



5<sup>th</sup>

SADC GROUNDWATER  
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GROUNDWATER: Making the invisible visible for socio-economic development

# Discerned Access: Underutilized groundwater potential for improving livelihood in Ngara District, Tanzania

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# INTRODUCTION

- Groundwater is an essential resource for a large share of the global population and economies, particularly in developing countries where water is becoming scarce.
- It is a vital drinking water source and the primary water supply source in rural and urban populations. It provides potable water to about two billion people and 42% of irrigation water, contributing to about 40% of world food production.
- However, groundwater sources are less exploited due to differentiated water sources, inadequate knowledge, poor technology, socioeconomic development and increased incidences of pollution.
- Thus recommended that Land use planners take the necessary steps to guarantee groundwater resources and their recharge mechanism are sustained and well protected (Nkosi et al., 2021).

# INTRODUCTION

- However, limited information on groundwater sources, recharge, stability and sustainability under the changing environments were noted.
- How the interdependence and interaction between climate change, irrigation, vegetation and river discharges affect the groundwater recharge process must be clarified.
- This study is devoted to groundwater sources that are less exploited and have very little governance information in the literature on the Kagera river Sub-basin (specifically in Ngara District).
- This paper contributes to knowledge for understanding the groundwater resources' potential and utilization challenges for decision-making.

## 2. Methodology

### Study area

- Ngara district is one of the eight Kagera Region districts, located between longitude 30° 15' E and latitude 2° 10' and 3° 0' S
- Ngara District is a strategic point that borders Rwanda and Burundi to the West and North West.
- The district falls in a series of dissected plateaus at different altitude levels, with hills and valleys resulting from subsequent erosion and dissection.

## Study area

- The district has major rivers; the Kagera, which marks the north-western border with Burundi and Rwanda, and the Ruvubu River, which flows around the southern border and crosses the district to join the Kagera River.
- There are Perennial and seasonal rivers and springs marked by the numerous valley bottoms across the district.
- The main land use types of Ngara district are uplands agriculture, wetland agriculture (mainly subsistence), silviculture, game reserve and livestock.
- The main natural vegetation types in the district include riverine forest, wooded grassland, bushed grassland, grasslands and the poorer drained parts of the minor valleys.



## • 2. Methodology

Used the mixed approach that includes qualitative and quantitative data collected through:

- Key informant interviews
- Household questionnaire,
- Focus group discussions,
- Direct Field observations.
- Literature review that reviewed the government reports, journal papers, books, published articles, policies and regulations.

# Data organization and analysis

- The study assessed groundwater differentiated access and challenges to knowledge, infrastructure development, capacity and technology that determines the water source.
- SPSS 20 and Microsoft excel software used to analyze quantitative data
- The thematic, content and trend analysis were used for qualitative data.
- The qualitative and quantitative analysis produced informative information presented in disruptive tables, graphs and charts to indicate essential variables and their significations.
- Data presented in graphs, Figures, Tables and descriptive statements

