THE IMPACT OF COMMUNITY BASED WATER PROJECTS ON THE HEALTH STATUS: A CASE STUDY OF MARIMANTI WATER SUPPLY PROJECT IN THARAKA DISTRICT-KENYA

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DECLARATION

1. Muthengi Gaichu Manguai declare that the work in this report is original and has never been presented in any other university or institution for the award of a degree or its equivalent.

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ABSTRACT
The research study attempted to determine the impact of Marimanti Water Supply Project on the health of the residents of Marimanti Town. Establish why some people still use river water and if their income has any influence on their behavior. Determine the awareness of the people on their health status in relation to the use of safe water.

During the study, qualitative research method was used to investigate the situation. It became evident from the research that majority of the Mbwembwe and Kirao estates are currently not using the tap water adequately as was intended. This is due to various factors as stated in the details of this study.

It also became evident that there is need for the management to institute a method of monitoring and evaluation of the situation as a continuing activity. Regular public, possibility by a social worker or PR officer, its also necessary to link the people with the objectives of the project. The management should also be keen on instant repairs in the system whenever any breakdown occurs to avoid disruption of continuous supply.

The findings of this study will be of importance to the policy makers, stakeholders in the water sector, donors working with the communities in Tharaka district, the management committee and the water consumers of Marimanti water supply project.
ACKNOWLEDGMENT

It's through the inspiration, encouragement and moral support of my friends, my wife and my beloved teenage daughter Tecla, my two lovely sons, Thaddeus and Conrad that made it possible to achieve this work. I fully acknowledge their influence throughout my study period and the many days and nights that they had to bear without my presence.

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ABBREVIATION
C.D.P.  Communal Drawing Point
C.P.E  Certificate of Primary Education
D.E.O  District Education Officer
I.C.S  Individual Connection
K.M  Kilometers
Ltrs  Liters
M.  Meters
M.O.H  Medical Officer of Health
M.W.S.P  Marimanti Water Supply Project
P.E.O  Provincial Education Officer
P.H.O  Provincial Health Officer
P.R.O  Provincial Relations Officer
R.W.D  Rural Water Development
CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Water is life. For several years everyone took water for granted. Few persons worried that water had finite limits that they loved to be lost to contaminations or outright removal. Numerous epidemiological studies have identified contaminated and poor sanitation conditions as the principle agent of certain diseases.

Urban ‘squatters’ suffer from proportionately worse health conditions than the people living in the rural areas. High-density living causes related illness to spread rapidly due to lack of safe water and low sanitary awareness.

Most high density out breaks of diarrhea diseases associated with defective water supply, mortality is more serious among young children suffering from a combination of malnutrition and infectious diseases. Their protein deficiency resulting from general malnutrition makes them susceptible to diarrhea diseases (Falkenmark, 1982).

Thus water plays a major role in virtually every aspect of human life. Regrettably too few persons understand physical and chemical properties of water well enough to effectively solve urgent and nearly universal problems related to its cost, availability, distribution and contamination. Water problems of any type, stem largely from lack of knowledge and therefore from mismanagement of the natural system.

The research study were carried out in a water supply system which was initiated to address high mortality rate but some intended large population seem to draw a thin line between the piped systems and the traditional river they had been using before and which some of them still insist to using.

Marimanti is situated within Tharaka Central in Tharaka District, is inhabited by people of low income. The population is a mixture of various tribes who have all the years relied on the Marimanti Water Supply for their domestic water.

Marimanti Water Supply Project was initiated to provide clean treated and water to the rural community living along Muyoya plains. The Austrian funded project was initiated with a view to alleviating high rate of child mortality among the community living along Muyoya plains. The thirty one million shillings project has benefited the targeted beneficiaries of Muyoya plains as much as it has benefited Marimanti town residents some eight kilometers away from the source.

