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Evaluation of Rural Water Sources and Sustainable Approaches to Rural Water Resources Development in Ezeagu, Enugu, Eastern Nigeria

Nwagbara, A.O.[1], Chijioke, E.O.[2]

Faculty of Environmental Sciences, Enugu State University of Science and Technology, Agbani, Enugu, Nigeria

Abstract: ***This study evaluated the water resources in Ezeagu and suggested sustainable approaches to water resources development in this area. Five towns were randomly selected from each of the three geographical zones and their water sources were evaluated. Direct observations, interviews and real time field survey were used to obtain reliable data on the state of water resources in the selected towns in Ezeagu Local Government Area. From the study, only three communities from the selected areas have big rivers that sustain their communities while others are water-stressed and depend on rain water harvesting, unprotected well, tanker-truck. It is obvious that nature has made the distribution of natural resources unequal. Tables 2 and 3 show that only Ozom Mgbagbu Owa, Olo and Umumba Ndiagu are the towns naturally endowed with big rivers that sustain them in Ezeagu Local Government Area. These rivers are the sources of water supply for the commercial water supply tanker drivers. Isigwu Umana, Aguobu Owa, Okpogho, Ihuonyia, Obeleagu Umana and Akama Oghe do not have reliable sources of water supply. Consequently they patronize the commercial tanker drivers. This study is significant as it will help the Local Government Authority in understanding the problems of Ezeagu Local Government Area with respect to availability of adequate and improved water supply.***

Keywords: Community Mobilization, Strategic Planning, Sustainability, Water Resources, Water-stress.

1. Introduction

Water is one of the natural resources on the planet earth and it occupies about 70% of the earth
surface while the remaining 30% represents land area. Shiklomanov (2000) assessed the future world water use and noted that 97.5% of the earth's total water is seawater. It was also noted that the majority of the fresh water resources is in form of ice and icebergs. About 0.3% consists of surface water such as river, lakes and ground water and only 0.1% of the fresh water is readily available for human beings.

1.1 Background of the study

Ezeagu is one of the local Government Areas in Enugu State of Nigeria. Water resources development has been has been one of the major problems facing Ezeagu Local Government Area for many years. The scarcity of water for domestic and commercial usage is prevalent in Ezeagu Local Government Areas. Most towns have neither natural water supply nor engineered water supply system. Consequently, most rural dwellers in Ezeagu Local Government Area find it difficult to get adequate supply of water every day. In dry season, some able-bodied men in some parts of the Local Government trek for more than two miles in search of water. At times, they meet the water contaminated with mud.

1.2 Statement of the problem

The Millennium Development Goals set at the United Nations Millennium Summit of September 2000 put in place eight goals to be achieved by 2015 which includes but not limited to:

- the eradication of poverty,
- reduction in child mortality,
- improvement of maternal health,
- achievement of universal basic education,
- combating of malaria and other diseases.

Most of these goals if not all may never be achieved if there is no provision and sustenance of good water supply as the lack or absence of good water will trigger the spread of diseases which may lead to increased child and maternal mortality rates and collapse of the education system as children will be out of school either due to sicknesses and deaths or longer time spent looking for water. According to Mara (2009), the Health of the World has improved in the last 40 years than in the previous 4000 years! But there are, of course, still major health problems in the World especially communicable diseases in developing countries, and many of these are due to inadequate water supplies and sanitation

1.3 Significance of the study

It is relevant to note that the rural areas where most of the agricultural activities are practiced in Nigeria enjoy little or no infrastructural facilities. Hence, much attention should be given to the rural areas when the subject of water supply and sustenance is being discussed. According to a report by The New Partnership for Africa's Development (NEPAD) (1996) on Water, Africa and in particular Sub-Saharan Africa is far from meeting the Millennium Development Goal of halving the number of people without access to safe water and sanitation by 2015. It stated that about two-thirds of Africa's population lives in the rural areas where water supply is poorest with the population of people without access to water supply outweighing the population of people with access to water. This calls for a renewed effort not only at ensuring adequate supply of quality water in rural Africa but ensuring that the supply remains an enduring success.

