The 2007 American Rainwater Catchment Systems Association Conference

August 14-17, 2007
Kilauea Military Camp (KMC)
Hawai'i Volcanoes National Park, Big Island of Hawai'i

RWH Presentation

Dynamics of Rainwater Harvesting (RWH) in Botswana: Understanding the Socio-economic Aspects for Effective Implementation of Programmes and Policies

Profile on Botswana

- Location: Botswana is located in the Southern part of Africa; just above South Africa
- Size: 600,370 km^2
- Population: 1.7 million
- Climatic conditions: Semi-arid
- Water: only 2.5% of the land is covered by surface water

Profile on Botswana Cont'd; Economics

- Currency: BWP
- Total GDP: US$18.72 billion
- Per-Capita GDP: US$11,400
- Main revenue export earner: Diamonds
- Foreign exchange reserves: US$7 billion
- Main spender and consumer: Government

Water situation in Botswana

- Water is sourced mainly from the following: dams; wells and boreholes
- Rain-water is only harvested on low scales
- The following government institutions and parastals are tasked with providing portable water from these sources to different market segments; Water Utilities Corporation (supplies urban areas); Water Affairs (supplies rural and major villages); councils (supply settlements).

Water situation in Botswana- Cont'd

- According to recent government statistics 97.7% of the population of Botswana have access to safe drinking water
- GOB is currently subsidising the operating costs of water delivery by more than 40%
- Annual water demand for urban and major villages stands at 77ML

Examples of some of the common water collection and reticulating systems used in Botswana


HONDA
WB30XT

Rainfall related issues

- Botswana is a semi-arid country
- Annual rainfall: 250-650 mm
- The Northern part of the country experiences more rainfall than the rest of the country
- Evaporation rate: 2000 mm
- 60% of the population uses ground water sources for water supply

Overview of the paper

- The paper formed a sub-set of the RWH project
- It therefore used primary data that was collected for the RWH Feasibility Project
- Its main focus however was on bringing across the socio-dynamics of RWH in Botswana- a sub-set of different disciplines investigated during the survey

Objectives

The paper aims to bring to light aspects regarding the following parameters;

- Trends in RWH practices
- Cost of such systems for those with systems
- Sources used to fund the systems
- Affordability of the systems

Objectives Cont'd

- Opinions of those without RWH systems
- General sentiments on practicing RWH by those with and without the systems
- NB. The survey covered the following market segments: Domestic; Agriculture; Commercial/ industrial enterprises and Institutions

Sampling Method

- The survey adopted the Convenience Sampling Method
- This was the ideal method given the nature of the research
- The 2001 Population Census of Botswana was used to determine the sample size for each area

Questionnaire designing

- SNAP software was used for designing the questionnaire
- The questionnaire contained both open-ended and closed questions
- The questionnaire was administered by our researchers to that we achieve the highest rate of response

Data Analysis Process

- The SNAP software was also used for data processing and analysis
- Tables depicted on the paper are derived directly from the SNAP software program
- Some of the tables are however simplified into graphs for purposes of this presentation

Data Discussions

- It is divided into the following segments;

