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Emerging issues on the sustainability of the community based rural water resources management approach in Zimbabwe: A case study of Gwanda District

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Abstract

Although there is considerable on-going debate about the suitability and sustainability of community based water resources management (CBWRM) in Africa as a water provision strategy, evidence shows that this approach has gone a long way in promoting access to clean water amongst rural African communities. CBWRM provides an alternative approach to water provision for rural communities. This paper examines how the strategy has been operationalised in Gwanda District in Zimbabwe. The paper examines the experiences of rural communities in using CBWRM. Data was collected using focus group discussions, key informant in-depth interviews and a survey of 685 households in Gwanda district across five wards. The findings of this study are that 67% of the surveyed rural communities in Gwanda depended on community managed water resources mostly in the form of boreholes and protected wells. High rates of nun-functional sources were reported at 60-70% in most wards. Several system weaknesses were noted in the current CBWRM set-up including a depletion of committee memberships, inadequate community resources, limited agency and government support. This paper makes several recommendations on strengthening the capacity of CBWRM in Zimbabwe and Africa.

Keywords: Community management, Water, Rural communities, Capacity, Sustainability

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1. Introduction

Community based rural water resources management has been largely embraced as the panacea for water provision for rural populations in sub-Saharan Africa (IRC, 1997; Harvey and Reed, 2007). In spite of the broad acceptance and adoption of community based water resources management [CBWRM] as a strategy for managing rural water supplies there is little understanding of the factors that drive the success or failure of such water management systems. It is argued that 'the fact that low rural water supply sustainability levels remain throughout sub-Saharan Africa indicates that there are severe limitations to current approaches to community management'. (Harvey and Reed, 2007:341). Over the past two decades players in the rural water supply sector have been aggressively employing the community based water resources management approach. This paper seeks to examine how the strategy has been applied in Gwanda district and with what consequences for sustainability. The paper seeks to understand what factors drive the success or failure of CBWRM with specific reference to Gwanda District as a case study.

2. Literature review

Research evidence in Africa shows that many hand pumps which have been constructed as part of the water infrastructure over the past two decades are no longer functional in most places. According to RWSN (2010), this represents a predicament of wasted infrastructure development. It is estimated that only about 67% of installed water hand pumps are working at any point in time in Africa (RWSN, 2010). When these breakdowns occur, many people who would have benefitted from these pumps resort back to unimproved water sources and thus endangering their health. Montgomery et al. (2009:362) state that 'In a survey of 11 countries in Sub-Saharan Africa, the percentage of functioning water systems in rural areas ranged from 35–80%.' Zimbabwe has not been spared from this predicament. Various agencies which include the District Development Fund, international and local non-governmental organisations have constructed hand pumps which have seized to function over the years (Hoko et al., 2009).

Community management as used in water resources management may be defined as a participatory approach to development whereby members of the community largely determine issues to do with the control, operation, management and maintenance of their water system (Harvey and Reed, 2007). The notion of community management has spread widely over the past few decades receiving extensive acceptance across most sectors in international development planning and management including the management of rural water supplies in Africa (Harvey and Reed, 2007). Kumar (2005:275) elaborates that 'The past few decades have witnessed a burgeoning number of projects in various parts of the world in natural resource management with the prefix 'community' attached to them.' The concept has spread in an attempt to find answers largely to the question of sustainability of impact from rural projects and programs. The inherent weaknesses of state dependent development interventions have driven the need for alternative community driven development management. Community based management of water resources (CBWRM) as a concept has particularly found sympathisers in developing countries where governments are financially incapacitated to meet water demands for rural populations. (ICE, Oxfam GB & Water Aid, 2011)

The concept of community based water resources management is not only an alternative way of managing rural water resources but it is also an essential strategy as evidence from many developing countries point to the fact that even the most organised and capacitated water agencies cannot effectively implement and sustain large networks of water systems that span over wide geographical space without the communities being actively involved in the management of those sources (Lammerink, 1998). Therefore, a full understanding of how community based water resources management functions will continue for the foreseeable future to be an integral part of understanding rural water supply systems in Africa.

The primary arm in the community management of water resources is usually some kind of water point management committee which is responsible for mobilising community members, gathering resources and ensuring the maintenance and repair of water systems for which the committee is responsible (Harvey and Reed, 2007). The focus of this paper is on understanding the experiences of communities in Gwanda district in operationalising these committees in community based water resources management.

