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# DEEP-WELL WATER SUPPLY IN LAGELU LOCAL GOVERNMENT AREA, IBADAN, OYO STATE, NIGERIA

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**ABSTRACT:** *The aim of the study is to examine the sustainability of deep -wells water supply in Lagelu LGA. It examines the quality and quantity of deep well water supplied through the formulation of five research objectives which are the socio-economic characteristic of respondents, the spatial distribution of deep –wells, respondents perception of deep -wells water supply problems, the current management strategies of deep -wells water supply in the study area and to make recommendations for sustainable deep- wells water supply in the study area. A total number of 239 questionnaires were randomly distributed to residents in the area to obtain relevant information on the socio-economic characteristics of the residents, quality and quantity of deep well water supplied and its effects on the health of the residents in the study. Data was analyzed using simple descriptive statistical analysis involving frequency counts, tables and percentages. The study reveals that the residents of the study area are facing problems of inadequate deep -well water supply and low quality and quantity of water which stood at 58.6% and 41.4% respectively.*
*In view of this it is recommended that government should embark on massive construction of deep –well water facilities in the area. In addition, each household should endeavor to purify their water before consumption.*

**KEYWORDS:** Deep-well, Water, Government support sustainability.

## INTRODUCTION

Water is life and precious to mankind, access to safe drinking water has improved steadily and substantially over the last decades in almost every part of the world. Well water is an excavation or structure created in the ground by digging or drilling to access groundwater in underground aquifers. The well water is drawn by an electric submersible pump, a trash pump, a vertical turbine pump, a hand-pump or a mechanical pump (e.g. from a water-pumping windmill). It can also be drawn up using containers, such as buckets that are raised mechanically or by hand. Wells can vary greatly in depth, water volume and water quality. Well water typically contains more minerals in solution than surface water and can promote the growth of iron and manganese bacteria that can form slimy black colonies that clog pipes.

Shallow pumping wells can often supply drinking water at a very low cost, but because impurities from the surface easily reaches shallow sources, a greater risk of contamination occurs for these wells when they are compared to deeper wells. The quality of the well water can be significantly increased by lining the well, sealing the well head, ensuring the area is kept clean and free from stagnant water and animals, moving sources of contamination (latrines, garbage pits) and carrying out hygiene education. It is important that the well is cleaned with 1% chlorine solution after construction and periodically every six months.

The present water situation is characterized by problems in large parts of the world. The main water problems arise from an increase in water demand as a consequence of urbanization, industrialization as well as the increase in population and a desirable rise in standards of living among others, (Mark et al, 1987). This has created planning problem which is complex and increasing within the above stated factors. Mabogunje (1993) the provision of basic infrastructural services (such as water) in virtually all Nigerian cities and villages is characterized today by acute shortage, frequent breakdown and un-sustained quality of provision.

According to Olokesusi (1987) and Nest (1991) the importance of water has been emphasized in the water international and world water day. It is a daily necessity and a key factor in human health and well being. Apart from the fact that the very survival and continued well being of human and animal life depend on assumed supply of water in the right qualities and quantities water influences the performance of many sectors of the economy such as agriculture, health ,industry and recreation (Adeniji 1985). Ayoade and Oyebande (1983) explained that there is a close relationship between water availability and economic development in Nigeria. They further observed that availability of potable water is one of the major factors affecting spatial distribution of population. Despite the merit-able importance of water, it has been observed that there is an increasing gap between supply and demand. As population grows and water use per person rises, demand for water rises (population reports, 1988). Overman (1968) stressed that unless decisive action is taken whenever demand is overreaching supply, man will fund himself on threshold not of a problem but of crises. Davis (1965) argued that inadequate water supply is peculiar to less developed countries but Kelion (1967) counter such assertion and argued that water shortage is a worldwide problem and based his argument on city of Tucson in the United States which is now gradually facing water shortages as no success have been recorded in various method adopted to improve water supply for the community.

The problems associated with water quality are enormous. This has attracted the attention of government, non-governmental bodies or agencies and individuals in order to set up policies that will eradicate these problems.

According to (UNCHS 1995), it was reported that only eight centuries out of about 50 countries in Africa, supplied water to more than 50% of their population. The situation is worse in Zaire, Guinea-Bissau, Madagascar and Sierra-Leone, where not more than 10% of the rural population has access to safe drinking water.