2. Research Methodology

This presents the methods used for the assessment of the water resources in 15 communities in Ezeagu Local Government Area. There were onsite visits and direct observations of most of the water sources in all the 15 communities selected in Ezeagu Local Government Area for the purpose of this research.

3. Study Areas

Ezeagu Local Government Area as a geographical entity is made up of Ezeagu North, Ezeagu South and Ezeagu Central development centre. Five towns were randomly selected from each of the three geographical zones and their water sources were evaluated. Table 1 shows the selected towns and their geographical location.

Table 1: Ezeagu geographical areas and the Towns

Ezeagu South	Ezeagu North	Ezeagu Central
Obeleagu Umana	Iwollo Oghe	Umuaji Mgbagbu Owa
Isigwu Umana	Okpogho	Ozom Mgbagbu Owa
Umana Ndiagu	Ihuonyia	Aguobu Owa
Agba Umana	Olo	Ezema Imezi Owa
Umumba Ndiagu	Akama Oghe	Awha Ndiagu

Source: Researchers' field survey

4. Data Presentation

The tabular presentations of the evaluation of the water sources from the selected towns are shown below.

Table 2: Towns and their water sources

Towns	Sources of Water
Umuaji Mgbagbu Owa	Borehole, Akpata river, Ngene
Ozom Mgbagbu Owa	Nnam river, motorized borehole
Aguobu Owa	Well water, Motorized borehole
Ezema Imezi Owa	Motorized borehole
Awha Ndiagu	Motorized borehole, unprotected spring
Obeleagu Umana	Rainwater, tanker-truck water
Isigwu Umana	Umio ditch water, tanker-truck water
Umana Ndiagu	Motorized borehole
Agba Umana	Motorized borehole
Umumba Ndiagu	Ajalli river
Iwollo Oghe	Well water, tanker-truck water
Okpogho	Unprotected spring, well water, tanker-truck water
Ihuonyia	Unprotected spring, well water
Olo	Kalawa river
Akama Oghe	Motorized borehole

Source: Researchers' field survey

Table 3: Water resources and Burden of Collection

Towns	Sources of Water	Burden of Collection
Umuaji Mgbagbu Owa	Borehole, Akpata river, Ngene	Akpata river is not less than 30 minutes trekking in relation to the nearest village, a queue at the borehole between 6am and 8am daily, Ngene is usually contaminated with sediments
Ozom Mgbagbu Owa	Nnam river, motorized borehole	Nnam river is less than 10 minutes trekking in relation to the nearest village, large and deep, sustains the community, motorized borehole is also centrally situated and usually without any queue before collection of water
Aguobu Owa	Motorised borehole	Not less than 10 minutes and usually a long queue between 6am and 8am
Ezema Imezi Owa	Motorized borehole	Not less than 10 minutes and usually a long queue between 6am and 8am
Awha Ndiagu	Unprotected spring	Not less than 45 minutes trekking in relation to the nearest village
Obeleagu Umana	Rainwater, tanker-truck water	Relies on rain water harvesting and tanker-truck provided water
Isigwu Umana	Umio ditch water	Does not sustain the community, community supplements with tanker-truck water
Umana Ndiagu	Motorized borehole	Not less than 10 minutes in relation to the nearest village, obvious reticulation to different villages
Agba Umana	Motorized borehole	Centrally situated, Not less than 10 minutes from each village
Umumba Ndiagu	Ajalli river	Ajalli river is less than 10 minutes trekking in relation to the nearest village, large and deep, sustains the community
Iwollo Oghe	Well water, tanker-truck water	Relies on rain water harvesting and tanker-truck provided water
Okpogho	Unprotected spring, tanker-truck water	Relies on rain water harvesting and tanker-truck provided water
Ihuonyia	Unprotected spring, tanker-truck	Relies on rain water harvesting and tanker-truck provided water
Olo	Kalawa river	Ajalli river is less than 10 minutes trekking in relation to the nearest village, large and deep, sustains the community
Akama Oghe	Motorized borehole	Relies on rain water harvesting and tanker-truck provided water