A water resources management system that has the community playing a more prominent role has been encouraged for a number of reasons (Lammerink, 1998). Some of the key reasons include the fact that such systems produce greater system efficiency and they improve the possibility of sustainability (Doe and Khan, 2004). Further to this, such a system seems to offload a significant amount of burden from cash strapped governments. All these issues have seen the growth of this approach in developing countries. However, community based water resources management systems appear to have a lot of weaknesses as testified to by the number of non-functional water sources that are community managed. As Doe and Khan (2004:364) further note 'Community management has not always lived up to its expectations and it faces many constraints, many of which the literature does not investigate adequately.' This paper explores experiences in community management to understand opportunities, constraints and possible operational options.

According to Harvey and Reed (2007) the growth of community management of water resources is also attributable to the fact that it is seen as a convenient concept for governments and agencies seeking to abdicate the responsibility of operating and maintaining water systems on an on-going basis. Harvey and Reed (2007) argue that this approach is a convenient way of abrogating the responsibility to provide water for rural communities with a clear conscience. Some researchers argue that community based water resources management is about the only realistic option in circumstances where there is a fragile or failed central government that is not able to provide portable water for rural communities (ICE, Oxfam & Water Aid, 2011).

3. Research methodology

3.1. Location of study area

The study was carried out in Gwanda District in November 2011. Gwanda District lies in the provincial capital of Matabeleland South Province. The district has twenty communal wards, one commercial ward, and three resettlement areas. Gwanda district falls within natural regions IV and V which are characterised by low, erratic rainfall patterns and droughts. The mean annual rainfall is 300 mm, rainfall decreases from Gwanda North to Gwanda South with the average being 380 mm per annum in North and 300 mm per annum in the South (Mzingwane Catchment Council, 2010). The rainfall season spans from October to April.

3.2. Target population and sampling method

The study adopted a multi stage cluster sampling technique in selecting specific wards, villages and households to be studied. Five wards were purposively selected to ensure an adequate geographical spread and coverage of the district in order to accommodate the various hydrological areas found in Gwanda. All villages in the sampled wards were further sampled for households to be studied based on a systematic random sampling technique. The households in the villages were also selected using a systematic random sampling technique.

The target area of study was the communal wards of Gwanda District. The communal area has an estimated total population of 160509. It is estimated that there were 21 158 households in the communal households and 1604 resettlement households in the District at the time of the study in 2011. There are a total of 20 Wards in the area of study out of 24 wards in the entire District. The combined number of villages in all the 20 Wards is 115. The study was limited to the following 5 wards: Ward 3 (Mzimuni), Ward 7 (Simbumbumbu), Ward 12 (Gungwe), Ward 13 (Garanyemba), and Ward 24 (Patana) as their hydrological conditions are representative of the whole district.

Mzimuni and Simbumbumbu are in the northern part of the district where the rainfall amount is higher than the southern part (Garanyemba, Gungwe and Patana) of the district as indicated in the section which provided a description of the district. The broken hilly granite rocks are a feature of both Gwanda South and North. At the level of the Ward all villages in the selected Wards were drawn for the study. Therefore a total of 28 villages were selected. A proportionate number of households per village per ward were selected.

3.3. Data collection methods

Three major data collection instruments were used and these were the Household questionnaire, Focus Group Discussions, and In-depth Interviews. Household Questionnaires were used to collect information on household demographics, household access to various types of water sources, household knowledge, attitudes and practices concerning community based water resources management issues, and water point sustainability among other issues. Focus group discussions were used to collect data on collective community views concerning community based water resources management. In-depth interviews were used to collect related data from informed water specialists and other stakeholders who included District Development Fund officers, Gwanda Rural District Officers and Health Officials. Data collection was done by a team consisting of 16 enumerators. The enumerators underwent training before going into the field so that they could ask and record proper responses. The survey was carried out over two weeks. A total of 698 households were sampled as shown in table 1 above. The questionnaire data was captured and analysed using the Statistical Package for Social Sciences (SPSS). Qualitative data from focus group interviews and in-depth interviews were analysed using Atlas.ti.

4. Results and discussion

4.1. Access to clean water in Gwanda

The results of the survey indicated that 66% of the surveyed households access water from protected sources. This means that at least 34% of the households use drinking water from unprotected sources (open well, traditional sand well or dam). However, it is important to note that some protected water sources were seasonal and even those communities that use protected water sources often resort to unprotected sources at some point of the dry season (May to October).

