



Catalogue

# **Frequently Asked Questions on Rooftop Rainwater Harvesting**

## Preface

Despite abundant rainfall occurring in two seasons per year in most of Uganda, and over 70% of houses with hard roof surface across the country, the adoption of rooftop rainwater harvesting (RRWH) technology is very low. Very few houses have provisions for channelling and storing rainwater for future use. This is owing to limited awareness, information gaps about the technology, cost, and lack of incentives. To address some of these limitations, several initiatives towards accelerating the diffusion of RRWH in Uganda were carried out in the past year, including, the formation of a strategic multi-stakeholder Alliance, awareness creation sessions at sub-national levels, an FAQ catalogue, and consultations to highlight opportunities for building regulations, a market brief on RRWH in Uganda, among others. In this report, the focus is on the Frequently Asked Questions (FAQ) on RRWH by potential consumers.

All of these are outputs of the Technology, Markets and Investment for Low-Carbon and Climate resilient Development (TEMARIN) project, that is carried out in two African countries, namely Kenya and Uganda. The project is funded by the Danish Ministry of Foreign Affairs and is implemented by the UNEP Copenhagen Climate Centre. It aims to support countries in accelerating the transfer, diffusion, and uptake of specific climate technologies. The project focus is on strengthening domestic markets for climate technologies, removing bottlenecks for domestic firms operating in these markets and increasing cooperation among private, public, and international actors to build global and national partnerships for upscaling implementation.

This FAQ catalogue updates and supplements the Handbook on Rainwater Harvesting Storage Options developed in 2013 by the Ministry of Water and Environment in Uganda (MWE, 2013), and contributes to the project's aim through directly addressing in a relatively simple, easy-to-read, and less technical form the most frequently asked questions by the consumers/users on RRWH.

**PUBLISHED:** August 2022

**PHOTO CREDITS:** Shutterstock

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## Acknowledgements

The brief was produced by Sara Namirembe, STEPUP Standard Limited, and supported by Lucy Ellen Gregersen, Padmasai Lakshmi Bhamidipati, and Lars Christensen. Together with key informant interviews, stakeholder consultations, and workshops conducted with private sector, government authorities and civil society, Sara Namirembe's groundwork on TNA, TAP and TEMARIN projects laid the foundation for this FAQ catalogue. Further, the project team would like to acknowledge Mary Nabacwa (consultant) and Rita Nabasumba (STEPUP Standard Limited) for contribution to compilation and gathering of the information, and Lucy Ellen Gregersen and Mathilde Brix Pedersen (UNEP-CCC) for reviewing as well providing valuable feedback and input to this catalogue.

# Contents

Introduction .....	4
What is rooftop rainwater harvesting technology? .....	5
1. Why should I use RRWH? .....	5
3. Can rooftop rainwater harvesting provide year-round access? .....	5
4. Is it only good for rural set-ups? .....	6
5. Is my roof suitable for RRWH?.....	6
6. What sort of tank and accessories should I use and where can I get them from? .....	6
7. What sort of pumps should I use? .....	8
8. Where do I buy the pumps from? .....	9
9. What does it take to channel water into a storage tank? .....	9
10. Won't the tank make my house look ugly and take up space? .....	9
11. What do I do if my tank fills up and overflows? .....	9
12. What do I gain if I already have piped water supply? .....	9
13. Can I connect rrwh to my existing house plumbing system? .....	10
14. How do I ensure good water quality? .....	10
15. What if I cannot afford the upfront costs, do I get assistance? .....	10
16. Would RRWH work for institutions or is it only for households? .....	11
17. Is rooftop rainwater harvesting only feasible for new buildings? .....	11
18. What are the rules governing my collection and use of RRWH?.....	11
19. What can I use the harvested water for? .....	11
20. Will the stored water harbour mosquitoes and other health hazards?.....	11
21. Where can I get advice on rooftop rainwater harvesting from? .....	11
Concluding Remarks .....	12
References .....	13
Annex .....	14

# Introduction

Uganda has an average rainfall of 500-1200 mm a year. Agriculture is rainfed and only about 69% of the total population has water access (i.e., within at least 1.5 km of an improved water source). Climate change is predicted to cause an increase in temperature, and erratic shifts in seasonality and intensity in rainfall. This is projected to increase much of the population and the economy vulnerable to severe cycles of water floods and water scarcities. Rooftop rainwater harvesting (RRWH) was identified in the Technology Needs Assessment (TNA) process as one of the technologies with great potential in enabling adaptation to climate change.

