

WATER AND SANITATION PROJECTS AND SOCIO-ECONOMIC CONDITIONS IN BUGESERA DISTRICT IN RWANDA

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ABSTRACT

All development initiatives are to improve welfare for social and economic conditions of people while at the same time addressing issues that make our environment harmful to human life. This study sought to examine the implications of water and sanitation projects on socio-economic conditions of beneficiaries in Bugesera District. The study involved 266 respondents, semi-structured questionnaire was used in data collection. The study revealed that the project facilitated access to water, reduced distance made to the fetching points, improved the safety of water, and access high quality latrines in the project area. The calculated t-values (41.750, 35.3, 35.766, and 39.3) for the above variables indicated significance of difference, as they are greater than the tabulated t (tcv) of 1.96. This meant that the project made tremendous changes when comparing the situation before and after the project intervention. The study revealed that increased access to water contributed significantly to the reduction of the distance made to the fetching points. This access also contributed greatly to the reduction of monthly expenses made by households on water. Furthermore, increased safety of water contributed significantly to the reduction of poor hygiene related diseases.

Key Words: Water, sanitation, socio-economic conditions

INTRODUCTION

The ultimate goal of all development initiatives is to improve welfare for social and economic conditions of people while at the same time addressing issues that make our environment harmful to human life. Gajigo (2013) reveals that access to improved water source still an issue of concern particularly in the sub-Saharan Africa, where the level of access is only 55%. This issue if not addressed can seriously weaken efforts by governments and donors to end extreme poverty. However, efforts in the continent to address the issue

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have been ongoing. According to Coussins (2009), each and every country adopts strategies to implement in accordance with its social needs. These strategies may have positive implications on meeting the MDG specifically of reducing by half the proportion of the people with limited access to improved water and sanitation by 2015. Though WHO and UNICEF in 2012 reported, the MDG target for safe drinking water had been met, this being good news, there is disguised regional disparities. For example, 768 million people across the whole world still do not have access to safe drinking water and 2.5 billion do not have access to adequate sanitation (<http://www.one.org/mdg>).

The government of Rwanda to attain the MDGs and accelerate its pace of development has been implementing water supply projects in various parts of the country and in particular in the eastern province. Government initiatives alone could not be enough to meet the needs of the growing Rwandan population. It is in this regard that Action Aid amongst many other NGOs has implemented water and sanitation project in Bugesera district, in the eastern province to improve access to water and sanitation for community members.

However, water and sanitation facility operation, maintenance and management remain key sector challenges affecting the sustainability for rural water supply infrastructure. Japan International Cooperation Agency report shows that the percentage of functional water schemes is quite low with up to 75% of sampled schemes poorly maintained. The accessibility to water by communities has a strong bearing on their health and sanitation levels. It saves energy and time spent by the members of the household particularly women and children. Despite the enabling policies in the water and sanitation sector, there are challenges such as maintenance of the facilities and participation in decision making in water supervision structures by communities especially women (East Africa Community, 2009). Further, the report indicated that improvements have been made in the area of Women's Economic Empowerment, Employment and Poverty Reduction, based on the constitution and enacted laws. Credit and finance mechanisms have been initiated to empower women economically and move them out of the poverty trap. However, a lot still needs to be done in the area of micro financing, land acquisition and other asset ownership by women to improve their economic situation. (Japan International Cooperation Agency, 200).

The transition to the new institutional framework may take time, but according sustainable functionality the priority it deserves will ensure that progress towards fulfilling MDG targets will remain positive. Sector financing should take into consideration recurrent costs such as operation and maintenance, which are decisive in determining the life cycle of water supply structures (Water Aid, n.d). The sustainable operation and management of rural water supply infrastructure is one of the key challenges of this sub-sector, where persistent rehabilitation is always required. However, the situation has changed significantly with the delegation of service responsibility to the districts and the introduction of delegated management. The percentage of schemes managed by private operators is rising

fast (reaching about 30% in 2012) and the first evaluations, in terms of improved functionality, has been encouraging. Water supply and sanitation services in rural and urban areas are provided by EWSA (Republic of Rwanda, Ministry of Infrastructure, 2013).