Time has gone by since the project was commissioned in 2000, but with little changes in the people; habit and attitude of using piped water. This has now become a warning trend and if not checked and impact assessed the old problem may not be eradicated.
Has the water supply project really made any impact on health status of these people to whom it was intended?

1.3 **Research questions.**
   a. What is the current rate of child mortality in the supply areas compared with the period before was intended?
   b. What is the reason behind some members of the community in insisting on using untreated water?
   c. How is the economy income and culture and of the people affecting the affordability and use of the piped water?

1.4 **Objectives of the study strive to:**
   a. Determine the impact of the project on the health of residents of Muyoya and Marimanti Town.
   b. To establish why many people still use untreated water and if their income has any influence on their behavior.
   c. Determine the awareness of these people on their health status in relation to the use of safe water.

1.5 **Hypothesis**
   a. Child mortality rate in the plains has no relation to the use of water.
   b. The income of the people is not an inhibiting factor to the affordability of the piped water project.
   c. No awareness of health consequences in the use of untreated river water.

1.6 **Significances of the study**
The study is expected to help the community understand the relation between their health status and the use of water and restore their faith in the project.

The study will benefit the project management and health workers in revealing the health situation, behavioral trend on water use by the people living along the Muyoya & Marimanti Town and any urgent issues, which require immediate intervention. It will also help in creating awareness on use of clean water for health.

1.7 **DELIMITATION (Scope of study)**
This study was carried along Muyoya and Marimanti municipality where the project supplies water. This connects a cross section of five locations Karuma, Kamatungu, Muyoya, Igumo and Mbwembwe of Tharaka District.

The people who were interviewed are water consumers, local leaders, and project manager committee officials, management of staff and public health officer.

1.8 **LIMITATIONSS**
This study may have some limitations since some respondents who felt let down by the project management may be biased in giving the true information about the project. Some members of the community may not have felt free enough to discuss their past health encounters especially relating to their children.
1.9 BASIC ASSUMPTION
The study was conducted under the assumption that any information that has given to the research by the respondents was not biased.

Respondents' freely volunteered information about their health and that of their family members.

1.10 DEFINITION OF SIGNIFICANT TERMS
b. Poor sanitation- The state of uncleanness around where we live.
c. Urban – Town centers where there is large population of people living.
d. Squatters- People occupying certain areas of land which are not their rightful and permanent places.
e. Malnutrition- The condition caused by not getting enough of the right food staff in the body.
f. Protein deficiency- State of being short of protein in the body.
g. Community- People living and sharing the common conditions of live in a given area.
CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter gives the history of water as written by various authors covering year’s way back to our biblical forefathers. It also gives an account of the properties of water. The importance and uses of water is another area it delves in not leaving the sources where we get our water. The chapter, further highlights on the problems of water scarcity that man, animals and plant experience. Lastly, it covers some strategies by governments, world organizations and local communication to resolve the water problem.

2.1 The story of water as the story of man

Their close association with water than the land by which they earned their bread has had more influence on the habits of man and the forms of their social organization this association is reflected in psalms of the Hebrew poets and in the laws, regulations and beliefs among the civilization of the near East, the far East and South America.

Read in the Old Testament “……A good land, a land of books of water of fountains and depths that spring out valleys and hills.”(Deuteronomy 8:7). “I did know thee in the wilderness, in the land of great drought”.

Property in water antedated property in landing in land of antiquity. Property rights were associated primarily with the use of water first for drinking, next to irrigation. Mohammed saw water as an object of religious charity. He declared that free access to water was the right of every community and that no Muslim should want for it. The precept of the holy Koran, “No one can refuse surplus water without sinning against Allah and man”. Was the cornerstone of a whole body of social traditions of regulations governing the ownership use and protection of water (Frank, 1955).

2.2 The properties of water

For all life water is necessary. For many uses it is convenient. In most of its functioning it is common place. But commonplace things are the least appreciated and the hardest to understand. We pay great attention to water movement from place to place as vapor and clouds in the air. As rain on the soil and then as streams back to the ocean. We know that water is the most abundant liquid on the earth. Always we use or fight its tendency to find its own level.