## Box 1. Brief introduction to the TNA Project

The TNA project is funded by the Global Environment Facility (GEF) and implemented by UNEP-CCC across nearly 100 developing countries. TNA involves a country-driven process for identifying, selecting, and implementing climate technologies for mitigating and adapting to climate change to support implementation of Uganda's nationally determined contributions (NDCs) and related technology-dependent climate actions at national level. The national stakeholders have prioritized water, agriculture, and forestry sectors within climate adaptation. Within the water sector, the TNA prioritised amongst others, RRWH as one of the technologies that can play a crucial role in climate change adaptation for the water sector in Uganda. The TNA plays a key role in promoting and facilitating technology development and transfer, supporting developing countries to identify appropriate technology options and implement them for their climate response. The work of TNA and NDCs have led to the TEMARIN project.

Rooftop Rainwater Harvesting System has multiple potential benefits including provision of clean and safe water for domestic use, reduction of excessive runoff minimizing soil erosion, flooding and damage to infrastructure, agricultural irrigation and enabling diversification of livelihood enterprises. However, only about 0.25% practice rooftop rainwater harvesting with adequate storage capacity (>6000 litres) to take an average household (of 6 people) from one rainy season to another. For more details, please refer to the RRWH market brief produced by UNEP-CCC as part of the TEMARIN project.<sup>1</sup>

During stakeholder consultations, the authors noted that lack of awareness was being cited as one of the major barriers to adoption. Although a rainwater harvesting guidebook exists,<sup>2</sup> it is not being widely circulated and used, possibly because the details it presents

do not seem to be responding to the knowledge gaps that potential users have. This catalogue is a compilation of responses to twenty-one Frequently Asked Questions (FAQs) that were gathered through stakeholder engagements during the implementation of the TEMARIN Project (August 2021 to April 2022).

Gathering and consolidation of questions was carried out during discussions with stakeholders in monthly meetings, as well as during awareness creation meetings in Kampala and Mukono. Questions were considered to be important if the stakeholders participating in the meetings presented them as frequently occurring in their interactions with (potential) RRWH technology users or promoters. Responses to these questions were generated from secondary literature, one-on-one interviews with the private sector equipment suppliers and service providers, as well as through consultations with different stakeholders including plumbers, real estate investors, water officers, NGOs, and water harvesting financial service providers. Annex 1 for complete list of stakeholders consulted.

A presentation of the draft list of FAQ and available responses was made in a major urban awareness meeting (April 5, 2022) which included members of parliament, water engineers from Ministry of Water and Environment, Plumbers' Association, Real Estate Developers, rainwater harvesting civil society organisations and networks, rainwater harvesting financial service providers, equipment, and advisory support suppliers.

Meeting participants commented and contributed to the list of questions and through a panel discussion with experts (April 5, 2022), available responses to the questions were verified and enriched. A revised draft shared by email with Rooftop Rainwater Harvesting Alliance members for comment and presented to the RRWH Alliance interim committee meeting (May 11, 2022). Comments from all these engagements were incorporated and FAQ finalised.

This catalogue is expected to address information barriers faced by potential users of the RRWH technology. Part of the information in the catalogue was used to develop a video, which was broadcast on Uganda Broadcasting Corporation and their You-tube channel ([https://youtu.be/z\\_n6etqUu\\_Y](https://youtu.be/z_n6etqUu_Y)). The electronic version of the catalogue and video will be disseminated through online networks of Alliance members and popularised in their future engagements.

