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WATER QUALITY ASSESSMENT OF THE GREAT MAN-MADE RIVER FOR SUSTAINABLE WATER RESOURCE MANAGEMENT:
A CASE STUDY OF SARIR-TAZERBO WATER SYSTEM

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ABSTRACT

Water analysis indicated that Sarir-Sirt / Tazerbo-Benghazi System water is worth mentioning that when mixing the water of Tazerbo wells field with that of Sarir wells field in a proportion of 1:1, it was revealed that this water is appropriate chemically for drinking and it conforms to the standard specifications and criteria of drinking water.

The mean salinity value of irrigation water was around EC 0.90 – 0.94 dS/m. In general, the SAR mean value was around 3.28 – 3.74 %. There is no potential restriction on water use due to boron and nitrate concentration. The water was assessed according (U. S. Salinity laboratory staff method, 1954) and furthere evaluated according to the guidelines of water quality for irrigation (FAO, 1985). The assessment showed that all irrigation water classified according to the American salinity laboratory's scheme on the water system of (Sarir-Sirt / Tazerbo-Benghazi). From the electrical conductivity value and sodium adsorption ratio (SAR) data, it is clear that this water system lies among the kind of (C3S1) "high saline low sodicity water". This means that water is not suitable for sensitive crops especially the citrus trees. It is suitable for use only in good permeable soils. The application of the FAO's guidelines to evaluate the irrigation water quality of the (Sarir-Sirt / Tazerbo-Benghazi) water system. From the results of water analysis listed in the Salinity Problem. It was found that the electrical conductivity (EC) equals 0.90 – 0.94 dS/m. In other words, there is a possibility of increasing the problem when using this water for irrigation.
Keywords: Great man-made river, Water quality assessment, GIS, Serir-Tazerbo

INTRODUCTION

The Libyan Arab Jamahiriya lacks permanently running rivers except for some temporal wadis. The Northern part of Libya is one of the most vital areas, as urban centers and other forms of development expanded and population congregated (81.3 %) found within this region, and it contains the biggest area of farm lands, demand for water escalated so the ground water resources was gradually exhausted, and the aquifers were subjected to sea water intrusion. Facing this situation, the government planned and initiated implementation of an ambitious water transfer scheme, the Great Man-Made River. Since 1960 during oil exploration deep in the southeastern part of Libya, vast reservoirs of good quality water were discovered in the form of aquifers, in the sedimentary basins of Al-Kufrah and Sarir. For the last four decades, these basins were subjected to extensive hydrogeological studies at the regional and sub regional scale (Ezzat, 1959; Gabert, 1961; Dubief, 1963; Conant, 1967; Fisk, 1970; Tipton and Kalmback, 1972; German water group, 1977; UNESCO/UNDP, 1972; Egyptian Consulting group (ECG), 1978; Ahmad, 1978; Al-Ramly, 1983; Al-Bakhbakhi, 2002). According to (Jones, 1969), Al-Kufrah and Sarir basin covers an area of 245,000 km^2 and available water resources of this basin is in the order of 25,000 km^3 of good quality water. (Fisk, 1970), has made hydrogeological studies, which shows that the Al-Kufrah basin is underline by more than 840 m of Nubian Sandstone of lower cretaceous age. According to the results of radioisotope hydrological studies, it was indicated that the ground water resources in the Nubian sandstone aquifer system is non renewable (Thorweigh, 1986; Pallas 1980) estimated the life time of the great man-made river will fields of 50 years and longer.

In October 1983, the Great Man-Made River Authority was created and invested with responsibility of taking water from the aquifers in the south, and conveying it by the most economical and practical means for use in the north. Water from the desert well fields in quantities up to 2 million cubic meters a day will be used for municipal, industrial and principally for extensive agricultural developments along the coastal area from Sirt to Benghazi.

Sustainable land management in agriculture is a very complex and challenging concept. It encompasses biophysical, socioeconomic and environmental issues that must be viewed in an integrated approach. Inventory of land resources is a prerequisite for the adequate utilization and sustainable management of the natural resources base of any country. Accurate inventories become imperative for the assessment of available natural resources with reach in each country (FAO, 2002). Geographic information system (GIS) provides tools that help integrating a variety of data sources and types, maintaining and managing inventories, visualizing data and related information using dynamic maps, decision making about resources management, and perform modeling and analysis. (Amarakul and Sanyong, 2000; Harahsheh, 1994; Suhaedi *et al.,* 2002; Varma, 1999; and Wu, 1998; Bahnassy *et al.,* 2001).