The majority (43%) of households surveyed pointed out that they primarily use boreholes as their source of drinking water. Twenty six percent (26%) of the households highlighted that they used water from traditional sand wells. Another 23% of the households pointed out that they primarily use protected wells. The other households were noted to be primarily using unprotected open wells (6%) and dams (2%).

Results further showed that the three most common water sources in Gwanda District are the borehole, the protected well and the traditional sand well. Respondents were asked to tick the types of water sources available to them. Where more than one source was available, respondents could tick all the available sources.

Sixty percent (60%) of household respondents indicated that their household members travelled distances of more than 0.5 kilometres to fetch water. According to the Sphere Project (2011:97), the maximum standard distance from any household to the nearest water point should be 500 metres i.e. 0.5km in disaster situations. From the Garanyemba Focus Group Discussions, it was noted that some households travelled up to 8 kilometres to the nearest water source especially during the dry season. In Simbumbumbu and Patana FGDs some households were reported to be travelling up to 5kilometres to reach a water source. In Mzimuni and Gungwe FGDs households were reported to be travelling up to 7 kilometres to reach a water source. This was because most boreholes had either broken down or were dry due to lowered water tables. Generally, it was noted that boreholes and protected wells were in a serious state of disrepair. This result points to the fact that the current water management systems needed a major overhaul.

The state of affairs highlighted above led to very low water usage levels below the minimum of 15 litres per person recommended by The Sphere Project (2011). The survey data revealed that the average level of water usage was 13.10 litres per person per day compared to the minimum requirement of 15 litres per person per day in disaster situations. This result was arrived at by dividing the average number of litres fetched per day by the average number of people per household. This result shows that Gwanda district is a high water shortage area. The ripple effect of this challenge is that hygiene standards were being compromised as villagers were not washing hands after using the toilet in order to save water.

According to data gathered from the FGDs, in village 1 of Mzimuni households were spending up to three hours at the water point waiting for the water source to recharge. It follows that the opportunity cost for fetching water is very high.

Survey data from the household questionnaires revealed that 58 boreholes were functional with 46 being non-functional in the survey area. Further analysis shows that wards 13, 24, 3 and 7 had more than half of the non functional boreholes within their wards. Ward 12 had more (28) functional boreholes than the non functional boreholes as compared to the other four wards.

4.2. Ownership of water resources in Gwanda district

The study established that water sources in Gwanda are generally community owned. Seventy two percent (72%) of the households interviewed said that the water sources they use are communally owned. Sixteen percent (16%) of the households used sources owned by various institutions including government clinics, schools and NGO projects. The remainder (12%) of the households used water sources that were privately owned by 13 families.

In view of the fact that most water sources are communally owned, it would be essential that any rural water policies for such areas should ensure optimum community participation in planning and implementation. The management of community owned water points presents different dynamics from those of privately owned water sources. As Harvey and Reed (2007) correctly observe 'The issue of communal ownership is very different to individual ownership, yet it is a common mistake to view them in the same way.' The critical difference between the two types of ownership is that where an individual has ownership of a water source that particular individual is entirely responsible for the maintenance and repair of the source. Where a community owns the water source complications normally arise when it comes to the financing of repairs and maintenance. The gist of this paper is to examine how these issues have been handled in the area of study (Gwanda District), and what the consequences of such practice have been.

Findings from focus group discussions showed that communities strongly associated the ownership of water sources with the particular agency that would have constructed the water source. Communities often referred to boreholes and dams by the name of the agency that constructed it. For example it was common to have dams and boreholes named after the constructing agency like 'idamu leDabane' (Dabane Trust Dam) or 'idamu le-Care' (CARE International Dam). CARE International and Dabane Trust were some of the organisations working in Gwanda District to provide clean water for communities. These findings showed that communities still had an expectation to depend upon the providers of water sources for repairs and maintenance. It was observed that many communities were approaching the agencies that constructed the water sources to assist with their repairs when they broke down. The feeling of ownership of the water sources was therefore observably low. This might account for the high levels of breakdown of community owned boreholes. Doe and Khan (2009: 365) point out that 'commentators have also blamed the failure of community management to deliver on a lack of feeling of ownership on the part of the community.' This might account for the high number of water sources in a state of disrepair in Gwanda District.

It should be noted that all privately owned water sources were at the time of the study reported to be in good working order. A number of reasons can be given for this state of affairs. Firstly, repairs and maintenance responsibilities rest squarely on the owner of the source. Therefore, there is no debate about who should pay for the upkeep of the source as is usually the case in community owned sources. Secondly, privately owned water sources do not endure the kind of pressure that community owned sources have to endure due to the large numbers of people that use them. Findings from the survey showed that on average a population of 945 people shared a single borehole. This is in comparison with a standard figure of 250 people per borehole. These findings show why privately owned sources rarely break down. Lastly, it would logically apply that private owners exercise extreme care and caution in using their sources in view of the fact that they incur personal expenses.