<sup>1</sup> <https://unepccc.org/project/strengthening-value-chains-and-capacities-for-expanding-clean-energy-markets-in-kenya-and-uganda/>

<sup>2</sup> <https://www.mwe.go.ug/sites/default/files/library/Rain%20Water%20Harvesting%20Handbook.pdf>

# What is rooftop rainwater harvesting technology?

Rooftop Rainwater Harvesting (RRWH) involves collecting rainwater from rooftops through gutters and channelling it into a storage container for future use for domestic purposes, crop, and livestock production. Rainwater is relatively clean and can be stored in relatively good quality standard for future use. RRWH is sometimes called Domestic Roof Water Harvesting.

## 1. Why should I use RRWH?

Your house collects rainwater that is relatively clean and can be put to various uses including drinking,<sup>3</sup> cooking, household hygiene, agricultural irrigation and livestock rearing. Why let it go to waste? If you harvest and store it, it will be conveniently available and you will have direct control over it without need for energy and chemicals for water purification.

Climate change is coming and it will change rainfall patterns, intensity and distribution. There will be frequent occurrences of wetter wet seasons (especially September-November), and drier dry seasons (especially December-February). Temperature will also rise, which will speed up the rate of evaporation (loss of water into the atmosphere) causing a reduction in water levels in surface water sources. This will reduce the amount of water available for supplying through piped networks yet with the rapid increase in population, demand will escalate and piped water may be rationed or become more expensive. Although installation of RRWH is costly, you will incur minimal recurrent costs afterwards.

If your building is located in a remote area that has not been reached by formal piped water supply or if piped water is too intermittent to supply your water needs or if you foresee an increase in your water needs or value in diversifying your water sourcing options, you need RRWH. Finally, it is good practice to harvest your rooftop rainwater and not let it drain away, contributing to soil erosion flooding and damage to infrastructure.

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<sup>3</sup> For details on quality requirements for drinking water please refer to the Water Supply Design Manual published by Ministry of Water and Environment (2013). <https://www.mwe.go.ug/sites/default/files/library/Water%20Supply%20Design%20Manual%20v.1.1.pdf>

## 2. What are the benefits of rooftop rainwater harvesting?

The benefits of RWH include:

- Rainwater can act as a convenient alternative, self-sufficient source of higher quality and quantity water in periods of water scarcity and to areas that have inadequate water supply and low groundwater potential.
- It can save your family members especially women and children from the drudgery and risks associated with fetching water daily.
- You will widen your options for improving basic hygiene and health
- You will contribute to flood mitigation and prevention of soil erosion.
- In contexts of environmental and geographical challenges, for example hilly terrains, island with limited freshwater aquifers, deserts with low rain fall, and in saline or coastal areas, RRWH becomes the best source of safe quality water.

## 3. Can rooftop rainwater harvesting provide year-round access?

Yes, but this depends on whether the storage capacity is sufficient to provide for the needs of the household or institution. The Ministry of Water and Environment recognizes tank sizes of 6,000 litres and above as adequate for increasing access to water. This value assumes up to 90 days without rainfall, an average household size of 6 persons, and water utilization of 20 litres/person/day.<sup>4</sup>

To estimate the storage size you need, there are four major considerations, which can be divided into demand (number of persons and duration of dry season) and supply (size of roof surface and amount of rainfall). Areas with higher annual rainfall can harvest more and need larger tanks than dry areas. Also, households with larger roofs have a higher capacity to collect larger amounts

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<sup>4</sup> Maria Sseruwo, Liaison, Ministry of Water and Environment

than those with small roofs. Clustered houses with small roof surface area can channel water into a shared storage.

Recommended tank sizes for households range from 10,000 litres for 6 persons to 22,000 litres for 12 persons.<sup>5</sup>

Masonry water harvesting tanks (Walugendo Model Tanks) of up to 500 thousand litre capacity constructed at institutions like schools and hospitals, can enable them to have year-round water.