The Rwanda Economic Development and Poverty Reduction Strategy, therefore targets to support Economic growth by improving infrastructure service provision especially electricity. The Rwanda electricity access Scale-Up and Sector-Wide Approach (SWAP) development project should help launch the National Electricity Access Program; to realize the primary target of the Second Economic Development and Poverty Reduction Strategy (EDPRS 2) for the electricity sector of tripling access to electricity by 2012 to about 16 percent of households and at least 50 percent of identified public institutions. The project was also providing an effective means to advance implementation of the Government-led sector wide approach and ongoing harmonization process in the electricity sector (Ministry of Finance and Economic Planning, 2013).

Overall the critical challenges/constraints identified sector to be addressed in this strategic plan and the EDPRS 2013-2017, include the following: insufficient access to clean water supply; inadequate management of water supply schemes; insufficient storm water management resulting in high level pollution risks due to erosion and waste water discharges; inappropriate solid waste management; lack of centralized sewerage system; insufficient individual and public sanitation facilities; lack of a well-structured in-service training for Watsan sector; and insufficient budgetary provision and expertise for Operational and maintenance of Water and Sanitation infrastructure. All the above are what the current strategic plan 2013-2017 will strive to address and achieve to 100% by 2017, itself a mammoth challenge to the sector (Republic of Rwanda, Ministry of Infrastructure, 2013).

In recent years, Rwanda has suffered from an acute shortage of electricity supply and severe load shedding. Its installed generation capacity, has been severely constrained by regional drought, which led to a rapid draw-down of the reservoirs. Furthermore, the poor quality of supply severely limits the competitiveness of Rwandan businesses, the sector has emerged from a period of supply shortages, helped by better-than- average rainfall and additional base-load thermal generation (Republic of Rwanda, 2013)

Even if SWAP project indicates success in the first phase, the performance assessment completed in April 2015, highlights that Energy, Water and Sanitation Authority (EWSA) performance has been poor that caused inefficient electricity in Rwanda. This poor performance should be a result of an increasing maintenance costs may be due to lack of effective M&E. Hence, currently most M&E works related to performance of the projects, internal accounting control and security over assets rather sustainability of the projects outcome. It is felt necessary to study the role of M &E to the projects sustainability in Rwanda, with reference of SWAP

Paulinus and Iyenemi (2014) carried out a study called M&E rural water supply projects and sustainable development in Nigeria and Ghana. The study reviews the sustainability issues that are associated with rural community water provision and some of

the challenges experienced in the in-Niger Delta region of Nigeria within the context of project benefits sustenance. The sustainability of this approach to water provision was assessed using a qualitative research methodology and undertaking a comparative review of Micro-Projects Programme (MPP3) in Nigeria with that of Volta Region Community Water Supply Programme (VRCWSP). The findings reveal the absence of sustainability in the current approach and the paper recommends that if community based hand pump operated rural water supply projects are to be sustainable; the sustainability factors must be given full consideration in its design and implementation

Water sources for drinking in Eastern Province are springs, groundwater and surface waters. For rural water supply, piped schemes by gravity or motorized pumps, groundwater equipped with hand pumps and protected springs are found. Of these, motorized pumps for piped schemes are powered either by generators or using commercial power. Also, in some areas, house connections are made. Residents who cannot access safe water within reasonable distances are using distant water supply schemes, untreated surface waters or contaminated waters. According to the household survey conducted in the target area, persons who fetch water are children, adult women and adult men, in this order, which can be thought of as work for the entire family. The total volume of water a household fetches is estimated between 60 to 80 liters a day, and varies from 13.3 liters to 16.0 liters per person showing differences between districts. Also, responses showed that time used to fetch water from a water supply scheme averaged 10 minutes to 3 hours one-way to public tap stands. Refer to Supporting Report for details of the social survey (Japan International Cooperation Agency, 200).

The rural area drinking water supply and sanitation program is a priority in the Rwandan Government's investment program. It contributes to the attainment of the objectives of the poverty reduction strategy and the 2020 Vision in the sub-sector. The approach used in the program, which is based on the demand of the grass-root communities, is consistent with the sectoral strategy and the decentralization policy adopted by the Government. This approach aims at beneficiary participation in the definition of sub-projects, the creation and management of infrastructure through the decentralized structures that the Government has put in place (Africa Development Fund, 2003).

The water schemes are managed by water users, association, private operators, central government and local administration. As for water fee collection, piped schemes are on volumetric or metered and hand pump schemes are charged on a flat rate basis at tap stands, fees are collected based on the jerrican which is a plastic water container of 20 liters and house connections are billed by cubic meter (WHO-UNICEF Report, 2000).