4.3. Water point user committees and other structures

The primary arm for Community Based Water Resources Management in Zimbabwe's rural areas is what is known as Water Point User Committees (WPUCs). The committees are responsible for enforcing the rules and the regulations in the use of boreholes, mobilising financial resources for the payment of pump minders in case of breakdowns, reporting breakdowns, conducting regular meetings so as to identify and solve problems related to the maintenance of the water sources. Each Water Point User Committee is comprised of 7 members namely; Chairperson, Vice Chairperson, Secretary, Vice Secretary, Treasurer and 2 Committee members. The communities democratically choose community members to be in the committees. The committees in most of the boreholes constitute near equal numbers between women and men. However, the leadership of WPUCs is dominated by men in all wards. This is in stuck contrast with the findings that in 85% percent of the households, it is women who are responsible for fetching water. Influential positions like that of the Chairperson, the Vice-Chairperson and the Treasurer were occupied by men. In all wards, the position of the Secretary was occupied by women. Gender inequality was found to be a barrier to the efficiency of WPUCs. The findings of the study were that although a few villages had functional water point user committees, most villages had none. The functional ones were in some instances an ad hoc organisation of individuals who came together when a borehole had broken down. Most water point user committees broke down when members either died or migrated to new resettlement areas. There was need to capacity enhance communities to sustainably manage their water points. The resuscitation of water point user committees would be a critical element of this capacity building exercise.

Fifty two percent (52%) of the respondents said that there was no water point user committee in their area. Forty three percent (43%) of the household respondents mentioned knowledge of water point user committees in their area. The remainder (5%) said that they did not know whether or not there was a water point user committee in their area. The water point user committees were existent in areas where the boreholes were functional, whilst in areas where the boreholes were non functional the water point user committees were no longer functional and hence they were not known by the communities. This begs the question whether the death of WPUCs led to the breakdown of boreholes or vice-versa. Findings therefore show that there is a relationship between the functionality of boreholes and the state of Water Point User

Committees. The availability of active healthy WPUCs tended to correlate with the higher functionality levels of boreholes. The WPUCs are important in the maintenance of water points through enforcing various rules and regulations agreed on by the communities. The communities indicated that where the WPUC is active the boreholes could go for four to five months without major breakdowns. If the WPUCs were not active it takes time for the break downs to be reported and attended to. In communities where WPUCs are active they enforce the agreed rules and regulations and they also respond to the breakdowns quickly.

It was the finding of this study that most Water Point User Committees were in a general state of dysfunction. This was caused by a number of reasons. Firstly, many members had died due to the HIV and AIDS pandemic that affected Zimbabwe over the past two decades. Some members of these committees had died due to other natural causes. Secondly, some members had migrated to new resettlement areas under the fast track land reform program. Lastly, some members had pulled out due to lack of interest and motivation. The study established that there was need for regular training of WPUCs in order to replace those who had died and those who withdraw or migrate to other places. In the absence of an active and functional government arm that consistently trains, motivates and directs these WPUCs, they gradually dissolve and become dysfunctional. Harvey and Reed (2007) point out that evidence from studies carried out in Zambia, Uganda and Ghana showed that community based water resources management is only sustainable where either a local government or NGO is actively playing a dynamic role in assisting the community. These findings suggest that it is CBWRM as a concept would not work where communities are entirely left to themselves to organize and run their own water systems. Such a system would fail due to lack of financing, motivation and capacity.

4.4. Sustainability challenges faced by water point user committees

The most common challenges that were faced by Water Point User Committees related to the funding of maintenance and operations of the boreholes under their jurisdiction. Most rural communities in Gwanda live under the poverty datum line. This means that maintaining boreholes becomes a challenge especially in view of the amount of money required to do so. Enquiries from dealers and the local community showed that a full borehole repair and rehabilitation kit cost on average $3000 (USD). On average the repair of a borehole would cost $100 for labour charges by pump mechanics. In instances where the breakdowns were frequent this amount would accumulate to larger sums. Gathering such an amount from poor rural communities has proven to be a major stumbling block for community approaches to water resources management. Communities in all the five wards pointed out that some households were unable to contribute for the maintenance and repair of community water sources. Various measures were being taken to address the issue of households who failed to pay. Such measures included registering the people with the kraal head. This meant that they would gradually clear their debt. In Simbumbumbu and Garanyemba, it was reported that households who failed to pay were prohibited from using the repaired boreholes. Households that experienced restricted access to such water points were forced to seek alternative sources which were far and unsafe, mostly in the form dam or river sand wells. This exposed them to water borne diseases.