The Handbook on Rainwater Harvesting Storage Options by the Ministry of Water and Environment (2013) gives more details on estimating appropriate storage.<sup>6</sup>

#### **4. Is it only good for rural set-ups?**

No, rooftop rainwater harvesting benefits everyone. If you are in a rural set-up, you are less likely to be connected to a centralized piped-water system and may not have an easily accessible water source. You need the RRWH technology for many reasons. It will provide clean and safe water for all your household needs and farming. It will save you from going long distances to collect water and it will make you less vulnerable to water scarcity during seasons of drought, which are predicted to become more frequent due to climate change.

If your house or institutional building is in an urban set up, chances are that you have a hard roof surface, which generates volumes of rainwater which can be collected in a clean and safe way for all the purposes that you get from piped water. Besides the installation costs, you remain free from recurrent monthly bills if you rely fully in RRWH. Alternatively, you can have RRWH as a standby in case piped water supply is cut off. It gives you flexibility and control in ensuring sustained access to water. If you harvest rainwater from your building in the urban area, you are contributing to the wellbeing and functionality of infrastructure by reducing downstream runoff and chances of flooding and damage to infrastructure.

If your building is a marketing arcade, shopping centre, bank, school hospital etc., you should install RRWH because it will provide you with large volumes of clean water for a variety of uses. One can store the water in an underground tank, which can be below your building or in the parking, to save space.

Hereafter, one can also then pump the water into a raised tank connected to your in-door plumbing system. This will greatly reduce water bills; one can enjoy more flexibility in keeping the premises clean and hygienic and contribute to reduction in runoff and flooding which can ruin the infrastructure on the premises and that of neighbours.

#### **5. Is my roof suitable for RRWH?**

Rainwater can be harvested from hard roof and grass thatch. Hard roof surface has the advantage of enabling fast accumulation and immediate runoff of water into gutters and storage receptors. It also provides relatively clean water and remains functional for a long period. Most guttering and piping fittings on the market are mostly straight, designed for hard roof surfaces. Builders and roofers are also more familiar with designing water harvesting off hard roof surfaces.

However, it is also possible to harvest rainwater from grass thatch although the flow is slower. When thatching is done by putting a polythene sheet on the wooden frames, covered with the first layer of grass, then another polythene sheet covered with the second layer of grass, clean well-sieved water can be collected. Since grass thatching is often on rounded structures, the easiest gutters for water harvesting are those of low gauge plastic, which is easy to bend. These need to be built around the house, supported with clumps at low intervals. Harvested water can be guided through pipes to storage tanks.

Rainwater harvesting is also possible from ordinarily thatched round houses roofed without polythene. However, because such thatch gets degraded over time, the cleanliness of water depends on how well the thatch is maintained. The quality of water harvested is higher when palm leaves are used in thatching.

#### **6. What sort of tank and accessories should I use and where can I get them from?**

There is a variety of tanks of different shapes made from different materials. These vary in terms of cost, aesthetic appearance and durability. Below are some quick facts.

<sup>5</sup> + <sup>6</sup> <https://www.mwe.go.ug/sites/default/files/library/Rain%20Water%20Harvesting%20Handbook.pdf>

