



Factors affecting sustainability of rural water schemes in Swaziland

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ABSTRACT

The Millennium Development Goal (MDG) target to reduce the proportion of people without sustainable access to safe drinking water by the year 2015 has been met as of 2010, but huge disparities exist. Some regions, particularly Sub-Saharan Africa are lagging behind it is also in this region where up to 30% of the rural schemes are not functional at any given time. There is need for more studies on factors affecting sustainability and necessary measures which when implemented will improve the sustainability of rural water schemes. The main objective of this study was to assess the main factors affecting the sustainability of rural water schemes in Swaziland using a Multi-Criteria Analysis Approach. The main factors considered were: financial, social, technical, environmental and institutional. The study was done in Lubombo region. Fifteen functional water schemes in 11 communities were studied. Data was collected using questionnaires, checklist and focused group discussion guide. A total of 174 heads of households were interviewed. Statistical Package for Social Sciences (SPSS) was used to analyse the data and to calculate sustainability scores for water schemes. SPSS was also used to classify sustainability scores according to sustainability categories: sustainable, partially sustainable and non-sustainable. The averages of the ratings for the different sub-factors studied and the results on the sustainability scores for the sustainable, partially sustainable and non-sustainable schemes were then computed and compared to establish the main factors influencing sustainability of the water schemes. The results indicated technical and social factors as most critical while financial and institutional, although important, played a lesser role. Factors which contributed to the sustainability of water schemes were: functionality; design flow; water fetching time; ability to meet additional demand; use by population; equity; participation in decision making on operation and maintenance; existence of fund for operation and maintenance; willingness to contribute money; existence of a user's committee; participation in the initial planning and design of the water scheme; and coordination between the local leaders and user's committee. The main factors which made the schemes unsustainable were: long fetching time; non-involvement in decision making; lack of willingness to contribute funds; absence of users committee; and lack of cooperation between local leaders and the users committee. Water service providers should address the technical, social, financial and institutional factors identified affecting sustainability in their planning and implementation of rural water schemes.

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1. Introduction

According to the 2012 progress update on Millennium Development Goal (MDG) target to reduce the proportion of people without sustainable access to safe water and sanitation by the year 2015, the target on drinking water has been met as of 2010, but huge disparities exist. There are still 780 million people without access to improved drinking water source. Some regions, particularly Sub-Saharan Africa are lagging behind. While coverage of improved water supply sources is 90% or more in Latin America and the Caribbean, Northern Africa and large parts of Asia, it is only

61% in Sub-Saharan Africa. There are also disparities in the use of drinking water sources between urban (83%) and rural (61%). Only 19 out of 50 countries in Sub-Saharan Africa are on track to meet the target by 2015. Countries that still have less than 50% coverage in water supply are almost all in Sub-Saharan Africa. Sub-Saharan Africa is also where 4 out of 10 people do not have access to improved drinking water (UNICEF and WHO, 2012).

While many of the countries in Sub-Saharan Africa not on track to meet the MDG on drinking water, the region has made a significant progress as 26% of the 2010 population had gained access to safe water since 1995 (UNICEF and WHO, 2012). To sustain the gained benefits in increased access to water, the sustainability of the water supply systems must be ensured. The sustainability of these water supply systems is questionable as in Sub-Saharan

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Africa at any given time, up to 30% of the water supply systems serving rural communities are not functional (Rahmato, 1999).

There are different views as to why the water supply systems are not sustainable. There are those who consider providing safe drinking water in rural areas as a major challenge because it is not easy to establish institutional arrangements that will ensure the facilities are provided, maintained, and managed in an efficient, equitable and sustainable way (Sun et al., 2010). Other scholars see outflows in the policies and focus of governments and service providers leading to unsustainability of the water supply systems. Madrigal-Ballester (2012) noted that for the United Nations (UN) MDG to halve the number of people without basic water services by 2015 to be met, one of the major challenges is not just providing the infrastructure to serve rural communities, but creating local institutions and policies and maintaining those systems and infrastructure over a long term are critical keys to success. Governments and organisations are also blamed for undertaking improved drinking water access to meet the MDGs target as their key factor (Smith, 2011). In India it has also been noted that despite the impressive coverage of provision of safe drinking water facilities in the rural areas are not sustainable, and among the factors cited limiting sustainability is the heavy emphasis on creation of new infrastructure but poor attention to the maintenance of existing systems (Government of India, 2010). To Haysom (2006), the drive behind attempts to meet the MDGs is drawing attention towards increased coverage to meet targets and distracts the need for maintenance of water schemes.

