



# Factors Affecting Sustainability of Borehole Water Supply in Blantyre Rural, Malawi: A Case of Matindi Area

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## Introduction

- Government and development partners have intensified efforts to provide accessible and safe water to rural communities in Malawi.
- This is in line with SDG number 6.
- But, sustainability of the facilities, e.g. boreholes, remains a challenge.

## Objectives

The study investigated factors affecting sustainability of borehole water supply in Blantyre rural, Malawi with a focus on Matindi area.

- Factors studied were community participation, borehole maintenance work, skills of water management committees, financial contributions.

## The Study Area

Matindi area

- Located in south west of Blantyre (21 kilometres from the city)
- Total inhabitants = 3860.
- Number of boreholes = 25
- Constructed by GoM, NGOs, DANIDA, IRA, Water for People, Village Hygiene Project, Water Aid, Mynnadzswamat Dawat Islamic



## Materials and Methods

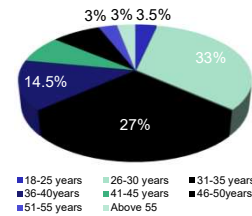
- Households respondents technique (questionnaire);
  - $N_f = \frac{n}{(1+2)/N}$  (Mugenda and Mugenda 1999)
  - = 200 respondents selected
- Test for reliability of instruments – Crombach's Alpha.
  - Result > 0.7 (reliable) (George & Mallery, 2003; Creswell, 2003).
- Regression analysis to evaluate the factors affecting sustainability of boreholes
- Correlation to evaluate relationship between the independent variables

## About the Author and Acknowledgements

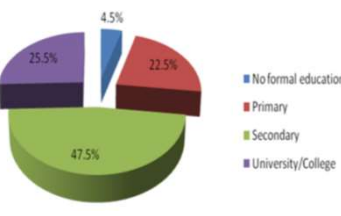
- Ms. Finaiah Lughano Kilembe is a graduating candidate of the Master of Science in Water Resources and Supply Management in the Faculty of Applied Sciences at The Polytechnic, University of Malawi.
- This work is part of her thesis.
- The authors acknowledge The Polytechnic for the support provided to the first author.

## Results and Discussion

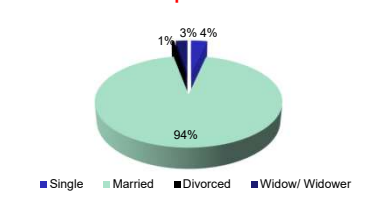
### Age Distribution of Respondents



### Respondents level of Education



### Distribution of respondents marital status



### Influence of community participation on sustainability of boreholes

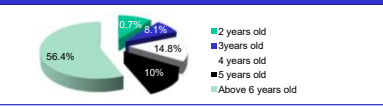
- Decision on site location of boreholes ~ 86.3% of respondents participated
- Figure below shows dominance of the community on deciding the exact construction site for the boreholes
 

Participant Group	Percentage
Supply Agencies	6.7%
The Community	79.3%
Church Leaders	1.1%
Muslim Leaders	2.3%
- Only 2% of the community participate in decision on type of borehole technology pump against 98% (providers)
- 94% of participants indicate participation in operation and maintenance of boreholes
- 96% of respondents affirmed knowledge of the significance of community participation in decision making on water supply
- Mild relationship between community participation and sustainability
  - Pearson's Product Moment Correlation (PPMC),  $r = 0.54, p < 0.05$**

### Challenges and opportunities associated with borehole maintenance

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- | Category       | Percentage |
|----------------|------------|
| AFRIDEV        | 88%        |
| India Mark ii  | 10%        |
| India Mark iii | 2%         |
- Recommended by Govt, the AFRIDEV hand pump is easy to maintain.
  - 87.3% of respondents identified that spare part are scarce in Mw
  - 73% of respondents claim hand pump technicians do the repairs,
    - 27% claimed water committees themselves repair the hand pumps
    - Requiring constant training

Figure below shows percentage of claims on years of continuous functioning of the borehole after construction



### Whether the borehole is working or not

- 83.3% reported positive functioning of their boreholes versus 16%. ~ 0.7% not sure.
- Figure below indicating %age of respondents indicating period of borehole non-functionality in their community.
 

Period	Percentage
For 3 weeks now	48.0%
For 1 month now	8.0%
For 6 months now	4.0%
More than a year	40.0%
- Figure below indicating percentage of people ascribing to a reason for borehole non-functionality
 

Reason	Percentage
High Concentration of salt in water	36%
Spare parts not available	24%
Spare parts very expensive	16%
Noone to maintain	10%
None to maintain	14%

### Management versus sustainability of boreholes

- 
- | Category                                | Percentage |
|---|------------|
| Adequate supervision                    | 34%        |
| Leadership involvement & Responsibility | 58%        |
| Community participation                 | 8%         |
- Important issues isolated by respondents affecting borehole sustainability
  - Responses on mgt training for committees
    - 72% of the committee said no formal operation and maintenance training given to them
    - 84% of borehole providers indicated lack of capacity to train committees
  - Willingness to contribute funds affects sustainability of boreholes ( $r = 0.795, p < 0.05$ )

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- | Skill Level | Percentage |
|-------------|------------|
| Very low    | 4%         |
| Low         | 10%        |
| Moderately  | 38%        |
| High        | 42%        |
| Very high   | 6%         |
- Distribution of skills of committee members
  - PPMC show a positive link btwn levels of skills and sustainability of boreholes ( $r = 0.37, p < 0.05$ )

### Major problems encountered with their boreholes

- Problems faced during borehole drilling
 

Problem	Percentage
Dry or Low yielding hole:	2%
Deep lying aquifers	19%
poor performing drilling equipment	24%
Poor roads to sight location	64%
- Borehole maintenance schedule
 

Schedule	Percentage
Thrice in a year	0.7%
Only when its broken	9.9%
No maintenance schedule	88.4%
- Financial capacity to sustain the boreholes
 

Response	Percentage
Yes	11.3%
No	19.3%
Don't know	69.3%
- Seasons in which a borehole was drilled ~ prefer dry season
  - Dry season yields are reliable

Season	Percentage
wet Season	2%
Dry Seasons	60%
All Seasons	38%

## Conclusions and Recommendations

- The combination of factors contribute to overall sustainability of boreholes in Matindi
- Community participation in all decision making process is very vital to sustainability of borehole facilities in the area
- Type of borehole technology plays a role in sustainability of boreholes

- Increased training of water committees on operation, maintenance and financial management is recommended
- Communities should be allowed to participate in choosing the type of technology

## References and source of information

Creswell, J.W. (2013). Research design: Qualitative, quantitative, and mixed methods approaches. 4th ed. London, UK: SAGE Publications, Inc.  
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