**TABLE 1. An overview of the variety of tanks, cost, and characteristics**

Type*	Cost (UGX) 10,000 litres	Durability	User	Supplier
Plastic tank	1,800,000 - 2,573,700	30 years. No rust, but easy to vandalise and difficult to repair	Household and institutions	Crestanks P:0750 748770; Gentex P: 0414 285186 0393 286980; Polyfibre P: 041 4271279; Gentex P: 022 23 70; 0414 286980; 0414 285186; Smileplast P: 0751 890890; Multiple Industries P: 0752 914900; 0752 914900; Poa Tanks P: 0756 122944; 0701 088222
Ferrocement tank	1,932,900	Durable – any cracks should be regularly repaired	Household and institutions	NETWAS Local masons
Corrugated iron tank	1,200,000	Thick gauge lasts longer	Household and institutions	Jua kali (open air artisanal metal fabricators)
Steel - Up to only 7000 l	1,200,000	No rust, no algae, fungi or insect contamination; fire resistant, but easy to vandalise and difficult to repair	Household and institutions	Steel & Tube P: 0706 467965; Green Tanks P: 0772 251877
Interlocking stabilized soil bricks	1,500,000	Durable – any cracks should be regularly repaired	Household and institutions	Technology for Tomorrow (T4T) P: 0772 685053; Nakyenyi Development Association (NADA) P: 0752491457; 0783732029.
EMAS (Escuela Movil de Aguay Saneamiento)	2,000,000	Underground and durable	Households and institutions	Appropriate Technology Centre
Brick masonry (bricks, cement blocks or stones) and reinforced concrete (underground)	6,000,000	Durable. Easy to repair	Household	Masons
Walugendo Model Tanks - Stone masonry rain-water harvesting tanks – up to 500 thousand litres	USD 100 per cubic meter	Large, low cost, made from local material that is not environmentally hazardous; durable	Institutions such as schools, hospitals, shopping centres, housing estates, prisons etc.	Masons; UMURDA Rainwater Harvesting P. O. Box 114 Bugiri. P: 0772604449
Bob Rainwater bag - Up to just 1,500 l	190,000 (for 1,500 litres)	Easily vandalized; difficult to repair	Households	International NGOs
Mortar jars - Up to just 2,000 l	642,000	Crack in dry seasons	Households	Local artisans
Tarpaulin	534,000 (for 15,000 l)	Surface evaporation losses	Households/ farm	Local artisans guided by engineers

Source: Authors' own elaboration (drawing on interviews and consultations)

\*Tanks can be constructed above ground, below ground, or partially below ground. Below ground tanks normally require a pump to extract the water

**TABLE 2. An overview of the accessories, their cost, and characteristics**

Type**	Cost (UGX)	Durability	User	Supplier
Painted metal gutters	30,000	Relatively cheap and long-lasting, but not fashionable, no standard quality	Older buildings and cheaper houses in suburbs and rural areas	Jua kali (open air artisanal metal fabricators)
Plastic gutters	35,000-85,000 (for 101.6 – 203.2 mm size)	Durable and smart, can be purchased in any size, light, easy to repair, widely available, 152 mm size is most suitable for average houses. However, difficult to dispose of.	Households, institutions, and commercial buildings	Gentex enterprises – see above; Polypipes Limited P: 0414 200 952; 0312 340100 /213/211  Multiple industries (weakens and cracks with time under the sun)
Plastic downpipes	40,000 upwards (for 76.2-101.6mm size)	Durable and smart, but disposal of disused parts can be burdensome	Households, institutions, and commercial buildings	Gentex enterprises – see above; Polypipes Limited – see above;
Metal downpipe	UGX 15,000 (for 101.6 mm)	Susceptible to rust if not well painted. Difficult to roll and seal without leakage. Not smart looking. Only sold in standard size leading to a lot of wastage	Rural or low-income households	Steel and Pipe Industries Jua kali (open air artisanal metal fabricators)
Steel pipes	NA	Durable, but heavy, relatively expensive, not widely available on the market	Households, institutions, and commercial buildings	Steel and Pipe Industries Jua kali (open air artisanal metal fabricators)
Corrugated iron pipes	NA	Durable, relatively cheap. Pipes are often large diameter used as culverts for diverting storm flow away from buildings	Large buildings with large quantities of storm flow	Jua kali (open air artisanal metal fabricators) Steel and tube

Source: Authors' own elaboration (drawing on interviews and consultations)

\*\* Prices vary depending on gauge; Thick gauge is more expensive and lasts longer. Standard length should be 20 feet (6.1 metres), but it is often 18 feet (5.5 m) on the market

## 7. What sort of pumps should I use?

There are various types of pumps used to convey water from storage tanks to supply the household pipework, agricultural or other need. Brands on the market include Grundfos, Pedrollo, Myers, Goulds, etc. Some of the suppliers in Kampala are listed below, these fall into two general categories: submersible and surface pumps. Submersible pumps must be submerged and would work best in an underground tank where the water is accessed from 50 meters depth or lower. They cost UGX 800,000 and upwards. Surface (centrifugal) pumps can work on surface and underground tanks. They are also suitable for conveying harvested water for agricultural purposes.

