households within each selected village an equal probability of selection. One eligible adult respondent was interviewed from each selected household using the structured questionnaire.

Following data collection, the 384 completed questionnaires were screened for completeness and consistency. Thirty-six questionnaires with substantial missing data or inconsistent

responses were excluded, resulting in a final analytical sample of 348 household respondents. Their distribution across the six study villages is presented in Table 1.

For the qualitative component, purposive sampling was used to select key informants and focus group discussion (FGD) participants. A total of 27 key informants were selected based on their positions, responsibilities, knowledge and experience of wetland governance and policy implementation in the study area. Six FGDs were conducted, one in each study village. Participants were purposively selected, with the assistance of village leaders, to represent the principal wetland resource-user groups. Each FGD comprised nine participants, giving a total of 54 participants. The use of probability sampling for the household survey and purposive sampling for the qualitative component provided complementary quantitative and qualitative evidence on the implementation of wetland policies and legal provisions and associated governance processes.

Table 1: Distribution of the household sample across study villages in Malagarasi-Muyovozi wetlands

Village	Total households (N _i)	Proportion of households (N _i /N)	Allocated Sample (n _i)
Chagu	5736	7.29	25
Ilalanguru	4745	6.03	21
Itebula	16712	21.24	74
Kasisi	2431	3.09	11
Malagarasi	24369	30.97	108
Mpeta	24690	31.38	109
Total	78683	100%	348

3.7 Operationalisation of Study Variables

The study examined institutional implementation using nine explanatory variables: policy implementation, community awareness, regulatory enforcement, integration of formal and informal rules, coordination mechanisms, users' participation, institutional collaboration with communities, institutional capacity, and formal-rule shortcomings. These variables covered the implementation of policies and by-laws, awareness of wetland governance, enforcement of regulations, interaction between formal and informal rules, coordination among institutions, participation of resource users, collaboration with communities, institutional resources, and weaknesses in formal rules. Institutional implementation mechanisms were also assessed by asking household respondents how institutional arrangements relate to decisions on wetland use, including fishing, grazing and farming. The mechanisms comprised the formulation of laws, policies and by-laws; enforcement and compliance; awareness creation and capacity building; economic and incentive-based influence; cultural and normative influence; and coordination and conflict mediation. The responses were summarized using frequencies and percentages.

Three governance processes were examined: stakeholder participation, regulatory compliance, and institutional coordination. Stakeholder participation refers to the involvement of stakeholders in wetland management through by-law formulation and enforcement, planning, co-management, capacity building, benefit-sharing, conflict resolution and recognition of local knowledge. Regulatory compliance refers to adherence to policies, laws, by-laws, wetland boundaries and other restrictions governing wetland resource use.

Institutional coordination refers to cooperation among institutions through information sharing, joint planning, joint patrols, conflict resolution and clarity of institutional responsibilities. The three governance processes were specified as dummy dependent variables and estimated jointly using the multivariate probit model.

Broader wetland governance was assessed in terms of improved resource-use compliance and reduced illegal activities, reduced conflicts and stronger stakeholder collaboration, improved wetland condition and livelihood sustainability, and improved wetland management and governance. These outcomes were analysed descriptively and were not included as dependent variables in the multivariate probit model. Socio-economic characteristics, including education, occupation or livelihood, years of residence, farm size, proximity to the wetland, and dependence on wetland resources; were used to describe the study population and provide context for differences in wetland use and governance. The explanatory variables were operationalized and coded for inclusion in the multivariate probit analysis.

3.8 Data Analysis Techniques

Quantitative and qualitative data were analysed using methods appropriate to the mixed-methods design. Quantitative data were coded, cleaned and analysed using IBM SPSS Statistics Version 27 and an econometric statistical package. Frequencies, percentages, means and standard deviations were used to describe respondents' socio-economic characteristics, institutional implementation, governance processes and wetland governance outcomes.

A multivariate probit model was used to determine associations between institutional implementation and three governance processes: stakeholder participation, regulatory compliance, and institutional coordination. The explanatory variables were policy implementation, community awareness, regulatory enforcement, integration of formal and informal rules, coordination mechanisms, users' participation in wetland management, institutional collaboration, institutional capacity, and formal-rule shortcomings. Three dummy outcomes were estimated jointly to account for possible correlations among their unobserved determinants. Robust standard errors were used, statistical significance was assessed at the 1%, 5% and 10% levels; and overall model significance was assessed using the Wald chi-square statistic.

For respondent i , the model was specified as:

$$Y_{ji}^* = \alpha_j + \beta_j' \mathbf{X}_i + \varepsilon_{ji}, \quad j = 1, 2, 3$$

where Y_{ji}^* represents the latent propensity for stakeholder participation, regulatory compliance or institutional coordination; $\mathbf{X}_i$ is the vector of nine explanatory variables; β_j is the vector of coefficients; α_j is the intercept; and ε_{ji} is the error term. The observed outcomes were defined as follow:

$$Y_{ji} = \begin{cases} 1, & \text{if } Y_{ji}^* > 0 \\ 0, & \text{if } Y_{ji}^* \leq 0 \end{cases}$$

The error terms were assumed to follow a joint trivariate normal distribution, allowing correlations between the three governance processes (ρ_{12} , ρ_{13} , ρ_{23}). This allowed the three equations to be estimated jointly.

Qualitative data from key informant interviews and focus group discussions were analysed using thematic content analysis. Responses were coded and organised around recurring themes related to institutional implementation and wetland governance. The qualitative findings and relevant quotations were used to provide context for the quantitative results and to identify areas of agreement and difference between the two sources of evidence.

3.9 Ethical Consideration

Ethical approval for the study was obtained from Sokoine University of Agriculture (Approval No. SUA/ADM/R.1/8/1253). Permission to conduct fieldwork in Kigoma Region, Uvinza District and all six study villages was subsequently granted by the President's Office – Regional Administration and Local Government (Reference No. AB.307/323/01/221).

Before data collection, participants were informed about the purpose of the study, the nature of their participation and their right to decline participation or withdraw at any time without consequences. Informed consent was obtained from household respondents, key informants and focus group discussion participants before their involvement in the study. Participation was voluntary, and confidentiality was maintained throughout data collection, analysis and reporting. Personal identifiers were excluded from the reported findings, and information obtained from participants was used solely for research purposes.

4.0 RESULTS

4.1 The Socio-Economic Characteristics of the Respondents

Table 2 presents an overview of the socio-economic characteristics of the surveyed population. Majority (66.1%) of respondents were male, with 77.3% identified as heads of their households. A considerable proportion, approximately 37%, fell within the 41 to 50 age group, while nearly half of the households (47%) comprised four to six members. The majority of respondents (93.7%) were married. In terms of educational attainment, 83.6% had completed primary education, 6.9% had attained secondary education, and only 0.6% had received some level of tertiary education. Regarding livelihood activities, 41.4% of respondents engaged in both farming and fishing, whereas 37.4% combined farming with livestock rearing. Approximately 25.3% were migrants who had resided in the area for between 16 and 21 years. Concerning land ownership, 44.3% of households reported having more than 10 acres of agricultural land within the wetlands. Furthermore, about 63% of respondents owned cattle, which were primarily grazed in the wetland areas.