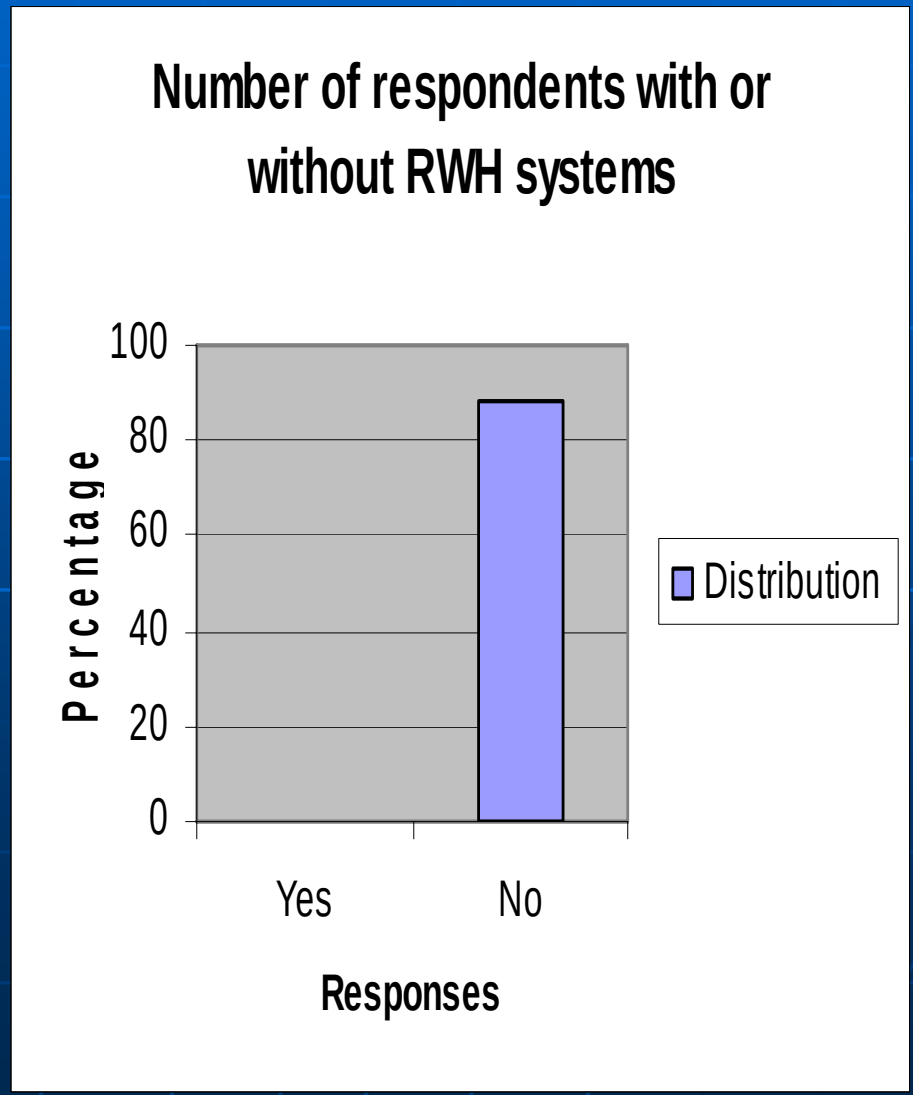
1. Sentiments of respondents with RWH systems are presented firstly
2. Sentiments of respondents without such systems then follow
3. Lastly we look at sentiments of all respondents irregardless of whether they harvest or not.

Population dynamics

- Sample size consisted of participants from rural and urban areas, and settlements
- Effectively the survey captured views of individuals and institutions with different socio-economic backgrounds
- Total sample size stood at 1273