Most of these impacts are limited to the works implementation period, namely: the risk of erosion, clearing of works sites, nuisance from works, mud intrusion into water courses on sites upstream during works and opening of quarries to extract construction materials. Other impacts require follow-up and mitigating measures, especially:

- the modification of the ecosystem around the watershed;

- the prevention of peasants from using certain plots of land around watershed to be developed (such lands have until now been devoted to farming);
- the risk of contamination of watersheds by latrines and agrochemicals; and
- the risk of water-borne diseases attributable to water stagnation around standpipes and poorly drained water points.

The Program will not have a significant negative impact on the ground water table since most extractions will be from surface water resources and shallow tables supplying such sour (Africa Development Fund, 2003). This study sought to identify and examine the implications of water and sanitation projects on socio-economic conditions of beneficiaries in Bugesera District.

METHODOLOGY

This study applied a co-relational research design to examine the implication of water and sanitation project on socio-economic conditions of beneficiaries. T-Statistics was used to measure the significance of difference between the situation before and after the project. As well Chi-Square was used to measure the relationship between independent and dependent variables. The study involved 266 respondents.

As recommends Kothari (2004), semi-structured questionnaire was used as a main research instrument, supplemented by Key Informant Interview (KII). Data was analyzed to measure the difference between the situation of water and sanitation before and after, and to measure the relationship between the project and socio-economic conditions of beneficiaries.

Water and sanitation project implemented in the study area consisted in three main activities. First the existing water supply systems were rehabilitated, distribution networks and fetching points were constructed for increased access for the rural people, and then public latrines were constructed.

RESEARCH FINDINGS

Water and sanitation before and after the project intervention

The findings in table 1 reveal that majority of the respondents (138, 50.5%) reported that before the project, they could not access water, and the rest could use other means to get water such as harvesting from rain, etc. This means that there were very few springs of water and people had to make longer distance to access water. At the end of the project, the water distribution network and rehabilitation of the existing dysfunctional system increased the access to water as reported by 131 (48%). This implies that installation of new springs has abled the beneficiaries access water for various uses (home and drinking).

The study also revealed that safety of the scarce water available before the project was problematic. Almost half of the beneficiaries (45.4%) reported that water before the project was not safe. Water from the wetlands, and springs was not protected; which in

exposure to all sorts of pollutants from various sources, including mainly erosion, and human activities. As a result of the project intervention, beneficiaries reported high satisfaction with safety of water. The beneficiaries reported that the implementation of project facilitated the construction of public latrines with highly good quality managed by the local government authorities in close collaboration with the villagers.

Table 1:
Water and sanitation before and after the project intervention

		Frequency	Percent
Access before	very difficult	138	50.5
Access after	Easy	131	48.0
Safety of water before	Not safe	124	45.4
Safety after	Safe	131	48.0
Quality of latrines before	Poor	79	30
Quality of latrines	very high	136	49.8

Significance of the difference made by the project

Findings in table 2 revealed that the project made significant difference in facilitating access to water, improving safety of water, and distance made before and after for fetching water. The calculated t values for the above variables t are 41.750, 35.766, 35.300, whereas the tabulated t (tcv) is 1.96. The calculated value being greater than the critical value, therefore, the Null hypothesis is rejected and conclude that there is a strong difference between access to water before the implementation of the project and access after the project, safety of water before and after and the distance made to the fetching points before the project and after the project. Now as distribution networks points of water increased, access to water has improved and distance made importantly decreased. This means that beneficiaries increased their involvement in other activities for the time that was spent to look for water from far and now they can generate income and improve their economic and social conditions.

Table 2:
Significance of the difference made by the project

Paired samples test			
	t	df	Sig.(2-tailed)
Access to water before and after	41.75	265	.000
Safety of water before and after	35.766	265	.000
Distance made before and after	35.3	265	.000

Socio-economic impact of water and sanitation project

The findings of this study revealed that water and sanitation project produced some changes both in access to water, safety, and eventually impacted socio-economic conditions of the respondents. The study revealed significant relationship between access to water and quality of latrines, safety of water and reduction in poor hygiene related diseases, access to water and monthly cost after the project, access to water and reduced distance.