The socio-economic characteristics of respondents provide important context for understanding institutional implementation in wetland governance. Most respondents depended directly on wetland-based livelihood activities, particularly farming, fishing, and livestock keeping, indicating high reliance on wetland resources. The large proportion of households owning extensive agricultural land within wetlands and practicing cattle grazing in wetland areas suggests increasing pressure on wetland ecosystems, which may complicate enforcement of environmental regulations and institutional compliance. Furthermore, the presence of migrants residing in the area for extended periods may influence local resource-use dynamics and institutional coordination. Low levels of formal education among respondents may also affect awareness and understanding of wetland governance regulations and participation in institutional processes.

Table 2: The socio-economic characteristics of the respondents in the Malagarasi-Muyovozi Wetlands (n = 348).

Basic characteristics of Respondents	Specific categories for each characteristic	Frequency (N)	Percentage of Respondents (%)
Sex	Female	118	33.9
	Male	230	66.1
Head of household	No	49	14.0
	Yes	299	85.9
Age	13-20	3	0.86
	21-30	31	8.91
	31-40	75	21.55
	41-50	129	37.07
	51-60	85	24.43
	61+	25	7.18
Household size	1-3	161	46.26
	4-6	165	47.41
	7-9	22	6.32
Marital status	Single	15	4.31
	Married	326	93.68
	Widow	7	2.01
Education level	No formal	30	8.62
	Primary	291	83.62
	Secondary	24	6.9
	Tertiary	3	0.86
Occupation	Farming & livestock	130	37.36
	Farming & fishing	144	41.38
	Farming, livestock & fishing	61	17.53
	Farming, livestock & business	6	1.72
	Farming, livestock & official	5	1.44
	Farming	2	0.57
Years of residence	15-20	31	8.91
	16-21	88	25.29
	22-27	66	18.97
	28-33	37	10.63
	34-39	8	2.3
	40-45	7	2.01
	46+	3	0.86
	Native	108	31.03
Farm size in the wetlands	<0.5 acre	2	0.57
	1-3 acres	13	3.74
	4-5 acres	59	16.95
	6-10 acres	120	34.48
	10+ acres	154	44.25
Number of cattle	<10	220	63.22
	10-20	21	6.05
	21-30	53	15.23
	31+	54	15.52

4.2 Institutional Implementation in the Malagarasi-Muyovozi Wetlands

4.2.1 Institutional Implementation Mechanisms

Figure 3 shows the main institutional mechanisms supporting wetland governance in the Malagarasi–Muyovozi Wetlands. The most commonly reported mechanism was the formulation of laws, policies, and by-laws (37.9%), followed by knowledge creation, awareness, and capacity building (32.2%). Economic and incentive-based mechanisms accounted for 10.3% of the responses, while enforcement and compliance mechanisms represented 10.1%. Cultural and normative influence (6.0%) and coordination and conflict mediation (3.4%) were mentioned less frequently.

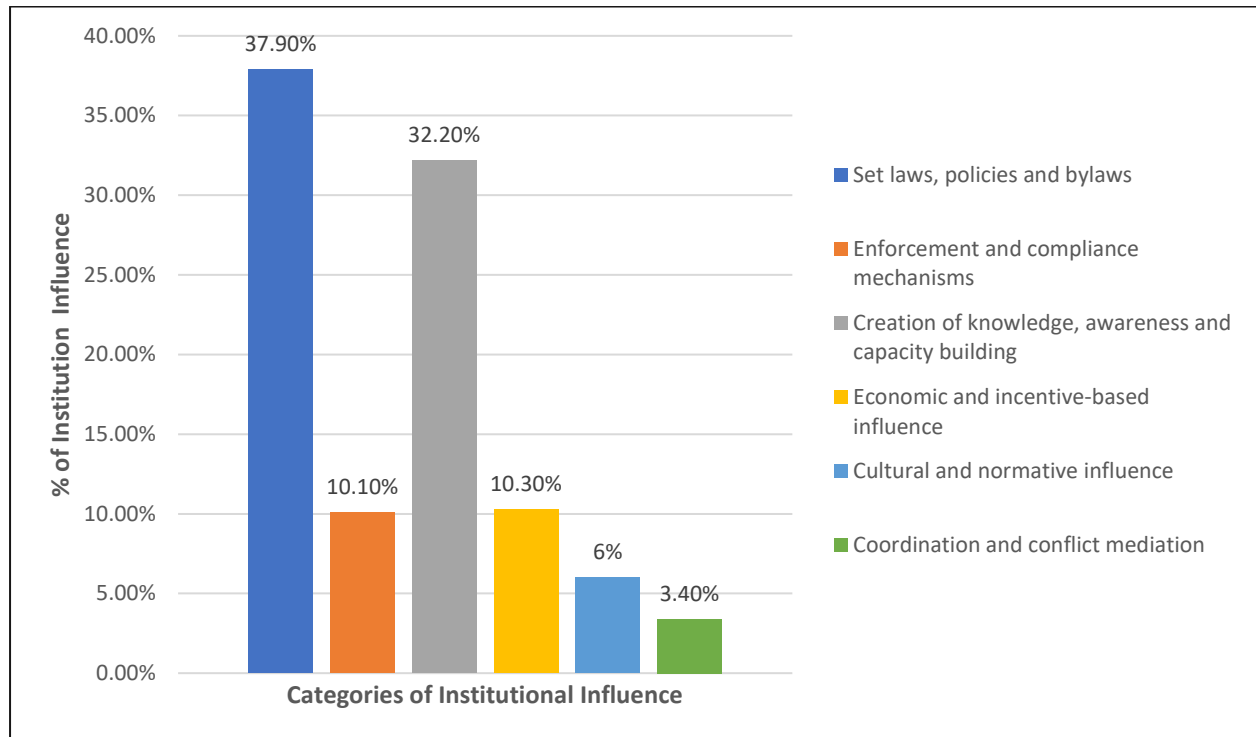


Figure 3: Institutional implementation mechanisms supporting wetland governance in the Malagarasi-Muyovozi Wetlands

4.2.2 Institutional Capacity

Table 3 summarises the institutional capacity indicators for wetland governance in the Malagarasi–Muyovozi Wetlands. Only 32.2% of the respondents reported that policy and legal frameworks were implemented at low levels, while 71.3% reported awareness of wetland governance, clearly defined institutional roles and responsibilities (14.7%), and participation in training and meetings (27.3%).