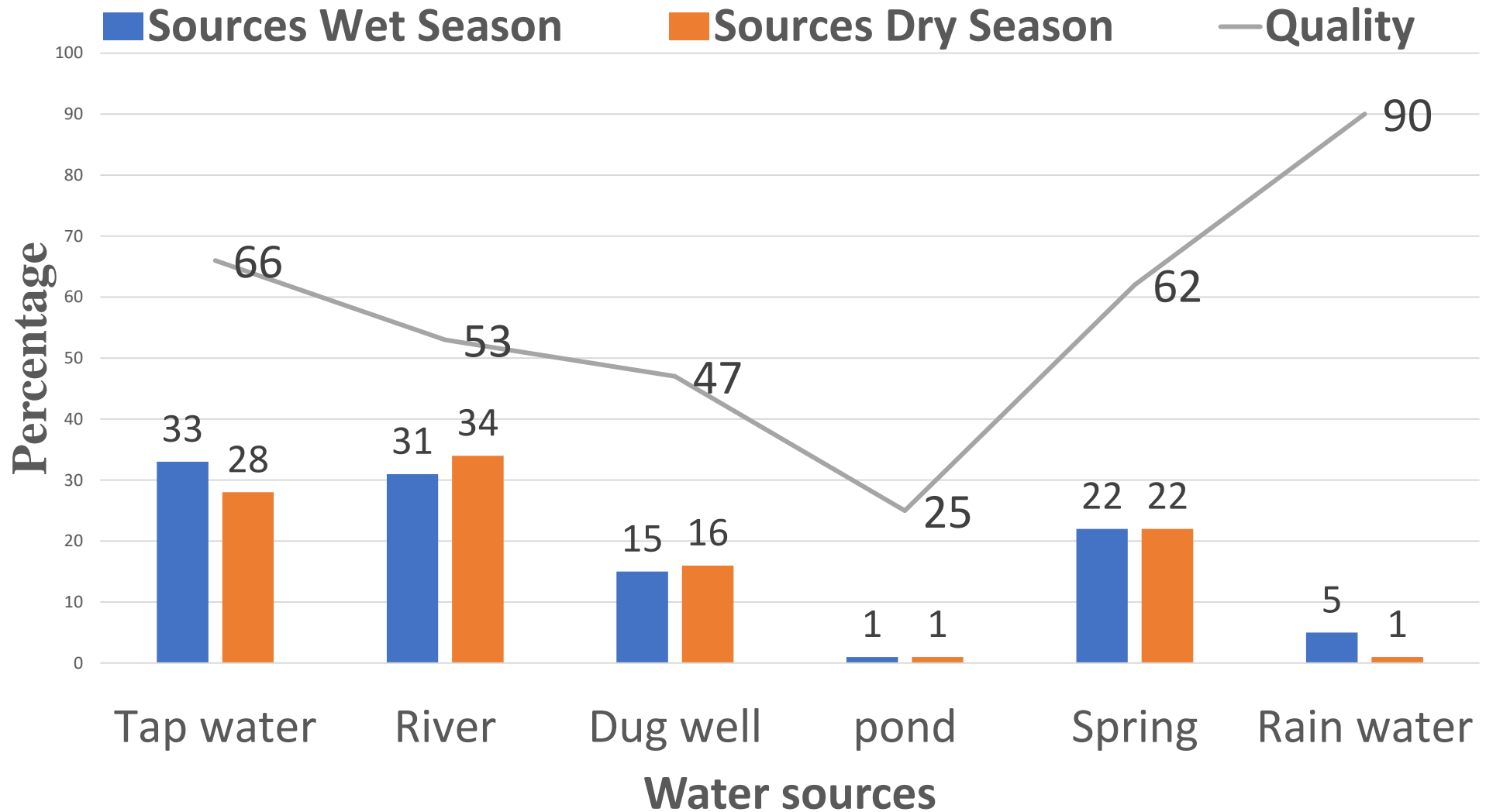
# RESULTS AND DISCUSSION

## Water sources and Groundwater utilization

- The results indicate most smallholder farmers and households rely on surface water springs, streams/ rivers and shallow wells for their domestic and productive purposes.
- Most smallholder farmers' households access groundwater through constructed shallow wells because it is based on using cheap and simple technologies that require little financial capital.
- The differentiated access to knowledge, infrastructure development, capacity and technology determines the water source.



