Quality of Water Sources in Kambu Quarters Area of Sardauna Local Government, Taraba State, Nigeria

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Abstract

Poor water quality plaques communities across the globe. Environmental pollution is mainly derived from the used of poor water. There is the need to conduct research in order to investigate the quality of water from some water sources reference to Kambu area of sardauna local government Taraba State.The quality of water was investigated by studying chemical parameters of water which are pH, turbidity, and hardness of water. The methodology used was water quality assessnment methodology (WQAP) The pH of the samples was analyzed and two of the samples of borehole 6.3 and well 6.4 were not in standard with world health organization (6.5 to 6.8). Turbidity was found to be 0.0 NTU borehole water, 1.0 NTU tap water and 0.0 NTU well water respectively, the results of the hardness shows that 68 mg/L tap water, 172 mg/L borehole water and 88 mg/L well water respectively. Only two of the samples were below the permissible limit, this implies that borehole and well water of the area are contaminated which are unsafe for drinking.

Keywords: Alkalinity, Hardness, pH, Turbidity, Water

Qualité des sources d'eau dans la région des quartiers de Kambu du gouvernement local de Sardauna, État de Taraba, Nigéria

Résumé

La mauvaise qualité de l'eau plaque les communautés du monde entier. La pollution de l'environnement provient principalement de l'utilisation d'eau de mauvaise qualité. Il est nécessaire de mener des recherches afin d'étudier la qualité de l'eau de certaines sources d'eau faisant référence à la région de Kambu du gouvernement local de Sardauna, dans l'État de Taraba. La qualité de l'eau a été étudiée en étudiant les paramètres chimiques de l'eau qui sont le pH, la turbidité et la dureté de l'eau. La méthodologie utilisée était la méthodologie d'évaluation de la qualité de l'eau (WQAP). Le pH des échantillons a été analysé et deux des échantillons du forage 6.3 et du puits 6.4 n'étaient pas conformes aux normes de l'organisation mondiale de la santé (6,5 à 6,8). La turbidité s'est avérée être respectivement de 0,0 NTU pour l'eau de forage, 1,0 NTU pour l'eau du robinet et 0,0 NTU pour l'eau de puits. Les résultats de la dureté montrent respectivement 68 mg/L d'eau du robinet, 172 mg/L d'eau de forage et 88 mg/L d'eau de puits. Seuls deux des échantillons étaient inférieurs à la limite autorisée, ce qui

implique que l'eau de forage et de puits de la zone est contaminée et qu'elle est impropre à la consommation.

Mots-clés - Alcalinité, dureté, pH, Turbidité, eau.

مجتمعات لوحات المياه ذات الجودة الرديئة في جميع أنحاء العالم.والتلوث البيئي مستمد أساسا من استخدام المياه الفقيرة. هناك حاجة لإجراء بحث من أجل التحقيق في جودة المياه من بعض مصادر المياه تشير إلى منطقة كامبو التابعة لحكومة سردونا المحلية بولاية تارابا تم فحص جودة المياه من خلال دراسة البارامترات الكيميائية للمياه وهي الأس الهيدروجيني والتعكر وصلابة الماء. المنهجية المستخدمة هي منهجية تقييم نوعية المياه تم تحليل الأس الهيدروجيني للعينات واثنتان من عينات البئر 6.3 وبئر 6.4 لم تكن في مستوى منظمة الصحة العالمية (6.5 إلى 6.8). تم العثور على التعكر لمياه الآبار 0.0 تظهر نتائج الصلابة أن 68 ملغ/لتر من مياه الصنبور، 172 ملغ/لتر من مياه الآبار NTU ومياه الآبار 0.0 NTU ومياه الصنبور 1.0 NTU و88 ملغم/لتر من مياه الآبار على التوالي. اثنتان فقط من العينات كانت أقل من الحد المسموح به،وهذا يعني أن الآبار ومياه الآبار في المنطقة ملوثة وغير آمنة لشراب

Introduction

Declining water quality has become a global issue of concern as human population grow, industrial and agricultural activities expand and climate change threatens to cause major alterations to the hydrological cycle. Water quality issues are complex and diverse and are deserving urgent global attention and action (UN – Water 2011).Consumption of contaminated or polluted water causes some diseases such as typhoid, cholera, and other diseases caused by bacterial or viruses (Pal, M.et al.,2018) Human population suffers from various form of water borne diseases

Water is essential to human being, aquatic organisms and the environment. It is a colorless and odorless,also a defining feature of our planet. The quality of water is a major factor to be considered in an environment. Ninety-seven and a half per cent (97.5%) of all water is found in the oceans (Waterstone, M. 1992). Functioning and healthy aquatic ecosystems provide us with a dazzling array of benefits – food, medicines, recreational amenity, shoreline protection, processing our waste, and sequestering carbon. The presence of foreign materials (which are innumerous natural or anthropogenic including toxic metals such as lead, cadmium and chromium) affects the quality of water Rivers are the dominant pathways for metals transport (Mendie, 2005).