Most respondents disagreed that monitoring systems and financial and human resources were adequate. Qualitative findings further supported the quantitative results. A key informant highlighted institutional capacity constraints, stating:

"We do not have adequate staff or financial resources. Most staff have not received training in wetland ecology, and the institution lacks essential equipment, including vehicles, boats, and GIS facilities for monitoring and security operations." (Key informant 9, Uvinza District level, 3rd October 2024).

Table 3: Descriptive Statistics of Institutional Capacity Indicators for Wetland Governance in the Malagarasi-Muyovozi Wetlands (N=348)

Variable	Category	N	%
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The policy and legal frameworks are implemented at low levels	Yes	112	32.2
	No	236	67.8
Awareness creation and capacity building	Yes	248	71.3
	No	100	28.7
		51	14.7
Roles are clearly defined and understood by stakeholders	Yes		
	No	297	85.3
Training and Meetings	Yes	95	27.3
	No	253	72.7
Monitoring and evaluation systems	Strongly Disagree	71	20.4
	Disagree	206	59.2
	Neutral	2	0.6
	Agree	67	19.2
	Strongly Agree	2	0.6
Financial and human resources	Strongly Disagree	129	37.1
	Disagree	138	39.6
	Agree	78	22.4
	Strongly Agree	3	0.9

4.2.3 Institutional Performance

Table 4 summarises the institutional performance indicators for wetland governance in the Malagarasi–Muyovozi Wetlands. Most respondents (72.13%) indicated that operational performance was absent, while 88.22% reported that regulatory functions were not implemented. These findings were reflected in the focus group discussions. For example, participants in an FGD agreed as follows:

"Operational activities are rarely implemented jointly in wetland management. Joint patrols, regular meetings, and task forces involving local communities and government authorities are conducted infrequently." (FGD4, Ilalanguru Village, 7th December 2024)

Similarly, limited regulatory performance was highlighted during the discussions; participants in an FGD noted:

"There are no institutional regulations specifying harvest limits or harvesting seasons. Consequently, resource users harvest at their own discretion, both in terms of quantity and timing, resulting in biodiversity loss in some wetland areas." (FGD2, Kasisi Village, 23rd November 2024)

Most respondents disagreed that statutory compliance (65.52%) and regulatory enforcement (82.18%) were effective. Informal institutions were more commonly used (67.8%) than formal institutions (32.2%) to resolve resource-related disputes. In contrast, most respondents (51.15%) agreed or strongly agreed (23.28%) that coordination existed among the institutions responsible for wetland governance.

Table 4: Descriptive Statistics of Institutional Performance Indicators for Wetland Governance in the Malagarasi-Muyovozi Wetlands (N=348)

Variable	Category	N	%
Operational performance	Yes	97	27.87

	No	251	72.13
Regulatory performance	Yes	41	11.78
	No	307	88.22
Authorities and conflict resolution	Informal institutions	236	67.8
	Formal institutions	112	32.2
Statutory compliance	Strongly Agree	1	0.29
	Agree	76	21.84
	Neutral	6	1.72
	Disagree	228	65.52
Enforcement performance	Strongly Disagree	37	10.63
	Strongly Agree	11	3.16
	Agree	47	13.11
	Disagree	286	82.18
Institutional coordination	Strongly Disagree	4	1.15
	Strongly Agree	81	23.28
	Agree	178	51.15
	Disagree	71	20.40

4.3 Wetland Governance Processes in the Malagarasi-Muyovozi Wetlands

4.3.1 Stakeholder Participation in Wetland Governance

Table 5 summarises stakeholder participation in wetland governance in the Malagarasi–Muyovozi Wetlands. Policy and legal frameworks supporting local communities' participation in the formulation and enforcement of by-laws were identified by 92.2% of the respondents. Most respondents (86.2%) indicated that institutional roles and responsibilities were not clearly defined, whereas 13.8% considered them to be clearly defined. Conflict resolution mechanisms were acknowledged by 65.8% of the respondents, while 34.2% indicated that such mechanisms were absent. Recognition of local knowledge in wetland governance was reported by 27.3% of the respondents, compared with 72.7% who indicated that local knowledge was not recognised. Among the forms of stakeholder participation, awareness and capacity building was the most frequently identified (47.99%), followed by co-management and participatory planning (29.31%) and benefit-sharing (22.7%).

Table 5: Stakeholder Participation in Wetland Governance (N=348)

Variable	Category	N	%
Policy and legal framework	Yes	321	92.2
	No	27	7.8
Clarity of institutional roles and responsibilities	Yes	48	13.8
	No	300	86.2
Conflict resolution mechanisms	Yes	229	65.8
	No	119	34.2
Recognition of local knowledge	Yes	95	27.3
	No	253	72.7
Forms of stakeholder participation	Awareness and capacity building	167	48
	Co-management and participatory planning	102	29.3
	Benefit-sharing	79	22.7

4.3.2 Regulatory Compliance

Table 6 presents the descriptive statistics for regulatory compliance in the Malagarasi–Muyovozi Wetlands. The implementation of policy and legal frameworks at the low levels had a mean of 0.32 (SD = 0.468). Participation of local communities in the formulation and enforcement of by-laws had a mean of 0.92 (SD = 0.268), while compliance with wetland boundaries among resource users had a mean of 0.06 (SD = 0.233). Farming within 60 metres of the wetland, as permitted by law, had a mean of 1.79 (SD = 0.406). Qualitative data also confirmed that 60-metre buffer zone is not respected. About this, one key informant reported that:

“A survey of the wetlands shows that the 60-metre buffer zone is not being respected, despite the presence of clearly demarcated boundaries” (Key informant 2, Mganza ward, 11th November 2024).

Penalties imposed by traditional leaders had a mean of 1.51 (SD = 0.864), and respondents' satisfaction with laws, policies, and regulations had a mean of 1.60 (SD = 0.490). Understanding of regulations governing wetlands and grazing areas had a mean of 1.02 (SD = 0.141). The institutions responsible for resolving conflicts between pastoralists and conservation authorities had a mean of 1.32 (SD = 0.468), while the application of by-laws restricting grazing in designated areas had a mean of 1.72 (SD = 0.450).