What is water? Why is it necessary?

The properties of water, such that like the one that lets it float when it is in the form of ice, can be explained by the structure of its molecules, of which there is a trillion in one ounce of water. The molecules are formed of three elements or atoms, two of hydrogen [1] and one of oxygen [O] or expressed as a symbol, H2O, which is one of the simplest compound (Sterlin, 1955).
2.3 Importance and uses of water

According to Leonardo da Vinci described water as ‘the driver of nature’ water makes human life possible. In fact all living things need and actually live because of water. Besides water for life to living things, it is difficult to imagine any programme for human development or improvement that does not require a ready available supply of water.

United nations water conference head at Mar der plata, argentines on 14th -25th march 1977 assessment of uses and demand listed the following uses that makes the most demand upon water supply and water related services. Drinking other domestic uses like cooking, washing, livestock drinking, soil moisture conservation also for crops and plant uses, irrigation, wet land habitat, navigation, hydropower, mining, mining manufacturing, processing waste disposal, recreation. Thus we can see water is essential for agricultural purposes that contribute almost all types of food for human needs.

In summary of its multi uses, the conference observed that uses very according to the available and the feasibility of altering water quality. Consumption depletion of available supply varies according to use and available technology and its extreme cases local supply can completely be dissipated. How society choose to use water and what technology they apply reflect individual and public attitude in appraising resulting costs and benefits.

In the edited report of world water conference in Mar der plata Argentina, (1977) Falkenmars referred to and quoted Wolman on function of water in society as stating that ‘water is at once the servant and master of man’. Water is a master of man as it indicates the limits of human settlement and growth. No water at all means flood catastrophe, waterborne diseases and death. But some is also the servant of man. The old revering cultures proposed because of the construction of intricate systems for water distribution. Development and improvement in our days is possible only with access to safe water in sufficient quantity and of satisfactory duality.

2.4 Sources of water

Water is everywhere but is limited in quantity and quality. It is everywhere but it is constantly in motion passing from one state to another and from one place to another. Water is to be found on the earth in four forms, atmospheric water, surface water, ground and sea. Water for domestic use generally is obtained mostly from surface water and underground water. Water of high quality is scarce. While oceans cover most of the earths surface, only about three percent of the worlds water is fresh and ¾ of that is frozen at the poles. This means that less than one percent is available in ground water, rivers and lakes and those ones are unevenly distributed.
More than half of the people in poor countries have no sources to safe drinking water and must rely on inadequate or populated sources such as urban stand pipes (shared by hundreds of families) or lakes, rivers and wells which are becoming increasingly polluted, or drying up. Once a source is endangered by some impacts of man, society can expand large sums of money and time to determine what the problems are and develop potential solutions. Therefore in recent years many scientists have made discoveries that in some cases transcend all the discoveries more about the major features of the science. Laymen are now taking advantage of these studies to utilize natural resources more fully and wise.

Water

Water one of the fundamental, is at once one of the most common substance and also one of the most unusual (Discall, 1986).

2.5 Problems of water scarcity

Water scarcity is evident in quantity (Physical scarcity) and in quality (Safety for human use). In whichever case, the scarcity adversely affects the nature of all living things and the development of man in specific.

2.5.1 Quantity

Each day women throughout the developing world walk miles developing world miles to carry water necessary for the barest survival. That the starvation continues to exist generation after generation is really a crime in humanity against women and children (Ochieng, 1980).

Therefore the provision of clean and accessible water world do no more than revolutionize the role of women in the world. Women being the traditional carries of water may spend along as four hours or more for a single journey to fetch water. Thus, the bringing water to rural communities world in some cases fundamentally after the existing division of labor between men and women---A male worker lying a sly water pipe horse in the city is considered "economically active". A woman carrying 40kg water jar daily for one or two hours is "just doing hoarse hold task, but obviously that daily hour might be used in more productive activities.