The study aimed at assessing the Water quality and Land resources of the Great Man-Made River Project at Sirt and Benghazi.

The main objective was realized through:

Evaluation of water resources of the Great Man-Made River of Sarir-Sirt / Tazerbo-Benghazi System.

METHODOLOGY

Study Area:

The study area consists of Sarir and Tazerbo wells fields.

General Description of the Area:

There are enormous stored quantities of fresh water in the desert in underground aquifers. These waters are being pumped to the ground level through wells their depth reach to 450 m. These wells lie in both areas of Tazerbo and Sarir.

Tazerbo wells field is composed of 108 productive wells whose waters gather in water collecting pipelines in order to pour into a reservoir at Tazerbo whose capacity is 170,000 m^3. From this reservoir, water flows naturally under gravity for a distance of 667 km through pipelines whose diameter is 4 meters to Ajdabiya reservoir.

Sarir wells field is composed of 126 productive wells whose waters accumulate in water collecting pipelines in order to pour into two reservoirs at Sarir. The capacity of each is 170,000 m^3 (Figure1).

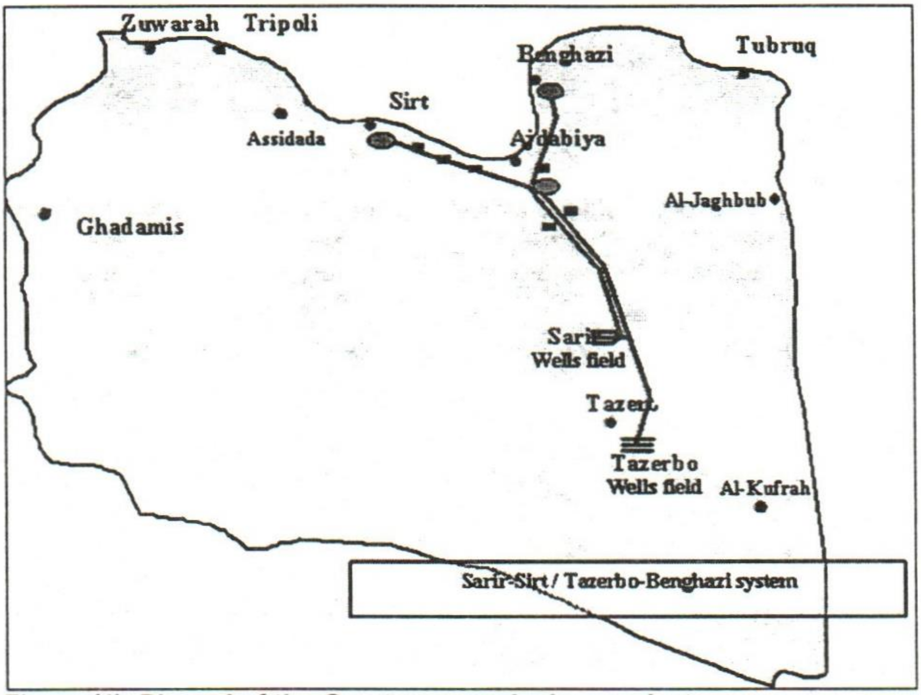

Figure (1): Phase I of the Great man-made river project

Data Collection:

This stage-included gathering of data such as topographic maps, geological maps, soil maps, for the study areas, these data were interred into the computer in order to facilitate their use in the study.

The following is a detailed description of the available data:

Water analysis data:

Great man-made river (Sarir and Tazerbo) water wells, chemical and microbiological analyses (Sarir 1998/1999, Tazerbo 1998/1999 and 2002/2003).

Analysis of Data:

The analysis and treatment of the data, which was collected in the previous stages, were used to cover the various objectives of this study.

Water Analysis:

The implementation of this research were carried out through the study of water quality of all production wells which includes 126 wells in the Sarir well field, and 108 wells in the Tazerbo well fields, for the total of 234 wells. Laboratory analyses were done according to (Handbook No. 60 U. S. Salinity Laboratory Staff, 1954). The collected data include complete information for each well such as date of drilling, depth, well log, initial analysis of water, and productivity, water analysis include: Temperature, EC, pH, TDS, Na^{+}, K^{+}, Ca^{+2}, Mg^{+2}, Cl^{-}, NO_3^{-}, HCO_3^{-}, CO_3^{-2}, $SO4^{-2}$, Fe, Mn, B, and total hardness.