Table 6: Descriptive Statistics for Regulatory Compliance in Wetland Governance in the Malagarasi-Muyovozi Wetlands (N=348)

Variable	Mean	Std. Deviation
The policy and legal frameworks are implemented at low levels	0.32	0.468
Local communities participate in by-laws formulation and enforcement	0.92	0.268
Boundaries are respected by wetland users	0.06	0.233
Farming within 60 metres of the wetland boundary is permitted by the law	1.7931	0.40566
Traditional leaders impose penalties for rule violations	1.5057	0.86392
Respondents are satisfied with wetland laws and regulations	1.6034	0.48989
Respondents understand wetland and grazing regulations.	1.0201	0.1406
Institutions resolve conflicts between wetland users and conservation authorities	1.3218	0.46785
By-laws restrict livestock grazing in designated areas	1.7184	0.45043

4.3.3 Institutional Coordination

Table 7 presents the descriptive statistics for institutional coordination in the Malagarasi–Muyovozi Wetlands. The relationship between formal and informal institutions had a mean score of 3.76 (SD = 0.506), while institutional collaboration had a mean of 1.51 (SD = 0.903). Clarity of institutional roles and responsibilities had a mean score of 1.02 (SD = 0.141). Government agencies coordinate effectively had a mean of 1.70 (SD = 0.458). Conflict resolution had a mean score of 1.32 (SD = 0.468). Information sharing had a mean of 4.71 (SD = 1.96), while joint patrols had a mean of 0.12 (SD = 0.330). Qualitative findings further showed that coordination between institutions was affected by unclear responsibilities, information delays and differences in institutional mandates. Participants in an FGD explained:

“Both formal and informal institutions work together. However, their relationship is affected by unclear mandates and responsibilities, delays in information sharing, competing interests, and mistrust over revenues generated from wetland goods and services. For example, Uvinza District Council and central government institutions issue permits for fishing and large-scale irrigated agriculture, but the revenues generated are not shared with communities surrounding the wetlands.” (FGD1, Chagu village, 22nd October 2024).

Differences in institutional jurisdiction were also reported by key informants. One informant stated:

“TAWA and Uvinza District Council issue different permits for wetland use and the harvesting of wetland resources. However, permits issued by Uvinza District Council are not valid within TAWA-protected areas.” (Key informant 20, Uvinza District level, 3rd October 2024).

Table 7: Institutional Coordination and Inter-Institutional Relationships in Wetland Governance of the Malagarasi–Muyovozi Wetlands, Tanzania (N = 348)

Variable	Mean	Std. Deviation
The relationship between formal and informal institutions	3.7644	0.50553
Institutional collaboration	1.5057	0.90307
Clarity of institutional roles and responsibilities	1.0201	0.1406
Government agencies coordinate effectively	1.7011	0.45841
Conflict resolution	1.3218	0.46785
Information sharing	4.7098	1.95754
Joint patrols in the Malagarasi-Muyovozi wetlands	0.1236	0.32956

4.4 Village-Level Variation in Institutional Implementation and Governance Outcomes

Key informant interviews revealed variation in institutional implementation and governance outcomes across the study villages. Relatively better outcomes were reported in Malagarasi and Itébula, while Mpeta, Chagu, Ilalanguru and parts of Kasisi experienced greater challenges related to enforcement, participation and compliance. Variation was also evident within Kasisi, particularly in Bulindye. Table 8 summarises the main village-level differences reported by key informants.

Table 8: Village-Level Variation in Institutional Implementation and Governance Outcomes

Village/locality	Main resource-use pressure	Participation	Compliance/enforcement	Coordination	KII assessment
Malagarasi	Grazing/fishing	Relatively stronger	Designated areas generally respected	Relatively stronger	Better governance outcomes
Itebula	Grazing/fishing	Relatively stronger	Designated areas generally respected	Relatively stronger	Better governance outcomes
Mpeta	Paddy rice expansion	Limited	Weak enforcement/non-compliance reported	Weak	Governance challenges
Chagu	Cultivation/grazing	—	Buffer-zone violations reported	—	Governance challenges
Ilalanguru	Cultivation/grazing	—	Buffer-zone violations reported	Limited joint activities reported	Governance challenges
Kasisi	Cultivation/grazing	Variable	Buffer-zone violations reported	Variable	Mixed
Bulindye (within Kasisi)	Livestock grazing	Relatively stronger	Relatively stronger compliance	Relatively stronger	Better local outcomes

The village-level comparison indicates that relatively better governance outcomes were reported where resource-use areas were clearly designated; rules were generally observed, and enforcement was present. In Malagarasi and Itebula, designated grazing areas and fishing grounds provided clearer arrangements for resource use, although livestock keepers with large herds still faced difficulties complying with grazing restrictions. In contrast, Mpeta was affected by the expansion of paddy rice production and weak enforcement, while Chagu, Ilalanguru and parts of Kasisi experienced cultivation and grazing within prohibited buffer zones. The experience of Bulindye within Kasisi further shows that governance conditions could vary within the same village, with stronger participation, compliance and coordination reported among traditional livestock keepers using privately held grazing land.

4.5 Multivariate Probit Model Diagnostic Tests

Prior to multivariate probit estimation, multicollinearity among the nine explanatory variables was assessed using the variance inflation factor (VIF) and tolerance (1/VIF).

Table 9: Multicollinearity diagnostics for explanatory variables

Variable	VIF	1/VIF
Policy implementation	1.48	0.675676
Community awareness	1.44	0.694444
Regulatory enforcement	1.39	0.719424
Integration of formal and informal rules	1.35	0.740741
Coordination mechanisms	1.28	0.78125
User's participation in wetland management	1.22	0.819672
Institutional collaboration	1.18	0.847458
Institutional capacity	1.12	0.892857
Formal-rule shortcomings	1.07	0.934579
Mean VIF	1.28	

VIF values ranged from 1.07 to 1.48, with a mean of 1.28, while tolerance values ranged from 0.676 to 0.935. All VIF values were well below 10 and all tolerance values exceeded 0.20, indicating no evidence of problematic multicollinearity among the explanatory variables (Field, 2009). Robust standard errors were used to account for potential heteroscedasticity in the multivariate probit estimates.

4.6 Association between Institutional Implementation and Governance Processes

The multivariate probit regression model was estimated using three dummy dependent variables: stakeholder participation, regulatory compliance, and institutional coordination, which represented the key dimensions of wetland governance in this study. Each variable was coded 1 if the respondent reported the presence of the respective governance outcome and 0 otherwise. The three equations were estimated jointly to account for possible correlations among the governance outcomes. This approach accounted for potential correlations across the governance outcomes and enabled the associations between institutional implementation factors and each outcome to be estimated jointly.

