WATER SALINITY ASSESSMENT OF GARUN-GABAS IRRIGATION SCHEME, JIGAWA STATE

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ABSTRACT

In Nigeria, Salt problem has been a threat in some of the irrigation scheme for instance the Garun- gabas Unguwar maidoki wells has been suffering from salinity hazard. In fact over 20 areas of land were abandoned due to this salt problem. For these reason research was conducted to investigate the salinity level at Garun –gabas unguwar mai- doki wells. The acidity, alkalinity, pH and Electrical conductivity of the irrigation scheme was randomly conducted. The result shows that the wells used for irrigation scheme at Garun gabas Unguwar mai doki were Alkaline water in nature and requires moderation for proper production.

KEYWORDS: *Salt, drainage water, irrigated land, water salinity, ground water*

1.1 INTRODUCTION

Water salt concentration has remained to be a serious setback in most irrigation scheme. Nearly all water contains dissolved salt and trace elements, many of which result from the natural weathering of the earth surface. In addition drainage water from irrigated land and industrial waste water can impact water quality; the primary water quality concern is salinity level, since salt can affect both the soil structure and crop yield. However a number of trace elements are found in water which can limits its use for irrigation. (Tchobanoglous *et al.,* 2003)

Groundwater is an important water resource in both the urban and rural areas of Nigeria (Adekunle *et al.*, 2007). The usual source of drinking water is the streams, rivers, wells and boreholes which are mostly untreated and associated with various health risks (Agbarie and Obi, 2009).

Dissolved salt in irrigation water present numerous challenges. Salt reduce the osmotic potential of water and high sodium chloride and boron, are toxic if water infiltrates in to soil, all of these effects of salinity need to be considered when assailing the suitability of a water sources for irrigation. During irrigation large volume of water percolate down to lower layers as a result of which the depth to ground water table regularly decrease under such a situation salt present in the water up by capillary and are deposited on the surface as a result of evaporation both deposited salt regards the land and pollute ground water (Tchobanoglous *et al.,* 2003). Several studies on ground water quality have been conducted in southern and Central Nigerian (Abimbola *et al.*, 2002, Adekunle *et al.,* 2007, Akaahan *et al.,* 2010, Emmanuel, 2011, Obasi *et al.,* 2001) and findings have shown that our water contain many impurities especially disease causing microorganism, also, harmful physical and chemical agents.

In Nigeria, salt problem has been a threat in some of the irrigation scheme for instance the garun-gabas unguwar maidoki wells has been suffering from salinity hazard. In fact over 20 areas of land were abandoned due to this salt problem. For these reason this work will investigate the salinity level at garun –gabas unguwar mai- doki wells. No research was done in the area on water salinity. The aim of this study therefore was to investigate the water salinity level in Garun-gabas irrigation sector of Garun-gabas unguwar mai doki wells and to suggest

possible solution based on the findings. The following objectives were to be achieved;

(I)To determine water salinity at garun-gabas irrigation sector in Unguwar mai doki wells

(ii)To determine the effects of water salinity to the irrigation sector of Garun-gabas unguwar mai doki wells.

2.0 METHODOLOGY
2.1 Collection of Water Sample

The water sampling was collected from the three wells of the Garun-gabas irrigation sector, randomly by using auger, at least (3) sample were collected and labeled A B C according to making (4) four sample from well

2.2 Sodium Chloride Test

The concentration of salt in solution trees water pond for most partible application is normally anywhere from a level of zero up to one once per gallon which equal to a 0.6% solution which is also equal to 6000 mg /1 of (NaCl) the basic instruction

assume testing for up to this level. However the higher level can be read.

Determination of salinity: This was done using a multiple parameter turbid meter. The probe was dipped into the water samples until a stable reading was obtained and recorded. N be determined with is kit.

Determination of Alkalinity: 50mL of the sample was pipetted into a clean 250mL conical flask. Two drops of methyl red indicator were then added and the solution titrated against a standard 0.01M NaOH solution to a pink end-point.

Total alkalinity (mg/L) = $\underline{V \times M \times 100,000}$

ML of sample used

Where V = volume of acid used

M = Molarity of acid used

3.0 RESULT AND DISCUSSION

Result of water pH, Acidity Alkalinity and electro conductivity of three random ally selected well are present in this chapter.

3.1: Water pH, Acidity Alkalinity

Table 1: The pH, Alkalinity, Salinity, Conductivity, Turbidity and Total Hardness values of potable and surface water samples in Canaan land, Ota. Potable Water	pH	Alkalinity (mg/l)	Salinity (mg/l)
Potable Water Distilled Water Borehole Water Tap Water	6.40 ±0.26 6.95±0.99 6.52±0.20	0.15 ±0.05 0.95±0.15 0.95 ± 0.15	14.55 ± 1.15 81.10± 0.30 86.45 ± 4.95

Well water shows highly saline nature of the wells

Table 3.2 value of water PH

Water Sample	Water PH
A	7.87
B	7.87
C	7.94
Average Value	7.89

Table 3.3. Value of water Acidity

Water. Sample	Water Acidity
A	6.50
B	6.75
C	6.90
Average Value	6.72

Table 3.4 Value of water Alkalinity

Water Sample	Water Acidity
A	8.60
B	8.35
C	8.04
Average Value	8.33

Table 3.5 Value of Water Electrical Conductivity

Water Sample	Water Electro conductivity
A	0.72
B	0.32
C	0.44
Average Value	0.49

From the results obtained average of water samples was found to be 7.89. This shows that the water was alkaline in nature and only slightly moderation was required. This will leads to improper growth of crops. Due to that, slight moderation of the well will help in much production.

CONCLUSION AND RECOMMENDATION

From the research conducted it can be concluded that the water in Garun- Gabas irrigation sectors is slightly Alkaline water in nature, due to the present of salt, if compared from the result obtained. The following recommendations were suggested;

- The investigation can be made to cover the garun- gibes irrigation sector.
- More parameter such as exchangeable sodium percentage (ESP) and caution realistic salinity level.
- Determination of calcium only (titration with EDTA).
- Calcium and magnesium in ammonium acetate extracts water can be determined for more elaboration of the salt content.

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