The World Health Organisation and UNICEF are addressing current monitoring challenges and those that lie ahead. The safety and reliability of drinking water supplies and the sustainability of both water supply sources and sanitation facilities are not addressed by the current set of indicators used to track progress (UNICEF and WHO, 2012). The inclusion of reliability and sustainability of drinking water supply sources and sanitation in the UN set of indicators to track progress towards the MDG target will indicate the magnitude of the problem and the need to focus more on sustainability aspects in improving access water supply systems. As sustainability is increasingly becoming a concern in attaining the MDG on halving the people without access to safe drinking water and sanitation by 2015, there is need to evaluate the sustainability of the existing water supply and sanitation systems. The results of such evaluations will inform policy and improve planning and implementation of sustainable water supply and sanitation systems.

Swaziland has managed to increase significantly (36%) the proportion of the 2010 population that gained access to drinking water since 1995 (UNICEF and WHO, 2012). The high rate achieved in improving access to drinking water may not be sustained as out of the 799 water schemes (National), 616 (77.1%) were functional and 183 (22.9%) were non-functional before 2005 (Government of Swaziland (GOS) RWSB, 2005). In the Lubombo region (the study area, out of 305 water schemes, 220 (72.1%) were functional while 85 (27.9%) were non-functional in 2007 (GOS, RWSB, 2007). The observed percentage of non-functional water schemes is very high and questions the sustainability of the water schemes in the country. There is thus a need to assess and establish the factors affecting the sustainability of water schemes in Swaziland.

The problem for this study was that the precise factors responsible for the failure of some water schemes in Swaziland and in the study area in particular were not very clear. Existing literature on the factors affecting sustainability of water schemes in Swaziland (Hlophe, 2004; Ndwanwe, 2005) were done using one criteria only, community participation. Assessments of sustainability of water schemes require a broad range of financial, social, technical, environmental and institutional aspects of the project. There is thus a need to assess sustainability and establish the precise factors affecting the sustainability of water schemes in Swaziland

using the Multi-Criteria Analysis Approach and not a single criterion as done in the previous studies. The main objective of this study was thus to establish the main factors that affect the sustainability of rural water schemes in Swaziland using Multi-Criteria Analysis Approach which considers all possible factors.

2. Methodology

2.1. Study area and sampling

Swaziland is a small country in southern Africa with an estimated surface area of 17,364 km². The country is located between latitude 25° 39' and 27° 25'S and longitudes 30° 48' and 32° 10'E and share borders with Mozambique in the east, and the Republic of South Africa on the other sides. Swaziland has four administrative regions: Hhohho, Manzini, Shiselweni and Lubombo. The study area is located in southern part of Lubombo region, which is the driest region and where water schemes are crucial in meeting household water demands. Fig. 1 shows the location of the study area which lies between latitudes 27° 10' and 26° 25'S and longitudes 31° 25' and 32° 10'E, with average temperatures of about 28 °C and receives annual rainfall ranging from 500–800 mm. Purposive sampling was used to select 11 communities with functional water schemes. The selected communities as shown in Fig. 1 are: Madubeni, Sigcaweni, Mdumezulu, Mambane, Sibisisweni, Nsubane, Mbutfu, Victoria, Magedeni, Madzakeni and Mdabukeni. From these selected communities there were 15 water schemes which were functional and all were included in the study. The water schemes studied were: Mhlangeni, Madzakeni1, Madzakeni2, Makilingo, Victoria1, Madabukeni, Magedeni, Madubeni1, Madubeni2, Sikheleni, Ka-Ndwanwe, Msabane, Kholwane, Kudzaka and Mbahane. Out of the 3175 households using the selected water schemes only a few (174) of those found at home were interviewed using a questionnaire. The sample size was considered adequate as information from the few interviewed was used to complement information obtained from sources and methods (checklist and focus group discussions).

The 2007 National census put the nation's population at 1,018,449. Population of Swaziland is unevenly distributed throughout the four regions. Manzini region has the highest population of 319,530 persons (31.4%) while Lubombo region has the lowest, with 207,731 (20.4%). This has been attributed to the dryness, hot conditions in the region as well as few job opportunities (GOS, 2007).

Swaziland has a small, but strongly export-oriented economy. While manufacturing sector has always been the country's main contributor to Gross Domestic Product (GDP) (29.6%), agriculture remains the mainstay of the Swazi economy despite its lower contribution to the GDP (14%). The country has two agriculture production systems. One is on Swazi Nation Land (SNL) where there is communal ownership of land and the other is on Individual Tenure Farms (ITFs) where there is private ownership of land. Production of crops and livestock on SNL is mainly subsistence whilst production on ITFs is commercial and consist of huge farms under irrigation producing high value crop such as sugar and citrus.

2.2. Study approach

2.2.1. Defining sustainability

Literature reviewed Lockwood et al. (Undated), indicate a wide range of definitions used to describe sustainability in relation to RWS projects: with focus on the capacity to continue a flow of benefits over time after the completion of the project itself; different organisations and institutions tend to highlight different aspects of sustainability in their definitions, often reflecting an

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