It has been calculated that it takes up to 12% in daytime calorie needs of not woman energy. 30% of the daily intake is used solely for nighttime metabolism and breast feeding may take another 35%. In conclusion the breasting, water drawing mother has to take the main part of energy for this basic task (Isley, 1980), cited in the (Falken Mank 1982).
According to Falken Mank, in planning water supply in an area under scarcity conditions it's essential to consider not only household water but water for all other activities as well as what the area's ecological balance depend: Biological production, for self-sufficiency, cattle, feeding, water for local industries, etc. A distinction should be made between internal & external water requirements, between water availability for plant production and for human needs & between local & transversal water resources.

2.5.2 Quality
The projected doubling & trembling of the world population coupled with increasing world industrialization & agricultural development contribute to serious deterioration on the quality of water. It is further observed as a statement of fact of suitable quality to sustain future growth unless water management is radically improved. On global assessment of water quality, a UN world conference held at Mar de Plata Argentina in 1977, noted: “organic waste from cities and factories constitutes a rapidly growing hazard to health for urban population especially for those in squatter settlements on the peripheries of cities which are not supplied with purified water” (Leonardo da Vinci, 1977).

Since water is a key element to achieve poverty eradication, health, nutrition and ecological service protection, it is important to change the out-dated water agenda so that it fits with current and future situations.

On the other hand, if the current trend continues water population will become a major crisis, especially in developing countries with very serious consequences on human health, agricultural production, ecosystem health and enormous investment to alleviate the crisis. In order not to reach such a situation, it is time to realize that water security is most critical at household level where famine and waterborne diseases bite hardest. It is important to note that water security is essential for sustainable development. Water security is however not achievable with a major shift in thinking (Ochieng, 2003).

Our water resources have a high value especially in the rural areas, not only for agricultural production, but also for the domestic consumption. Availability of safe drinking water becomes therefore, more and important for the sustainable of rural development. However in spite of many water projects the quality of water at home is often still below acceptable standards and needs additional treatment as boiling, chlorinating. This additional has been overlooked in many water cases especially at home level.” In spite of all “safe” water points created, many water analysis of rural water development own bacteriological laboratory showed that the water at home is often contaminated mainly due to the poor quality of water at the source due to improper storage and handling at home. Waterborne diseases such as typhoid and cholera are still epidermis in the rural areas” (Van Beers, 2003).

A distinct yet important aspect of water evaluation is the evaluation of the water quality and surveillance system of the water agency. This requires a study of the need for water quality surveillance and adequacy of existing laboratory services (Wiley, 1980).
2.6 **Strategies to resolve the water problems**

The health hazards vary with the water source available, many factors influence a woman’s actual choice of water source. Generally prevention of diseases involves breaking the chain of diseases transmission chains may be water related excreta elated or both. Therefore clean water is seldom enough to realize increased health, it has to go with organized sanitation and hygiene education to make people aware of the link between hygiene and health. The major causes of childhood diseases and death are diarrhea diseases, most of which are water related. Health education therefore forms a crucial ingredient in any campaign towards better public health (Falkenmark, 1980).

According to present experiences that have been gathered globally from failed water supply programmes early involvement of the public is a decisive factor for the success of a project. The attitude of rural people to improved water supplies has been shown to be an important part of the problem of failing schemes. In places, for instances, installed supplies have been used as intended.