Electrical or motorized pumps can be driven by ordinary household electricity, generators, or solar batteries. They should be mounted in dry, weatherproof locations or housings and installation must be done

by professional persons. You can get more information by inquiring from your supplier, a plumber you trust or a recommendation from someone with an existing installation. There are also manually operated pumps which are often used for livestock.

Small motorized pumps of 0.5 Hp are suitable for household use and cost about UGX 300,000. A household of six may pump twice a week for about 30 minutes to top up a 1000 litre raised tank, and this consumes electricity worth about UGX 3,000 per week. Solar pump units (panel, battery and pump and accessories) cost about UGX 4 million to install. They are supplied by several companies e.g., Davis and Shirtliff, DELUK, Smileplast etc.<sup>7</sup>

<sup>7</sup> Jimmy Ssebaddawa from All Plumbers Association <https://chat.whatsapp.com/Ex7oEiONwGt4PoMmiRWhia>



## 8. Where do I buy the pumps from?

Supplier's Name	Contact	Location	Service Category
Water And Pumps International Limited	039 2177202	Kampala	Solution provider; installation
Prime Power Uganda	0702 847264	Ndeeba	Products provider
Trojan waters LTD	0782 650969	Kampala	Products and solution provider
SprinkTech Ltd	0393 240788	Kampala	Products and solution provider
Water and Energy Solutions	0702 465108	Kampala	Products and solution provider
Weis Engineering Ltd	0393 225452 0759 790556	Kampala	Products and solution provider
Davis and Shirliff International Ltd	0323 346000	Kampala	Products and solution provider

Source: Authors' own elaboration (drawing on interviews and consultations) as well as secondary information from online using keyword search (water pump, suppliers, Uganda, rainwater harvesting).

## 9. What does it take to channel water into a storage tank?

A typical RRWH system consists of a rooftop which acts as a catchment, a conveyance system including gutters and pipes, a storage tank and dispensing unit. For water collection, gutters are constructed around the roof at an angle that allows a gentle flow away from the hard roof into the storage tank so that it can be accessed. Storage tanks are either ready-made or built-in place on the surface, above the ground, underground or partially buried in the ground. A dispensing unit can be a tap, hand or electric pump. Other key accessories are first-flush diverters, hard or concrete ground below the taps and channels to drain off excess water in ways that minimize creating a muddy conditions and soil erosion. RRWH can be done at household, or community level for domestic, agricultural or other uses.

## 10. Won't the tank make my house look ugly and take up space?

There are options for designing RRWH provisions in a chic way. The best way to do this is before construction of a building. Tanks can be built below the house or under the compound. Architects and builders can provide a variety of designs that enable without compromising the strength of the structure. Underground tanks are provided with manholes enabling access for regular inspection and cleaning. Tanks can be fully or partially underground. Above ground storage is usually built at the back of the house and can also be designed to match well with the structure of the house. Architects

can provide a variety of options including installing chic rainwater harvesting to already standing buildings.

## 11. What do I do if my tank fills up and overflows?

You must fix an overflow kit and tank diversion system on your tank. However, this must be done with caution, so that excess storm water does not cause conflict with your neighbours nor find its way into the water ways, which would likely cause erosion or flooding downstream. Spill over water can be guided to a garden bed or grassed area where it can infiltrate back into the soil or to an existing storm drainage system if the area around the tank is paved. Alternatively, excess water can be directed into an extra tank. It can also be directed to a soak pit. However, harvested rainwater volumes are high and may overwhelm your soak pit. This would entail dirty substances from your soak to flood around it for a day or two before it is soaked away.

## 12. What do I gain if I already have piped water supply?

You can make savings from recurrent water bills.

For example: A household of 6 persons pays a water bill of about UGX 60,000 monthly for piped water supply. Installation of a 10,000 litre tank costs UGX 1.8 million per unit of Gentex tank; 200,000 for guttering; 200,000 for stand for pipe support; 250,000 for a water pump and 100,000 for pipework and fixtures.

