

AWARENESS CREATION AND CAPACITY BUILDING INITIATIVES THROUGH THE NATIONAL ASSESSMENT OF DRINKING WATER QUALITY PROJECT IN COMMUNITIES FOR THE POST-2015 SUSTAINABLE DEVELOPMENT GOALS

Omogbemi O. YAYA¹ and Dogara BASHIR²

Regional Centre for Integrated River Basin Management (RC-IRBM), Kaduna Nigeria

E-mail: omime93@yahoo.com¹ & dogara.nwri@gmail.com²

ABSTRACT

Rapid Assessment of Drinking Water Quality (RADWQ) was conceived by the World Health Organization (WHO) and the United Nations Children Fund (UNICEF) and executed to explore the quality of drinking water from “improved” sources in five pilot countries including Nigeria. National Water Resources Institute (NWRI) was one of the institutions in Nigeria that participated in the Programme. The Programme, apart from providing snapshots of the quality of improved sources of drinking water, as a first step towards strengthening drinking water quality regulations and baseline information gathering on water quality status in the country, built the capacity of NWRI staff that participated in it. The methods and procedures applied were later mirrored by NWRI in a national project, “*National Assessment of Drinking Water Quality Project*” in fulfillment of one of its mandates to perform applied research functions in all aspects of water resources development. The Project with funding support from the national budget has successfully been executed in eleven of the thirty six states of the country including the Federal Capital City of Abuja. States-wide water quality statuses have been established.

Keywords: Drinking water quality, Project framework, Capacity building, Sustainable Development Goals (SDGs)

1. INTRODUCTION

The objective of National Water and Sanitation Policy in Nigeria is the provision of sufficient potable water and adequate sanitation for all Nigerians in an affordable and sustainable manner. Several international treaties and conventions including the Millennium Development Goals (MDGs) focus on increasing global access to water and sanitation. In pursuance of this objective, Nigeria at all levels of government and with the support of External Support Agencies [3], [4], [8] & [9] scaled up the execution of several water schemes all over the country to meet the Millennium Development Goals (MDGs) target of reducing by half those that do not have access to potable water. The water supply coverage in Nigeria has appreciably improved, Despite the giant strides made by these concerted efforts and the improved coverage recorded, safety of many water supplies sources remain unknown and uncertain to executing institutions and particularly consumers across the country that have questioned the quality of their drinking water and have had cause to express dissatisfaction on their potability. The impression by many that groundwater is naturally pure, being a concealed and well protected resource, to deliver potable water when developed is now questionable due to uncontrolled anthropogenic activities. Even pipe-borne water supplies in big towns and cities in the country are not spared of similar treats. It is for these reasons that this project is justified to ensure rapid assessment of the quality of drinking water from the various sources in order to clearly demarcate areas with objectionable problems and provide

baseline information for appropriate policy formulation and actions to address unpleasant circumstances.

2. PROJECT OBJECTIVES

The main objective of the project is to rapidly assess the drinking water quality status of point and non-point sources of water in areas investigated. The specific objectives are to;

- i. Conduct field investigations using appropriate sampling and analytical methods to carry out drinking water quality tests;
- ii. Empirically examine the measured parameters in the drinking water and determine areas whose water sources have noticeable shortcomings due to aesthetic and objectionable problems;
- iii. Recommend and suggest remediation/mitigation measures for such areas with shortcomings;
- iv. Build capacity of host institutions and communities on water quality assessment and monitoring as well as improve knowledge of quality status; and
- v. Sensitize and mobilize the state to institutionalize the art of sustainable quality assessment and monitoring of its drinking water sources to reduce or eliminate data paucity and knowledge gaps for the overall public good.

3. METHOD OF STUDY

The project execution is segmented into: Pre-visit to collaborating Agencies for advocacy and mobilization of Stakeholders; Technical Meeting(s) with field staff; Field Exercises/Laboratory Analyses; Data Collation and Analyses and Report Writing; Internal seminar and Stakeholders' critique workshop to validate analyzed results and reports; and Information Dissemination as explained below.

High-level sensitization and mobilization of the state government for a buy-in in the exercise is carried out. The officers to participate in the exercise are selected from the pool of Hydrogeologists, Water Resources Engineers, Chemists, Biochemists and Microbiologists working in the collaborating Agencies [5], [6], [7] & [11] and are those that may have participated in the construction of the water schemes or are managing them and know their locations and level of serviceability.

The framework of action for the field exercise, list of schemes to be assessed and their locations, the routing protocols are mapped out. Contacts is established with the local health officers in the local government areas (LGAs) and members of the community based water users associations (WUAs) under whose purview are the selected schemes for buy-in. Furthermore, the specific laboratories where samples are to be analyzed are decided and if necessary inspect them to ascertain their viability. The field officers are grouped into 2-3 with each group having a Hydrogeologist, Chemist/Biochemist and Microbiologist.

The category of water schemes that are sampled are: Hand pumped and motorized boreholes; protected yard/public dug wells; and treated water in reservoirs and water from public stand pipes in the town or community. Where available, water from protected springs frequented by the community may be sampled. Sampling protocols are in line with Standard Methods for Examination of Water and Wastewater (APHA) while quality analyses are done according to Standards for Analysis of Potable Water (API) and the Nigerian Standards for Drinking Water Quality. Parameters that are analyzed for in the water samples collected are: Temperature, Colour, pH, Turbidity, Total Dissolved Solids, Electrical Conductivity, Total Hardness, Salinity, Nitrate, Chloride, Fluoride, Sodium, Potassium, Iron, Manganese and heavy metals such as Arsenic, Lead, Cadmium, Chromium, Mercury and Faecal coliform. All environmentally unstable parameters are measured in the field to avoid errors in analysis. Blank samples are also taken to check sampling procedural errors. Sanitary conditions of water schemes sampled are assessed by use of WHO criteria.