Increased access to water and quality of latrines

The findings of this study reveal that access to water has significantly led to the improved quality of latrines. Improved quality of latrines is an indication that sanitation is being attained at a satisfactory level. the calculated p-value does not exceed the level of significance in respect to access of water increasing quality of latrines ($0.005 < 0.05$), which shows that there is a significant relationship between respondents' access to water amongst the beneficiaries and high quality of latrines. Therefore, the null hypothesis was rejected. Hence, a conclusion can be made that increased access to water strongly influences quality of latrines in the study area. It is very obvious that water being easily accessible is very important in attaining sanitation. Cleaning the latrines with safe water reduces propensity of users to use the latrines in their own way.

Table 3:
Increased access to water and quality of latrines

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.366 ^a	6	.005
Likelihood Ratio	13.481	6	.036
Linear-by-Linear Association	1.283	1	.257
N of Valid Cases	266		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is .28.

Safety after the project intervention and reduction in poor hygiene related diseases

It is worth noting that safety of water is very important thing to take into consideration while designing and implementing water and sanitation projects. The findings of this study reveal that safety of water has tremendously increased. The increase in safety of available water has significantly led to improvement in health conditions of the beneficiaries.

The table below indicated that the calculated p-value does not exceed the level of significance in respect to safety of water affecting reduction in poor hygiene related diseases ($0.000 < 0.05$), which shows that there is a significant relationship between safety of water and reduction of poor hygiene related diseases. Therefore, the null hypothesis was rejected. Hence, a conclusion can be made that increased safety of water strongly influences improvement in people's health conditions in that it reduces poor hygiene related diseases.

Table 4:
Safety of water and reduction of poor hygiene related diseases

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.924 ^a	15	.000
Likelihood Ratio	36.368	15	.002
Linear-by-Linear Association	.119	1	.730
N of Valid Cases	266		

a. 16 cells (66.7%) have expected count less than 5. The minimum expected count is .02.

Access to water and sanitation and reduction of monthly cost

The findings of this study revealed that increased access to water is very great achievement that the project has made as a result of increased water distribution networks. Further this access made very significant reduction in monthly expenses made on water.

The results in table 5 indicated that the calculated p-value does not exceed the level of significance in respect to access of water affecting reduction in monthly expenses made on water ($0.03 < 0.05$), which shows that there is a significant relationship between access to water and reduction in monthly cost of water. Therefore, the null hypothesis was rejected. Hence, a conclusion can be made that increased access to water strongly reduced monthly costs made on water. This reduction of monthly expenses may have very many other implications on economic conditions of the beneficiaries of the project.

Table 5:
Access to water and monthly cost of water

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.289 ^a	9	.032
Likelihood Ratio	20.844	9	.013
Linear-by-Linear Association	.148	1	.700
N of Valid Cases	266		

Access to water and reduction of distance

The findings of this study revealed that increased access to water is very great achievement that the project has made as a result of increased water distribution networks. Further this access made very significant reduction in reduction of distance made in to fetch water.

The table 6 indicated that the calculated p-value does not exceed the level of significance in respect to access of water affecting reduction in distance made to fetch water ($0.03 < 0.05$), which shows that there is a significant relationship between access to water and reduction in distance made to fetch water. Therefore, the null hypothesis was rejected. Hence, a conclusion can be made that increased access to water strongly reduced the distance made to fetch water. This reduction of expenses could in some cases or even in a long run produce some impacts on economic conditions of people in the study area. This reduction of monthly expenses may have very many other implications on economic conditions of the beneficiaries of the project. However, reduction in distance made to fetch water did not show any significant association with the reduction of expenses made in monthly cost of water as is indicated, the p value calculated (0.202) is greater than the level of significance 0.05. therefore, the null hypothesis was accepted and a conclusion can be made that there is no significant relationship between reduction of expenses after the project intervention and reduction of monthly expenses on water.

Table 6:
Access to water and reduction of distance

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Access and distance	18.592 ^a	6	.005
Distance and reduction in monthly cost	8.519 ^a	6	.202

CONCLUSION

The study revealed that the project has scientifically improve the socio-economic conditions of the respondents. The findings show that there is a significant difference was made comparing situation of water and sanitation before and after the project intervened. From the findings, one can ascertain that increasing availability of water and putting up sanitation facilities would further significantly improve socio-economic conditions of the population.

From the study, recommendations were formulated to the project beneficiaries, and the local government entities in the study area.

1. Beneficiaries

- Ensure that the project benefits are well maintained for sustainability
- Report to local leaders about any challenges regarding the water system, and distribution networks

1. Government

- To take prime responsibility of the water system and distribution network
- Ensure that the system is functional
- To attract more funders to the local community for addressing water related problems

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