The calculated sodium adsorption ratio (SAR)

$$\textbf{Normal SAR} = Na^{+} / ((Ca^{+2} + Mg^{+2})/2)^{1/2}$$

$$\textbf{Adjusted SAR} = SAR\,(1 + (8.4 - pHc))$$

Where:

pHc is the value of theoretical pH for irrigation water; these values were found in special tables (FAO, 1976).

Bicarbonates Effect:

Eaton (1950) suggested a term denting the evaluation of irrigation water in terms of its content of carbonates and bicarbonates. He termed it residual sodium carbonate and symbolized by RSC as a standard for evaluating irrigation water quality. (Azubadi 1989). The Residual calcium carbonate RSC were calculated from the following Formula:

$$RSC = ((CO3^{-2} + HCO_3^{-}) - (Ca^{+2} + Mg^{+2})),$$

These data were used as input data for Arc View 3.2 program to prepare maps for water well fields, along the conveyance pipe line, plotting, some of the results on the map in order to facilitate their presentation. In addition the results were presented as diagrams and tables.

Evaluation of Water Quality:

For the evaluation of water quality for drinking purposes, the results of chemical and microbial analyses were compared with the Libyan, Egyptian, and world heath organization (WHO) standards.

Water quality assessment was carried out according to the (U.S Salinity Laboratory Staff 1954) methods. Guidelines for interpretations of water quality for irrigation (FAO, 1985) was used to determine the potential irrigation problems, related to the water resource quality.

RESULTS AND DISCUSIONS

Water analysis (Table 1) indicated that Sarir-Sirt / Tazerbo- Benghazi System water is worth mentioning that when mixing the water of Tazerbo wells field with that of Sarir wells field in a proportion of 1:1, it was revealed that this water is appropriate chemically for drinking and it conforms to the standard specifications and criteria of drinking water.

The water analysis also indicated that the mean salinity value of irrigation water was around EC 0.94 dS/m. In general, the SAR mean value was around 3.74 %. There is no potential restriction on water use due to boron and nitrate concentration. From the electrical conductivity value and sodium adsorption ratio (SAR) data, it is clear that this water system lies among the kind of (C3S1) "high saline low sodicity water". This means that water is not suitable for sensitive crops especially the citrus trees. It is suitable for use only in good permeable soils.

The application of the FAO's guidelines to evaluate the irrigation water quality of the (Sarir-Sirt / Tazerbo-Benghazi) water system. It was found that the electrical conductivity (EC) equals 0.94 dS/m. In other words, there is a possibility of increasing the problem when using this water for irrigation (Table2).

Table (1): Main water chemical characteristics of the Sarir-Sirt /Tazerbo-Benghazi wells field (1997/1998)*

Analyses	Sarir Wells		Tazerbo Wells		After Mixing	
	Mean.	Max.	Mean.	Max.	Mean.	Max.
Ph	8.00	9.00	7.60	7.80	7.80	8.50
EC (dS/m)	1.55	1.99	0.33	0.44	0.94	1.17
TDS (mg/kg)	930	1170	195	250	560	700
Ca^{+2} (meq/l)	3.14	4.74	0.90	1.25	2.00	2.99
Mg^{+2} (meq/l)	2.80	3.79	0.99	1.23	1.89	2.47
Na^{+} (meq/l)	9.57	11.31	0.91	1.52	5.22	6.52
K^{+} (meq/l)	0.33	0.51	0.51	0.76	0.43	0.64
HCO_3^- (meq/l)	4.40	4.80	2.10	2.60	3.20	3.70
Cl^- (meq/l)	5.92	8.46	0.59	1.21	3.24	4.80
SO_4^{-2} (meq/l)	5.00	7.08	0.60	1.04	2.81	4.17
SAR (%)	5.47	5.55	0.94	1.36	3.74	3.95
adj.SAR (%)	12.22	12.60	1.40	2.32	7.11	8.29
RSC (meq/l)	-1.54	- 3.73	0.21	0.12	– 0.69	– 1.76
NO_3^- (mg/kg)	0.17	0.25	0.00	0.01	0.06	0.07
Boron (mg/kg)	0.05	0.08	0.01	0.03	0.03	0.05
Mn (mg/kg)	0.00	0.00	0.00	0.01	0.00	0.01

***Source: (WUAD 1997; and WUAD 1998)**

Table (2): Main water chemical characteristics of the Sarir-Sirt /Tazerbo-Benghazi wells field (2002/2003)