The government of Kenya is encouraging private sector participation in the management of water supplies in urban areas in a bid to improving efficiency and off-load the burden on local authorities (Kanu, 2003). According to the minister, rural communities would take over water supplies currently run by the government so as to make the supplies more sustainable. "In the new Act, communities will have a greater say in the management of water sources." The minister said that many local authorities had found it difficult to manage water production supply, urban centers deplorable due to constant breakdowns of distribution systems and it was hoped the private sector world implement. According to Gatunga water supply association chairman, F.M.Bizie Awange creation, community sensitization & mobilization to start water supply project for the provision of clean and safe water for domestic use as a means for control & prevention of the precedence of high rate of infant mortality, waterborne &infectious diseases, is the basis of successful community based water project (Awange, 2003).
CHAPTER THREE: METHODOLOGY

3.0 Research Design
The study was basically investigative. The researcher employing qualitative method used open & closed ended questionnaires to gather information from consumer, project staff, committee officials and government officials. Scheduled interviews were used to collect information from local opinion leaders. Other methods were observation and documentation.

3.1 Studied population
The population studied was consumers living along Muyoya and parts of Marimanti town where Marimanti water supply project supplies with totaling to 5000 people. A sample of 10 water consumers was interviewed in the water supply zones.

The zones where the questionnaires were distributed were Karuma, Kamatungu, Muyoya, Igumo and Mbwembwe. Of the 15 questionnaires distributed only 13 were answered.

The project officials responded to their questionnaires, that is, the chairman and two- area representative. Two project staff members answered their questionnaires i.e the manager and accounts clerk. Five local leaders including two assistant chiefs responded to the questionnaire and interview schedules. The deputy public health officer answered the questionnaire and interview schedules. The deputy public health officer answered the questionnaire for the P.H.O. The reasons the researchers control MOH and DWO did not respond frantic attempts to get their responses.

3.2 Data collection procedure
Stratified random sampling were used to select the subjects the subjects to be interviewed. The project supply area was divided into three regions.

The regions were;
The rural region comprising of two supply zones where 5 water consumers were interviewed. Estates in urban areas comprising of two supply zones, where 4 water consumers were interviewed.
The project committee chairman and zone representatives were interviewed. Project management staff (two members, local opinion leaders, assistant chiefs) and government officials(deputy public health officers) were interviewed.

3.3 Research instruments
For convenient gathering of data, the research employed the use of various research instruments.

3.3.1 Questionnaire
Open-ended questionnaire were given to the management staff, project officials, government officials and some local leaders who filled in the responses.
3.3.2 Interviews
Using closed ended questionnaires forms were read out to the water consumers. And filled according to their responses. This made it possible for the researcher to cope up with the short time was available for the study to be conducted successfully as majority of water consumers were involved in the interviews.

3.3.3 Observation
This instrument was used to study the sanitary measures taken by water user at the collection points. The research watched the behavior of water collection and how they handled water they collected. The study was also done using this instrument on how clean utensils used for drinking in a few households.

3.3.4 Documentation
This instrument was used to gather information contained in the project constitutions and to seek information from the district hospital, information documentation officer on rates of prevalent diseases and most vulnerable group of people. The researcher visited the project library and the district documentation office.
The respondents were asked if they were married or single. Either of the status would help in determining the quality of water they required to meet their needs and the quantity would also determine the quality they would go for. Out of 10 respondents 9 were married and had families. This represents 90% of the total population sample. The here shows that the majority of the respondents would need more water to meet their needs.

Asked about the level of education the water consumers responded as shown in the table 1 below.

Table 1: Water consumer’s level of education

<table>
<thead>
<tr>
<th>Level of education</th>
<th>No of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below CPE</td>
<td>14</td>
<td>33.33%</td>
</tr>
<tr>
<td>CPE and above</td>
<td>28</td>
<td>67.67%</td>
</tr>
</tbody>
</table>

The level of education proves that over half of the studied population sample would be having good understanding of diseases, their causes and preventive measures that they can apply in their situation.

Asked about their income, their responses proved that 98% fall in low income group i.e peasant farming, small scale business or just house wives whose income is below 3000 shillings per month. Being people of low income, there is a likelihood of them considering free or cheap sources of water?

Asked where they get water for domestic uses from, 10 said they get either from the river, borehole or springs. This number composed of the respondents from the springs and river Mbwembwe zones in the rural, and from Kirao zone in town estate.