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Borehole and tap waters are obtained from underneath the earth crust, and the quality are usually affected by some chemicals such as heavy metals, mineral salts and slightly by a change in the pH.They are African's most valuable resources, which provides reliable water supplies for more than a 100 million people. However, most of the contaminated water affected by some chemicals such as heavy metals, mineral salts are mostly found in the rural areas, this is due to fact that rural areas have the abundance of miner Water quality is based upon the soluble species due to weathering from source rocks and anthropogenic activities. Usually occur below the surface and not typically in contact with the atmosphere, it is often assumed to be fairly safe for consumption, compared to surface water (Quist *et al.*, 1998). Specifically, natural groundwater storage offers a buffer against climatic variability; quality is often good, and infrastructure is affordable to poor communities (Adelana and Mac Donald, 2008). Ground water has historically been

considered as a reliable and safe source of water protected from safe contamination by geological filters that removes pollutants from water as it is percolated through the soil (Prasad and Chandra, 1997).

Water is also present in the atmosphere in solid, liquid, and vapor states. Water is the most common
liquid on our planet, vital to all life forms. It is also an important component of the tissues of most other living things. Water is one of the nature's most important gifts to mankind. It is an essential element for survival of human being. One can survive for a month without food but cannot survive a few days in the absence of water (Namita Soni and Anju Bhatia, 2015). Quality of drinking water is important to be studied when the overall focus is sustainable development keeping human being at focal point. Water is the dispersion medium for all biochemical reactions of the living process and takes part in many of these reactions (Tambekar P.*et al*., 2012).

Objective of the study

i. To study the various water quality parameters at various locations.
ii. . To collect the water samples from various sources atdifferent areas of kambu, Sardauna local government Taraba state.
iii. To analyze the quality parameters of water.
iv. Compare the data obtained with standards.
v. Give the suggestion and recommendations for improving quality of water.

Materials and methods

Description of the study area

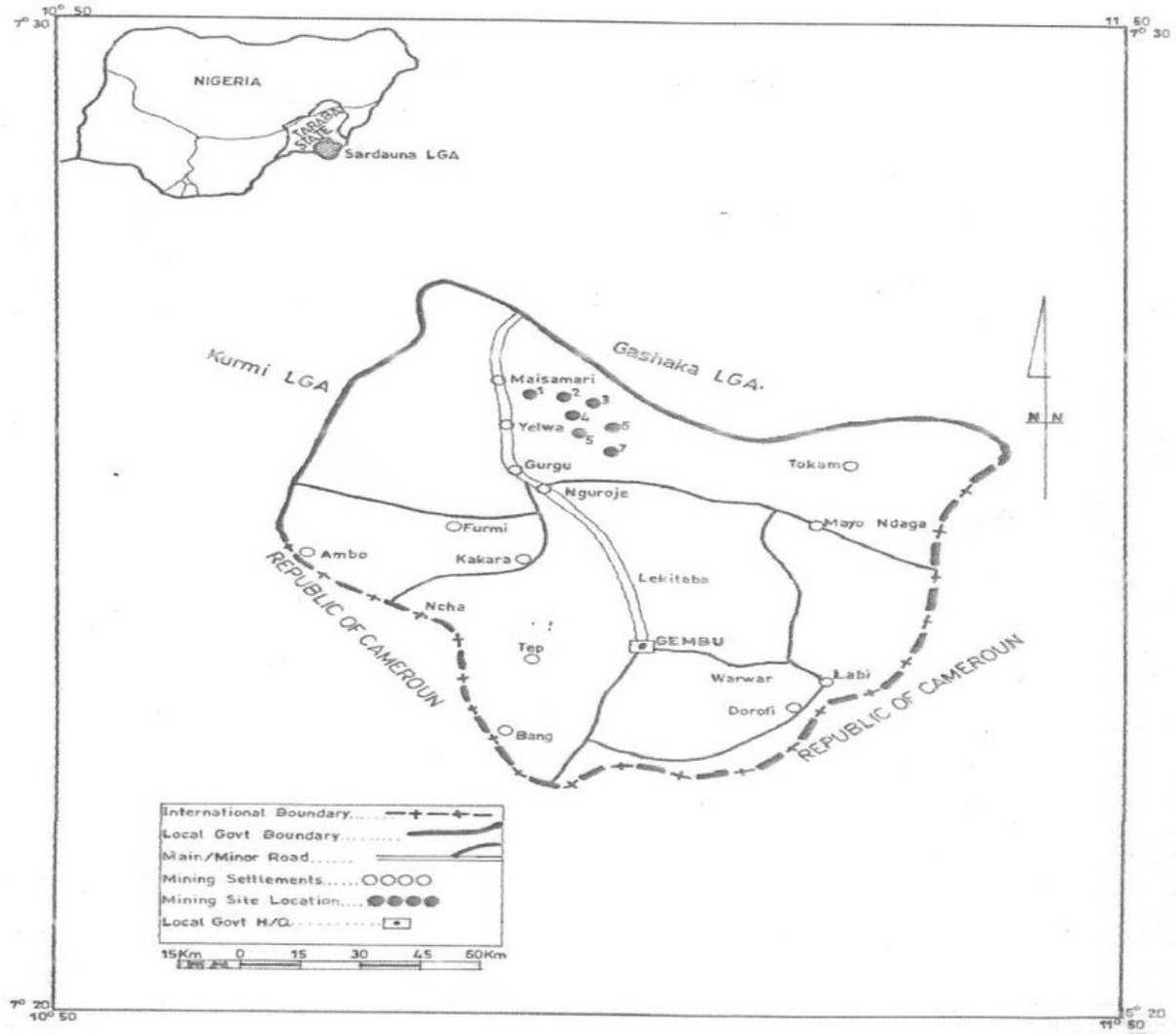
Sardauna (formerly Mambilla) Local Government Area (LGA) is located in the extreme Southeast of Taraba State in Nigeria. It is synonymous with the Mambilla Plateau, which is dotted by many towns and villages. The capital of the LGA is Gembu, an ancient Mambilla settlement whose name is a corruption of "Gelmvu", the name of an ancient monarch of the area. Other ethnic groups from the mainstream Nigeria and neighbouring Cameroon Republic such as Hausa, Kanuri, Banso, Kambu, Fulani, etc. can be found in the commercial centres.