Therefore, it is evident that poverty is having an adverse effect on the sustainable operationalisation of the community based water resources management strategy. It may be argued that CBWRM as it is currently practiced is not a viable option for poor communities. However, it must be noted that in the case of many rural communities in Africa, community based water resources management as an approach is not a matter of an option; it is about the only avenue that has to be worked through in a sustainable manner. Lack of capacity by government structures leave most rural communities with no option but to organise and to manage their own water resources. Because of the economic crunch that has affected Zimbabwe since the late 1990s, rural communities have found themselves increasingly having to manage their own water resources with little, if any, central government assistance.

It is evident that the missing element in rural water supply programming is the issue of costs for the maintenance and operation of the water points after the withdrawal of the constructing agency or government department. As the RWSN (2010:4) notes, 'Questions regarding how to support water users after construction of new infrastructure and who should pay for the long-term costs of operation and maintenance are considered to be, somebody else's problem', and of little concern to the organisations funding the new infrastructure. Too little attention is paid to how communities are likely to deal with the real-life complexities of a water supply system.' Over-emphasis is placed on the installation of infrastructure without considering how it will be maintained. Montgomery et al. (2009) highlight that the issue of fully accounting for the operation and maintenance costs of boreholes has been emphasised before in studies that examined the cost effectiveness of hand pumps in Africa. It has been found out that the cost of operating and maintaining new boreholes is three times higher than the cost required to expand coverage into new areas, and yet planners remain blindfolded to these costs.

This paper proposes that community based water resources management should adopt a more flexible and integrated approach that leaves room for participation by other players besides the rural communities who are often too poor and incapacitated to carry the load alone. As Lamerink (1998) suggests; community management does not imply that communities must pay the full costs and take care of everything. The idea of partnership implies sharing responsibilities between communities and supporting agencies. Therefore the functions of local management organisations can vary considerably, depending on the agreed division of responsibility between the community and the agency.

Further to the point raised above, future programs embarking on the installation of water infrastructure should include some income generation side-project such as vegetable gardening that would be meant specifically to raise funds for the maintenance of the water infrastructure. Such projects would be collectively managed and run by the communities to raise funds for the repairs and maintenance of their water sources.

The key strategy is as spelt out by Montgomery et al. (2009:372) who argue that;

> *...establishing long-term, dynamic operation and maintenance practices requires a financial plan and enforceable operation standards... The financial plan should calculate and determine sources of funding for direct operation costs, future repair costs, institutional and training costs, including monitoring, and expansion costs...*

This critical element appears to be missing in community based rural water resources management as it is currently practiced in Zimbabwe and other sub-saharan countries. It is often imagined that if a community has a borehole constructed for it, they will see to its operation and maintenance somehow. The number of non-functional boreholes across sub-saharan Africa shows that the somehow planning method is incomplete and ineffective to drive a robust water provision strategy for rural areas. Water resources planning needs to take a shift and combine with financial viable strategies to generate money for boreholes. This was lacking in all the five wards that were surveyed. Communities only collected money from households when a borehole broke down in order to buy spares and pay for repairs labour. On-going strategies to collect money need to be considered more seriously. This could be in the form of side-projects run by the community such as vegetable gardens. Communities may also pay monthly subscriptions that accumulate towards repair and maintenance fees. This would ensure that there is always an accumulated amount of money before any breakdown occurs. It was noted from focus group discussions that boreholes could be broken down for up to five months while communities were collecting money to repair them. A study conducted by Hoko et al. (2009) in Mt Darwin District showed that villagers were unwilling to pay money in advance to Water Point Committees because they feared that the money would be abused. It would be necessary to institute professional and trustworthy structures to handle community money.

The other issue that appears to be a universal problem in the community management of water resources is the nature of the concept of ‘community’ and its internal political dynamics. Generally, when community based water resources management is discussed, it is often imagined that ‘community’ is a uniform group of people who have the same needs, capacities and thoughts. As Doe and Khan (2004) note these definitions share the commonality of being about a group of people, with common interests who are capable of taking collective decision and action for their common good.