Table 10: Description and Measurement of Explanatory Variables Included in the Multivariate Probit Model

Variable	Type	Measurement/coding	Expected sign
Policy implementation	Dummy	1 = Yes; 0 = No	±
Community awareness	Dummy	1 = Yes; 0 = No	±
Regulatory enforcement	Ordinal	1 = Strongly disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree	+
Integration of formal and informal rules	Ordinal	1 = Poor; 2 = Fair; 3 = Good; 4 = Very good; 5 = Excellent	+
Coordination mechanisms	Ordinal	1 = Strongly disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree	±
Users' participation in wetland management	Dummy	1 = Yes; 0 = No	+
Institutional collaboration	Composite measure	Constructed from participatory planning, co-management, capacity building and training, benefit-sharing, and incorporation of traditional knowledge	±
Institutional capacity	Composite measure	Constructed from adequacy of human and financial resources, training, monitoring and evaluation, adequacy of equipment, and clarity of institutional responsibilities	±
Formal-rule shortcomings	Composite measure	Constructed from limited land-planning reviews, revenue-related problems, inadequate harmonization of environmental policies and laws, corruption, and political interference	–

Table 11 presents the multivariate probit estimates for stakeholder participation, regulatory compliance, and institutional coordination. The estimated model was statistically significant (Wald χ^2 (27) = 159.88, $p < 0.001$). In the stakeholder participation equation, policy implementation, community awareness, and institutional collaboration were positively associated with stakeholder participation, while institutional capacity was negatively associated with it. In the regulatory compliance equation, enforcement mechanisms, formal rules, and informal rules were positively associated with regulatory compliance, whereas users' participation and institutional collaboration were negatively associated with compliance. In particular, users' participation had a statistically significant negative association with regulatory compliance ($\beta = -0.532$, $p = 0.017$). Given the cross-sectional design, this association should not be interpreted as evidence that participation leads to non-compliance.

Table 11: Multivariate Probit Regression Estimates of the Association between Institutional Implementation on Wetland Governance (N = 348).

Variable	Stakeholder participation			Regulatory Compliance			Institutional coordination		
	Coefficient	Robust std.	P-value	Coefficient	Robust Std	P-value	Coefficient	Robust Std.	P-value
Policy implementation	0.655	0.183	0.000***	0.276	0.388	0.476	-0.334	0.249	0.181
Community awareness	0.503	0.209	0.016	-0.125	0.392	0.751	0.197	0.29	0.498
Regulatory enforcement	-0.022	0.088	0.804	0.664	0.144	0.000***	0.286	0.14	0.041**
Integration of formal and informal rules	0.024	0.083	0.771	0.255	0.127	0.044	-0.158	0.129	0.22
Coordination mechanisms	-0.002	0.082	0.985	-0.1	0.152	0.508	-0.863	0.117	0.000***
Users' participation in wetland management	0.073	0.081	0.367	-0.532	0.222	0.017**	-0.135	0.122	0.268
Institutional collaboration	0.069	0.026	0.008***	-0.105	0.044	0.017**	-0.009	0.033	0.795
Institutional capacity	-0.169	0.077	0.029**	0.201	0.136	0.139	-0.047	0.107	0.659
Formal-rule shortcomings	0.019	0.028	0.494	0.167	0.051	0.001***	0.095	0.04	0.017**
_cons	-1.024	0.486	0.035	-4.776	1.026	0	0.694	0.629	0.269

*** p<.01, ** p<.05, * p<.1 Log pseudolikelihood = -325.04736; Wald chi2(27) = 159.88; Prob > chi2 = 0.0000, Number of obs = 348

4.7 Governance Outcomes Associated with Institutional Implementation

Table 12 presents the distribution of governance outcomes associated with institutional implementation in the Malagarasi–Muyovozi Wetlands. Improved compliance with wetland regulations was reported by 235 respondents (65.53%), while 113 respondents (32.47%) indicated no improvement. A decline in illegal activities was reported by 233 respondents (67.0%), whereas 115 respondents (33.0%) reported no decline.

Strong stakeholder collaboration was most frequently reported during donor-funded projects (75.3%). Collaboration across all the listed activities was reported by 21.3% of the respondents, while 1.1% identified strong collaboration during boundary marking only. A further 2.3% reported no strong stakeholder collaboration. About the same issue, collaboration, a key informant remarked as follows:

"Stakeholder collaboration is stronger during donor-funded projects because institutions are more committed to carrying out their roles and responsibilities. A good example was the Sustainable and Integrated Management of the Malagarasi–Muyovozi Ramsar Site (SIMMORS) Project (2001–2007)." (Key Informant 7, Mpeta Village, 20th January 2025)

Regarding perceived wetland condition, 64.9% of the respondents reported deterioration; 26.7% reported improvement; and 8.3% reported no change. The main constraints affecting wetland governance were interference from local political interests (44.3%), followed by irresponsibility of local leaders (25.3%), limited channels of communication between wetland users and authorities (22.1%), and limited consideration of local knowledge and practices (8.3%).

Table 12: Governance Outcomes Associated with Institutional Implementation in the Malagarasi-Muyovozi Wetlands (N=348)

Variable	Category	N	%
Improved compliance with wetland regulations	Yes	235	67.53
	No	113	32.47
Reduce illegal activities	Yes	233	67
	No	115	33
Reduced conflicts	Yes	284	81.6
	No	64	18.4
Strong stakeholder collaboration	During donor funded projects	262	75.3
	During marking boundaries	4	1.1
	All the above	74	21.3
	None	8	2.3
Sustainable ecosystem management	Perceived improvement	93	26.7
	Perceived deterioration	226	64.9
	No change observed	29	8.3
Main constraints affecting effective wetland management	Limited channels of communication	77	22.1
	Local knowledge and practices are less considered	29	8.3
	Interference of local political interests	154	44.3
	Irresponsibility of local leaders	88	25.3

5.0 DISCUSSION

5.1 Key Findings of the Study

The study found that the presence of institutional and legal frameworks had not translated into effective wetland governance in the Malagarasi–Muyovozi Wetlands. Despite the existence of policies, by-laws, awareness programmes, and capacity-building initiatives, governance was constrained by inadequate institutional resources, weak enforcement, limited monitoring, infrequent joint patrols, and unclear institutional responsibilities. The findings also show that formal and informal institutions coexist in wetland governance, but weak coordination and limited recognition of local knowledge constrain their effectiveness.

The multivariate probit results show that institutional implementation was associated with stakeholder participation, regulatory compliance, and institutional coordination in different ways. Policy and legal frameworks, community awareness, and institutional collaboration were positively associated with stakeholder participation, while enforcement mechanisms and formal rules were positively associated with regulatory compliance and institutional coordination. Despite reported improvements in regulatory compliance and decrease in illegal activities, 64.9% of the respondents reported that wetland conditions were deteriorating. However, this result reflects respondents' perceptions and should not be taken as evidence of objectively measured ecological decline. This indicates that the reported improvements in governance outcomes had not yet translated into noticeable improvements in the condition of the wetland ecosystem.

5.2 Institutional Implementation and Wetland Governance

The findings show that wetland governance in the Malagarasi–Muyovozi Wetlands is supported by policies, laws and institutional arrangements, but their implementation remains uneven. Although awareness of wetland policies and regulations was relatively high, respondents reported weak monitoring, inadequate financial and human resources, unclear institutional responsibilities and inconsistent enforcement. This indicates that the existence of formal rules and responsible institutions does not necessarily ensure their effective application at the local level. The findings also show that implementation depends on the capacity of institutions to enforce rules, coordinate activities and work with local resource users.

