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Sustainability of donor-funded rural water supply and sanitation projects in Mbire district, Zimbabwe

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ABSTRACT

The sustainability of donor-funded rural water supply and sanitation projects was assessed in Mbire district, Zimbabwe in terms of level of community participation, quality of implementation and reliability of the systems. The study was carried out through questionnaires, focus group discussions, interviews and field observations. The results show that the quality of implementation of the projects was deemed to be good and participation of the communities in project ideas initiation and choice of technology was found to be very low. Reliability of the systems was found to be very high with 97% of the boreholes in all the three wards studied being functional. Financial management mechanisms were very poor because water consumers were not willing to pay for operation and maintenance. The projects were classified as potentially sustainable with sustainability index between 5.00 and 6.67. Poor financial management mechanisms for effective borehole maintenance, poor quality of construction and lack of community participation in project planning were found to be potential threats to the sustainability of the projects. Future projects should establish the need for the service and should thus be demand driven to ensure effective participation of the water consumers and enhance project's potential for sustainability.

1. Introduction

The achievement of lasting and sustainable impacts from projects is a major challenge for donors and the agencies implementing or supporting water supply and sanitation projects in developing countries (Sanders and Fitts, 2011). This is mainly due to poor cost recovery because water consumers are not contributing to the cost of operation and maintenance of water supply facilities (Nkiwane, 2007; Sharma, 2012; Kamruzzaman et al., 2013). Regardless of how successful an intervention may be in the short-term, if its beneficial impacts are not sustained over long period, it cannot be deemed cost effective (Carter and Rwamwanja, 2006). Progress towards the Millennium Development Goals (MDGs) is undermined by non-sustainable interventions (UNDP, 2011). Globally the MDG target relating to access to safe drinking-water has been met, but progress has been uneven in different regions (WHO, 2012). For instance, while 89% of the world population enjoy piped and other improved water supplies, only 63% of people living in Sub-Saharan Africa have improved water supplies (WHO/UNICEF JMP, 2013). Global drinking water trends indicate that of the 2.1 billion people who gained access to improved water supplies between 1990 and 2011, 1.3 billion (61.9%) lived in urban areas (WHO/UNICEF JMP, 2013). In fact 83% of the world population without access to improved water supplies lives in rural areas, suggesting that rural communities remain severely underprivileged (Tadesse et al., 2013; WHO/UNICEF JMP, 2013). On the other hand, the MDG target on sanitation has not been met, with approximately 36% of the world's population without improved sanitation (Moe and Gangarosa, 2009; WHO/UNICEF JMP, 2013).

In Zimbabwe, progress in achieving water and sanitation targets is off track (GoZ/UNDP, 2010). Zimbabwe's experience of water and sanitation sector development is that of a model of African sector development, collapsing within a decade. This reflects the vulnerability of sector service development built on state subsidies and donor finance, without sufficient focus on sustainability (AMCOW-CSO2, 2009/10). The sustainable performance of rural water supply and sanitation projects is of fundamental importance in meeting the Millennium Development Goals (MDGs), in terms of ensuring environmental sustainability, improving health and eradicating extreme poverty for the overwhelming rural majority living in the developing world including Zimbabwe. Once change for the better has been brought about, that trajectory of change must be maintained and enhanced (WaterAid, 2011).

Sustainability is influenced by many factors, some of which are technical, but others are non-technical (Rietveld et al., 2009).

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Effective community organizations, ability of the community to operate and maintain facilities, ability of the community to raise adequate user fees for purchasing spare parts, and strong backup support from external parties at the district level to solve major breakdowns contribute to the sustainability of water supply systems (Musonda, 2004). Serious failings in the quality of implementation of hardware and software aspects may act as a killer factor from which recovery is impossible without significant additional investment (WaterAid, 2011).

Zimbabwe was a forerunner in establishing a system of government/community collaboration for the management and maintenance of the rural water supply infrastructure in the 1980s and 1990s. Maintenance of rural water points in Zimbabwe was under a centralized maintenance system, called the Three-Tier Maintenance System (Hoko et al., 2009). The three-tier system, which had three structures, was believed to be a good framework for sustainable water supply systems (Hoko et al., 2009). However, in the past decade these maintenance arrangements broke down, largely because the main tier, which was the District Development Fund (DDF) responsible for maintenance of rural water points, was no longer effectively functioning as it was 80% dependent on donor funding that was suspended since 2002. This resulted in reduced access to safe water in the rural areas.