Respondents with or without RWH systems

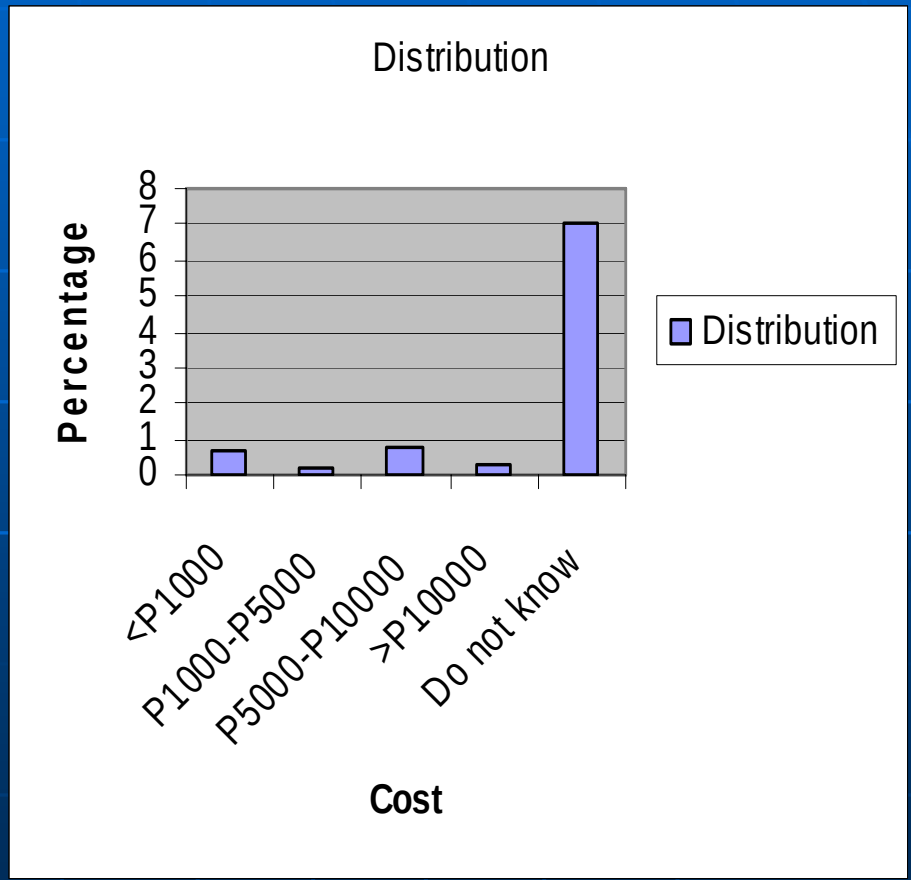
- 88.3% of the total sample did not have RWH systems
- 11.5% had RWH systems while 0.2% of the sample did not respond to the question



