

## TECHNOLOGY DESCRIPTION

### TECHNICAL DESCRIPTION

Rooftop rain water harvesting (RRWH) involves collecting of rain water and storing it for future use. 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. Storage tanks are either ready-made or built in place on the surface, above the ground, underground or partially buried in the ground. They can be made of plastic, stabilized soil bricks, mortar, poly fibre, tarpaulin or corrugated iron and they vary in size. A dispensing unit can be a tap, hand or electric pump. RRWH can be done at household, or community level for domestic, agricultural or other uses. Rooftop rain water harvesting is an easily replicable technology that can increase year-round access to clean, safe water for human consumption and agricultural needs and reduce vulnerability to water scarcity.

### CURRENT TECHNOLOGY READINESS

The technology Readiness Level for RRWH in Uganda is between 5 (technology validated in relevant environment) and 6 (technology demonstrated in relevant environment). Out of the wide range of options available for customizing RRWH to suit a variety of housing and utilization designs, majority of the population is exposed to only a few. Although several government documents (e.g., Ministerial Policy Statement for Ministry of Water and Environment (2020), Sector Development Plan (2015-2020), Agricultural Sector Development Plan (2015-2020), reflect intentions of promoting rainwater harvesting, it is not clear to what extent these target RRWH. The most current Water Sector Performance Report estimates that there are only 20,320 RRWH storage facilities of > 6000 litres

capacity countrywide, and these are serving about 122,000 people (about 0.25% of the total population). Because deployment of RRWH is household-focused with low prospects of generating revenue, it is costly and has received lower priority for public investment compared to other community-focused options. Nonetheless, despite the national target of reaching 100% of the population with access to an improved water source (availability of 20 litres/person/day within at least 1.5 km radius) by 2030, currently about 7.4 million people have not been reached and remain vulnerable to severe seasonal scarcities due to climate change. Another 13.6 million with “limited” access (it takes > 30 minutes to retrieve safe water) also remain vulnerable. Given the country’s average rainfall of 1180 mm/year and with 70% of houses having hard roof surfaces and predicted to expand with the increasing urbanization, there is an excellent opportunity to boost water access using RRWH technology.

### CLIMATE RATIONALE OF THE TECHNOLOGY

Uganda urgently needs RRWH technology to reduce the vulnerability of households to predicted severe impacts of climate change where rainfall seasonality will be erratic, with frequent occurrences of wetter wet seasons, and hotter and drier dry seasons. Wide adoption of RRWH is critical as it will not only enable households to store clean and safe water in wet periods for use in periods of scarcity, but will save women and children from drudgery and avert environmental challenges related to large volumes of runoff such as soil erosion, floods and landslides.

### AMBITION OF THE TECHNOLOGY

#### SCALE FOR IMPLEMENTATION AND TIME-LINE

Establish 200,000 rainwater harvesting tanks of about 10 m<sup>3</sup> to serve 1,151,222 persons in up to 40 districts by 2030 (1 tank of 10 m<sup>3</sup> serves a household of 6 persons/y).

#### AMBITION FOR TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

The ambition is to achieve Technology Readiness Level 9 by 2030 where a wide range of the available options for customizing RRWH to different contexts has been demonstrated and manufacturing and deployment has been accelerated.

### EXPECTED IMPACTS OF THE TECHNOLOGY

- Increased deployment of RRWH holds great potential for increasing access to safe water, sanitation and hygiene (WASH) for households, hospitals and other institutions and reducing vulnerabilities to disease spread (Ebola, Corona Virus Diseases 2019 (COVID 19), cholera dysentery etc.). For example, the government of Ghana is currently investing in deployment for water tanks as a measure for controlling the spread of COVID 19.
- Although initial installation costs of RRWH can be prohibitive for households and publicly driven programs, it has low operation and maintenance costs which ensures long-term functionality and this has great potential in contributing to water needs of the 7.4 million people that do not have access to clean water source and 13.6 million who have limited access.
- Rooftop rainwater harvesting will potentially relieve households not yet reached with

infrastructure for an improved water source, especially women and children from difficulty in supplying water for domestic use including walking long distances (up to 5 km e.g., Isingiro), time (up to 6 hours e.g. during the dry season), labor (exacerbated by steep and slippery paths) and risks to their health and safety. It will potentially free up time for girls to go to school and women to engage in gainful activities

