SAF-ADAPT

South Africa / Flanders Climate Adaptation Research and Training Partnership

**RESEARCH BRIEF**
October 2024

# Exploring household water conservation methods in rural South Africa: a case of the Mbhashe and Mnquma local municipalities

**Fortunate N. Mapuka, Werner Nel, and Ahmed M. Kalumba**

## RESEARCH BACKGROUND

It is forecasted that by 2030 around half of the world's population will inhabit regions facing significant water stress, leading to widespread displacement. In the South African context, the majority of rural communities (over 50% of the population) face significant challenges related to unequal access to water and sanitation, an issue exacerbated by infrastructure deterioration, maintenance, repair and upgrade.

Climate change and variability are leading to prolonged drought events, a recurring phenomenon which is particularly prevalent in South Africa's Eastern Cape Province. The province was declared a drought disaster region in October 2019, and despite municipal efforts to mitigate water shortages, rural communities continue to battle water scarcity, leaving them vulnerable. Therefore, there is an urgent need to implement effective water conservation methods to alleviate challenges and promote sustainable water use in drought-prone rural areas.

Household water conservation is one type of water conservation, commonly encompassing behavioural change for reduced water use. This study aims to investigate how rural households in the Mbhashe and Mnquma local municipalities conserve their water, assess the effectiveness of their approaches, and identify potential strategies to support community water security efforts.

## PROJECT SUMMARY

This study examines water conservation practices in the rural communities of Mbhashe and Mnquma local municipalities in the Eastern Cape, South Africa. The research highlights how households cope with severe water scarcity and explores the effectiveness of their water conservation methods. It also identifies barriers to accessing clean water and strategies to enhance community water security.

## KEY FINDINGS

- Poor infrastructure, poverty, and unpredictable rainfall force residents to **rely on practical, low-cost water conservation techniques**. Water storage was the most common method, but most households only practised one strategy, indicating untapped potential for broader conservation.
- Many households rely on **distant, contaminated natural water sources** due to limited access to clean water, which has led to health problems.
- Community taps and tanks are difficult to access, often far from homes, and vulnerable to theft or vandalism. **Perceptions of water quality were linked to the source**, with piped and tank water rated higher than natural sources.

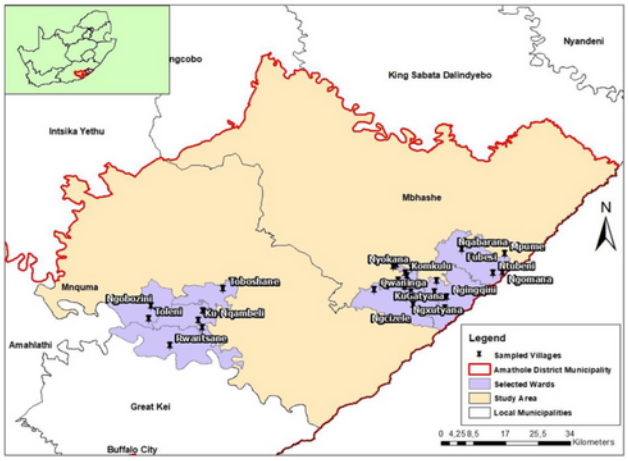


**Figure 1**. Map of study area in Mbhashe and Mnquma local municipalities in the Eastern Cape, South Africa

# RESULTS AND DISCUSSION

## DESCRIPTIVE ANALYSIS OF RESPONDENTS

- The study focused on water conservation measures adopted by residents of the Mnquma and Mbhashe local municipalities. Respondents' demographics are presented in Table 1 and the activities that use the most water in their households are depicted in Table 1. Household use/ chores were most frequently cited as an activity that used the most water, and laundry was second. Water use increased with household size.
- Many rural households expressed difficulty with accessing safe, reliable, and piped water. Despite the existence of the Free Basic Water policy which states that each household is entitled to 6000 L of water per month, the majority of families in the villages of Mbhashe and Mnquma must rely on rivers, streams, and springs for their water supply (Figure 2). The lack of piped water in rural areas is often attributed to infrastructural disparities referred to as "urban bias".
- The majority of respondents who relied on streams and rivers for water and reported that it had to be boiled pre-consumption as it was contaminated by animals, dumped waste, soap, and detergents. Household Tanks, the second most common source of water, were reportedly prone to pollution which contaminated the water.
- Participants reported that community taps were often subject to vandalism and theft while household taps delivered dirty water which had to be boiled before consumption.
- When asked about the quality of water, 55.2% of respondents rated it as poor to very poor, 38.4% rated it good or very good, and 6.4% it neither good nor bad. The perceived quality of water was directly related to the water source, as is depicted in Figure 3.