Table 2: Diseases caused by water, which are known to the respondents

<table>
<thead>
<tr>
<th>Disease</th>
<th>Typhoid</th>
<th>Amoeba</th>
<th>Cholera</th>
<th>Dysentery</th>
<th>Bilharzias</th>
<th>Malaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>21</td>
<td>16</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Percentage</td>
<td>75%</td>
<td>57.1%</td>
<td>32.1%</td>
<td>28.5%</td>
<td>17.7%</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

Asked if any member of their families have suffered from the diseases, 15 answered Yes and 18 No. According to the data, diseases suffered by the members of their families, the ranges were as follows,

Typhoid was leading with 10 respondents.
Amoeba was second with 9 respondents
Dysentery was third with 2 respondents.
Cholera was fourth with 1 respondent.
Bilharzias was never mentioned.
The rages of period when these diseases were suffered were from one to five years ago. The foregoing data reveals that some people still suffer from water borne disease.

Table 3: Project management efficiency rating.

<table>
<thead>
<tr>
<th></th>
<th>Not good</th>
<th>Fair</th>
<th>Good</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>32.1%</td>
<td>14.2%</td>
<td>32.1%</td>
<td>21.4%</td>
<td></td>
</tr>
</tbody>
</table>

On their contribution towards the project

5 said labor and membership
2 said installation fees.
2 said membership only
16 said they did not contribute anything.

Asked if the tap water is affordable according to the project tariff rate.
9 answered affordable.
12 answered high.
7 answered never been able to use tap water.

Table 4: Reliability of the water sources.

<table>
<thead>
<tr>
<th>Sources</th>
<th>Not reliable</th>
<th>Fairly reliable</th>
<th>Very reliable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tap</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>River</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Springs</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Boreholes</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

The data facts of the study shows that the boreholes are very reliable followed by the river than tap spring fourth on the reverse, tap lead in not being reliable.

Responding to the question on their alternative sources incase of shortage the responses are shown in Table 1 below:

Table 5: Alternatives sources used incase of shortages.

<table>
<thead>
<tr>
<th>Current sources</th>
<th>River</th>
<th>Borehole</th>
<th>Spring</th>
<th>Tap</th>
<th>No change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tap</td>
<td>3</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Spring</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Borehole</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>River</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
</tbody>
</table>
Asked if they believed water should be bought, 6 answered No, while 22 answered Yes.

CHAPTER FIVE: CONCLUSION AND COMMENDATIONS

5.0 Overview
This chapter contains the findings of the study, recommendations for implementation and further research.

5.1 Findings
A study of the constitution documents of Marimanti water supply association reveals that the objectives for which the project was initiated are to improve the health and living standards of water users living along Marimanti, through constant supply and provision of safe portable piped water.

It can be concluded that, the project has not adequately impacted on the life of the people whom it was targeted to serve. The same applies to the people living in Mbwambwe where the supply was extended to cover. However, Marimanti enjoy services of the project as the majority of the interviewed respondents who were using tap water come from the same area.

5.2 Awareness
It was proved by the overwhelming 100% response of the studied population that there is awareness that water can cause some diseases but little do the people link with their own sources and see it as an existing problem in their situation.

87.1% of the studied population attach importance of good water to good health and 82% preferring tap water as the best for drinking. Interestingly, 75% of the population studied said they have not notice any improved health attributed to good water. This scenario show that the people are either unconscious or vaguely aware of the prevailing dangerous situation in which they are and therefore not taking their case seriously.

5.3 Recommendations for implementation

5.3.1 Monitoring and Evaluation
Often a water project implies introduction of new technologies and new concepts on the relationship between water and health. It is imperative that baseline study be conducted before the commencement of a project implementation. This is to provide the dates and information required for the project design, and to represent a pre-project evaluation of the given situation, the problem to be solved and the existing potential for the change and the factors to be modified.
The management of Marimanti water project should be institute as a matter of concern, a model and organ with funds set aside for monitoring and evaluating the health situation according to the objectives of the project. Thus monitoring and evaluation should be carried out as a continuing exercise.