- The RRWH technology provides an affordable additional water source which households and institutions can use for diversification of enterprises such agricultural irrigation and livestock, fish farming and direct selling of water.
- Access to RRWH will potentially reduce the recurrent costs households and institutions have to incur in paying bills for piped water services.
- Increased adoption of RRWH potentially reduces the volume of runoff water, which can destroy paved infrastructure, cause soil erosion and flooding
- Enabling communities in scattered settlements without access to a clean shared water source to access clean and safe water for household and agricultural needs.

### POLICY ACTIONS FOR TECHNOLOGY IMPLEMENTATION

#### EXISTING POLICIES IN RELATION TO THE TECHNOLOGY

Rooftop water harvesting falls under the Directorate of Water Development under the Ministry of Water and Environment. Various policies make reference to water harvesting but not specifically to rooftop rainwater harvesting.

- National Water Policy 1999: Promoting appropriate water harvesting technologies for irrigation and livestock development.
- Handbook on Rainwater Harvesting Storage Options: Has strong emphasis on RRWH
- National Agriculture Policy 2013: Seeks to... Develop capacity to harvest and utilize rain water for agricultural production.
- National Climate Change Policy 2015: Seeks to... Promote and encourage water harvesting and efficient water utilization among individuals, households, institutions and sectors.
- National Irrigation Policy 2017: Aims to... Promote development of rainwater harvesting including runoff, flood management and water smart agriculture.
- National Land-Use Policy 2006; Promote rainwater harvesting and strengthen existing education and extension programs on water harvesting techniques and practices.
- National Adaptation Plan for Agriculture 2018: Support traditional and improved/modern rainwater harvesting techniques and on farm water storage facilities for storing harvested rainwater, during periods of water scarcity, for farming activities
- Water Sector Strategic Investment Plan 2018: New investment focuses on shallow wells, boreholes, and rainwater harvesting tanks.

Transport (MWT) for embedding RRWH in designs of housing and works infrastructure. Legislativ a requirement for structures to have RRWH provision.

- In rural settings, strengthen coordination between MWE and Ministry of Agriculture Animal Industry and Fisheries (MAAIF), and Non-Government Organizations for RRWH deployment for agricultural production. Standardize technical specifications and messaging for RRWH. Design options for inclusivity of not just large households, but those that are small, youth-headed and lacking ownership of houses and lands they live in.

b) Develop a catalogue or database of information on RRWH technology

- Develop catalogue with details that enable potential consumers to demand for RRWH.
- Popularize the catalogue and existing RRWH Handbook.

c) Enable functional private sector engagement in RRWH

- Design incentives for private engagements in RRWH e.g., reduce tax on finished RRWH storage tanks and accessories, provide subsidies for products and regulations that make financial services more accessible for the poor.
- Strengthen the capacity of small and medium enterprises to supply equipment and services for RRWH.

PROPOSED POLICIES AND MEASURES TO  
ENHANCE TECHNOLOGY IMPLEMENTATION

a) Strengthen coordination for implementation of RRWH

- In urban settings, build coordination between Ministry of Water and Environment (MWE), Ministry of Lands, Housing and Urban Development (MLHUD), and Ministry of Works and



THE REPUBLIC OF UGANDA

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## ACCELERATE ROOFTOP RAINWATER HARVESTING FOR CLIMATE-CHANGE ADAPTATION



### COSTS RELATED TO THE IMPLEMENTATION OF POLICIES

To realise the ambition of deploying RRWH to by 2030, the total investment needed is US dollars 1,504,700

### CONTACT DETAILS

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### LINKS TO TNA REPORTS

<https://tech-action.unepdtu.org/country/uganda/>