



**INVESTIGATING THE POTENTIAL OF RAINWATER HARVESTING AS AN  
APPROPRIATE TECHNOLOGY FOR WATER SUPPLY IN PERI-URBAN AREAS IN  
UGANDA: "A case of BWAISE- KAWEMPE DIVISION KAMPALA"**

**BY**

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**DECLARATION**

I, Mwebaze Emmanuel, declare that this dissertation is my original work and has never been submitted to any Institution or University for the award of a degree.

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## **DEDICATION**

This research project is dedicated to my dear Wife, Ms. Kellen N. Mwebaze who has been toiling to see me through my education endeavours.

I also dedicate this dissertation to my Children and my Mother Ms Rhoda Rutaromba whose encouragement, material and moral support has enabled me to accomplish this course.

Lastly I dedicate it to my Family Members; My Brothers, Churchill Tutayomba, Mwebesa Joseph, Bakashaba Christopher and Mutainara. My Sisters, Komugisha and Doreen. Without their prayers I would not have managed to see myself through.

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## LIST OF ACRONYMS

DRWH	Domestic rain water harvesting
FGD	Focus group discussion
GIS	Geographical Information System
MWLE	Ministry of water, lands and environment
NEMA	National Environment Management Authority
NSWSC	National Water and Sewerage Corporation
PEAP	Poverty Alleviation Action Plan
RC	Run- off Coefficient
RWH	Rain water harvesting
SPSS	Statistical Package for social scientists
URWA	Uganda Rain water harvesting Association
WSSCC	Water supply and sanitation collaborative council
WWAP	World Water Assessment Programme.
URWA	Uganda Rainwater Association



## ABSTRACT

The study aimed at determining rainwater harvesting potential as an appropriate technology for water supply in peri-urban areas in Uganda with the case study of Bwaise, Kawempe Division, Kampala. Three hundred eighty four (384) respondents (tenants and owners of buildings) were purposively and randomly selected from Bwaise I, II and III. In this study, the housing characteristics and their influence on the ability to carry out rain water harvesting in Bwaise were assessed; and domestic water demand and the potential rain water supply in Bwaise was determined. Additionally, policies and socio-economic factors, people's perceptions and attitudes towards rain water harvesting were analyzed.

Questionnaire survey was conducted as a data collection tool. Tenants, Landlords and key informants were asked to complete a questionnaire-form developed which was implemented in July and August 2013. Demand side approach (seasons demand versus supply) method was used for calculating estimates for the required tank size. Calculating potential rainwater supply was done by estimating run-off. The amount of available rainwater depended on the amount of rainfall, the area of the catchment, and its run-off coefficient. Geographic Information System (GIS) based method was used to determine the overall rainwater rooftop capture potential of Bwaise I, Bwaise II and Bwaise III. GIS was used to identify the total area coverage of residential and non-residential roofs which are impervious. Rainfall data from the year 2003 to 2013 was obtained from the Meteorological Department in Kampala and used to determine the runoff in the area.

Majority of respondents (76%) supported rainwater harvesting while 24% disagreed arguing that the housing characteristics do not affect this practice. Majority (50.8%) used 80-120 liters of water per day. Most of the households comprised of an average of 4 members whose water demand in a month was 3000 liters and the required water storage for a dry season of 4 months was 14400 litres.

Over 90% of the respondents did not have any knowledge about the existence of policies on rain water harvesting. The major socio-economic factor influencing adoption of rainwater harvesting was proximity to alternative water sources (60.4%). The majority (66.6%) of the landlords reported lack of enough space to support installation rainwater harvesting facilities. The majority (60.5%) respondents' accessed water at zero distance.

The total of rooftop area in Bwaise was 284,310 m<sup>2</sup> and the volume of water collectable was 346 million litres. Rainwater was found insufficient to supply water to the whole population of Bwaise but it can contribute 30% of the water supply needed in this area.

It was found out that water demand increases with household size but further increase in household size may not necessarily lead to a proportional increase in water demand. It was also found out that level of income influences willingness to adapt to rainwater harvesting. It was also established that the housing characteristics mainly spacing and temporally buildings have a positive influence on the adoption of rainwater harvesting of up to 71.9%. Improving people's incomes, creating mass awareness and incorporated rainwater harvesting in Uganda's National Building Code are vital for adoption of RWH.