

Issue 101 | May 17, 2013 | Focus on Rainwater Harvesting

This issue contains 2012 and 2013 studies and resources and updates the December 2011 WASHplus Weekly on RWH. Some studies cover the conservation, health, and economic impacts of RWH and others discuss RWH in urban areas and as a component of multiple-use water services. Also included is a new CAWST website that has a collection of training materials on RWH as well as information on other water and sanitation topics.

Future issues of the *Weekly* will focus on menstrual hygiene management, innovation, water point mapping, mobile applications and we welcome your contributions to these topics and suggestions for other topics that would be useful to you.

COMMUNITY ACCEPTANCE

- **Complementing Water Supply through Rainwater Harvesting in Some Selected Villages of Sahel Savannah Ecological Zone in Borno State Northeastern Nigeria.** *Jnl Water Res Protec, Feb 2013.* Hassan Tsenbeya Ishaku. ([Full text](#))

One of the greatest environmental challenges that confront rural communities in Nigeria especially in Borno state is scarcity of water supply. RWH can reduce over-dependence on centralized piped water supply and checkmate climate change. This study in two rural communities determined the water per capita use, examined water sources, and then estimated the amount of rainwater that can be harvested by households in these villages. Although over 80 percent of households are aware of rainwater harvesting practices, only 2 percent harvest rainwater due to the seasonality of rainfall coupled with inadequate water storage facilities.

- **The Extended Participation of Low-income Women in a Rainwater Harvesting Program in Brazil, 2012.** A Moraes. ([Full text](#))

This paper presents a qualitative case study of women's participation in RWH as an illustration of the achievement of gender equity and women's empowerment in water development. Women not only derived significant material benefits from the program, such as access to water, more time, and better health for their families, they also acquired economic and political opportunities (as cistern builders and as members of

municipal water commissions), roles traditionally reserved for men.

ECONOMIC ASPECTS

- **Application of Contingent Valuation Method (CVM) in Determining Demand for Improved Rainwater in Coastal Savanna Region of Ghana, West Africa, 2013.** A Amoah. ([Full text](#))

The study found that about 93.2 percent of respondents are willing to pay GH 0.025 daily for a 34 cm container of clean rainwater, and this amount was observed to be influenced by some socio-economic factors. Government involvement is therefore recommended in the provision of modern rainwater harvesting facilities because of the incidence of poverty within the coastal savanna areas of Ghana. It is also recommended that more education on the modern method of harvesting rainwater should precede the application of any rainwater harvesting strategy in Ghana.

- **Potential of Rainwater Harvesting Implementation in Malaysia from Multiple Economic Impacts Measures, 2012.** N Rais. ([Full text](#))

RWH is a promising, but challenging approach to minimize the use of treated water and help mitigate the water deficit. However, due to limited knowledge and promotion of RWH, the practice is unpopular in Malaysia despite the high total rainfall. This paper identifies the importance of RWH systems in sustainable development and their potential benefits for new development. The significance of RWH on environmental and economic impacts is also discussed.

EDUCATION/TRAINING/REFERENCE RESOURCES

- **CAWST WASH Education and Training Resources.** ([Home page](#) | [Rainwater harvesting](#))

In an effort to provide practicable and accessible WASH education and training resources to implementers, CAWST—the Centre for Affordable Water and Sanitation Technology—has launched a new website with resources in English, French, and Spanish. These resources have been used to educate and train over 1.5 million people worldwide. Key topics covered include: community education and water quality and household water treatment.

- **WASHplus Weekly: Focus on Rainwater Harvesting, Dec 2011.** ([Link](#))

This issue contains studies and guidelines on RWH as a source of drinking water and for other domestic uses. Included are RWH fact sheets, studies on the economic and health impacts of RWH, and country reports.

HEALTH ASPECTS

- **Acceptance and Use of Eight Arsenic-Safe Drinking Water Options in Bangladesh.** *PLoS ONE*, Jan 2013. J Inauen. ([Full text](#))

Rainwater harvesting has only a medium level of acceptance. Although users and

nonusers both think that RWH is not time-consuming, this option scores particularly low in terms of normative factors. People do not perceive many others to be using this option. Therein may lay the reason why rainwater is collected by only a few households. A possible intervention to enhance social norms could convince well-known persons to praise this option.

