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THE FUTURE OF WATER, SANITATION AND HYGIENE:
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Promoting rainwater harvesting through the private sector

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In developing countries around the world hundreds of thousands of households collect rainwater in pots, pans, buckets, basins, whatever containers that are handy when it rains. However, moving from this opportunistic collection of water from the drip edge of their roofs to obtaining a substantial portion of their domestic needs from rainwater harvesting has proven to be problematic. The vast majority of rainwater harvesting projects in developing countries are based on subsidies for the hardware, tanks, gutters and downpipes. For the past several years Relief International-EnterpriseWorks/VITA has been looking at ways to promote rainwater harvesting through the private sector without subsidy. It is evident that this requires looking at the problem from a business perspective rather than from a donor perspective. This paper discusses the progress of a commercial pilot project in Uganda and the development and marketing of a low cost, easily transportable rainwater storage product for rural households.

Introduction

The goal of the current pilot project in Uganda is to demonstrate that there is a large market for a low cost rainwater storage product and that private sector channels are appropriate for getting it into households in a sustainable way. A successful private sector approach depends on having the right product at the right price. Market research through surveys with rainwater professionals and rainwater harvesting projects from around the world found that the major impediment to large scale uptake of domestic rainwater harvesting by poor households was the cost of storage (EWV, 2009). It became clear that until a much lower cost storage product was available, there was little chance for a commercial success.

If the problem was well known, then why has it been so hard to find a solution? First of all there are only a limited number of people who concentrate on solving problems that affect the bottom of the pyramid. Secondly development professionals view problems differently from businesses and therefore come up with solutions that while technically sound, may not be economically viable. A development professional may look at a rural household and calculate their water needs and the length of the dry season to determine the necessary storage capacity to provide the family with water throughout the year. A business looks to provide a client with an affordable product that will be marketable because it provides a significant improvement over their current situation, even if it does not meet all of their needs.

Historically development has been a step-wise process and in the last 10 years this has been widely acknowledged through concepts like: the development ladder and the sanitation ladder. This project was designed to move households up the rungs of the "rainwater ladder" starting from opportunistic collection in a few pots and pans to providing a substantial portion of their domestic supply. The project built upon lessons learned in the Thai Jar Programme (EWV, 2009), where incremental improvement in service was obtained through incremental investments. Rainwater harvesting programs from around the world reported that once people experience the convenience of having clean rainwater at home that they want more of it and they are willing to invest in more storage. We need to get people on the ladder with an affordable solution.

Product development

After searching the literature and conducting 20 desk studies (EWV, 2009) and 5 field studies (EWV, 2009) it was clear that a lower cost storage product for rainwater was needed. Rees presents some examples from Uganda of the considerable work on low cost storage for rainwater in East Africa (Rees, 2005). Perhaps the best value in terms of cost/litre of storage and durability is the 90 m3 below ground hemispherical tank (Nissen-Petersen, 2007) While some of these solutions work, a scaleable commercially viable product has remained elusive. Current storage costs in Africa remain high. For storage volumes less than 5,000 liters the studies found costs ranging from USD 75 to 225 per cubic meter of storage volume. The 20-liter plastic jerry can falls in this range at USD 95-120 dollars per cubic meter. This is simply too expensive for poor rural households to adopt rainwater harvesting on a large scale. The ideal product would be low cost, easy to transport, suitable for a wide variety of conditions, durable, user friendly and able to maintain water quality over time. It became clear in the early stages of product development that reconciling product features and price was going to be a challenge.

In October 2008 Relief International-EnterpriseWorks/VITA (RI-EWV) commissioned Innocentive (www.innocentive.com) to run an internet based contest to find a rainwater storage system that could be installed in a developing country in Africa and Asia for less than $20 for a 500-liter capacity without subsidy. The rules stipulated that all material, labor and transport costs must be covered in the cost of the storage system. Site preparation could be an additional cost if it only requires unskilled labor and free materials that the homeowner could provide. When the contest was announced it was received with a lot of scepticism, many felt that the bar was set too high. However, the response to the contest was impressive; over 1000 solvers read the challenge, almost 200 solutions from 15 countries were received. The winner suggested using a Flexible Intermediate Bulk Container (FIBC) or Jumbo Bag as the storage container. These are tough woven polypropylene bags used for the bulk transport of granular materials with a capacity of a tonne or more, but they are not used for transporting or storing liquids. A new use for an existing product; it would require modification but its features including ease of transport and compact size and price were right.

Figure 1. Focus group evaluation of product concept

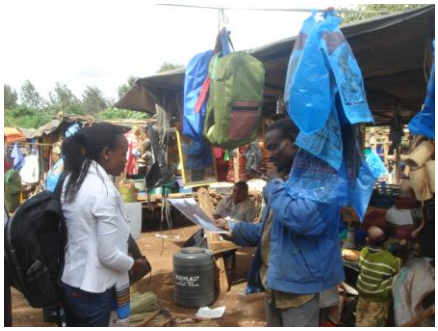

Figure 2. Feedback from merchants on product idea

Over the next 18 months the idea was modified and improved with the help of our potential clients. Focus groups evaluated the product acceptability and defined the features that customers considered essential. Field testing at the household level provided additional input into the design. Some of the modifications based on consumer feedback are given in Table 1 below. It is critical to understand what clients are currently purchasing and the factors that influence their decisions. For a commercial approach if we do not have the right product at the right price we are not going anywhere. It does not matter if we think that the product meets the client's needs, they need to agree with us, and they show their agreement when they purchase the product.