Access to safe drinking water according to the World Health Organization (WHO, 1992) is a basic requirement for health to prevent diseases. They remarked that consumers of water must be within 15 minutes walking distance to a treated water source. Most settlement lack access to safe and potable water supply. Thus, people make do with the available water, either good or not for daily consumption. The indispensability of water has made it necessary for us to be studying it every now and then. Obviously, one of the major problems confronting and debilitating the growth of rural areas in Nigeria is the problem of potable water availability, lack of clean water cause a lot of havoc to both human being as well as livestock which is a source of economic booster especially for farmers and other rural dwellers. The specific objectives of the study are to: examined the socio-economic characteristics respondents, availability of deep-well water in the area cum sponsors of deep-well water, mode of drawing water, storage water facilities by respondents, perception of

respondents on outbreak of diseases and the management of deep-well water facilities in the area.

## MATERIALS AND METHODS

### Brief of the Study Area

Lagelu local government is one of the 33 local Government councils in Oyo state with its headquarters at Iyana-offa is in the eastern part of Ibadan the capital of Oyo state. It has an area of 338km square and a population of 147,957. It shares boundary with Iwo Local Government in the North and Egbeda Local Government in the West. It is also bounded in the South by Ibadan North East Local Government and Akinyele local government in the East. The study covers ten political wards in lagelu local government area namely: Ajara/Opeodu, Apatere/Kuffi/Ogunbode, Arulogun Ehin/Kelebe, Ejioku/Igbon/Ariku, Lagelumarket/ Kajola/Gbena, Lagun, Lalupon I, Lalupon II, Lalupon III, Ofa Igbo, Ogunjana/Olowode/Ogburo, Ogunremi/Ogunsina, Oyedeji/Olode/Kutayi And Sagbe/Pabiekun

### Methods of Data Collection

Data for the study were collected from both primary and secondary sources. The primary sources include information from the field through structured questionnaire administration, personal observation and oral interview from respondents and opinion leaders. Such information include: their socio-economic characteristics, availability of deep-well water and their locations, accessibility of deep-well water, water quality in relation to health of the residents, sponsors of deep-well water in the area, mode of drawing water from the deep-wells, type of storage water facilities, perception of respondents on the outbreak of water borne diseases emanating from deep-well water and their management strategies. The secondary sources involve the review of relevant literature on deep-well water supply and maintenance.

### Methods of Data Analysis

Data were collected and analyzed through descriptive statistics such as frequency count, table and percentages to affirm the sustainability of deep-well water supply in the study area.

## RESULTS AND DISCUSSION

### Socio-Economic Characteristic of the Study Area:

It was observed from the questionnaire administered that 55.6% of the respondents were male and 44.4% of the respondents were female. This shows that the percentage of male that were interviewed is more than the females. Majority of respondents are between the ages of 26-35 years with 38.5% and the number of residents that are married especially in the core areas is the highest with 41.8%. This result shows that the study area is occupied with more married people than those that are single because of illiteracy, lack of services and work to be

engaged with, these youths are engaged with sexual activities and they marry at tender ages which is common in hamlets and villages.

Highest number of respondents in the study area has no formal education with 31.4%. This justifies the reason why there is low rate of literacy and high rate of illiteracy among the inhabitants of the Lagelu LGA. Majority of respondents were civil servants; they constitute 35.6% of the total respondents and are majorly Christians.

## MEASURE OF THE SPATIAL DISTRIBUTION OF DEEP WELLS IN THE STUDY AREA

**Table 1: Spatial Distribution of Deep-Well in the Study Area**

| VARIABLE | | FREQUENCY | PERCENTAGE |
|---|---|---|---|
| a) SPONSORS OF DEEP-WELL | i. Government | 70 | 29.3 |
| | ii. NGO | 29 | 12.1 |
| | iii. Community | 100 | 41.8 |
| | iv. Affluent | 40 | 16.7 |
| b) METHOD OF COLLECTING WATER | i. Head porterage | 155 | 64.9 |
| | ii. Pumped into the house | 64 | 26.8 |
| | iii. Use of vehicle to fetch water | 20 | 8.4 |
| c) QUANTITY OF WATER | i. Very satisfied | 43 | 18.0 |
| | ii. Satisfied | 37 | 15.5 |
| | iii. Fairly satisfied | 108 | 45.2 |
| | iv. Not satisfied | 51 | 21.3 |
| d) MODE OF DRAWING WATER | i. Tin bucket | 45 | 18.8 |
| | ii. Rubber bucket | 140 | 58.6 |
| | iii. Tube bucket | 34 | 14.2 |
| | iv. Pumping machine | 20 | 8.4 |
| e) STORAGE FACILITIES | i. By tank | 39 | 16.3 |
| | ii. Drums | 100 | 41.8 |
| | iii. Secured pots | 60 | 25.1 |
| | iv. No storage facility | 40 | 16.7 |
| **TOTAL** | | **239** | **100** |