Analyses	Sarir Wells			Tazerbo Wells			After Mixing		
	Min.	Max.	Mean.	Min.	Max.	Mean.	Min.	Max.	Mean.
PH	6.91	8.06	7.63	6.50	7.80	7.00	6.71	7.93	7.32
EC (dS/m)	1.02	2.33	1.46	0.25	0.42	0.34	0.64	1.38	0.9
TDS (mg/kg)	613	1536	957	181	254	204	397	895	581
Ca^{+2} (meq/l)	1.10	5.80	2.52	0.40	1.05	0.52	0.75	3.43	1.52
Mg^{+2} (meq/l)	0.90	6.64	3.00	0.41	1.23	1.01	0.66	3.94	2.00
Na^{+} (meq/l)	4.22	14.17	9.08	0.43	1.78	0.85	2.33	7.98	4.97
HCO_3^- (meq/l)	0.80	4.64	3.37	1.82	2.92	2.35	1.31	3.78	2.86
Cl^- (meq/l)	2.54	5.34	5.79	0.56	0.85	0.65	1.55	3.10	3.22
SAR (%)	2.63	7.97	5.58	0.49	2.01	0.97	1.56	4.99	3.28
adj.SAR (%)	5.39	15.94	11.32	0.69	3.22	1.42	3.04	9.58	6.37
RSC (meq/l)	-9.87	1.04	-2.12	0.19	1.35	0.81	-4.84	1.20	-0.66
NO_3^- (mg/kg)	ND	ND	ND	0.00	1.00	0.03			
Boron (mg/kg)	ND	ND	ND	0.04	1.80	0.45			
Mn (mg/kg)	ND	ND	ND	0.02	0.23	0.12			
Fe (mg/kg)	ND	ND	ND	0.94	4.25	2.01			

Assessment of Water Quality for Drinking:

Due to the use of a portion of the water Sarir-Sirt /Tazerbo-Benghazi System for domestic use purposes (drinking), it is necessary to evaluate the suitability of this water for drinking purposes. The results of microbiological analysis revealed that this water is good for drinking from the microbiological point of view, and conforming to the standard specification and criteria of drinking water. Chemical analyses (Table 2) showed that this water is appropriate for drinking from the chemical aspect, except for some samples of wells water which recorded increase in the allowable limits according to the standard specifications and criteria which we will review as follows:

• **Total Dissolved Salts (TDS):** The results of the analysis of some Sarir wells field water shown in (Figure 2) indicated the increase in the concentration of the total dissolved salts as they recorded the highest value 1,536 mg/kg. The increase of TDS than the allowed limits 1,000 mg/kg may lead to human health problems (Arfidh, 1997).

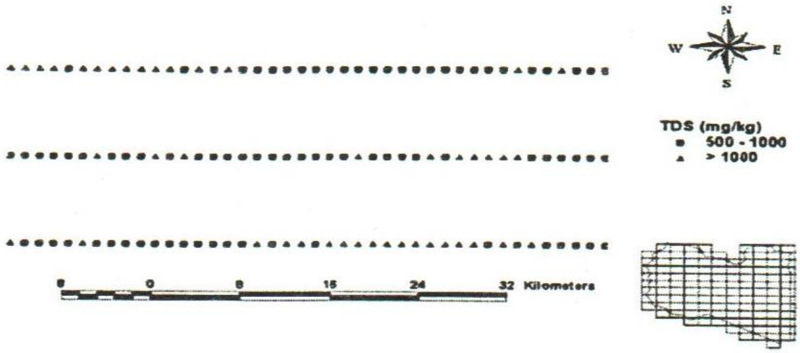

Figure (2): TDS (mg/kg) Distribution for Sarir Wells Field

• **Sodium:** Results of some Sarir wells field water analysis (Figure 3), recorded rise in the value of sodium concentration 326 mg/kg. The increase of sodium ion than the allowed limits in the drinking water 200 mg/kg may cause hypertension among persons who have hereditary liability (Arfidh, 1997; and Abdalziz, 1999).