6.3.2 Health Education programme

Intensive health education programme, most be and integral part of project management and objective. This is to secure the understanding, support and participation of rural population. It should also be into account traditional social beliefs and attitudes of the people. The implication is that the local people might find it difficult to see any need for a water project and agree to its underlying hypothesis, if the link between and health problems will not be obvious for the villagers. Health benefits will only be obtained after a proper health education programme is conducted for the beneficiaries.

Marimanti water supply management should therefore consider having public relation officer or social worker that will be operating as a link between the project and the community on issues, which attach them to the project. This will help closing the gap through regular public education on health matters and water use.

5.3.3 Financial and Technical Capacity.

Once a project is designed with a designated target population and a purpose, any unplanned on-course changers expansion beyond the original scope should never be considered because it will at once defeat the original purpose and create discontent among the targeted population.

The intended social objectives are attained only if the water provided is actively used, people find access to the water source and the supply system properly maintained to ensure constant supply. Financial and technical capability of the supply to manage instant repairs whenever they occur must be considered as fundamental for the maintenance of constant supply. Unsteady supply of treated water is a major impediment in an attempt to achieve supply objectives of improved health. The management should therefore take a keen concern in making instant repair in system whenever they occur.

5.3.4 Recommendation for further research.

The researcher covered only the impact of the project on health of the community. It became evident during this research that many people use unprotected and untreated alternative water sources. The research could not ascertain the quality of water from the sources.
To come up with a comprehensive study of the impact of these alternative sources on health, the researcher suggested a further study, more technical to determine the quality of these water sourced and their fitness for use as drinking water.

In the event that the mushrooming boreholes will be proved to be unfit for use in drinking, the ministry in charge of water in collaboration with other players in water sector should come up with a regulation that would ensure regular treatment of these boreholes with chlorine to make them fit for use. If possible, the ministry-concerned should take a leading role in giving necessary assistance in water treatment.

**Bibliography**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>1. Position of leader</td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td></td>
</tr>
<tr>
<td>2. Name [optional]</td>
<td>Level of Education</td>
</tr>
<tr>
<td>3. What is the appropriate size of the population under your authority?</td>
<td></td>
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<tr>
<td>4. What are the major income activities of the people?</td>
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<tr>
<td>5. What percentage of adults have CPE education and above?</td>
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<tr>
<td>6. What is the major source of water supply</td>
<td>How reliable is the source?</td>
</tr>
<tr>
<td>7. Which are the common diseases affecting the people in your area?</td>
<td>How frequent do they occur?</td>
</tr>
<tr>
<td>8. When was MWSP initiated</td>
<td>What was the community’s contribution</td>
</tr>
<tr>
<td>Why was the project started?</td>
<td>How do the people benefit from it?</td>
</tr>
<tr>
<td>9. What is child mortality rate in your area</td>
<td>What are the causes of death</td>
</tr>
<tr>
<td>How do you compare it with the rate during the period before the project</td>
<td></td>
</tr>
<tr>
<td>10. Do they use the project water?</td>
<td>Is it affordable to the people?</td>
</tr>
<tr>
<td>11. In your opinion, do you think the people are aware of the dangers of using untreated water?</td>
<td></td>
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<tr>
<td>12. Are there any public health education conducted for the people?</td>
<td></td>
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<tr>
<td>13. What do you think make people to use the river water instead of tap water?</td>
<td></td>
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<tr>
<td>14. What is your view on the people’s culture in relation to the use of water?</td>
<td></td>
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<tr>
<td>15. Do you think people need some education concerning water use?</td>
<td></td>
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<tr>
<td>16. What is your opinion about the project management? Are members of the community Involved and well represented?</td>
<td></td>
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