*Source: Author's fieldwork 2011.*

### Sponsors of Deep Well Water in the Study Area:

According to the respondents as indicated in the table 1, 41.8% of deep-wells were donated by the community, 29.3% of deep-wells were donated by the government, 16.7% of wells were donated by affluent and 12.1% of wells were donated by the NGO. From the survey conducted most of public wells in Lagelu local government area were donated by the community.

**Method of Collecting Water from the Well in the Study Area**

Table 1, reveals that 64.9% of respondents collect water through head porterage, most of the respondents prefers to transport water by carrying it in their heads. 26.8% of respondents collect water by pumping water into the house, 8.4% of respondents prefers to use vehicle to fetch water.

**Residents Satisfaction with the Quantity of Deep Well Water in the Study Area**

Table 1 reveals that 45.2% of the respondents were fairly satisfied with well water supplied, 21.3% of the respondents expressed total dissatisfaction with the condition of well water, 18.0% of respondents expressed high level of satisfaction with the well water supply and 15.5% of respondents were relatively satisfied with the quality of well water supply and supplied in the study area. Observation shows that some residents in ward 5 of Lagelu local government area are not satisfied with the quantity of well water supply because there are no public wells in the area. For example in make-hay area, Iyana-church, there are only two deep wells dug by individuals in which other people fetch from.

**Mode of Drawing Water from the Well**

Table 1 reveals that 58.6% of the respondents use rubber bucket to draw water 18.8% of the residents use tin bucket to draw water from the well, 14.2% of respondents draw water with tube bucket and 8.4% of residents use pumping machine to draw water from the well. According to the survey, large percentage of respondent prefer to draw water from the well with rubber bucket because it is convenient to pull and affordable.

**Residents Storage Facilities**

Table 1 indicate that only 41.8% of respondents use drum as their storage facility which can only serve that household for about 2-3 days, 25.1% of respondents use secured pots to store water, 16.7% of the respondents has no storage facilities apart from their small buckets or pail that can only hold water for a day and 16.3% of respondents has tank that can store water for a month, particularly during the dry season when there is general scarcity of water supply.

**RESPONDENTS PERCEPTION OF DEEP-WELL WATER SUPPLY PROBLEMS IN THE STUDY AREA**

**Table 2: Problems of Deep-Well Water Supply in the Study Area**

| VARIABLE | | FREQUENCY | PERCENTAGE |
|---|---|---|---|
| a) LOCATION OF DEEP-WELL | i. Backyard | 132 | 55.2 |
| | ii. Close to soak-away | 38 | 15.9 |
| | iii. Close to burial ground | 29 | 12.1 |
| | iv. Close to septic tank | 40 | 16.7 |
| b) DAMAGE OF DEEP-WELL | i. Occasionally | 112 | 46.9 |
| | ii. Frequently | 49 | 20.5 |
| | iii. not al all | 58 | 24.3 |
| | iv. not working again | 20 | 8.4 |
| c) ODOUR OF THE DEEP-WELL | i. Very good | 41 | 17.2 |
| | ii. Good | 58 | 24.3 |
| | iii. Fairly good | 95 | 39.7 |
| | iv. Not good at all | 31 | 13.0 |
| | v. I don't know | 14 | 5.9 |
| d) OPINION LEADERS ON AILMENT OF DEEP-WELL WATER | i. Strongly agree | 38 | 15.9 |
| | ii. Agree | 56 | 23.4 |
| | iii. Fairly agree | 109 | 45.6 |
| | iv. I don't know | 36 | 15.1 |
| e) PERCEPTION ON OUTBREAK OF DISEASES | i. Very many | 29 | 12.1 |
| | ii. Many | 63 | 26.4 |
| | iii. Very few | 109 | 45.6 |
| | iv. Not at all | 38 | 15.9 |
| **TOTAL** | | **239** | **100** |

*Source: Author's fieldwork 2011.*

**Location of Deep-Well Water in the Study Area**

Table 2 reveals that 55.2% of wells were located at the backyard of the house, 16.7% of wells are located close to septic tank, 15.9% of wells are located close to soak-away and 12.1% of wells are located close to burial ground. This shows that majority of the wells are located at the backyard or front yard of the house.