Total cost of installation including labour and transportation comes to about: UGX 3.2 million. Pumping of water into the raised tank costs about UGX 4,000 monthly. Payback period for this alternative is about 6 years, plus you have full control of your water.<sup>8</sup>

Harvesting rainwater gives you countless other options including more freedom in maintaining cleanliness of your home, irrigation, livestock keeping and creating good relations with communities.

It is good to be prepared with an alternative water source in case of scarcity and rationing due to climate change, rationing and increased tariffs.

If harvested rainwater is used for only washing laundry and flushing toilets, it is likely to save a household nearly 50% of its daily water usage. In the Ugandan tariff system that charges 80% of each unit used for sewerage, the savings can be substantive.

### **13. Can I connect RRWH to my existing house plumbing system?**

Yes. Plumbers can help one to do this through gravity flow or using a manual or motorized pump to convey water to a raised tank connected to your house plumbing system. Robust pumps if well installed can last for many years. A plumber can advise you of the suitable brands on the market. One can also alternate between main piped water and harvested water. The All-Plumbers Association can also be contacted on the following WhatsApp link: <https://chat.whatsapp.com/Ex7oEiONwGt4PoMmiRWhia>.

### **14. How do I ensure good water quality?**

Although it does not necessarily conform to the strict WHO standards (zero occurrence of E. coli), roof-harvested rainwater does not necessarily require further processing to be safe and these provisions help to further improve the quality:

- ▶ Using first flush diverters,
- ▶ Ensuring no light penetration in the water tank to prevent growth of algae

- ▶ Covering the tank with a lid and providing filtration screens to prevent debris, leaves or rodents from entering the tank,
- ▶ Cleaning the water catchment surface and gutters of leaves and other debris (every six months).
- ▶ Treating the water using for example bio-sand filtration, SODIS or UV sterilization.

First Flush Diversion ensures that the first volume of water from each rainstorm, which carries high amounts of impurities such as dust, bird-droppings and debris from the roof surfaces is drained away in a down pipe before it reaches the storage tanks. First flush diversion can be a pipe or a smaller tank that is fixed on the conveyance system just before the storage tank. The size of the diversion system is often about 50-100 litres, but it really depends on the roof area and the degree to which a neighbourhood is prone to dirt. This diversion pipe/tank needs to be actively opened after a rainstorm to release the dirty water or put it to other use such as watering plants, washing cars, floor scrubbing etc.

*Please refer to the Handbook on Rainwater Harvesting (2013) Storage Options for different designs of First Flush Diversion.*

### **15. What if I cannot afford the upfront costs, do I get assistance?**

There are financial service providers including SACCOs, banks and microfinance institutions with provisions for assisting you to access your tank and pay back the cost on favourable terms. One of these is the Katosi Women's Development Trust, which uses a revolving fund method. This Trust installs tanks for households on credit after they have been guaranteed by group members. Beneficiary households then pay back the cost of the tank over a period of three years at a 10% interest rate. Beneficiaries can choose which tank type and size they prefer.

There are other credit institutions including Opportunity Bank, Vision Fund etc. These have a variety of packages to enable households to overcome the high upfront installation cost barriers. Other banks and micro-finance entities can also support one, e.g., FINCA and Housing Finance Bank. These institutions will be able to provide further tailored information.<sup>9</sup>

<sup>9</sup> Information from consultations (February to April 2022) with Katosi WOMens' Development Trust, FINCA, Opportunity Bank, Housing Finance Bank and Vision Fund

<sup>8</sup> Sara Namirembe, personal experience since April 2020

Companies can also partner with tank manufacturers to provide packages (such as grants, subsidized loans, revolving funds, zero interest loans etc.) that help households overcome the upfront costs. The Alliance for Rooftop Rainwater Harvesting for Climate Change Adaptation is working on building such partnerships. If you are in an organized group or association, you can work with your leaders and artists to crowd-source through activities like the charity runs, walks, car washing etc.