This pattern reflects a wider implementation gap reported in wetland governance literature. Materu *et al.* (2018) found that wetland management in Tanzania is affected by fragmented sectoral legislation, weak coordination and enforcement, with implementation influenced by sectoral, district and political interests. They also noted management challenges in protected Ramsar sites, including Malagarasi–Muyovozi. Similar findings have been reported elsewhere in Africa. Marambanyika and Beckedahl (2016) found a gap between wetland legislation and its implementation in Zimbabwe, linked to limited awareness and enforcement, inadequate institutional resources, political interference, poverty and livelihood pressures. They further observed that improved awareness alone was unlikely to strengthen implementation without adequate regulatory capacity and alternative livelihood options. In Uganda, Barakagira and de Wit (2019) found that wetland management agencies and conservation policies were in place, but degradation continued because their activities were constrained by inadequate funding, political interference and other institutional difficulties.

The Malagarasi–Muyovozi findings, therefore, add to evidence that the main challenge in wetland governance is not only the availability of policies and institutional arrangements, but also their translation into practice. In this study, formal arrangements coexist with inadequate

resources, weak monitoring, unclear responsibilities and uneven enforcement. From an IAD perspective, this distinction is important because governance depends on how formal rules operate as rules-in-use within local action arenas. The Institutional Theory similarly helps explain why formal structures may exist without producing the intended practices or outcomes. Effective wetland governance, therefore, requires more than establishing policies and assigning institutional responsibilities; it also requires adequate implementation capacity, clear institutional roles, consistent enforcement, coordination among responsible institutions and meaningful engagement with local resource users.

5.3 Stakeholder Participation and Institutional Implementation

The findings indicated that policy implementation was strongly associated with stakeholder participation, with positive associations also observed for community awareness and institutional collaboration. This finding is in line with Newig *et al.* (2023), who, in their meta-analysis, found that stakeholder participation could improve environmental governance when appropriate institutional conditions are in place. In the Malagarasi–Muyovozi Wetlands, the positive relationship between policy implementation and stakeholder participation indicates that formal provisions for community involvement provide a basis for bringing local stakeholders into wetland governance.

At the same time, the findings show a difference between recognising participation in policy and providing opportunities for people to influence decisions. Most respondents were aware of policies and laws that supported community involvement in activities such as by-law formulation and enforcement. However, many respondents had limited understanding of the specific roles and responsibilities of different institutions, and local knowledge was not widely recognised in formal decision-making. Awareness creation and capacity building were the most frequently reported forms of participation, whereas co-management, participatory planning, and benefit-sharing were less common. This suggests that stakeholder participation in the study area was still largely centred on consultation, awareness creation, and capacity building, with fewer opportunities for communities to take part directly in planning, decision-making, implementation, and evaluation.

This finding agrees with the wider governance literature, which shows that the presence of stakeholder participation does not necessarily mean that stakeholders have a meaningful role in governance. Hayes and Murtinho (2024) argue that participation is more meaningful when institutional arrangements give stakeholders an opportunity to influence decisions, rather than limiting their involvement in receiving information or being consulted. Musasa *et al.* (2023) similarly, shows that stakeholder involvement is important for wetland conservation, but that participation alone does not guarantee effective conservation outcomes. The findings from the Malagarasi–Muyovozi Wetlands, therefore, suggest that increasing the number of participatory activities is not enough; greater attention is needed to the extent to which communities can influence decisions affecting wetland governance.

The limited recognition of local knowledge is another important issue in the Malagarasi–Muyovozi Wetlands. Emmanuel and Kweka (2024) identified challenges in incorporating indigenous and local knowledge into resource management within the same wetland system. The present study supports this observation; as local knowledge was not adequately incorporated into formal governance processes. This is important because communities living and working around the wetlands have practical knowledge of seasonal changes, resource availability, customary rules, and management practices that have developed through long-

term interaction with the wetland environment. Greater consideration of this knowledge could improve the relevance of management decisions, strengthen community acceptance of regulations, and encourage compliance with agreed management measures. It could also help institutions develop conservation approaches that are better suited to local conditions.

5.4 Regulatory Compliance and Enforcement

Regulatory compliance emerged as one of the weakest aspects of wetland governance in the study area. The findings showed limited respect for wetland boundaries, weak enforcement, and poor adherence to regulations governing activities such as cultivation and grazing. The qualitative findings also showed that the 60-metre wetland buffer was not consistently respected, even in areas where boundaries had been demarcated. These findings point to a clear gap between the requirements set out in laws and regulations and the practices of people using wetland resources. The positive relationship between enforcement mechanisms and regulatory compliance further demonstrates the importance of effective enforcement in ensuring that environmental regulations are followed. This finding is consistent with the Institutional Theory and the IAD Framework, which emphasize the role of rules, institutional capacity, and enforcement in shaping behaviour. It also agrees with previous studies that have identified weak enforcement as a major challenge to wetland governance in Tanzania and other parts of Africa (Materu *et al.* 2018; Barakagira & de Wit 2019; Masese *et al.* 2025).

The findings also show that regulatory compliance is closely linked to the livelihood activities of local communities. Many households depend on farming, fishing, and livestock keeping for their livelihoods, and these activities often require access to wetland resources. As a result, restrictions on cultivation, grazing, and other forms of resource use may conflict with the economic needs of households living around the wetlands. Compliance, therefore, cannot be viewed simply as a matter of whether individuals are willing to follow environmental regulations. Where people have few alternative sources of income or productive land, continued use of restricted areas may be driven by livelihood needs. Langensiepen *et al.* (2023) similarly point to the need to balance wetland conservation with the livelihood requirements of communities in East African wetland systems.

The negative association between user participation and regulatory compliance found in the multivariate analysis should be interpreted with caution. It does not necessarily mean that participation reduces compliance. Rather, it may indicate that participation alone does not lead to better compliance when the institutional arrangements governing wetland use are weak. Local resource users may take part in meetings, awareness programmes, or other participatory activities while continuing to use wetland resources in ways that conflict with existing regulations. This may occur where institutional responsibilities are unclear, monitoring is weak, or enforcement is inconsistent. The findings, therefore, suggest that participation is more likely to contribute to compliance when it is accompanied by clear rules, defined responsibilities, regular monitoring, accountability, and consistent enforcement. In this context, effective wetland governance requires both community involvement and institutions capable of ensuring that agreed regulations are applied in practice.

