

Socio- Economic Factors in Rural Water Scarcity: A Case Study of Molepolole Village in Botswana

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The main objective of this paper is to illuminate the socio- economic factors in water provision with a special focus on Molepolole, one of the major villages in Botswana. Intrigued by why such an important resource can be so scarce, the author carried out a focus group qualitative case study of the village using focus group discussions with water stakeholders in the region between November 2011 and May 2012. Using the theory of reasoned action, the author argues that the capacity to act rationally by those with power to provide public goods and services is under siege if reason cannot prevail in ensuring continued access to safe drinking water in Molepolole, one of the biggest villages with a high population. One of the major findings of the exploratory focus group study is that there are problems of urban bias in service provision, cost, efficiency and effectiveness of goods and service provision which paralyzes access to safe portable drinking water in all eight major villages, especially during the dry season. In conclusion, the need for a dialogic process on the importance of seriously taking water as a priority area cannot be overemphasized.

Keywords: rural, water scarcity, Molepolole village, Botswana

Introduction

The International Water Supply and Sanitation Decade (1980-1990) paid a lot of attention, advocacy and the requisite resources to meet need for safe drinking water for urban and rural areas globally. Despite great strides made by countries during this era to ensure access to safe access drinking water, water scarcity has continued to haunt Molepolole, making it difficult to lubricate the rough patches of poverty and gender inequality in the micro and macro provision of global water. Water has a gender and a gender- based poverty dimension. Water scarcity, food insecurity, energy and national security are anticipated to worsen with global warming.

This study was prompted by the fact that it was not clear why major villages, including Molepolole, were the hardest hit by water scarcity in Botswana. The global warming problem has resulted in inevitable changes in the capacity of Botswana to provide portable water national and particularly in Molepolole, one of the biggest villages in the country. Botswana is an arid landlocked country with very limited water reserves due to dry weather conditions. As a land-locked country, Botswana's road infrastructure is integral to its regional and international competitiveness, and the nation would

benefit from its accessibility by one of bituminized primary roads in the country, linking Gaborone, the Capital, to Molepolole. The importance of water to human life through preservation of human loss and prevention of water borne illnesses, road construction and domestic industrial supply cannot be overemphasized. The poor rural women and their children are already the most and hardest hit by the rough patches of scarce water resources due to their already existing socio- economic constraints. This is what is emphasized in the findings section of this paper.

Brief Overview on the Global Importance of Water

Hypertension and diabetes incidence

New data highlight increases in hypertension, diabetes incidence. In News release of 16 May 2012 Geneva - The World Health Statistics 2012 report, released today, puts the spotlight on the growing problem of the no communicable diseases burden. One in three adults worldwide, according to the report, has raised blood pressure – a condition that causes around half of all deaths from stroke and heart disease. One in 10 adults has diabetes.

This report is further evidence of the dramatic increase in the conditions that trigger heart disease and other chronic illnesses, particularly in low- and middle-income countries,” says Margaret Chan,

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Director-General of WHO. “In some African countries, as much as half the adult population has high blood pressure” (World Health Statistics Report, 2012).

For the first time, the World Health Organization’s annual statistics report includes information from 194 countries on the percentage of men and women with raised blood pressure and blood glucose levels.

In high-income countries, widespread diagnosis and treatment with low-cost medication have significantly reduced mean blood pressure across populations – and this has contributed to a reduction in deaths from heart disease. In Africa, however, more than 40% (and up to 50%) of adults in many countries are estimated to have high blood pressure. Most of these people remain undiagnosed, although many of these cases could be treated with low-cost medications, which would significantly reduce the risk of death and disability from heart disease and stroke.

Also included for the first time in the *World health statistics 2012* are data on people with raised blood glucose levels. While the global average prevalence is around 10%, up to one third of populations in some Pacific Island countries have this condition. Left untreated, diabetes can lead to cardiovascular disease, blindness and kidney failure.