The reality on the ground shows that this is far from true as communities have different needs, capacities and thoughts inherent within them. The study established that there are various types of water users in any given community in a rural set-up. Findings from focus group discussions showed that besides using water for drinking, other key uses of water included livestock watering, brick making and vegetable gardening. It was noted that community groups do not use water in the same way. Some members of the community were of the opinion that some groups use water more than others and should therefore be made to pay more for repairs and maintenance. While all households used water for basic purposes to cook, drink and wash, it was noted that others were into extra activities such as brick-making, livestock watering and gardening. However, the determination of the amount of extra water used by such groups remained a challenge. As Kumar (1998) states ‘...communities are not necessarily clearly bounded social or geographic units, nor are they likely to be homogeneous entities with single or agreed interests...’ These findings confirm the fact that communities are not homogeneous entities and this presents problems in terms of community based water resources management. Some villages managed the situation by distributing water equally for all households. For example, in Mtandiwenema village in Garanyemba Ward, each household was restricted to a maximum of four twenty litre buckets (80 litres) of water per day regardless of the number of people in a household. This served to minimize the depletion of the water table and also to minimize pressure on the borehole that could lead to more frequent breakdowns. This effectively meant that households had to find alternative sources of water for other activities.

5. Conclusion

It is evident from the foregoing discussion that the concept of community based water resources management will remain the only avenue for most rural communities in Africa given the lack of capacity of many developing country governments in providing clean water for rural populations. This is corroborated by findings from the Gwanda District case study and other findings from elsewhere. The study has established that rural communities in Gwanda, as is the case in most parts of Africa, largely depend on community managed water supply systems. These systems are largely run on the basis of water point user committees. While these committees have endeavoured to keep water sources functional, they face various sustainability challenges. There are no existing mechanisms to ensure a constant resuscitation and rejuvenation of the committees that face depletion due to various factors. The communities that these committees serve have major financial challenges due to high poverty levels. This makes it difficult for the committees to raise funds required to run the water sources. Further to this, the smooth running of CBWRM is based on the assumption that communities are homogeneous groups with the same interests. Findings show that water users differ vastly and this often results in conflicts when it comes to contributions for repairs and maintenance. Policies may be crafted to either equalise water consumption across households or increase the amount paid by those who use more water. It is evident from the foregoing discussion that more dynamic funding mechanisms need to be engrafted into water planning for rural areas including those discussed here. One other critical strategy might be to include a side projects that generate funds for the maintenance and repair of water sources.

References

Doe, S.R. and Khan M.S. (2004) "The boundaries and limits of community management: Lessons from the water sector in Ghana", *Community Development Journal*, Vol. 39 No. 4, pp. 360–371.

Harvey P.A and Reed R.A. (2007) "Community-managed water supplies in Africa: sustainable or dispensable?" *Community Development Journal*, Vol. 42 No. 3, pp. 365 –378.

Harvey P.A. and Drouin T. (2006) "The case for the rope-pump in Africa: A comparative performance analysis", *Journal of Water and Health*, Vol. 4 No. 4, pp499-510.

Hoko Z., Demberere, T. and Siwadi, J. (2009), "An Evaluation of the Sustainability of a Water Supply Project in Mt Darwin District: Zimbabwe", *Journal of Sustainable Development in Africa*, Vol. 11 No. 2, pp. 98-112

ICE, Oxfam GB & Water Aid (2011), *Managing Water Locally: An Essential Dimension of Community Water Development*, Oxfam Publications, Oxfam.

IRC International Water and Sanitation Centre (1997), *Water Supplies Managed by Rural Communities*, IRC, Netherlands.

Kumar, C. (2005), “Revisiting ‘community’ in community-based natural resource management”*, Community Development Journal*, Vol. 40 No 3, pp. 275 –285.

Lammerink, M.P. (1998), “Community managed rural water supply: experiences from participatory action research in Kenya, Cameroon, Nepal, Pakistan, Guatemala and Colombia”, *Community Development Journal*, Vol. 33 No. 4, pp. 342-352.

Montgomery, M.A., Bartram, J. and Elimelech, M. (2009), “Increasing Functional Sustainability of Water and Sanitation Supplies in Rural Sub-Saharan Africa”, *Environmental Science Engineering*, Vol. 26 No. 5, pp. 1017-1023.

Rural Water Supply Network (2010), “Myths of the Rural Water Supply Sector”, *RWSN Perspectives,* No. 4.

Wells, M. and Brandon, K. (1992), *People and Parks: Linking Protected Area Management with Local Communities*, World Bank Publications, Washington DC.