**Occurrence of Deep-Well Getting Spoilt in the Study Area**

Table 2 shows that 46.9% of the well occasionally gets spoilt, 24.3% of the wells do not get spoilt at all, 20.5% of the deep wells frequently get spoilt and 8.4% of the deep well are not working again. This shows that most of the wells in the study area occasionally get spoilt.

**Respondents Opinion on the Odor of the Deep Well**

The perception of the residents on the odor of deep well water in the study area is varied as it is revealed in the table 4.3c: 39.7% of the respondents agreed that the odor is fairly good, 24.3% of the respondents said that the odor of the water is good, 17.2% of the respondents agreed that the odor is very good, 13.0% of the respondent agreed that the odor of the well is not good at all and 5.9% of the respondent said they don't know how to rate the odor of the well water.

**Respondents Opinion on Ailment Associated with Water**

Table 2 reveals that 45.6% fairly agreed that deep well water can cause ailment, 23.4% relatively agreed that their water can cause sickness, 15.9% of the respondents strongly agreed that their water can cause ailment and 15.1% don't know if deep well water can cause ailment. As discussed earlier the level of water quality in the study area is low and this might be the reason why large percentage of the respondent agreed that their well water can cause ailment.

**Residents Perception on Outbreak of Diseases**

Table 2 revealed that 45.6% of the respondents said that there are very few outbreak of diseases 26.4% of the respondents agreed that there are many outbreaks of diseases and 15.9% of the respondents said that there are no outbreaks of diseases at all and 12.1% of the respondents agreed that there are very many outbreak of diseases through well water intake. From the above analysis majority of the respondents agreed that their water could cause outbreak of diseases meaning that the well water in this area is not portable and safe enough for consumption.

**RESPONDENTS ASSESSMENT OF DEEP-WELL WATER MANAGEMENT STRATEGIES IN THE STUDY AREA**

**Table 3: Management of Deep-Well Water Supply in the Study Area**

| VARIABLE | | FREQUENCY | PERCENTAGE |
|---|---|---|---|
| a) TREATMENT OF WATER | i. Boiling | 45 | 18.8 |
| | ii. Use of alum and sieving | 109 | 45.6 |
| | iii. Chemical treatment | 45 | 18.8 |
| | iv. Others | 40 | 16.7 |
| b) AVAILABILITY OF COVER FOR DEEP-WELLS | i. Yes | 190 | 79.5 |
| | ii. No | 49 | 20.5 |
| c) METHOD OF COVERING THE DEEP- WELLS | i. Ring with concrete | 192 | 80.3 |
| | ii. Plastered with cement | 27 | 11.3 |
| | iii. None of the above | 20 | 8.4 |
| d) REPAIR OF DEEP-WELLS | i. Regularly | 23 | 9.6 |
| | ii. Once in a year | 106 | 44.4 |
| | iii. Not regular at all | 60 | 25.1 |
| | iv. I don't know | 50 | 20.9 |
| e) AGENCIES INVOLVED IN THE REPAIR OF DEEP-WELLS | i. Community | 142 | 59.4 |
| | ii. Government | 30 | 12.6 |
| | iii. NGO | 40 | 16.7 |
| | iv. Affluent | 27 | 11.3 |
| **TOTAL** | | **239** | **100** |

*Source: Author's fieldwork 2011.*

**Treatment of Water Before Use**

Water can be polluted right away from the source, therefore render it unsafe for human consumption unless it is well treated. Ground water can be naturally reached in mineral matter thereby making the water unsatisfactory for most uses unless the demineralization process is undertaken. There is high tendency of using contaminated water when it is assumed potable and safe for human consumption on the platform of physical screening of the water being odorless and tasteless, it is possible that water may pass physical test but chemically when subjected to the laboratory test it contains pathogens and other chemical elements harmful to human body.

Table 3 indicated that 45.6% of respondent treat their water by using alum and sieving method, 18.8% of respondents treat their water by boiling, 18.8% of respondents treat their

water by using chemical treatment like chlorine etc and 16.7% of respondents fall under the group "other" which include no treatment and other local treatment.