- **Consumption of Rainwater and Diarrheal Disease in Children Under Five in the Dominican Republic from 2002 to 2007**, 2012. A Mpogui. ([Full text](#))

This study concluded that consuming rainwater presents a decreased risk for diarrheal disease compared to all other sources (excluding bottled water). These results are consistent with existing studies that have attempted to quantify the health risks of rainwater consumption, which also found no increased risks associated with its consumption though the designs are vastly different. More studies are needed to add evidence to the existing literature regarding health risks associated with rainwater consumption.

- **Field Trial on a Novel Control Method for the Dengue Vector, *Aedes Aegypti* by the Systematic Use of OlysetW Net and Pyriproxyfen in Southern Vietnam.** *Parasites & Vectors*, 6(6) 2013. [Tsunoda](#). ([Full text](#))

In the trial area, OlysetW Net lids were used to cover five major types of water/rainwater containers (ceramic jars, cylindrical concrete tanks, other concrete tanks, plastic drums, and plastic buckets), while pyriproxyfen was used to treat flower vases and ant traps. The study showed that the treatment with OlysetW Net and pyriproxyfen had a strong negative effect on the prevalence of immature *Ae. aegypti*, which persisted for at least five months after treatment.

- **Rainwater and Health in Developing Countries: A Case Study on Uganda**, 2012. D Baguma. ([Blog post](#))

The authors state that that improved capacity building in water management at the household level should supplement efforts focused on water supply and quality. Emphasis on usage instructions, including information on waterborne diseases and the persistent promotion of active local water associations can partly improve domestic water management.

- **Risk of Gastrointestinal Illness Associated with the Consumption of Rainwater: A Systematic Review.** *Env Sci Tech*, Mar 2012. J Dean. ([Abstract](#))

The collection of rainwater for human consumption is a practice well established in many parts of the world. Much of the research to date regarding this inexpensive and sustainable source has focused on its microbiological or chemical quality, and there have been no reviews of epidemiological evidence regarding actual health risks associated with rainwater consumption. The evidence suggests that rainwater is safer than water from unimproved water supplies. Where feasible, RWH should be encouraged as a step toward achieving millennium development targets.

- **Water Quality and Health Strategy 2013–2020**, 2013. World Health Organization. ([Full text](#))

The quality of water, whether used for drinking, domestic purposes, food production, or recreational purposes has an important impact on health. Water of poor quality can cause disease outbreaks and it can contribute to background rates of disease manifesting themselves on different time scales. Initiatives to manage the safety of water do not only support public health, but often promote socioeconomic development and well-being as well. This document sets out the strategy adopted by the World Health Organization to manage water quality with a view to protecting and promoting human health.

MULTIPLE-USE WATER SERVICES

- **The Role of Productive Water Use in Women’s Livelihoods: Evidence from Rural Senegal.** *Water Alternatives*, 5(3) 2012. E van Houweling. ([Full text](#))

This research focuses on the significance of productive water use in the livelihood diversification strategies of rural women. In Senegal, we find that access to water for productive purposes is a critical asset for expanding and diversifying rural livelihoods. The time savings associated with small piped systems and the increased water available allowed women to enhance existing activities and initiate new enterprises. Women’s livelihoods were found to depend on productive use activities, namely livestock-raising and gardening, and it is estimated that one half of women’s incomes is linked to productive water use.

- **Using Community Interviews to Study Desirable Water Projects: A Case Study in the Koshi Basin Region of Nepal**, n.d. A Skodyn. ([Full text](#))

Villagers in the mountainous regions of the Koshi Basin in Nepal face continual challenges due to too much water in some months, and far too little water in other months. To find out what water-related projects would be most desired in these villages, community interviews were held in five villages located at different elevations in the Koshi Basin. Next, a grounded theory method and a sustainable livelihoods framework were used to analyze the community interview transcripts to answer the research question: “What is water unavailable for in these villages, and which water-related solutions would the villagers value the most?”

