

# The Potential for Rain Water Harvesting in Uganda

## Introduction

The United Nations Millennium Summit (2000) agreement set a time bound and measurable goals and targets for combating poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. Similarly, the Ugandan Government put in place the Poverty Eradication Action Plan (PEAP) as a national framework for poverty eradication. The PEAP has adopted a multi-sectoral approach, recognizing the multi-dimensional nature of poverty and linkages between influencing factors. The PEAP objectives are being addressed through various programmes including water and sanitation.

The policy objective of the Government for water (domestic) water supply and sanitation is to provide “*sustainable provision of safe water within easy reach and hygienic sanitation facilities, based on management responsibility and ownership by the users, to 77% of the population in rural areas and 100% of the urban population by the year 2015 with an 80%-90% effective use and functionality of facilities*” (MWLE, 2004e). With proper water management we can have enough water for most of domestic, agricultural and environmental needs.

The objective of this document is to disseminate knowledge and create awareness on Rain Water Harvesting (RWH) concept as a simple, low-cost technology for supplying water of required quality for domestic purposes and other uses. Readers are encouraged to share the information herein with families and friends so that the message is disseminated to a wider audience.

Rainwater Harvesting (RWH) refers to the collection and storage of rainwater and also other activities aimed at conservation and efficient utilization of the collected water endowment in an area. RWH requires impermeable surface or “hard roof” and a storage facility (tank, pot, jar, bucket, pond, etc). The hard surface can be a rock with reasonably good surface area that can collect and store water without being contaminated. Reliability of RWH depends on frequency and amounts of rainfall, capacity of the storage facility and collecting surface in order to match the user water demands. The technique of RWH has been used in some local projects for many years especially in schools and churches where roofs are made of iron sheet but many homes with iron sheets still do not have RWH facilities (gutters and tanks – see figures below).

RWH is a very significant entry point for poverty alleviation, sustainable development and integrated management of water resources and one of the key solutions to safe water for all. Although the practice was not very common in the last few decades among the Ugandan population compared to other ways of abstracting and storing water, it is now increasingly being recognized as one of the key solutions for achieving the goal of safe water for all. This practice is vital for achieving water security for the future Uganda as climate change and variability impacts on water resources intensifies.



Communal RWH tank in Sheema, Bushenyi



Improved and affordable gutter system



RWH collecting jar

In Uganda we are blessed with a bimodal rainfall pattern (two distinct rainy seasons in a year) and receive, on average, about 1200mm of rainfall annually (for 2/3 of the country) and yet we still fight

for water at the long water source queues and our crops still fail because of “drought”. As the impacts of climate change manifests itself, it is time to start paying serious attention beyond the traditional ways (boreholes, shallow wells, springs, etc.) of collecting water that only meet some of our needs to a point and look towards RWH techniques to find the answers that other technologies cannot provide.

RHW is one of the gateways to Prosperity for all since it can result in increased incomes and transformation of the society –it is at the disposal of every household.

Rainwater harvesting plays an important role in making both rural and urban areas self-reliant in their water needs. In India for instance, there are some areas that receive as little as 300mm of rainfall annually and yet they are able to survive. Their ‘big secret’ is that they harvest their little rainwater and are thus able to meet their water needs (domestic and agriculture). Rainwater can be collected and stored to provide water for crops, livestock and water for home use in addition to controlling flooding. It is of particular importance and relevance to semi-arid areas, like Karamoja, Nakasongola, Rakai, Isingiro, Kiruhura and other similar parts in the country where other technologies (method of collecting and storing of water) are not feasible and in cases of scattered human settlement. In urban areas, rainwater has a role to play as a top up to piped water supplies for use in activities such as watering gardens, flushing toilets while at the same time controlling floods.

RWH practice is a very convenient method of collecting and storing water compared to other water sources (‘just at the door-step) hence reduces time and effort otherwise spent on ferrying water from long distances. RWH is economically attractive (cheaper than alternative ways of achieving a fair standard of water supply for households over 500m from a safe point water source) and can be operated without communal management which can be adaptive as a sole source water supply at household level.

The most interesting feature of RWH is ‘convenience’ which delivers water-without-walking and therefore has greater potential to reduce the time and effort involved in obtaining clean and safe water than any ‘point source’ form of supply (see pictures below). Its prospects are therefore closely linked to the standards for ‘convenience’ adopted within water practice. Standard will move towards a ceiling of less than 1.5 minutes per litre as an annual average for the time cost of obtaining water. This corresponds roughly to a limit of 1000 meters on the mean round-trip distance to access water, the greatest distance compatible with a per capita quantity standard of 20 litres per day.



Completed tank within no walking distance



Family RWH tank being completed – without walking distance to access it

Operation and Management (O&M) of Domestic Rainwater Harvesting (DRWH) is very simple. It should be noted that DRWH can be operated without commercial or communal management. ‘Good management’ (periodic cleaning of the gutters and the tank) is needed but it is well within the scope of householders who have every incentive to practice it.