1.
Respondents with RWH systems

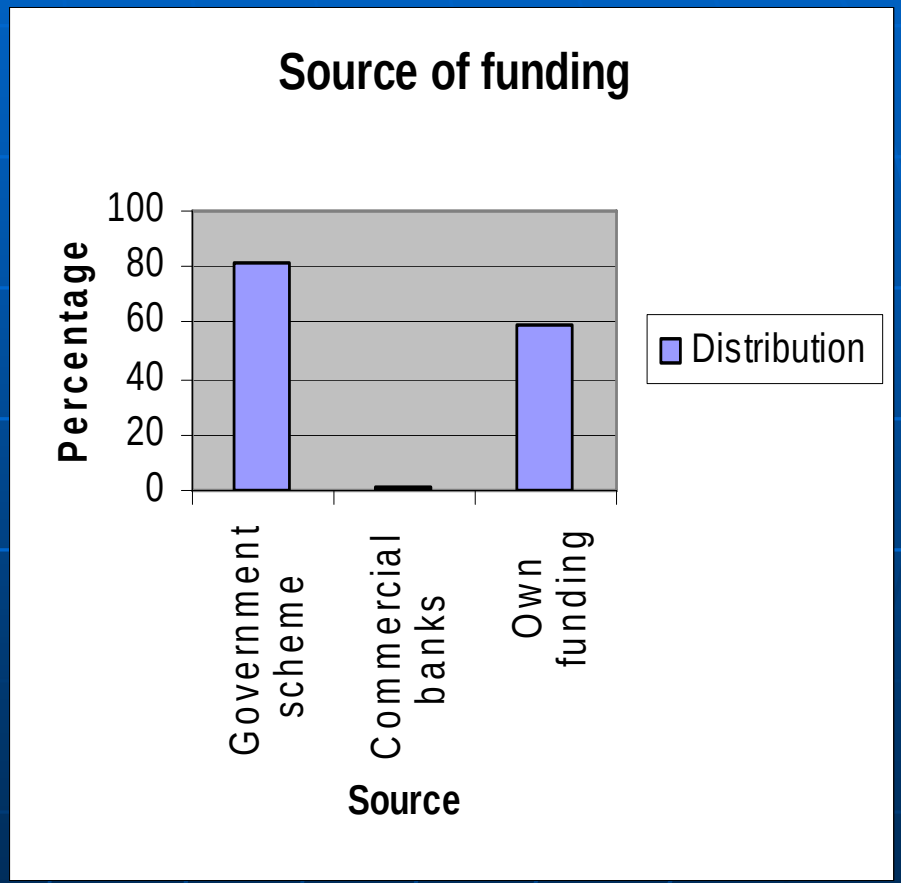
Cost of RWH systems

- Most respondents were not aware of the cost of their systems
- Another significant number maintained that their systems had a “price tag” of P1000 (US$160) to P5000 (US$809)
- Subsequently most of the respondents felt their systems were affordable