The Appropriate Technology Centre is working with the Ministry of Water and Environment (MWE) on a costed and inclusive rainwater harvesting strategy.<sup>10</sup>

## **16. Would RRWH work for institutions or is it only for households?**

Rainwater harvesting can supply water for institutions such as schools, hospitals, local government offices, shopping centres, market structures and prisons. Institutions often have multiple buildings in proximity to each other, adding up to a large total surface area of hard rooftop with potential to collect large volumes of rainwater. Rainwater can be channelled through gutters and pipes from adjacent buildings into a collective large volume-storage preferably underground (to save space). The water can be pumped to a raised pump to supply standpipes and indoor plumbing system. Stone tanks with capacity of up to 500,000 litres can be built for such set-ups. Contact Walugendo Model Tanks, UMURDA (see Table 1).

## **17. Is rooftop rainwater harvesting only feasible for new buildings?**

Both new and old buildings can be fitted with RRWH facilities. The advantage for new buildings is that RRWH can be built into plans and structured in such a way as to exploit maximum gain from it at low cost and with less compromising of space and beauty of the layout.

## **18. What are the rules governing my collection and use of RRWH?**

Rainwater harvesting falls under the self-supply policy framework, which seeks to foster households to invest in incremental improvement of their water sources. You have the right and liberty to access water using your own resources. You only require technical advice to ensure

that you establish and operate your installations appropriately to ensure access to adequate and safe water.

## **19. What can I use the harvested water for?**

Some of the different uses are:

- Harvested water can be used for drinking, cooking, washing, irrigation, and livestock
- Collected rainwater can be used for domestic use such as washing utensils, bathing, flushing toilets, laundering clothes, washing cars, and also drinking.
- It can also be used for agricultural purposes such as irrigating crops, livestock, landscapes, gardens, and extendedly aquaculture.
- It can be used for industrial purposes such as manufacturing processes, fire suppression, cooling systems, building construction
- It can be used for commercial purposes, whereby it is sold, and money collected could boost household finances.

## **20. Will the stored water harbour mosquitoes and other health hazards?**

Not if you cover the top of the storage tank with a lid and ensure good water quality as described under question 14.

## **21. Where can I get advice on rooftop rainwater harvesting from?**

Water officers at local government offices are a potential source of advice. There are various other advisory service providers with the technical skills including certified technicians from various vocation training institutes, rural groups (often women and youth) trained by NGOs and people working with private companies that supply equipment for RRWH. The challenge is that these people are seldom formalized with a clear physical or virtual address that is readily available. Often the quickest way to get them is through word-of-mouth recommendation from those that have installed RRWH technology. In Kampala, a team of plumbers have registered an organisation called All Plumbers' Association with WhatsApp link <https://chat.whatsapp.com/Ex7oEiONwGt4PoMmiRWhia>

# Concluding Remarks

To sum up, the catalogue comprises of twenty-one frequently asked questions on rooftop rainwater harvesting technology aimed at the end-user stakeholder group. This catalogue is expected to address information barriers faced by potential users of the RRWH technology.

As highlighted previously, this FAQ catalogue is a supplementary output to the Handbook on Rainwater Harvesting Storage Options developed by the Ministry of Water and Environment in Uganda in 2013.<sup>11</sup>

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<sup>11</sup> <https://www.mwe.go.ug/sites/default/files/library/Rain%20Water%20Harvesting%20Handbook.pdf>

Part of the information highlighted in the catalogue was also used to develop a short video, which was broadcasted on Uganda Broadcasting Corporation and their You-tube channel ([https://youtu.be/z\\_n6etqUu\\_Y](https://youtu.be/z_n6etqUu_Y)). The electronic version of the catalogue and the short video will be disseminated through online networks of the Alliance for Rooftop

Rainwater Harvesting members and popularised in their future engagements' country-wide in Uganda. Conversations are on-going seeking to have it on websites of relevant government ministries including Water and Environment, Local Government, Housing and Urban Development, etc. This will also be disseminated through international forums and engagements, as this will potentially have a resonance across developing countries.

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