Source: Researchers' field survey

5. Sustainable Approaches to Adequate Water supply in Ezeagu

There is the need to ensure a successful water supply scheme in Ezeagu Local Government Area. The first step to be taken will be to ensure the provision of a water supply scheme which the villagers are compatible with as well as can easily operate and maintain. According to Mara (1996), the best choice of sanitation technologies should be the option should be that is cheap, socio-culturally acceptable and technically and institutionally feasible. This also applies to improved and adequate water supply scheme. Cairncross and Feachem (1983) supported this by saying that "appropriate technology is the technology which fits the circumstances and is appropriate. A technology must be appropriate in terms of cost in order that it can be afforded; it must be appropriate in performance so that it does the job required; and it must be appropriately simple so that it can be operated and maintained". There are different water supply facilities which aid water provision in any locality

and these include protected dug wells, boreholes, pipe borne water systems, taps, hand pumps, solar pumps and public stand pipes. For rural community water supply schemes, the most suitable options are usually the hand pumps and protected dug wells as these are reliable, cheap to install and require simple and cheap operation and maintenance.

Ensuring community mobilization and awareness are of paramount importance in the sustainable development of water scheme in Ezeagu Local Government area. No matter the level of service to be provided for the rural communities, if the communities are not mobilized, well-informed and carried along, any effort towards such a scheme may not succeed. Glennie (1983) in his book "Village Water Supply in the Decade: Lessons from Field Experience" cited an example of a village water supply project in which a politician, anxious to demonstrate his ability to bring benefits to the people includes a village for a rural water supply project without informing the villagers concerned. Months later, the villagers were informed that the project will commence soonest but they did not believe this but three weeks after, a technician comes with pipes and other materials to commence the project but was surprised that the villagers had not started digging the trench to which the villagers angrily responded that they were not aware of the project and will not dig unless paid to do so. Eventually, the project was not executed.

In order to get the support of the rural settlers for the proposed scheme, the leadership of the Community needs to be informed prior to deliberation and consultation of other village elites and the entire villagers. They should be given a brief of what the project entails as regards design and implementation so that they will in turn carry the villagers along on the scheme thereby ensuring cooperation and total support from the community when the scheme gets underway.

Partnership with the government is vital in the success of water scheme in any community. There is the need to understand that the government alone cannot carry out this difficult task. It therefore calls for the involvement of the private sector as well as donor agencies to work with the government since most of the rural communities in Africa live below poverty level and the burden may be too enormous for the government. The Department For International Development (DFID) (2001) in its report on addressing water crisis hinted that, "to ensure that private sector participation is successful, the government needs to put in place and enforce a legal and environmental policy defining roles and responsibilities and transparent processes for awarding contracts to service providers. Strong leadership by the public sector client and good regulation also benefit the private sector companies by providing a more stable operating environment, as well as benefiting the rural poor by helping to ensure that the increased investments and efficiencies actually reach them".

Capacity building and training of the community dwellers for effective involvement in the scheme should be embarked upon. Since these people are the beneficiary of the water supply scheme, they should be actively involved in the design, implementation, operation and periodic maintenance of the water scheme. Arlosoroff, et al., (1987) said that "the highest potential for sustainability is achieved when the community is involved in all phases of the project''. To them, "if the scheme is to continue to operate satisfactorily, people have to recognise the need for the improved service, be able and willing to pay for the maintenance cost and be willing to manage the maintenance". Cairncross and Feachem (1983) advised that "the cheaper and simpler the technology, the less maintenance it requires, the more reliable it is in practice and the easier to repair under village conditions". Glennie (1983) supported the view of Arlosoroff, et al., (1987) on community involvement to promote operation and maintenance stressing that "the greater the community involvement, the greater will be the degree of responsibility felt by the community". For effective operation and maintenance, the construction committee made up of the community dwellers should undergo training programme on handling and operating the installed systems following which they are reformed into a maintenance committee whose duties will be to ensure the surveillance of the system and ensure that any defect is immediately spotted and rectified as well as report issues beyond it to the appropriate local authority. This concept is what Arlosoroff, et al., (1987) referred to as Village Level Operation and Maintenance (VLOM) which helps to avoid the high cost, long response time, unreliable service and operational difficulties especially in the repair of hand pumps through central maintenance systems.