5.5 Institutional Coordination and Institutional Pluralism

Institutional coordination in the Malagarasi–Muyovozi Wetlands reflects both the opportunities and challenges associated with institutional pluralism. Formal institutions operating at village, district and national levels coexist with customary and other informal institutions involved in wetland management. Although these institutions exchange information and sometimes

undertake joint activities, coordination remains uneven, with limited joint patrols, unclear responsibilities and varying levels of collaboration. Informal institutions contribute to local resource management and conflict resolution, while formal institutions provide statutory rules, permits and enforcement. Institutional pluralism also occurs among formal institutions. For example, TAWA and Uvinza District Council exercise authority over different aspects and areas of wetland use, but permits issued by the District Council may not apply within TAWA-protected areas. Such differences can create uncertainty among resource users about which rules and permits apply. This finding is consistent with Agrawal and Ribot (1999), who argue that decentralised natural resource governance requires clarity about the actors exercising authority, the powers assigned to them and the accountability relationships through which those powers are exercised. Unclear mandates, delays in information sharing, competing interests and concerns over revenue and benefit sharing further complicate institutional relationships, although institutional legitimacy was not directly measured in this study.

The quantitative findings provide further evidence of the importance of relationships among institutions. Integration of formal and informal rules was positively and significantly associated with regulatory compliance, suggesting that compliance might be stronger where statutory requirements and locally recognised rules are better aligned. However, coordination mechanisms were negatively associated with institutional coordination. This unexpected association may reflect weaknesses in the operation of existing arrangements, particularly where coordination mechanisms exist but regular joint activities, information sharing and follow-up remain limited. Similar challenges have been reported elsewhere. Materu *et al.* (2018) identified fragmented and poorly coordinated legal provisions in Tanzanian wetland management, while Mkonda (2022) reported financial constraints, cultural barriers and uncoordinated policies in the Akagera Wetland. Ngowi (2024) found that cultural practices and local institutions can support compliance and enforcement, while Barakagira and de Wit (2019) identified inadequate funding and political interference as constraints on wetland management agencies in Uganda. Turyahabwe *et al.* (2017) similarly reported inadequate enforcement and the need for locally adapted by-laws and clearer communication of wetland policies. Musasa *et al.* (2023) also emphasized stakeholder participation in wetland conservation in Zimbabwe. Nevertheless, in the present study, users' participation and institutional collaboration were negatively and significantly associated with regulatory compliance. This suggests that participation alone may not be sufficient where enforcement is weak, responsibilities are unclear or livelihood interests conflict with regulatory requirements.

Taken together, the findings indicate that institutional pluralism can support wetland governance where the rules, responsibilities, and authority of different institutions are sufficiently aligned. Formal and informal institutions can complement one another through participation, conflict resolution, enforcement and the application of locally accepted rules. However, overlapping jurisdictions, unclear mandates, weak communication, competing interests and concerns over revenue and benefit sharing can hinder coordination. The presence of multiple institutions is therefore not sufficient in itself; how authority, responsibilities and accountability are organised in practice is also important. This interpretation is consistent with the IAD Framework's emphasis on rules-in-use and interactions among actors within the action arena, as well as the Institutional Theory's attention to the relationship between formal arrangements, local norms and informal institutions. It also reflects Agrawal and Ribot (1999) emphasis on authority and accountability in decentralised governance. Given the cross-sectional design of this study, these relationships should be interpreted as associations rather than cause-effect relationships. Improving wetland

governance, therefore, requires cleaner institutional responsibilities better communication between institutions, closer alignment of formal and informal rules transparent benefit-sharing arrangements, and meaningful involvement of local institutions and resource-users in wetland management.

5.6 Explaining the Negative Associations: Why Institutional Arrangements Do Not Always Produce Expected Governance Results

The multivariate probit results showed several negative associations. Users' participation and institutional collaboration were negatively associated with regulatory compliance ($\beta=-0.532, p=0.017$) and $\beta=-0.105, p=0.017$), respectively). Institutional capacity was negatively associated with stakeholder participation ($\beta=-0.169, p=0.029$), while coordination mechanisms were negatively associated with institutional coordination ($\beta=-0.863, p<0.001$). These results show that the presence of institutional arrangements does not always translate into effective implementation. Participation and collaboration may occur alongside non-compliance where livelihood needs are strong or communities have limited influence over decisions. Mariki (2013), similarly, found that participation and benefit sharing were important in shaping local attitudes towards conservation in Tanzania.

The negative associations with institutional capacity and coordination mechanisms may also be linked to implementation challenges. Inadequate resources, weak monitoring, unclear responsibilities and limited joint activities can affect how institutions work in practice. Park *et al.* (2021) also found that formal coordination mechanisms alone were not sufficient to strengthen collaboration, as informal relationships and communication were also important. The negative associations might, therefore, reflect weaknesses in how institutional arrangements operate rather than suggesting that participation, collaboration, capacity or coordination are undesirable.

These findings support the IAD framework's emphasis on rules-in-use, where the effects of institutional arrangements depend on how actors apply them in practice. They also support the Institutional Theory by showing that formal arrangements may function differently from what they are intended to do. For wetland management, this means that participation and coordination need to be supported by clear responsibilities, adequate institutional capacity, regular joint action, and consideration of local livelihoods. Since the study was cross-sectional, the results show associations and should not be interpreted as cause-effect relationships.

5.7 The Compliance-Outcome Paradox: Why Do Improved Compliance and Perceived Deterioration coexist?

The findings reveal an apparent paradox: 67.5% of respondents reported improved compliance and 67.0% reported reduced illegal activities, yet 64.9% perceived continued deterioration of the wetland. One possible explanation is a time lag between improved resource-use behaviour and ecological recovery, as changes in wetland condition may take longer to become visible. The deterioration may also reflect the cumulative effects of past degradation, which cannot be reversed quickly. In addition, the level of compliance may still be insufficient to halt or reverse degradation, particularly where enforcement and monitoring remain weak and wetland boundaries, including the 60-metre buffer zone, continue to be disregarded.

The apparent contradiction may also arise from differences in what the indicators measure. Compliance and reduced illegal activities reflect changes in governance and resource-use

behaviour, whereas perceived wetland condition reflects respondents' assessment of environmental change. People may, therefore, observe improvements in compliance while still noticing deterioration in vegetation, habitats or water conditions. Such perceptions may also be shaped by previous experience and expectations of wetland recovery. Improved compliance should, therefore, not be taken as evidence of ecological recovery.

5.8 Strengths and Limitations of the Study

The study has several important strengths. A key strength is that it addresses a relevant research gap by focusing on the implementation of institutional arrangements and their association with wetland governance in the Malagarasi–Muyovozi Wetlands. The integration of the Institutional Analysis and Development (IAD) Framework and the Institutional Theory provides a sound basis for examining institutional structures and the interactions among governance actors. The use of a mixed-methods approach is another strength, as quantitative data from 348 household respondents were complemented by information from key informant interviews, focus group discussions, field observations and documentary review, allowing for triangulation of the findings. The study also involved a wide range of stakeholders, including local communities, government authorities, conservation institutions, traditional leaders and civil society organizations. In addition, the use of simple random sampling for household respondents and purposive sampling for key informants and focus group participants enabled the study to obtain both quantitative evidence and detailed information on institutional processes. The application of a multivariate probit model was also appropriate for examining the relationships among stakeholder participation, regulatory compliance and institutional coordination. The study therefore provides useful empirical evidence for understanding institutional challenges and improving wetland governance in Tanzania.