In the year 2000, Zimbabwe faced economic challenges, which led to the collapse of public sector investment and the flight of donor finance (Makoni et al., 2004). With the government having inadequate financial resources and no donor support, rural water supply institutions were neglected and became dysfunctional in the last decade. Despite this, there have been efforts by several humanitarian organizations to increase access to improved water supply and sanitation in rural areas of Zimbabwe. In 2008/9, World Vision Zimbabwe (WVZ), International Committee of the Red Cross (ICRC), Oxfam GB, and International Organization for Migration (IOM) implemented water and sanitation projects in Mbire district.

The government of Zimbabwe established Mbire district in 2007 from the former Guruve district in order to bring development close to the people (LGDA, 2009). Soon after the establishment of the district, different NGOs rehabilitated boreholes as sources of ground water supply for the communities and also implemented latrine construction projects in the district, but sustainability of these facilities was never assessed.

Therefore, this research assessed the sustainability of these water supply and sanitation projects implemented by humanitarian organizations in Mbire district and given to poor rural communities to operate and maintain. In this study sustainability in rural water supply and sanitation systems refers to the lasting benefits achieved through the continued enjoyment of water supply and sanitation services as well as permanent change in bad hygiene practices. The study assessed the sustainability of donor-funded rural water supply and sanitation projects in terms of level of community participation, quality of implementation, reliability of the systems and sustainability of the projects.

2. Materials and methods

2.1. Study area

The study was carried out in Mbire district located in Mashonaland Central Province in the Manyame Catchment and occupying the Middle Zambezi Valley (Fig. 1). The district has 17 wards and it covers an area of approximately 4700 km^2. Mbire district is in the agro-ecological region V, according to the land classification system in Zimbabwe and is characterized by mean annual temperature of 25 °C and mean annual rainfalls of 650–700 mm, but it is highly variable with one year in four being below 550 mm and one in four being above 800 mm (Fritz et al., 2003; AWF, 2010). The major economic activities in the area include crop production and cattle ranching for subsistence and wildlife hunting and fishing. Mbire district is a water stressed area and the community depends on groundwater for domestic requirements with deep wells and boreholes being the main sources of drinking water.

2.2. Data collection

Data on the sustainability of the rural water supply and sanitation schemes was gathered through households' survey, focus group discussion, key informant interviews and field observation. The household questionnaire was used to obtain primary data on issues related to water source and sanitation, investigation of demand responsiveness, type of community participation, and the role of water committees in the management of community boreholes. Key informant interviews were done to generate relevant data from the District Development Office (DDF), humanitarian organizations, Health office and National Coordination Unit (NCU) office. Physical inspections were carried out on all the thirty two (32) hand pumps and sixteen (16) toilets to determine the quality of the hand pumps and physical condition of both hand pumps and toilets. Main aspects assessed under physical condition were the overall functionality of the water supply points and construction quality for both the water points and toilets. A perfect physical condition score indicates that a water system is free of contamination, has high quality construction without visible defects in masonry and should provide abundant flow water at the first pump. A visit was made to the supplier of hand pumps and spares to assess the manufacturing process especially use of dimensional control tools, checking use of "Jigs and Fixtures" and use of go and No Go gauges for assuring dimensional tolerances and inter-changeability of parts from one pump to another. Focus group discussions (FGDs) were held with user communities and water committee members using a discussion guide.

2.3. Data analysis

The primary data collected from household survey through structured questionnaires was first checked for accuracy and data entries coded. Data was then entered, edited and analyzed using Statistical Package for Social Science (SPSS) version 16.0 software. The Sustainability Analytical Framework adapted from UNDP-World Bank Water and Sanitation Program report was used for analysis of the sub-indicators of sustainability (Sara and Katz, 1997). The five sub-indicators, such as, (a) financial management, (b) operation and maintenance practices, (c) consumer satisfaction, (d) physical condition of system and, (e) willingness to sustain the system. Modifications were made on the questions in the questionnaires to suit the context of study. Each sub-indicator score was based on a group of eight (8) to twenty (20) related questions collected by the study team. Each question was scored on a scale of zero to two, and the total score for the sub-indicator is calculated by combining these scores and converting to a ten-point scale. Overall sustainability index in each ward is an average of the five sub indicators. It is adjusted to a ten-point scale, with financial management comprising 12% of the overall sustainability score, and each of the other four indicators comprising 22% percent. The index for each project was grouped into three categories. Index above 6.67 was categorized as Sustainable, below 5.00 as Unsustainable and between 5.00 and 6.67 as potentially sustainable based on the Sustainability Framework from the UNDP-World Bank Water and Sanitation Program Report (Sara and Katz, 1997).