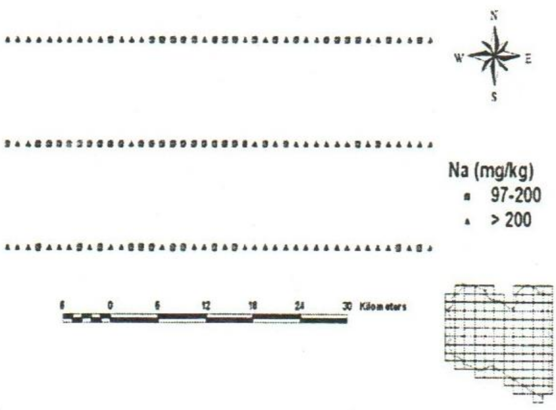

Figure (3): Na^+ (mg/kg) Distribution for Sarir Wells Field

• **Chloride:** Results of some Sarir wells field water analysis (Figure 4), showed the increase in the value of chloride concentration. Actually, they recorded the highest value of 380 mg/kg, and an increase of chloride than the permissible limits in drinking water 250 mg/kg, which lea may to water acquisition of unappetizing taste for drinks and cause may metal corrosion in the distribution network (Arfidh, 1997; and Abdalziz, 1999).

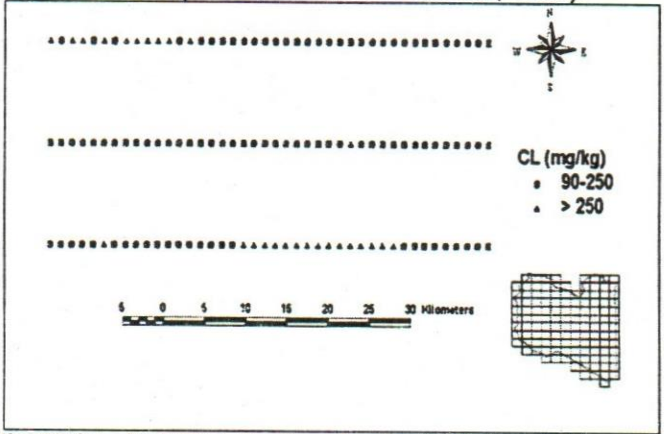

Figure (4): Cl⁻ (mg/kg) Distribution for Sarir Wells Field

• **Total Hardness:** Results of some Sarir wells field water analysis (Figure 5), revealed the rise of total hardness value as they recorded the highest value of 600 mg/kg. The rise of total hardness than the permissible limits in drinking water 500 mg/kg, may lead to the high liability of urinal stones. Some studies stress the relation between water total hardness and cardio vascular disease (Arfidh, 1997).

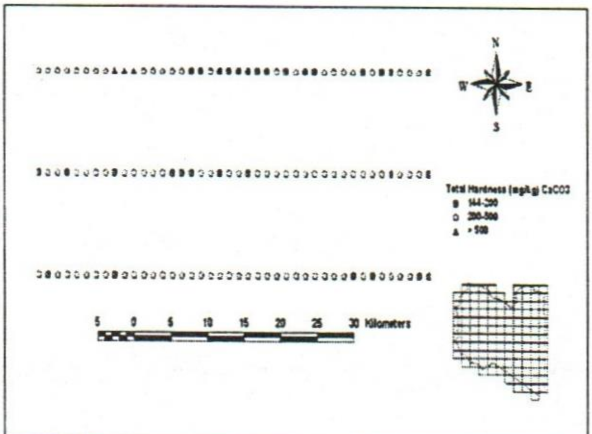

Figure (5): Total Hardness (mg/kg) Distribution for Sarir Wells Field

• **Iron (Fe):** Results of some Tazerbo wells field water analysis, showed an increase of the iron concentration in all wells as the value ranged between 0.94 – 4.25 mg/kg. The increase of iron concentration to exceed that of the permissible value in drinking water 0.3 mg/kg, may lead to difficulty of digestion and constipation in addition it causes an unappetizing taste for drinks. More ores iron colors clothes and the fittings of water pipes (Arfidh, 1997; and Abdalziz, 1999).

• **Mangnese (Mn):** Results of some Tazerbo wells field water analysis (Figure 6), an increase in the concentration of mangnese ion as they recorded the highest value of 0.23 mg/kg. The increase of mangnese value than the permissible limits in drinking water 0.1 mg/kg, may lead to its accumulation in pancrease, liver and kidney. In addition, it gives an unappetizing taste for drinks and it causes the coloring of water pipes fittings and clothes (Arfidh, 1997; and Abdalziz, 1999).

