



CSIR-WATER RESEARCH INSTITUTE & CSIR-SCIENCE AND TECHNOLOGY POLICY RESEARCH INSTITUTE

WATER WITHIN YOUR REACH!!! – ROOF RAINWATER HARVESTING IN GHANA.

Taking control of your water supply needs

In Ghana, it is the norm rather than the exception that households, public institutions and schools in rural, peri-urban and many urban areas have inadequate access to water for hygiene and other purposes. This is as a result of over reliance on the stressed Ghana Water Company Ltd (GWCL) for water supply. The difficulties that the GWCL faces has meant poor water supplies resulting in households and public institutions spending colossal amounts of money on other sources of water supply such as water tanker services often for water of uncertain quality. Roof rainwater harvesting (RWH), which is recognised as an improved water source by the WHO/UNICEF Joint Monitoring Program on the MDGs on Water and Sanitation, can come to the rescue. With a proper RWH system households and public institutions can have water within their reach!

Roof rainwater harvesting (RWH) is the capturing of rainfall from roof surfaces and storing the collected water for use in households, schools and other private and public institutions. RWH systems can be constructed in a multitude of ways. In collaboration with SINTEF Technology of Norway and funded by the Nordic Climate Facility (NCF) of the Nordic Development Fund (NDF) implemented through NEFCO, the CSIR-WRI and CSIR-STEPRI have developed standardized RWH systems to provide water of good quality after days, weeks and months of storage required between rains and to be environmentally, economically and socially sustainable over time. The technology has been designed based on standardized criteria that offer affordable, appropriate, and cost-effective RWH solutions, including water filtration and disinfection, for safe urban, peri-urban and rural water supply.

Under the project “Rainwater harvesting for resilience to impacts of climate change on water resources in Ghana” and dubbed “Water Within Your Reach!!!” a pilot implementation of the standardized designs is being undertaken in 20 households and 2 institutions in the Greater Accra Metropolitan Area (GAMA). These installations will be monitored for functionality of the various components forming the complete systems and for the quality of harvested water at various abstraction points outside and within the buildings. In addition, a core of artisans

is under training to acquire the necessary skills to undertake installations of the standardized systems successfully and to form viable businesses in RWH systems. These training sessions are facilitated by CSIR-STEPRI. So far six training sessions have been organised on topics such as, Business opportunity identification, business registration, records keeping, budgeting, cash flow clustering to create market for RWH. Already 10 household systems have been completely installed and are being monitored. Installation of the 2 institutional and the remaining 10 house systems are scheduled for completion by the end of September 2014, to be ready for the minor season rainfall before the project comes to an end at the end of January 2015.

How the technology works

RWH systems consist of various components that collect, clean, convey, store, disinfect and distribute rainwater in a house or building. The water is collected from suitable roofs and transported through suitable rain gutters attached to the roof. The water is then cleaned by removal of leaves and other debris through the use of rain heads and diversion of part of the collected water through a first flush system to discard the dirty water from the first rains. The clean water is then conveyed to storage tanks through downpipes and other piping system and distributed in buildings through the use of pumps, overhead tanks and plumbing networks. Before distribution, however, the water can be further cleaned through filtration to remove suspended particles. The water can also be disinfected to render it potable. The size of the storage tank depends on how much rainwater can be collected from a given roof and the consumption rate and pattern of users.

The standardized RWH systems that have been developed at the CSIR are implemented in 3 main categories – the Basic, Intermediate and Advanced systems. The Basic system is a low cost one with no filtration, distribution and disinfection components. Water from such system is accessed by abstracting manually and directly from the storage tank. The Intermediate system has both filtration and distribution components, including an electric pump and overhead tank, but has no disinfection. The advanced system is a high end system in terms of both system cost and features. It has all the functions of the intermediate system but as an addition uses a UV disinfection component so potable water can be obtained. All systems are fitted with rain heads and automatic first flush diverters. The standardized systems can be modified by adding extra components as required.

Market Potential

- The systems have been designed to use components available in the Ghanaian market.
- They are cost effective, affordable and environmentally friendly
- They are suitable for areas with unreliable or no water supply from the utility company
- They can supply up to 80% of the annual water requirements of a household, depending on the roof catchment size, the size of the household and the consumption rate and pattern.

- The expertise to undertake good quality installations, including trained artisans with registered businesses, is available in the country
- RWH is an appropriate and recommended adaption technology at the household level for the impacts of climate change on water resources of the country.
- RWH is currently being actively promoted by government through the Ministry of Water Resources, Works and Housing. The ministry has already developed a RWH strategy for the country.
- RWH is currently being undertaken in various forms in some households, schools and public buildings nationwide though many of these need improvements in the quality of the system components used.
- Technical support for the assessment, installation and monitoring of the standardized systems is readily available at the CSIR-WRI

Dissemination Strategies and Diffusion

Diffusion of the technology is undertaken directly through seminars, workshops and field demonstrations with a wide variety of stakeholders including:

- Real Estate developers such as GREDA
- The Ghana Institution of Architects
- Private small scale finance institutions such as MASLOC
- Ghana Water Company Ltd (GWCL) and Community Water and Sanitation Agency (CWSA)
- Selected households within GAMA
- Selected mushroom and other vegetable farmers within GAMA
- Selected schools within GAMA
- System component suppliers
- The Ministry of Education, Ministry of Environment, Science, Technology and Innovation and the Ministry of Water Resources, Works and Housing.
- Water Resources Commission
- The print and broadcast media.

End-Users of the Technology

- Individual households
- Communities
- Schools, including community day schools
- Small scale mushroom and other vegetable farmers
- Public and private institutions such as ministries, clinics, offices

Challenges and Opportunities

The main challenge is the relatively high initial or installation cost. Though the installed standardized systems have been found to perform very well with users saving considerably from costs of water tanker services, the initial installation costs are high with respect to

monthly incomes of the average civil servant. The opportunity thus exists for the private sector to be involved in the diffusion of the technology through the provision of affordable loan facilities (such as the Green Loans of ProCredit) to potential beneficiaries of the technology.

Another challenge is the lack of awareness of RWH as a very good source of water to at least supplement other sources. Public education on this will, therefore, be necessary with the media playing a big role.

In addition, if RWH systems are installed at ALL the CSIR institutes for demonstration purposes it will go a long way to popularizing the technology.



Contacts: Mr. Roland Asare, Project Co-ordinator at CSIR-STEPRI

rnyasare@yahoo.com

Dr. Barnabas Amisigo, Project Co-ordinator at CSIR-WRI

barnyy2002@yahoo.co.uk

Dr. Kankam-Yeboah, Head SWD, CSIR-WRI

kyeb59@yahoo.com