Water Sample

The water samples were collected using a polythene plastic container. The containers were rinsed with water before filling with the water samples, labelled as A, B and C for borehole, tap, and the well water, respectively. The water samples were collected from different locations to obtain a composite sample. The tap water was allowed to run out of the tap for 45minutes before collection

Analysis of samples

The water samples were analyzed, three different parameters were investigated which include pH, total hardness and turbidity using the standard procedures recommended in guidelines for water quality monitoring as described by Maushkar JM (2007). The pH was assessed by electrometric method using pH meter (Hanna H19813 Grocheck meter), turbidity was assessed using nephelometer (NTU), hardness, total hardness which include calcium and magnesium were assessed using Ethylenediaminetetraacetic acid (EDTA) titrimetric method.



Map of Sardauna Local Government Area

Results and Discussions

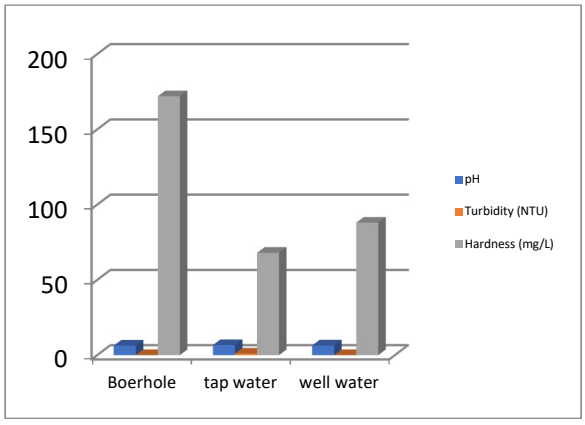


Figure 1: Physicochemical analysis of water
Sample A= Borehole water; Sample B= Tape Water; Sample C= Well water

The pH of the water samples in Kambu quarter area of Sardauna Local Government, Taraba State, are 6.3 (borehole water), 6.7 (tap water), and 6.4 (Well water). The turbidity of the water samples was 0.0 NTU (borehole water), 1.0 NTU (tap water) and 0.0 NTU (Well water). The hardness levels

showed a 68 mg/L (Tap water), 172 mg/L (borehole water) and 88 mg/L (Well water). Borehole and well waters were below the permissible limit.

Conclusion

In conclusion, Turbidity of borehole and tap water were be less than the recommended limit laid by WHO. The hardness of the water samples was above the permissible limit

Authors Declaration

The authors declare that this manuscript is their original research work

Conflict of interest

The authors declare that there is no conflict of interest or competing interest that are relevant to this article

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