Despite these strengths, the study has some limitations. The cross-sectional design limits causal interpretation and does not allow changes in governance conditions to be examined over time. The negative association between users' participation and regulatory compliance may be related to reverse causality, unmeasured factors, or similarities in the measurement of the two variables. The study was conducted in only six villages in Uvinza District, which may limit the applicability of the findings to other areas of the Malagarasi–Muyovozi Wetlands. The use of self-reported information may also have introduced response bias, particularly in reporting regulatory compliance and involvement in illegal resource use.

The use of dummy measures for stakeholder participation, regulatory compliance, and institutional coordination may not have captured the full range of these governance processes. In addition, the involvement of village leaders in identifying qualitative participants may have influenced participant selection and reduced the representation of less visible or marginalised resource users.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The findings show that improving governance in the Malagarasi–Muyovozi Wetlands requires greater attention to implementing existing institutional arrangements rather than developing additional policies. This requires clear institutional responsibilities, adequate capacity, consistent enforcement and better coordination. Community participation remains important, but it needs to be supported by clear rules and effective enforcement to strengthen compliance. Likewise, formal and informal institutions need to be better coordinated so that their roles complement each other. The reported improvement in compliance and reduction in

illegal activities, alongside continued perceptions of wetland deterioration, also suggests that improvements in governance may not result in immediate improvements in wetland condition.

This study contributes to wetland governance research in four areas. Theoretically, it combines the IAD Framework and the Institutional Theory to show that different aspects of institutional implementation are associated with participation, compliance and coordination in different ways. Empirically, it provides evidence on how institutional arrangements operate in the Malagarasi–Muyovozi Wetlands and how governance conditions vary across villages. Methodologically, the multivariate probit model allows the three governance processes to be examined jointly, while qualitative findings help explain the relationships observed in the quantitative analysis. From a policy perspective, the study identifies weaknesses in institutional capacity, enforcement, monitoring, coordination and the integration of formal and informal institutions. The findings, therefore, show that the effectiveness of wetland governance depends not only on the existence of policies and institutions, but also on how they are implemented and coordinated in practice.

6.2 Recommendations for Policy and Practice

6.2.1 Local Communities: Farmers, Livestock Keepers and Fishers

Local communities should comply with wetland regulations and take an active part in conservation and management. Farmers should observe cultivation restrictions and buffer requirements; livestock keepers should follow grazing restrictions and village by-laws; and fishers should comply with fishing regulations and help prevent illegal fishing. Communities should also take part in co-management, planning, monitoring and enforcement, report illegal activities and support agreed village by-laws. Traditional knowledge of seasonal resource use and customary management practices should be documented and considered in wetland management decisions.

6.2.2 Village Governments

Village governments should strengthen the implementation and enforcement of wetland by-laws and clarify the responsibilities of village leaders, environmental committees and resource users. Village environmental committees should record violations, conflicts, monitoring and enforcement activities and report them to the Uvinza District Council. Regular meetings should involve resource users, traditional leaders and environmental committees to address conflicts, seasonal pressures and compliance with wetland regulations. Joint monitoring and communication with district authorities should also be strengthened. Decisions on wetland boundaries, enforcement and resource access should follow existing laws, by-laws and management arrangements, particularly as local political interests were reported as the main constraint to wetland management by 44.3% of the respondents.

6.2.3 Uvinza District Council

The Uvinza District Council should coordinate wetland management at district level by bringing together relevant departments, village governments, NEMC, TAWA, TFS, fisheries authorities, customary leaders and NGOs for joint planning, monitoring and enforcement. Responsibilities should be clearly defined, supported by regular meetings and joint field activities. The Council should allocate adequate funds for monitoring, transport, patrols, awareness activities and enforcement. Wetland management should also be integrated into district plans for agriculture, livestock, fisheries, land and water resources to address conflicts between conservation and the livelihoods of wetland-dependent communities.

6.2.4 Environmental and Natural Resource Management Institutions (NEMC, TAWA, AND TFS)

NEMC, TAWA and TFS should strengthen enforcement, technical support and coordination within their respective mandates. Joint inspections and patrols should target areas affected by wetland degradation, illegal resource use and encroachment. NEMC should strengthen environmental monitoring and compliance, TAWA should enforce regulations where wildlife management overlaps with wetland use, and TFS should address activities contributing to vegetation loss. The three institutions should also share field information and plan joint activities to improve coordination and avoid duplication.

6.2.5 Non-Governmental Organizations (NGOs)

NGOs working in the Malagarasi–Muyovozi Wetlands should provide long-term support for institutional capacity, community participation and monitoring. They should support community-based monitoring, participatory planning, co-management and the inclusion of local knowledge in wetland management. Where possible, NGOs should also support livelihood activities that reduce pressure on wetland resources. Their activities should be coordinated with the Uvinza District Council, village governments and relevant government institutions to avoid duplication and ensure that wetland management activities continue beyond donor-funded projects.

6.2.6 Phased Implementation of Institutional Reforms

The recommended institutional reforms should be implemented in phases. In the short term, a governance audit should identify gaps in institutional mandates, resources, enforcement and coordination. In the medium term, a multi-stakeholder governance platform should be piloted to support joint planning, monitoring, enforcement and conflict resolution among government institutions, local authorities, customary institutions, communities and conservation organisations. In the long term, sustainable financing mechanisms should be established to support regular monitoring, enforcement and coordination while reducing dependence on short-term donor funding.

6.2.7 Directions for Future Research

Future studies should use longitudinal designs to examine changes in institutional implementation, stakeholder participation, regulatory compliance and institutional coordination over time, and how these relate to wetland conditions and livelihoods. Comparative studies of wetlands in Tanzania and other parts of East Africa are also needed to examine differences in governance under varying institutional, ecological and socio-economic conditions. Further research should examine the negative associations between users' participation and regulatory compliance, and between coordination mechanisms and institutional coordination, with attention to institutional conflicts, power relations and weaknesses in existing governance arrangements.

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Author Contributions

J.B. contributed to the conceptualization and design of the study, methodology, data collection, data analysis and interpretation, and preparation of the original manuscript. C.P.M. and H.O.M. contributed to the study design and methodology, supervision, interpretation of the findings, and review and editing of the manuscript. All authors read and approved the final manuscript.

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Conflict of Interests

The authors have no conflicting interests to declare.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Qualitative data containing potentially identifiable information are not publicly available because of ethical and confidentiality considerations.

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