The rainwater bag will be test marketed in Uganda in 2011. It is a 1400-litre, circular polypropylene bag with a polyethylene liner and an outlet tap. It will retail for about USD 50. It provides seven times the storage volume of a 200-litre polyethylene drum and will cost about twice as much. Our clients feel that this is a good value proposition. Challenges in product design still remain, especially with the liner and outlet. While technical solutions exist for these problems, cost effective solutions are more difficult to find. For

example a multi-layer liner, similar to those used for wine-in-a-box, could double the cost of the product, pushing it out of reach of the target clients.

Table 1. Customer input into product development

Features	Initial Design	Customer Desires
Colour	White, standard colour for industrial FIBC	Brown, so that it will not show the dirt that will splash when it rains
Outlet	Siphon, cheapest solution that does not compromise the integrity of the bag	Water tap so that it is like having piped water. Difficult to do while maintaining low cost.
Support	On the ground	Raised platform made from local building materials at a height so that a bucket can be placed under the tap
Locking Tap	Not considered necessary	Optional feature using local design
Shape of base	Square, shape of standard FIBC	Round, more pleasing aesthetically and would fit neatly into the round base

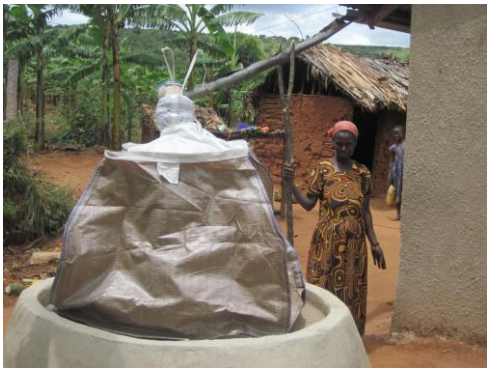

Figure 3. Rainwater Bag installed in Uganda

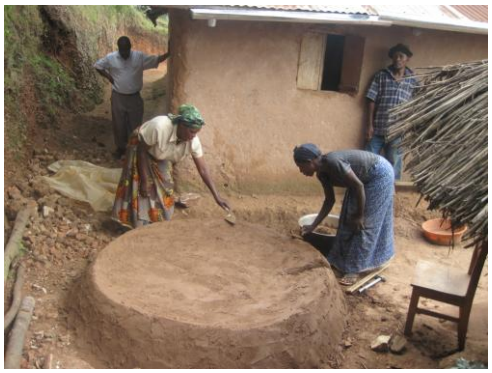

Figure 4. Women building base using local materials

The rainwater bag provides a low cost, easily transportable solution that can be placed on simple base and protected from sunlight and physical damage by building a protective wall using locally available materials. However, compare to a ferrocement tank it is certainly less durable and at a greater risk for theft.

Product sales and marketing

The product launch will begin in January 2011 in three districts in Uganda. These three districts were chosen for the initial product launch because of their varied rainfall patterns, the distance from alternative sources and their long experience with rainwater harvesting. In order to ensure sustainability everyone in the supply chain must make a profit and the final retail price must be attractive to the consumer. The product is currently manufactured in China and imported into Uganda. Relief International-EnterpriseWorks/VITA acts as both the importer and the national distributor. These roles will be spun off to a private sector entity once the viability of the market has been demonstrated. Distribution is through existing channels and dealers were identified from among shops that currently sell plastic jerry cans and drums. These shops include hardware and house wares shops. A sales team was recruited to support the supply chain through promotional efforts and to identify and sign up new retailers.

An advertising firm has been recruited to develop product brand name and promotional materials. The marketing campaign will combine product marketing with social marketing to promote best practices in rainwater harvesting. Promotion of a new product that also provides education for consumers on how the

product should be used is critical in the successful transfer of technology through the private sector. Promotional activities will include radio, wall paintings, live market day demonstrations and dealer level demonstrations.

In order to ensure quality installation of this new product the project will train installers. This is important because the product is very different from other products on the market. The installers will be selected by the local dealers from trades-people in their area. In this way the installers will be linked to the retailers and will be able to generate additional sales.

Evaluating impacts

The overall goal of this project is to improve access for rural families to an improved water source. For this reason the rainwater bag has been developed to be affordable for low income consumers. RI-EWV is aware that private sector lead initiatives have limitations in reaching the poorest segments of society. The rainwater bag will cost the equivalent of a month's wages for a rural labourer, and this will exclude some households. In order to evaluate the impact at the household level and the effects of price and marketing strategies on the uptake, RI-EWV has partnered with Innovations for Poverty Action (IPA) to conduct a study. The study will involve 3,200 households in 80 villages. It will evaluate the rate of uptake and also changes in the time used to collect water, perceptions on the water quality and water consumption patterns. The results of the study will permit decision makers to understand how many low income households are excluded by a strictly commercial approach. It will help to define the criterion for a rational subsidy that would encourage both uptake and proper use of the rainwater bag to ensure that desired impacts are achieved.

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EWV Studies are available at: http://drwh.enterpriseworks.org/files/Library/

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