Conceptual Framework

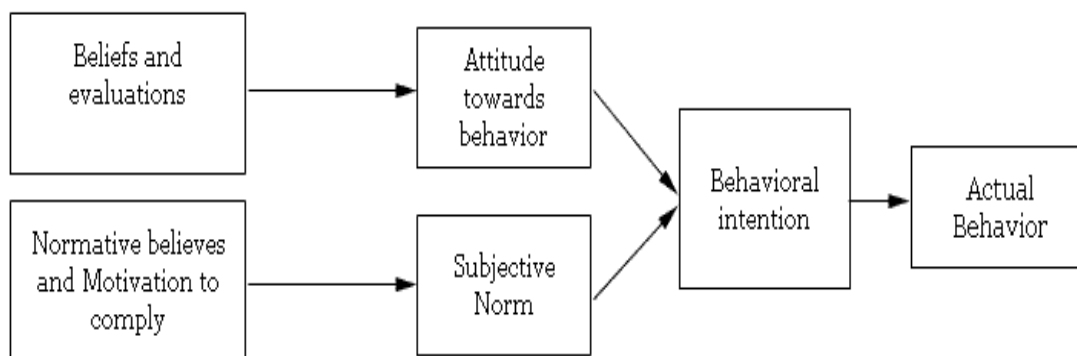


Figure 1. Theory of planned behavior/reasoned action, Adapted from, Bagozzi et Warshaw (1989) , Fishbein and Ajzen (1975); Sheppard, Hartwick, and Warshaw (1988).

To explain the above in simple terms: a person's voluntary behavior is predicted by his/her attitude toward that behavior and how he/she thinks other people would view them if they performed the behavior. A person's attitude, combined with subjective norms, forms his/her behavioral intention.

Theory of planned behavior/reasoned action

The Theory of Reasoned Action (TRA) is a model that finds its origins in the field of social psychology.

This model developed by Fishbein and Ajzen (1975) defines the links between beliefs, attitudes, norms, intentions, and behaviors of individuals. According to this model, a person’s behavior is determined by its behavioral intention to perform it. This intention is itself determined by the person’s attitudes and her/his subjective norms towards the behavior. Fishbein and Ajzen (1975, p. 302) define the subjective norms as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein & Ajzen 1975, p.302). This theory can be summarized by the following equation: $Behavioral\ Intention = Attitude + Subjective\ norms$ (See figure 1).

According to TRA, the attitude of a person towards a behavior is determined by her/his beliefs on the consequences of this behavior, multiplied by evaluation of these consequences. Beliefs are defined by the person’s subjective probability that performing a particular behavior will produce specific results. This model therefore suggests that external stimuli influence attitudes by modifying the structure of the person’s beliefs. Moreover, behavioral intention is also determined by the subjective norms that are themselves determined by the normative beliefs of an individual and by motivation to comply to the norms.

Fishbein and Ajzen say, though, that attitudes and norms are not weighted equally in predicting behavior. "Indeed, depending on the individual and the situation, these factors might be very different effects on behavioral intention; thus a weight is associated with each of these factors in the predictive

formula of the theory. For example, you might be the kind of person who cares little for what others think. If this is the case, the subjective norms would carry little weight in predicting your behavior" (Miller, 2005, p.127). The relevance of the Theory of Reasoned Action has received considerable and justifiable attention within the field of consumer and human behavior. It appears to accurately provide an explanation for predicting consumers' intentions and behaviors and carves the way forward in targeting them for behavior change. Applied to the study of socio-economic factors in rural water scarcity, the theory illuminates factors that are key to addressing water scarcity and can be used by water practitioners and consumers to carve the way forward in ensuring access to safe drinking water.

The Study Area

Botswana has spectacular wilderness areas, ranging from the Kalahari Desert to the Okavango Swamps. Molepolole, a huge sprawling hillside village in Kweneng District and the home of Kodisa Lodge is proud of varying historical sites, starting with Lekadiba along Tshwaanyane river, Legaga la ga Kobokwe or Livingstone's Cave (situated 4 km south of the village on the hillside), to the ancient stone walled enclosures and the nearby grove of marlothii, with the interesting bird life associated with the area, particularly the Tshwaanyane river.

Molepolole is Botswana's biggest villages. It lies in the south east of the county. Molepolole serves as the capital of the Bakwena. It was named after the Molepolole river. Molepolole is about 60 km away from the capital city of Botswana, Gaborone, and one the largest villages of over 69,789 people in 2008 (Central Statistics Office, 2011).

Methodology

There were four major research questions that were the focus of data collection on the water crises in major villages with a special focus on Molepolole:

a) Why is there severe water crisis especially in Molepolole since 2010 to-date? b) Why is it difficult to sustain water provision and availability despite the existing water distribution infrastructure? c) Which institutions and sites of interest are the hardest hit by the water crises? And how have stakeholders related to the water crises? d) What are the socio-economic factors in relation to water provision in major villages? Data collected to inform this paper was mainly from desk study, focus group discussions with Water

Authorities in the district capital, transect walks around standpipes for interviews with queues of villagers desperate for water, emergency visits to institutions and sites hardest hit by water crises. Data was also collected on the lived experiences of villagers' access to safe drinking piped water, and the 2012 Water Pitso deliberations on water scarcity especially in major villages including Molepolole.