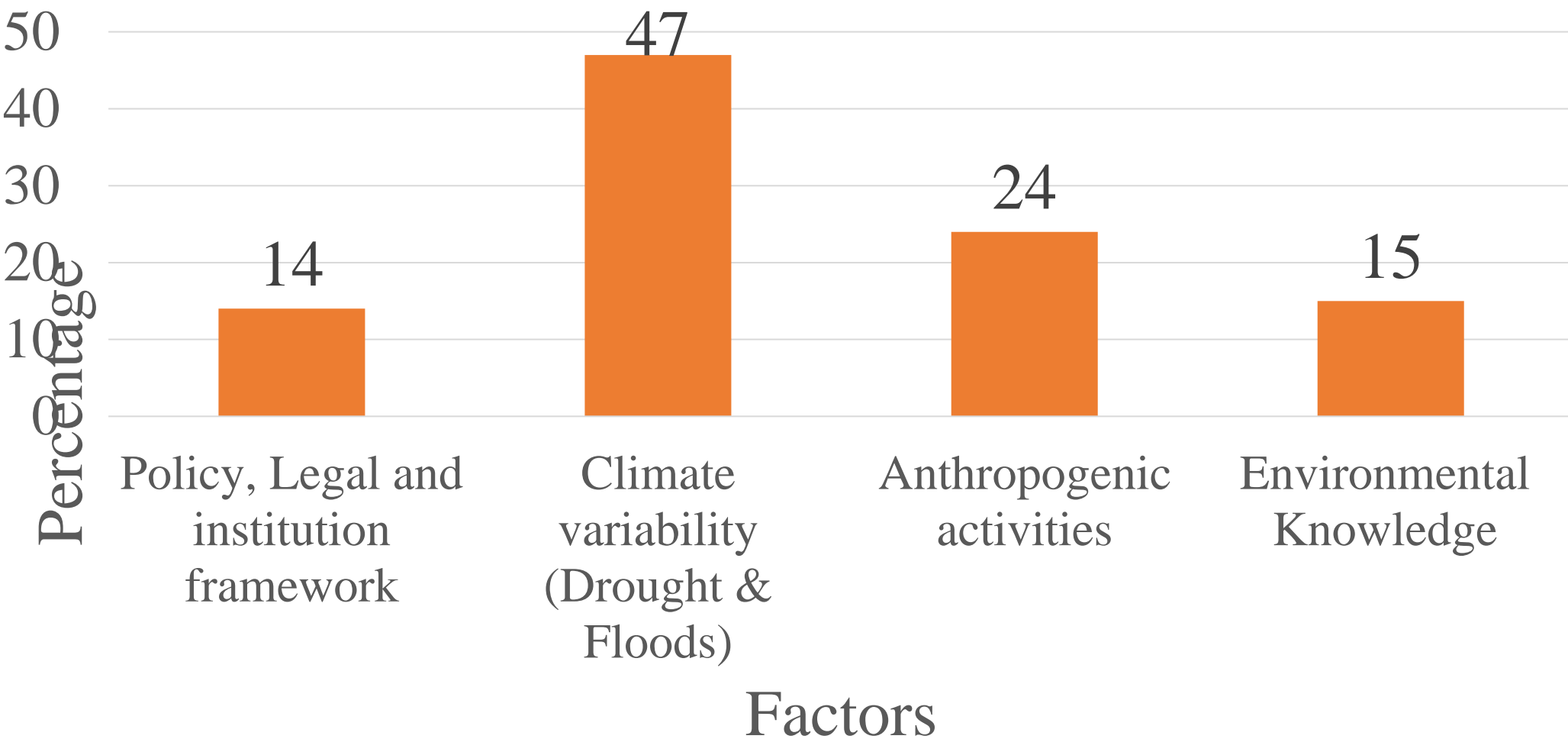
# Main water sources used in the area



# Groundwater resources use and management

- Low technology, lack of knowledge and enforcing capacity, exacerbated by different priorities among government actors, and groundwater exploitation, are limited to improving groundwater access for different uses.
- Constraints by lack of resources to enable adaptation to changes
- The challenges include the water table decline and siltation (from floods) that increases the cost of deepening and enlarging wells, financial capital, technology and governance for sustainability.