The success of the operation and maintenance system will also involve raising minimal amount of money by the maintenance committee through the community for carrying out the operation and maintenance. In as much as the government and the private sector will fund the installation, the communities will have to fund the operation and maintenance. The fund collection system should be done such that the committee is made up of members from different quarters in the communities. It is these members who will be tasked with the responsibility of collecting the funds from the members of the communities for onward delivery to the committee. There should also be meetings scheduled either weekly or monthly in which the maintenance committee will brief the members of the communities on funds collected and maintenance works carried out to ensure transparency and accountability and encourage the community to remain committed to the scheme.

There should be provision of spare parts for the technology type installed. Without the provision of spare parts for the water systems installed for the communities, operation and maintenance of the scheme will be a failure and once operation and maintenance are not carried out, the system will eventually collapse bringing the communities back to status quo and a waste of investment. The spare parts should be kept in the custody of the maintenance committee since they are the ones that execute maintenance works for the scheme.

The issue of hygiene education is another factor that needs to be given consideration if the rural water supply scheme is to be successful. According to Mara (2009), 'the objective of hygiene education is to educate the people by providing

them with information that will enable them to improve their health by using their improved water supplies facilities appropriately. According to Mara (2009), it is not about being forceful neither is it about telling people what to do, rather it is about explaining to the people what they need to do, the reason they need to do it and the how doing it will improve their health. With a new scheme of this type comes a new way of life which will only be possible by hygiene education. Hygiene education must be all encompassing including personal, water, toilet, domestic, food & domestic hygiene all of which one way or the other can pollute water supply'. Hygiene education should be directed mostly to the women in the communities since they are the ones around which water and sanitation activities revolve through village meetings by communicating appropriate messages to them geared towards changing their beliefs and practices. The women will in turn educate the children and their households. One way to ensure water hygiene especially in the case of a hand dug well will be to ensure that the well has a cover over it and a bucket is permanently hung at the well from a windlass so that it is neither removed from the well nor put on the ground to avoid pollution of the well water.

In addition to these, the selection of communities is another critical factor to be considered in ensuring a successful rural water supply scheme. Mara (1996) suggested that practically, it is best to start with less poorer communities before moving on to the very poorest communities. This is to avoid the possibility of the less poorer communities rejecting the water supply scheme provided for them if it is the same with that provided for the poorest communities on the grounds that it might be good enough for the very poor but not good enough for them. He stated further that the poorest communities may demand subsidies, which is a reason for not serving them first to avoid the possibility of the less poor communities demanding subsidies also.

6. Conclusion and Recommendation

To this end, the water supply scheme in Ezeagu Local Government Area, Enugu can be improved through concerted efforts of the Local Government Authority and the people of Ezeagu Local Government in the following ways:

- The Local Government Authority should initiate the strategic planning for water development in conjunction with the community leaders.
- The Local Government should set up a water development committee that will see to the development of water treatment plants in each town in Ezeagu Local Government.
- The Water Development Committee should be made of some of the village Leaders from all the towns in Ezeagu together with the Local Government Authority. This is for effective representation of each town in the committee since each town has different water sources, topography, and villagers' orientation.
- Periodic Maintenance, Monitoring and Control are imperative for the sustainability of water resources infrastructure

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