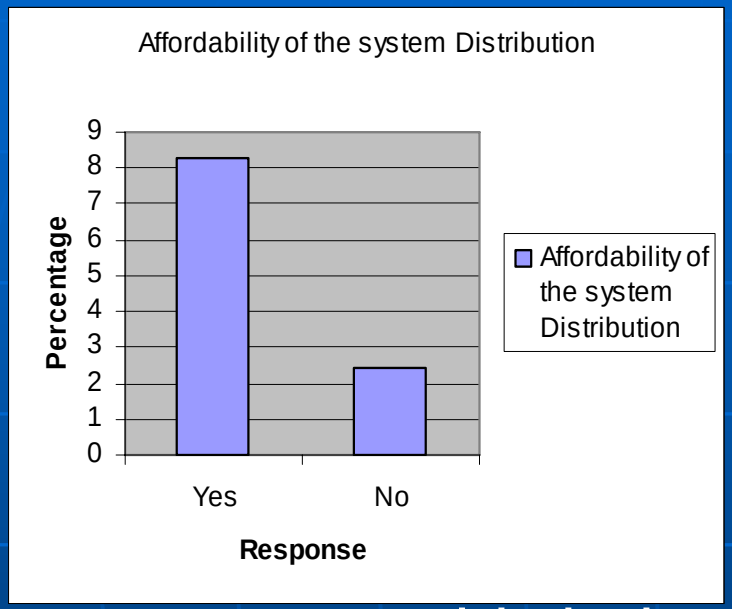


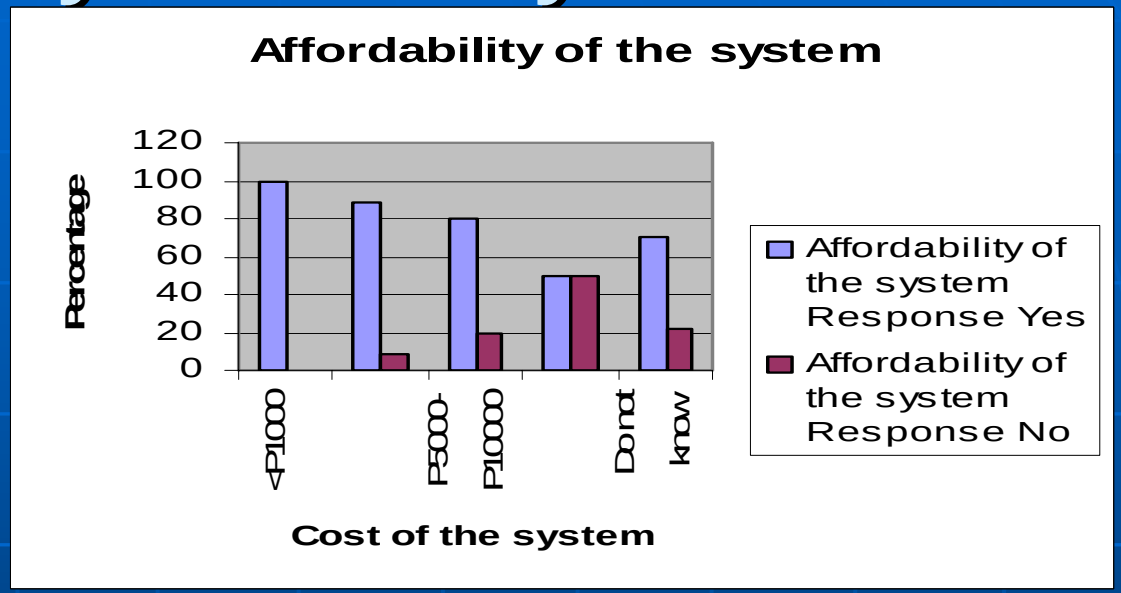
Source of funding

- Most of the systems were funded from government schemes with a few using own savings to set-up system



Affordability of the system





- 8.3% said their systems were affordable
- 2.4% said their were not affordable
- 100% of respondents whose system cost below >P1000 said it was affordable
- 50% of respondents with systems costing between P10 000 said theirs was also affordable and 50% equally said it was not affordable

2
Respondents without RWH systems

Reasons for not having RWH systems

- Most of respondents without RWH systems did not have them because they could not afford them
- A good number of respondents also argued that they were not knowledgeable

3
General sentiments about RWH

All respondents

Opinions on harvested RW

- Most respondents argued that harvested rainwater was clean enough to be used – 35%
- A good number of respondents also argued that respondents felt that it was tastier than conventional water – 22.2%

Analysis % Respondents	
Base	100.0%
Missing	
No reply	37.4%
Variable V7	
Clean enough	35.0%
It has no chemicals	5.3%
It is tastier than current source	22.2%
It is natural	7.4%
Contains less salts	1.9%
It is soft	1.4%
Only safe for irrigation and watering animals	4.2%

Cleaning harvested RW

Analysis % Respondents	
Base	100.0%
Missing	
No reply	65.4%
Variable V8	
Boil before use	28.6%
First flush	2.8%
Filtration	1.6%
Use chemicals	0.9%
It is clean enough	2.4%
Clean tanks regularly	2.4%

- Most respondents encourage boiling the harvested rainwater prior to using
- First flush is significant in ensuring that harvested rainwater is clean

Preferred RWH systems

Base % Respondents	
Base	100.0%
Missing	
No reply	2.6%
Which of the following systems would you prefer?	
Communal rainwater harvesting system	18.3%
Private rainwater harvesting	80.7%

- Given a choice between communal and private RWH systems, most respondents preferred private RWH systems
- This is shown by the 80.7%

Potential benefits that could accrue to the economy if RWH is encouraged

- The survey shows that people are quite aware of water scarcity, and would associate RWH with possibility of reducing this scarcity.
- Equally important are the steadily rising costs of reticulated mains water supply

Initiatives needed to encourage RWH

- Most respondents argued government policies and programmes which encouraged subsidies should continue to be encouraged, a practice which has been in existence in the past

Base % Respondents	
Base	**100.0%**
Missing	
No reply	2.1%
What initiatives would you like to see in place to encour...	
Government subsidies	79.6%
Easy access to funds	49.9%
High piped water bills	14.4%
More educational materials on RWH	73.0%
There are enough initiatives	1.0%

Market segments that stand to benefit more from RWH

- Given the rain fed conditions under which agriculture is usually practiced in Botswana, it is not alarming to observe that 87.2% of respondents would like RWH to be encouraged within the agriculture sector, thus boosting efficiency of food production. .

Conclusions

- The following conclusions can be drawn:
- RWH is one initiative that can easily be absorbed and practiced by most Batswana.
- The issue of affordability is a major deterrent among those without RWH systems.
- Public education and awareness about RWH in general is essential to motivate and encourage efficient utilisation of the harvested rainwater for greater communal benefit.