# Factor affecting groundwater resources utilization and management

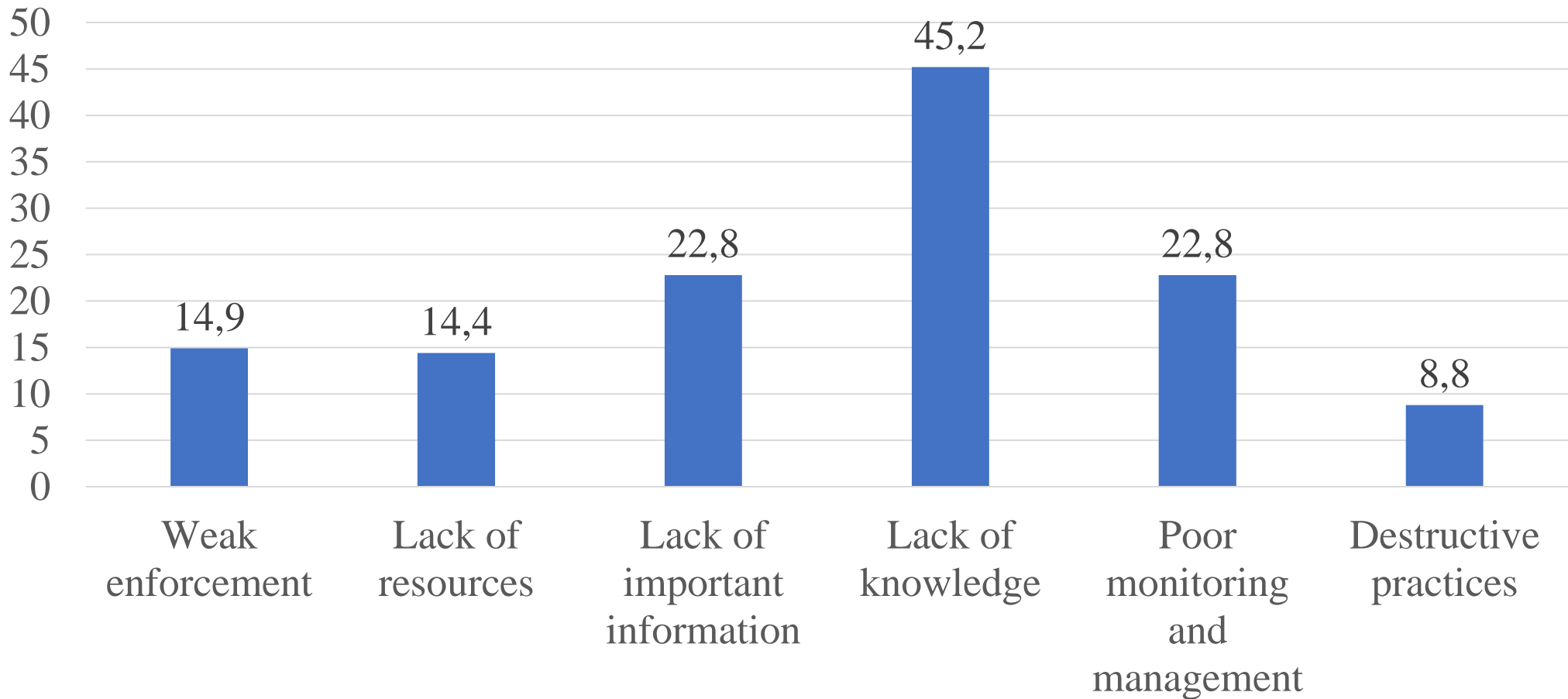


# Challenges in groundwater utilization

- The challenges resulting from human activities, especially income generation, multiple uses opportunities, management technologies and industry.
- Evolving socio-economic context and stakeholders with conflicting interests lead to a highly complex decision problem.
- Activities conducted upstream, within water sources (agricultural and deforestation for different use, including energy).
- Climate change impact on water resources availability (drought and floods)



# Challenges for utilization of groundwater sources



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# Option for groundwater development

- Capacity building for groundwater resource use and management rests an urgent need at both individual and the institutional level
- More investment in groundwater assessment and infrastructure relative to its potential
- Growing awareness at decision-making levels about the importance of groundwater needs to be adequately reflected in policies and practices.
- Investment in groundwater to address climate change, pollution and ineffective maintenance and reduce challenges.
- Availability of information

# Conclusions and recommendations

- Understanding water sources and a sound management system of livelihood and the environment reduce risk and improve resource management and community livelihood.
- Despite the low level of groundwater utilization, it provides a potential source for irrigation and water resilience under the changing environment and increasing water demands.
- Social relations, including material, cultural, and political-economic, including access to financial capital and technology, can constrain or enable access to groundwater.

# Conclusions and recommendations

- There is a need to enhance groundwater's role in water access, ecosystem sustainability, livelihoods, climate change response and addressing Sustainable Development Goals.
- The study recommends understanding the processes and improving groundwater access and quality and how they are being reinforced through policy and regulations.



# Thank you for your attention