## NARRATIVE ANALYSIS OF WATER CONSERVATION MEASURES BASED ON PARTICIPANTS' RESPONSES

Generally, rural households' most common water conservation methods include rainwater harvesting, water storage, reuse, and using water-efficient appliances. 18.6% of participants indicated that they did not practice any water saving measures, 81.6% reported practicing at least one water conservation method and, to those with conservation measures, only 9.7% practiced more than one conservation method. Amongst those that did not practice water conservation, participants either reported that water was already too scarce and therefore there was no excess to save or they relied on "freely available" sources such as streams and therefore did not see reason for conservation measures.

**Table 1** Activities that use water the most in households

| Activity | Sub-category | *Frequency |
|---|---|---|
| Household use/chores | Cooking<br>Cleaning<br>Drinking | 401 |
| Laundry | | 191 |
| Bathing | | 53 |
| Gardening | | 93 |
| Construction | | 23 |
| Livestock | | 17 |
| Ceremonies | Traditional ceremonies<br>Funerals | 2 |

*Frequency indicates the number of times the activity was mentioned as being the activity that uses the most water in different households

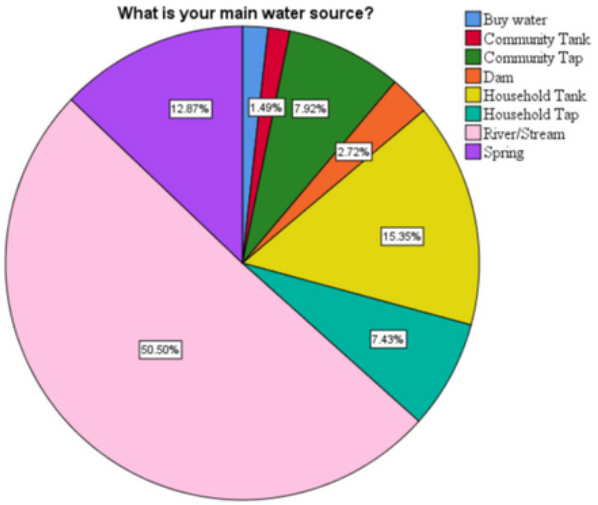


**Figure 2**. Percentage distribution of main water sources

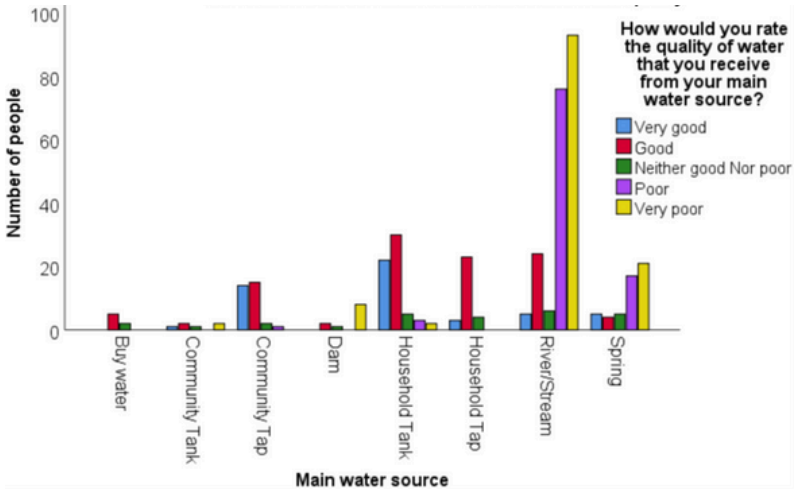


**Figure 3**. Correlation between main water source and water quality

### WATER STORAGE

18% of sampled villagers resorted to water storage, collecting water from multiple sources in buckets, drums, and tanks that were kept closed to avoid contamination. Importantly, some respondents did not perceive water storage as a conservation measure but rather, a means of ensuring there was water available to meet household needs.