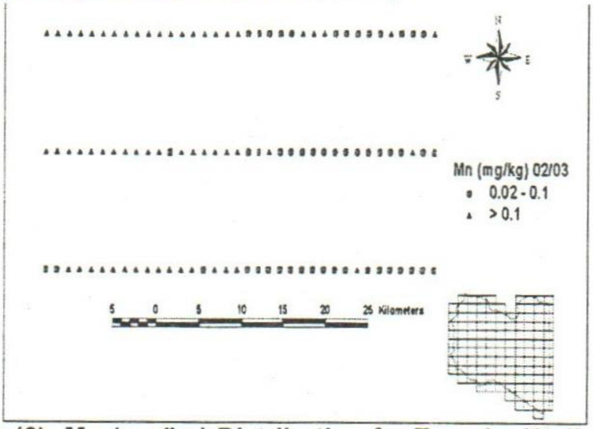

Figure (6): Mn (mg/kg) Distribution for Tazerbo Wells Field

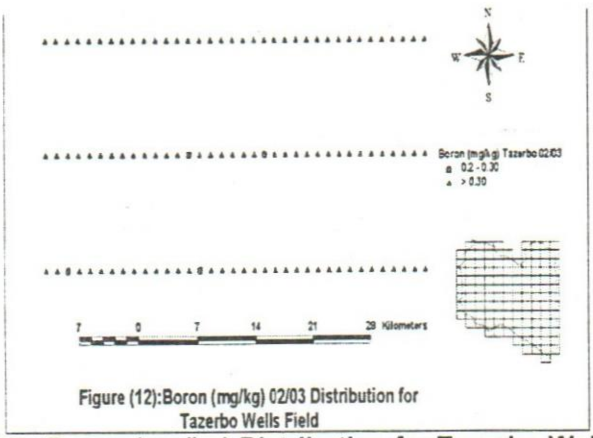

Figure (7): Boron (mg/kg) Distribution for Tazerbo Wells Field

• **Boron (B):** Results of most Tazerbo wells field water analysis (Figure 7), recorded an increase in boron as it recorded the highest value of 1.8 mg/kg. The increase in boron value to exceed permissible limits of 0.3 mg/kg may cause food poisoning (Arfidh, 1997; and Abdalziz, 1999).

It is worth mentioning that when mixing the water of Tazerbo wells field with that of Sarir wells field in a proportion of 1:1as shown in (Tables 1&2), it was revealed that this water is appropriate chemically for drinking and it conforms to the standard specifications and criteria of drinking water.

Assessment of Water Quality for Irrigation:

Among the most important factors that determine the suitability of any water source for irrigation purposes is the total soluble salt concentration, sodium adsorption ratio, residual sodium carbonates and the concentrations of some other elements especially chloride and boron.

The results of the chemical analysis Conducted by (WUAD 1997/1998) of the (Sarir-Sirt / Tazerbo-Benghazi) water system of the great man-made river from the two available sources, namely Sarir wells field and Tazerbo wells field as well as the calculated concentrations after mixing of both sources with the required ratio (i.e., 1:1) shown in (Table 1). Same data were calculated in this study with the same manner during years (2002/2003). These results are shown in (Table 2) and it is in agreement with the previous results (Tables 1&2). Based on the mean average of salinity of Sarir wells field the water quality is classified as degree (C3), which is considered to be high saline according to the United States Department of Agriculture classification of irrigation water, except for the well No.33, which is classified as (C4) and considered to be very high saline. On the other hand, the degree of salinity for Tazerbo wells field would classify these waters as (C2) which is considered moderately saline. Assuming complete mixing process between the two sources with a ratio of 1: 1, it is expected that the electrical conductivity of the water system would reach approximately between 0.90 – 0.94 dS/m, this would classify water as (C3), which is considered to be high saline. This means that it is possible to use these waters for irrigation purposes without causing harmful saline effects on the crop production with good management of field irrigation and leaching the soil periodically and ensuring good drainage so that salts would not accumulate. The expression "Sodium adsorption ratio" (SAR) is used to denote the risk of sodium concentration in water.