Findings

Desk study

This part covers a review of international environmental protocols, instruments such as MDGs, Water Statistics reports and basic statistics on water provision.

Botswana as a nation is party to the multilateral environmental agreement of (MEA), specifically the Kyoto Protocol, 1997, and the UN Convention to Combat Desertification and Drought, 1994. There are major target s of MDG 7 to "Ensure environmental sustainability" Specific targets are:

- To halve the population of people without access to safe drinking water and basic sanitation.
- To integrate the principles of sustainable development into policies and programmes and reverse the loss of environmental resources.

The above targets are applicable to water provision in Botswana. Access to improved water resources increased from 93% in 1990 to 96% in 2007. Access to improved sanitation increased from 38% in 1990 to 79.8 % in 2007. About 23% of the population is estimated to be living in absolute poverty.

Key environmental facts on Botswana

- a) 1.300 hectares of arable land is irrigated.
- b) Annual rainfall is the highest in the north-eastern Botswana (650 mm) and lowest in the extreme South West (250mm).
- c) 18000 registered boreholes.
- d) 11 million cu. Meters of water flow into the Okavango Delta every year.
- e) Mining and energy account for 19% of water consumption (*MDG Status Report on Botswana, p. 53*).

The report goes on to say that: Water demand is expected to increase from 120 million cubic meters in 1990 to 335 million cubic meters in 2020...The provision of water supplies is costly because Botswana has few water resources (p54).

Table 1. The poverty situation.

Indicator	Value/Year	Value/Year
Poverty head (%)National Poverty Line	47(1993)	30.6(2002)
Count Rate 1\$/Day Poverty Line	24.3(1992)	23.5(2002)
Poverty gap ratio	11.8(1992)	11.6(2002)
Rate of unemployment (%)	20.8(1998)	26.2(2008)
Life expectancy at birth (Years)	64.3 (1998)	55.6 (2006)
Access to safe drinking water (%)	93.0(1990)	95.8(2006)
Access to sanitation (%)	38.0(1990)	79.8(2007)
Adult Literacy Rate (%)	19% illiterate in 2003	81(2003)
Child Malnutrition (%)	7.1(2003)	4.3(2009)

Sources: Central Statistics Office, Vision and the MDG Indicators Report (2009).

In 2008, the national population was estimated at 1.8 million (2million). Life expectancy at birth increased from 55.5 in 1971 to 65.3 years in 1991, and decreased to 54.4 years in 2006 due to the impact of HIV/AIDS (National Development Plan 10, p. 13). Literacy rate increased from 68.9% in 1993 to about 90% by 2003. If literacy rates continue to increase by 12% every ten years, Botswana is most likely to have a literacy of about 93% in 2013 (CSO/NFE,2003, p.54).

According to the MDG Status report on Botswana (MFDP/UNDP, 2010): Ninety seven percent of the population has access to safe drinking water, slightly higher than the average (93%) for upper Middle Income Countries (MICs) and far ahead of Sub-Saharan Africa. (p17). The water provision infrastructure is well set up but there is continuous absence of portable water in major villages including Molepolole. Botswana has only two perennial rivers-Okavango and Chobe. Ephemeral rivers provide locations for dam sites that provide improved water access in urban areas.

The Central Statistics office (2008, p55) reports that in Botswana, major users of water are human settlements, households, agriculture (Livestock), industrial (mining), energy, recreation, irrigation and wildlife. Amongst the challenges to provision of continued reliable water supply are the following:

- Protecting aquifers from pollution
- A better understanding of ground water recharge.
- Recycling domestic effluent and acceptance
- Applying a comprehensive demand management program to improve the efficiency of water usage.

Water consumption in Molepolole

Access to water for residents of Molepolole has risen from 44 564 in 1998 to 58,187 in 2008. This amounts to 1,054 996 cu. m of water in 1997/98 to 1,592,827 in 2007/08. Water consumption rose from 613,072 cu. m in 1997/98 to 1,866,237 cu. m in 2007/08. These figures indicate more demand for water than is available.

Water losses for Molepolole were 441,924cu.m in 1997/98 to 726,590cu.m in 2007/08 indicating a sharp rise over the 10 years decade. There are a lot of water losses due to pipe leakages. This makes water provision very costly for the Water Utilities Corporation. The high cost of water rise further compounded by poverty, unemployment, drought and disparities between water supply and demand. (Republic of Botswana, 2008, pp. 66-67).