It is economically attractive or cheaper than alternative ways of achieving a fair standard of water supply – if applied specifically to households currently over 500 meters from a protected point source. In few locations where non-potable water is readily available, it is possible to employ a cheap potable form of DRWH to provide just 7 litre per capita per day of clean and safe water through say 95% of each year.

The challenges of DRWH is its need for a substantial area of roofing or hardsurface per person – so large in the case of using DRWH as a sole or even main (e.g. 90%) source of water that it is currently not available in the majority of rural households in the country. This needed roof area ranges from 7 square meters per person in the wettest inhabited parts of the country through 9 m<sup>2</sup> in an area of average rainfall to over 15 m<sup>2</sup> in the lightly populated North-East. Over half the 60% of Ugandan rural houses that do have hard roofing possess under 9 m<sup>2</sup> of it per person. Sometimes, if RWH is the Sole-source or Main-source for water supply then it requires a larger and hence expensive tank. The economics and the roofing challenges mean that DRWH is meeting some (e.g. 70%) rather than all of a household's water demand. However, it can meet almost all wet-season demands but only critical water needs (say 7 litres/person/day) in the dry months that typically comprise 35% of a Ugandan year. It requires the household to seasonally vary its rate of drawing from a rainwater tank. The lesser overall demand allows for operation with smaller roofs, while the easier demand pattern allows a five-fold reduction in the water storage volume needed. Thus adaptive DRWH is recommended as the main form for its use to reduce the national water-fetching burden. The lack of any hard roofing by 40% of rural houses (higher in the North, lower in the rest of the country) poses further challenges of equity wherever DRWH is promoted. The national rate of penetration of *mabati* roofing is rising at about 2% per year and in much of the country hard roofing can be expected to be almost universal within a decade. By contrast the North of the country may not reach even 50% penetration within a decade.

Further challenge of DRWH is its essentially house-by-house nature, which jars with a rural water practice dominated for many years by communal technologies like the borehole. Forcing RWH into a communal form is neither feasible (communal roof areas are grossly inadequate, suitable rock surfaces are rarely to hand) nor desirable. So some changes in expectations and in the constraints applied to government water investment are needed if DRWH is to be widely used. This is already being addressed by the Ministry of Water and environment (MWE) through its Directorate of Water Development (DWD). First and foremost DWD carried out a number of pilot projects on RWH in the Western districts of Mbarara and Busenyi. The objectives of the pilot were; (i) to test and document Domestic Roofwater Harvesting (DRWH) approaches; (ii) implement Government co-funded community water supply programme through NGO delivery mode; (iii) improve access to clean and safe water at household level or nearby; and improve sanitation of the beneficiaries as well as promote the concept of RWH in the country. The pilot project clearly showed that there is great potential for RWH as a water supply technology for the rural areas. Moreover, there is willingness for communities to contribute to construct individual rainwater systems given some external support. DWD has now started on a serious campaign on upscaling the RWH activities in the country. The nation up-scaling activities of RWH have been started in the districts of Isingiro, Busenyi, Kamuli and Rakai. District Water and Sanitation Conditional Grant (DWSCG) funds under the budget line “Promotion of Domestic Roof water Harvesting” is also catering for small scale (Parish level) domestic roof water harvesting pilot projects in water stressed areas (i.e. where other conventional technologies are not feasible).

The contribution made by Non-Governmental organisations such as Uganda Rainwater Association (URWA), WaterAids, etc. and Community-based Organisations (CBOs) in increasing access to safe water, through RWH, is increasingly being appreciated by the stakeholders. The government of Uganda recognizes efforts made by other NGOs in promoting RWH as a complimentary source of water supply.

MWE calls upon the private sectors and other financing institutions to partner with the communities, individual farmers and households to promote RWH for production activities,

irrigation of high-value crops including vegetables to increase incomes in addition to improving household requirements.

Government of Uganda strategy is to ensure that all potential areas in the country embrace RWH practice as one of the better ways of management environments and supply of safe water to the population. This is already being addressed: (i) directly contracting NGOs to carry out mobilization and construction (using local groups) activities, (ii) funding specific RWH activities of the District Water Offices and (iii) disseminating RWH information to beneficiary communities. All these are being done through a cost-sharing principle. Due to financial constraints, Government priority for RWH is first for water stress areas (when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use) of the country.

The basic principles of water management is the simplicity itself and it is Government's belief that catching water where it falls will go a long way in increasing water coverage in the country; particularly in the water stressed areas where alternative technologies can not meet local water supply demand. The aspect of individual ownership in RWH improves operation and maintenance of the system. It is time to embrace the science (RWH) that was started by our forefathers and make a difference in our water problems. DWD believes that the sure way of achieving sustainable livelihood in Uganda, whose majority of the population survive on household subsistence farming, is to embrace effective RWH that would ensure availability of water when and where it is needed and also conserve the environment through soil conservation.

DWD also continues to appeals to the Government and donors to specifically fund RWH activities in the country.

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