### ROOFTOP RAINWATER HARVESTING

Despite global popularity, rooftop rainwater harvesting as a water conservation method was only practiced by 13.9% of survey participants. This was done using rooftop gutters and plastic tanks or metal drums, buckets, and dishes. The absence of the aforementioned equipment was cited as the limiting factor for rooftop rainwater harvesting.

### GREYWATER USE

Some households reported purifying greywater using lime while others chose to reuse bathwater for activities such as laundry and gardening – as is consistent with research done by Njoku et al. (2022). Household-level water treatment is critical under circumstances wherein municipal and community water treatment is inadequate (Rosegrant, 2020).

### LIMITING WATER USAGE AND AVOIDING WASTAGE

Respondents save the little water they have by limiting the amount of water used when doing household chores such as cooking, cleaning and laundry. This is consistent with previous research affirming the efficacy of minimising water waste by intentionally minimising water use across a range of activities (Njoku et al., 2022; Wallis, 2010).

### LIFESTYLE CHANGES

Practiced by 4.7% of participants, adjusting daily activities is another water conservation tactic. Some participants mentioned separating clothes for special occasions from daily garments to limit the frequency of laundry Others chose to cook every second day, bathe less, and only plant crops during the rainy season.

### USING WATER FROM DIFFERENT SOURCES

In order to preserve safe drinking water, some households use river/stream water is to water garden crops, bath and wash clothes while tap water is used exclusively for cooking and drinking.

### GENDER, EDUCATION AND WATER CONSERVATION

The results indicated no significant correlation between gender and the adoption of water conservation methods. Similarly, there was no significant correlation found between levels of education and the adoption of water conservation methods. Importantly, the absence of a significant association between the two variables does not nullify the need for water conservation education in communities, as the current study found that even those with formal education opted not to conserve water.

## CONCLUSION

Local municipalities like Mbhashe and Mnquma facing water scarcity implement water conservation methods to cope with unreliable and contaminated water sources.

This research presents several key findings:

- Poor infrastructure, poverty and unpredictable rainfall force residents to utilise the most practical and affordable water conservation techniques. The study found that water storage was the most prevalent water conservation method amongst rural households. Most participants practised at least one water conservation method while very few adopted more than one, suggesting that households may not be maximising available water conservation strategies.
- Participants frequently rely on natural sources although these have significant contamination levels and are often far away.
- Accessing clean water is a widespread challenge for many rural households who have to walk far to access community taps and tanks– an issue which is exacerbated by infrastructure theft or vandalism. Perceptions of water quality directly correlated with the water source, with piped or tank water rated as being higher in quality than water from natural sources. Contaminated water frequently led to an array of health-related issues.

The availability of water sources has a significant influence on the adoption of water conservation measures, with those relying on surface water choosing to not conserve it as they do not need to pay to access it

The SAF-ADAPT project is funded by the Government of Flanders, and is a 4.5-year collaborative project between University of Cape Town, University of Fort Hare, and University of Venda, KLIMOS Interuniversity Platform, and the South African Adaptation Network. This work was co-funded by VLIR-UOS, the Flemish University Council for University Development Cooperation through the ReSider project.

All opinions, interpretations and conclusions expressed are entirely those of the authors and do not reflect the views of the funder, the Government of Flanders and VLIR-UOS.

Published by the SAF-ADAPT project - www.saf-adapt.org

Corresponding author: Fortunate N. Mapuka (201412369@ufh.ac.za) or **READ THE PAPER HERE**

Flanders
State of the Art

SAF-ADAPT
South Africa / Flanders
Climate Adaptation
Research and Training
Partnership

KU LEUVEN

University of Fort Hare
Together in Excellence

University of Venda
Creating Future Leaders

University of Cape Town
iYunivesithi yaseKapa
Universiteit van Kaapstad