The study is important for illuminating the socio-economic factors involved in water shortage and further crises that was announced over all available media about global warming and how it is likely to have further adverse effects on the already existing water crises. Concerns about water availability at a micro level in Africa are more of the business of women and their girl children than men and boys, especially at household level. The rich are already advantaged to sell water to those who cannot afford it. Water scarcity thus has both social and economic dimensions

Social factors

According to the Republic of Botswana Water Statistics Report (2008, p.9) the proportion of population that gets piped water whether from a private connection or communal tap is 87.01%...A comparison between cities./towns and villages (urban and rural) shows that 99.5% of the population in cities/towns get piped or tapped water while in villages the population is 84.1 per cent.

Water provision and scarcity have both a gender and a geographical dimension. Scarcity poses a hygiene threat especially to human being, domestic animals and occupations where women are overrepresented. Hospitals in areas such as Molepolole, Ramotswa, homes, and small stock that are well represented by women are highly affected by water scarcity. Water scarcity is a threat to human health, personal hygiene water borne illnesses and hard hit on women who are socialized to serve as

caregivers for all family members. Culturally, water shortage threatens hygienic practices in that there is overall pollution and lack of personal and environmental hygiene.

Economic factors

In Botswana, water provision was the responsibility of the public sector. The water reform project of 2008 involved, amongst others, removing the water industry from the Water Affairs Department, a local authority, to Water Utilities Corporation. Outsourcing water provision when the Government of Botswana has no control over WUC is detrimental to the poor who cannot afford the high price of water.

Privatizing water services from a public entity to a private/parastatal entity has had a negative impact on water availability in Botswana. Water rates have escalated though service delivery has never improved as expected. Referral and major hospitals were affected by lack of water, further compounding poor water service to hospital service delivery. Financing of secondary pipelines and household connections are problematic. Safe water provision is an expensive enterprise as it involves not only able bodied human labor but the use of expensive machinery that has to be maintained for regular supply of water. Water scarcity disproportionately affects men and women, rich and poor. These are factors in widening disparities and relative poverty. During the months of March to May 2012, hospitals affected lost their health status and capacity to deliver essential services such as caring for intensive care units patients, and laundering for admitted patients in a hygienic way. Lack of portable water is aggravated by absence of surface water that requires drilling of boreholes at a high price for the rural poor most likely to be socially, educationally disadvantaged in access to gainful employment.

The distance from urban areas to rural and remote areas with poorly maintained roads and telecommunication systems worsen the spikes of regular supply of safe drinking water. Safe water provision is essential for human life but very costly to sustain, given the harsh climatic conditions such as global warming and high rates of evaporation. Water for industrial use is important to avoid paralyzing the performance of industries which cannot function without water.

Future directions

There is a need to implement some of the recommendations of the 2005 Applied Research Study commissioned by the Gob and UNDP. The study recommended embracing sustainable utilization

of water affordability to all sectors of society, minimization of water wastage, efficient use and access to sufficient and good quality water.

Several projects were proposed for financial year 2013 by the Ministry of Minerals, Energy and Water Resources during the 2012 Budget Speech (Ministry of Finance and Development Planning, 2012). Among these are a need to allocate more human and non-human resources. The 2012 Budget Speech also suggested the need to promote water demand management and use of non-conventional water. Financial resources for adequate water, replacement of tanks, equipping and electrification of boreholes, design and upgrading of water schemes, construction of pipelines, water treatment plants, prepaid standpipes, However, WUC has been compelled to finance the deficit from its reserves, which are projected to decline to P290 million by end of this financial year 2012/2013.

Implications of the Study

The study on socio-economic factors in rural water scarcity has illuminated the need to drought proof Botswana's economy to ensure that there is adequate water especially for rural villages where a significant number of citizens reside. Botswana as an arid to semi-arid country must have disaster preparedness cushions given that it is a known fact that the country has no surface water provision and heavily relies on expensive borehole water. Adequate provision of water in rural Botswana would help bridge gender gaps by reducing the burden of household water provision for women and children to divert their focus on other unmet but important needs such as setting up enterprises for gainful employment.

Conclusions

Water is a very scarce but indispensable resource, and its scarcity is expected to heighten with global warming. One would have expected that the country would have long reasoned to have measures in place to cushion the current population of two million people from the harsh effects of water crises. All living creatures from plants, wild game, individuals, families, institutions, and heritage sites are adversely hard hit by the water crises. The socio-economic dimensions indicate that water provision must be a high priority for the entire nation. It is mandatory for safe water provision to be a top political agenda item to safeguard all human life, animals and plant species. Disaster preparedness and safety cushions need to be permanently in place to alleviate water

scarcity which is always part of Botswana's harsh climatic conditions.

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Figure 2. Map of Botswana