- **Voices from the Source: Struggles with Local Water Security in Ethiopia**, 2013. M Dessalegn, Overseas Development Institute. ([Full text](#))

This study initially focused on access to water supply (for domestic and productive uses). However, the impact of high rainfall variability on both agricultural and livestock production emerged as the most important dimension of water insecurity for most communities. People respond to this pressure, where they can, by diversifying livelihoods or migrating to more promising areas. Both of these responses may be temporary or permanent, and may be either a planned accumulation strategy or a survival response.

URBAN AREAS

- **Design and Construction of Rainwater Harvesting System for Domestic Water Supply in Ibadan, Nigeria**, 2012. O Shittu. ([Full text](#))

Roofwater Harvesting provides an innovative solution to inadequate water supply. In this study, a complete RWH system was designed and constructed for a household where a public water system was nonexistent. The RWH system was incorporated into the existing shallow well water system. Safety measures were taken to ensure that the harvested rainwater was of good quality. The study revealed that RWH is a cheap and viable water supply option in both urban and rural areas for domestic, industrial, and agricultural purposes.

- **Future Proofing Cities: Risks and Opportunities for Inclusive Urban Growth in Developing Countries**, 2012. Department for International Development. ([Full text](#))

This document outlines a five-stage future proofing approach to help cities develop programs of investment that build on the institutional capacity they have available. One example is RWH, which is being used successfully in Bangalore and other cities that are particularly vulnerable to environmental risks.

- **On-Site Rainwater Harvesting to Achieve Household Water Security Among Rural and Peri-Urban Communities in Jordan**. *Resources, Conservation and Recycling, Apr 2013*. A Assayed. ([Abstract, author email](#))

This project was designed to build the capacity of local community-based organizations to raise the awareness level around water demand management and engage community members in water management measures. It showed how local solutions decrease the reliance on public water systems and ultimately help in facing the water shortage on a national level. RWH at the household level was able to save an average of 24 percent in potable water per year.

WATER CONSERVATION

- **A New Methodology for Evaluating Potential for Potable Water Savings (PPWS) by Using Rainwater Harvesting at the Urban Level: The Case of the Municipality of Colombes (Paris Region)**. *Water, 5(1) 2013*. A Belmeziti. ([Full text](#))

The practice of RWH is spreading rapidly in urban areas. This article studies the impact of a possible generalization of this practice for municipalities by proposing a new method to quantify the potential for potable water savings (PPWS) by using RWH at the urban level. In the case of the municipality of Colombes (located in the suburbs of Paris), the method shows that the PPWS by using RWH represents about 10 percent of the total potable water consumption: the residential buildings account for 64 percent of this potential. This method can be applied to other municipalities with a level of acceptable reliability.

- **Potential for Potable Water Savings by Using Rainwater: A Case Study of Ibadan, Nigeria.** *International Journal of Advancements in Research & Technology*, April 2013. O Lase. ([Full text](#))

An average roof size of 150 m² in Ibadan City will collect 182,250 liters/year (99.86 liters/head/day) of water for a family of five, which is above the average daily water demand. The capacity of a storage tank (182,250 litres) required for an all-purpose water supply system based on RWH is quite large; however, the size can be reduced to something more practicable if water is collected and stored for cooking and drinking only, while nonpotable uses are supplemented with water from other sources. This study clearly shows that Ibadan City has good potable water-saving potential using rainwater.

Each WASHplus Weekly highlights topics such as Urban WASH, Indoor Air Pollution, Innovation, Household Water Treatment and Storage, Hand Washing, Integration, and more. If you would like to feature your organization's materials in upcoming issues, please send them to Dan Campbell, WASHplus knowledge resources specialist, at dacampbell@fhi360.org.



About WASHplus - WASHplus, a five-year project funded through USAID's Bureau for Global Health, creates supportive environments for healthy households and communities by delivering high-impact interventions in water, sanitation, hygiene (WASH) and indoor air pollution (IAP). WASHplus uses proven, at-scale interventions to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under five years of age globally. For information, visit www.washplus.org or email: contact@washplus.org.

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