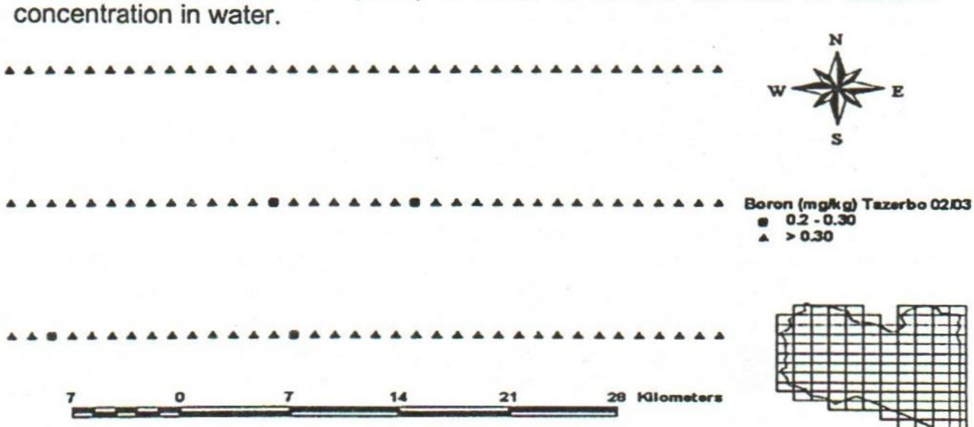

Figure (8): Boron (mg/kg) Distribution for Tazerbo Wells Field

It is a number that expresses water ability to decrease soilpermeability (Tables 1&2), illustrates water classification classes on the basis of sodium adsorption ratio. These ratios in the water system ranged between 3.28 – 3.74, this means that sodicity problem in this water is ranging from slight to moderate.

Bicarbonates Effect:

Bicarbonates affect soils and plants in different ways. Therefore, it is considered one of the chemical compositions of the irrigation water included in evaluating the quality of irrigation water, as the presence of high concentrations of these ions would lead to the precipitation of Ca and Mg in the soil. Consequently, this would affect the sodium adsorption ratio (SAR).

When applying this standard to the (Sarir-Sirt / Tazerbo-Benghazi), water system it was found that the value of RSC is negative. This means that the concentration of Ca^{+2} & Mg^{+2} higher than the concentrations of $CO_3^{=}$& HCO_3^{-}. In other words, there are no residual bicarbonates. Thus, the residual carbonates and bicarbonates work on mixing with the alternating calcium and magnesium in soil to form insoluble residuals decrease the soil permeability and increase alternating exchangeable sodium percentage (ESP) in soil.

Water Classification for Irrigation:

According to the American salinity laboratory guidelines, and FAO guidelines, the classification of water system of (Sarir-Sirt / Tazerbo-Benghazi) will be as follows:

Applying the American Salinity Laboratory Guidelines:

The American salinity laboratory's scheme used to calamity on the water system of (Sarir-Sirt / Tazerbo-Benghazi). Using the electrical conductivity value and sodium adsorption ratio (SAR) data, which is shown in (Table 2), it is clear that this water system lies among the class of (C3S1) "high saline low sodicity water". This mean that water is not suitable for sensitive crops especially the citrus trees and is suitable for use only in good permeable soils as the soils of Benghazi (Yehia, 1982).

Applying the FAO Guidelines:

The application of the FAO's guidelines to evaluate the irrigation water quality of the (Sarir-Sirt / Tazerbo-Benghazi) water system listed in (Table 2) revealed the following:-

The Salinity Problem:

A salinity problem due to water quality occurs if salts from the applied irrigation water accumulate in the crop root zone and this will affect the yield of crops. The potential salinity problem caused by these salts in the irrigation water is evaluated by the guidelines of (Table 2). It was found that the electrical conductivity (EC) equals 0.90 dS/m. In other words, there is a possibility of increasing the problem when using this water for irrigation.

The Toxicity Problem:

A toxicity problem is different from the salinity and the permeability problems, in that toxicity occurs within the crop itself as a result of the uptake and accumulation of certain constituents from the irrigation water and may occur even though salinity is low.

The toxic constituents of concern are sodium, chloride or boron. They can reduce yields and cause crop failure. Not all crops are equally sensitive but most tree crops and other woody perennial-type plants. Toxicity problems of sodium and chloride, however, can occur with almost any crop if concentrations are high enough. Toxicity problems often accompany and are a complicating part of a salinity or permeability problem. Sprinkler irrigation may cause special toxicity problems due to sodium and chloride being absorbed through the leaves. The analyses of water for the great man-made river project reveals:

i) The toxicity of sodium ion is determined by the adjusted sodium adsorption ratio. In our case, the calculated mean average of the adj.SAR for the mixed water is expected to reach around 6.37 which classify this water as slight to moderate. In other words, there is a probability of increasing permeability problem when using this water for irrigation unless it was used with cautions.

ii) The toxicity of chloride ion: there is no toxicity in chloride ions when using system water in irrigation as its concentration is estimated by about 3.22 meq/l. Therefore, it might cause a slight harmful effect if using sprinklers irrigation system. However, in case of using flood irrigation, there is no harmful effect.

iii) The toxicity of boron ion: Boron concentration amounts to be 0.03 mg/kg (Table 1), this means that there is no toxicity in boron ion when using system water in irrigation.