A stakeholders' critique workshop is held to consider the draft report. The workshop entertains observations, criticisms and contributions. It provides the state the platform for an increased awareness of the statutes of the drinking water quality in their areas, meaningful discussions on strategies for sustained

monitoring and evaluation of water quality and acquisition of knowledge of sanitary habits that protect their water sources from future degradation.

4. RESULTS AND DISCUSSIONS

The results for physico-chemical and microbiological analyses of all samples are reported in comparison with the Nigerian Standards for Drinking Water Quality (NSDWQ) (2007) and World Health Organization Guidelines for Drinking Water Quality (2004). Some results of four (4) states in group of two are presented in the table below:

S/n	State	Major Findings
1.	Taraba	<ul style="list-style-type: none"> • Poor sanitary conditions in the immediate vicinity of 78% of assessed boreholes and 100% of pipe-borne water supplies record 100% good sanitary conditions • 0% Residual chlorine at the water treatment plants and consumer stand pipe supplies • Deformation of bones due to excessive fluoride contamination exists. • Cadmium is the only toxic metal with concentration in excess of Nigerian Standards for Drinking Water Quality (NSDWQ) permissible level in 6% of analyzed samples.
2.	Niger Delta Region (Bayelsa, Delta and Rivers States)	<ul style="list-style-type: none"> • Iron concentration compliance is 28%, 54% and 57% in Bayelsa, Rivers and Delta States respectively. • Manganese concentration compliance is 48%, 88% and 83% in Bayelsa, Rivers and Delta States respectively • Chromium concentration compliance is 64%, 80% and 96% respectively in Bayelsa, Rivers and Delta states respectively. • Lead concentration compliance is 0% for Bayelsa and Rivers states and 20% for Delta state. • Mercury concentration compliance is 16%, 7% and 100% in Bayelsa, Rivers and Delta states respectively. • Cadmium concentration compliance is 0%, 78% and 94% in Bayelsa, Rivers and Delta states respectively. • Nitrate, Fluoride, Total hardness and Total suspended solids are 100% compliant. • pH values for all field samples met the NSDWQ standards.

5. CONCLUSIONS

The National Drinking Water Quality Assessment Project has created insight into the status of drinking water sources in some parts of the country. The capacities of staff of the participating institutions in those states have been built, state-wide awareness of drinking water quality status is enhanced, strategies for sustainable monitoring and evaluation established, and guidelines for appropriate policy formulation for execution of future water supply and sanitation established. The UNESCO-IHP International Initiative on Water Quality (IIWQ) stands to benefit from the expertise of NWRI in the execution of the National Drinking Water Quality Assessment Project by supporting its replication in not only other parts of the country yet uncovered but in the West African sub-region region through the RC-IRBM.

ACKNOWLEDGEMENTS

The authors thank the National Water Resources Institute, Kaduna for the permission to present this paper as an overview of the National Assessment of Drinking Water Quality Project.

REFERENCES

- [1] Stoveland S and Bassey BU. Status of Water Supply and Sanitation in 37 small Towns in Nigeria. *A paper presented at Donor Conference in Abuja*. 12 Pp. (2000).
- [2] World Bank. Water Supply & Sanitation Interim Strategy Note. Federal Republic of Nigeria. 38 Pp. (2000).
- [3] African Development Bank, European Union Water Initiative and United Nations Development Programme. Getting Africa on Track to Meet the MDGs on Water and Sanitation – *A Status Overview of Sixteen African Countries*. 120 Pp. (2006).
- [4] European Union/United Nations Children Fund. *Water & Sanitation Summary Sheet*. Water and Sanitation Monitoring Platform. Pp 6. (2008).
- [5] NWRI Research Report. *Assessment of Drinking Water Quality in selected States of the Niger Delta Region, Nigeria*. No. 2. 67 Pp. (2009).
- [6] NWRI Research Report. *Assessment of Drinking Water Quality in Ogun State, Nigeria*. 55 Pp. No. 3 (2009).
- [7] NWRI Research Report. *Assessment of Drinking Water Quality in Kaduna State, Nigeria*. 49 Pp. No. 4 (2009).
- [8] Global Sanitation Fund, Water Supply & Sanitation Collaborative Council. *Sanitation Section status and Gap Analysis: Nigeria*. 48 Pp. (2009)
- [9] United States Aid for International and Development (USAID). *Nigerian Water Situation Profile*. 4 Pp. (2010).
- [10] World Health Organization/United Nations Children Fund. Rapid Assessment of Drinking Water Quality in the Federal Republic of Nigeria. *Country Report of the Pilot Implementation in 2004-2005*. 92 Pp. (2010).
- [11] NWRI Research Report. *Assessment of Drinking Water Quality in Taraba State, Nigeria*. 59 Pp. No. 5 (2011).
- [12] Africa Ministers' Council on Water. AMCOW Country Status Overviews – Regional Synthesis Report. *Pathways to Progress: Transitioning to Country-Led Service Delivery Pathways to Meet Africa's Water supply and Sanitation Targets*. Washington DC. The World Bank/Water and sanitation Programme. 100 Pp. (2011)

APPENDIX

- a. Field Team in advocacy meeting with an Agency officials mapping out field routes
- b. A well maintained handpump borehole in school premises being sampled by a Microbiologist on the Field Team