Some household does not treat their water regularly because they are ignorant of the fact that water should be treated regularly so as to be fit for human consumption and other uses both domestically and industrially. The use of rope and bucket for drawing water from the well can also be a source of pollution if not kept in hygienic places.

**Availability of Cover to Protect the Well**

Table 3 reveals that 79.5% of the respondents have cover to protect their well and 20.5% of the respondents do not have cover to protect their well. Although most of the wells are properly covered and the surrounding environment are relatively clean to some extent and free from dirt, but washing of dish and clothes is carried out around the wells as it was observed in the field.

As it was observed in the field, in some houses where animal is reared and with children of six years of age, unconsciously it is easy for human and animals waste to contaminate the well especially the uncovered ones.

**Method of Covering Deep-Wells in the study area**

Table 3 revealed that 80.3% of the respondents has ring with concrete to cover their well, 11.3% of the respondent have their well cover plastered with cement, 8.4% of the respondents do not have anything to cover their well meaning their well is opened which can easily get contaminated.

**Repair of Deep-Wells in the Study Area**

Table 3 shows that, the repair of deep well water in the study area is not regularly done because of the nonchalant attitude of residents towards the repair of deep-wells. According to the table, 44.4% of the respondents repair their wells once in a while, 25.1% of the respondents do not repair their wells regularly, 20.9% of the respondents do not have the idea of repair and 9.6% of the respondents repair their wells regularly. The repair of deep-well reduces threat on water purity, though the well water may be assumed to be clean some people use unclean fetchers to draw water thereby introducing pollutants into the water which may render it unsafe for human consumption therefore there is need to often repair deep well to ensure safe and potable water for consumption.

**Agencies Involved in the Repair of Deep-Wells in the Study Area**

Table 3 above shows different agencies and individuals' involvement in the repair of deep-well in the study area, with community based organizations efforts having highest involvement with 59.4%, followed by NGO's provisions with 16.7% then government agencies with 12.6% and affluent with 11.3%. Survey shows that the governments' participation in the repair of deep-well is poor and need to be improved on; the repair is mostly done by the community.

**PLATE 1: DEEP-WELL IN AJARA, LAGELU LOCAL GOVERNMENT AREA , IBADAN, NIGERIA .**

*Source: Author's fieldwork 2011.*

**PLATE 2: A DEEP-WELL COVERED IN LAGUN, LAGELU LOCAL GOVERNMENT AREA, IBADAN, NIGERIA**

*Source: Author's fieldwork 2011.*

## RECOMMENDATIONS

As suggested by the residents government should embark on the provision of potable water supply by construction of more deep-wells and boreholes in the study area. Also each household should endeavor to purify their water themselves before drinking and used for other domestic activities. Household water can be purified by boiling to $100^0$c and use of chemical treatment like aluminum sulphate (Alum), ozone and chlorine. Different household filters are available in the market that can be used to purify water: filtering material like porous store, industrial earth, unglazed porcelain etc.

The public health official also has to contribute in the aspect of organizing seminars and enlighten campaign for the populace to know how to protect their well water from the source to the point of consumption. Also there is need for constant surveillance by public health officials to enforce water quality control measures and ensure safe and potable well water supply at all time.

Regular water test should be carried out on the source and point of consumption to detect impurities so as to reduce and eliminate health hazards. Furthermore, there is need to gather data to monitor how water quality and quantity change with time: this will help in formulation of plan. With the data, government should embark or undertake a comprehensive sustainable well water development plan together with waste management programme to protect water from being polluted by the wastes generated by various human activities.

A technical consumer's guide for private well owners should be developed to focus on improving technical knowledge of well construction and maintenance. Outreach, inspection and enforcement efforts should be aimed at ensuring that large diameter wells are constructed to reduce the potential points of entry. The link between sustainability and construction materials and methods needs to be more fully explored.

Therefore guidelines for well location and construction should incorporate information regarding topography of the property, any structural problems that may be present due to the soil type or geology, and where possible, the local flow of groundwater should be known before a well is drilled. Wells should be positioned so that they are not located down-gradient from any pollutants.

Also, the quality of the well water can be significantly increased by lining the well, sealing the well head, fitting a self-priming hand pump, constructing an apron, ensuring the area is kept clean and free from stagnant water and animals, moving sources of contamination (latrines, garbage pits) and carrying out hygiene education. The well should be cleaned with 1% chlorine solution after construction and periodically every 6 months.

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