Miscellaneous Problems:

From the standpoint of the guidelines, there are just a few specific miscellaneous problem mentioned. These are concerned with nitrogen, bicarbonate and pH. The analyses of (Great Man-Made River) water indicate that:

i) Nitrates effects: there is no problem concerning using this water system as nitrates concentration does not exceed 5 mg/kg taking into consideration that increase of nitrogen in water cause an increase of the green foliage growth and a delay in crop maturity.

ii) Bicarbonates effect: when using this water system, there is a possibility of the emergence of increasing the problem represented by the appearance of white spots on the leaves of some crops especially these irrigated by sprinkler method.

iii) pH effect: we find that the water system lies within the normal pH, which ranges between 6.5 and 8.4.

CONCLUSION

Water quality management for sustainable irrigated agriculture:

- It has been shown that recent groundwater recharge is negligible, and that the extraction from the Nubian Aquifer System is a mining process. In other words, groundwater deposit would be eventually depleted through natural and artificial processes. For this reason, choice of development area and production rate must be planned carefully.
- Irrigation water management: Proper control of water being distributed to minimize losses that could cause degradation of water quantity and quality

as well as the proper application of water on fields as the crop needs dictate. Thus, seepage from distribution systems must be controlled; irrigation water is applied in a timely manner and over irrigation is avoided.

- Salinity management issues: Salinity management requires careful consideration of leaching fractions so excessive irrigation water is not applied to move salts not only out of the root zone but well beyond the field soil profile thus mobilizing excess salts and other pollutants needlessly.
- Agronomic practices: Agronomic practices in irrigated areas can also impact water quality. Pest control for example can greatly reduce the opportunity for water quality degradation when integrated pest management systems are used. Agricultural chemicals that are properly used should be applied as needed by the plants to minimize the leaching from over irrigation.

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تقييم نوعية مياه النهر الصناعي العظيم لتحقيق الإدارة المستدامة للموارد المائية: دراسة حالة منظومة مياه السرير – تازربو

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تهدف الدراسة إلى تقييم الموارد المائية لمشروع النهر الصناعي العظيم، وذلك من خلال تقييم موارد مياه النهر الصناعي العظيم لمنظومة السرير – سرت وتازربو – بنغازي.
ولتحقيق هذه الأهداف تم تجميع البيانات الخاصة بتحاليل مياه منظومة أبار النهر الصناعي العظيم في كل من السرير وتازربو ، والخرائط الطبوغرافية والجيولوجية والبيانات المناخية و غيرها من المعلومات ذات العلاقة.
وتتلخص النتائج التي توصلت إليها الدراسة في الاتى:-
أوضحت نتائج تحاليل المياه لمنظومة السرير – سرت وتازربو – بنغازي انه في حالة خلط المياه من هذين المصدرين و بنسبة ١:١ بأنها ملائمة لأغراض الشرب وذلك بتطابقها مع معايير مياه الشرب. كذلك أشارت تحاليل المياه بأن ملوحة هذه المياه كانت في حدود من ٠,٩٠ الى٠,٩٤ ديسيسمنز/م. كما تبين أن القيمة المتوسطة لنسبة الصوديوم المدمص (SAR) كانت في حدود من ٣,٢٨ ٪ الى ٣,٧٤ ٪. وتعتبر مياه الري مناسبة من محتواها من البورون والنترات. وان هذه المياه تعتبر غير مقبولة بالنسبة للمحاصيل الحساسة مثل الموالح. وهى تعتبر ملائمة للاستعمال وخاصة للترب ذات النفاذية الجيدة.
إدارة مياه الري:
١ - نظرا لعدم وجود تغذية للخزانات الجوفية في مناطق أبار منظومة النهر الصناعي العظيم في السرير وتازربو، فإنه يجب المحافظة على تلك المياه عند الاستعمال وذلك باختيار نظام الري المناسب وعدم الإسراف في مياه الري.
٢ - المحافظة على مستوى معين من الملوحة وذلك من خلال إضافة مياه الغسيل مع الاحتياجات المائية للمحاصيل لضمان خلو منطقة الجذور من الأملاح.