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EFFECT OF WELLS WATER QUALITY ON SOME SOIL PROPERTIES AND PRODUCTIVITY IN TOSHKA AREA.

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ABSTRACT

The current investigation was carried out to evaluate the ground water quality of some wells in Toshka area comparing with the Nile water (Nasser Lake) as a control, during 2007-2008 season. Soil chemical properties; and soil productivity for wheat plants (*Triticm aestivum L*) Giza 168 were also observed. Data obtained from water samples of all wells show that, the pH values of irrigation water were in the normal range, the values of EC were ranged from 0.93 to 1.99 dSm^{-1}, the values of total dissolved solid (TDS mgl^{-1}) were ranged between 595.2 to 1273.6 mgl^{-1}, and the cation values for water wells were found in the following order: Na > Ca > Mg than K. While anions were: Cl > SO_4 more than HCO_3. Meanwhile, the data obtained from soil samples show that, the soil texture was generally sandy loam, soil reaction is generally slightly to moderately alkaline, gypsum content were ranged from 0.80 to 6.43%, soil organic matter ranged between 0.14 to 0.93%, cation exchange capacity was ranged between 3.08 to 17.62 meq/100g soil, and the soluble cations are in the following order: Na > Ca > Mg than K., while soluble anions were Cl > SO_4 more than HCO_3. Finally, soils in Toshka area were very poor in there contents of available macro and micro nutrients; therefore, the productivity of wheat plants were recorded 10.75 ardab fad^{-1}. Also, data revealed that the macro and micronutrients in wheat grains, straw and roots recorded lower values compared with the normal values.

Keywords: Toshka area, water quality, soil properties and wheat productivity.

INTRODUCTION

Toshka area is one of the most prospective areas for sustainable agricultural development in south valley, Egypt. There is no doubt that the ratio between the land resources and human resources is the most critical problem in Egypt. The agriculture and in habited man land ratio in Egypt decreased from 0.71 feddan in the beginning of 19^{th} century to 0.12 fed. So, Egypt now is starting some gigantic programmers and project in south valley, Egypt. The aim of the project is to go out from the Nil Valley and to set up new agro-industrial activities centers in Toshka area on the long term. The national project is aiming to increase the inhabited area from 5% to 25% of the total area of Egypt over next 20 years. One of these main projects is Toshka project through the proposed area to be cultivated is about 540,000 fadden using the water received from Lake Nasser. This is beside area of about 135.000 fadden could be irrigated using ground water extracted from proposed 300 wells (ELwan 2009).

Toshka area lies to the southern west of Egypt and adjacent to Nasser Lake at its northern west direction. Khader and Hussien (2003) found

that the chemical composition of the some ground water samples collected from some wells in Toshka area, the total dissolved solids of water samples vary from 716.8 to 1222.4 ppm, and the water quality is good to moderately suitable for agricultural purposes. Sodium chloride and sulfate dominate the ionic composition of irrigation water in most of the studied wells. Groundwater in all the studied wells are low sodium water (S_1) as SAR is less than 10, and high salinity water (C_3) as EC. Value is ranged between 1.120 to 1.910 $dS.m^{-1}$. Yousif (2006) mentioned that soils of Toshka conceder very low in organic matter content, and were ranged between 0.1 to 0.5%. the soil reaction in Toshka was slightly to moderately alkaline, Calcium carbonate content ($CaCO_3$%) were ranged between 0.6 to 15.9%, gypsum content was ranged from 0.2 to 13.1%, soil salinity was ranged from 1.1 to 74.4 $dS.m^{-1}$ and CEC values were ranged between 4.1 to 36.6 meq.100g $soil^{-1}$. Soil salinity is most common in the arid and semi- arid regions where evapotranspiration exceeds water supply for the growing plants. Chloride and sulphate salinities are known to affect growth development, and yield attributes in various plant crops to different degrees (Lauchli and Epstein 1984).

EL Nabway(1995) reported that, the reduction in yield and yield component of wheat at higher salinity level is due to increased osmotic pressure of soil solution because of higher concentration of salts in growth medium. Also, Abrol (1986) reported that, the wheat production is limited due to adverse environment stresses, particularly salt stress especially under arid and semi-arid conditions.

The present work has been undertaken to study the chemical properties of soils, water resources and soil productivity of Toshka area.

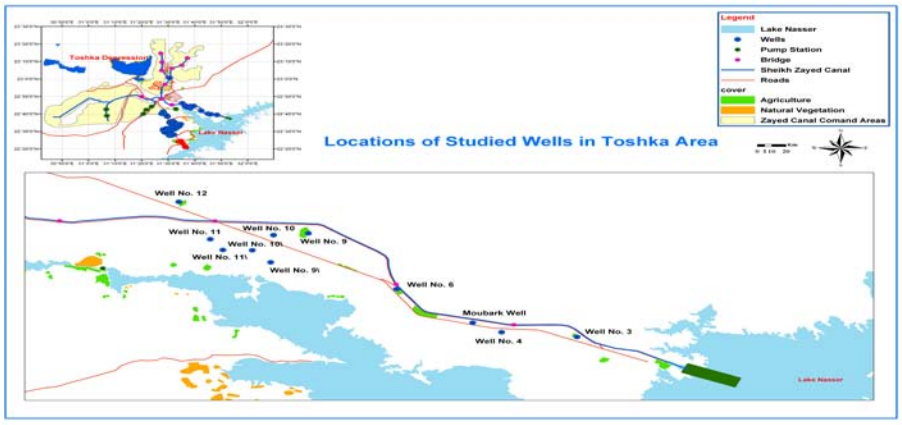
MATERIALS AND METHODS

The current investigation aims at studying the ground water quality of some wells in Toshka area, for one year (2007-2008) and Nile water Nasser Lake as a control and their effects on some soil properties and wheat productivity (*Triticm aestivum L.* Giza 168). Twelve ground wells water samples were collected monthly for one year from October 2007 until September 2008 at different points, started from well No. 3 nearest Mubarak pump station on longitude EL-Shekh Zaide Channel until well No. 12; as illustrated in map (1). Also, one hundred and twenty (120) surface and subsurface soil samples have been taken at different depths from studied well's soil in Toshka area on extension of EL Shekh Zaid Channel it is bounded by latitudes 22° 36" and 22° 48" N and longitudes 31° 48" and 31° 36" East. Three soil samples were taken from the soil irrigated with each studied wells at different depths, i. e (0-20, 20-40,40-60 cm and 60-80cm) each surface well's soil layer have been mixed and also subsurface at the same depths for each well alone to get thirty eight (38) homogeneous soil samples represented well's soil studied. The depth was depending on founding the hardpans. Soil samples were made by auguring to 80 cm depth, to represent some soils selected in Toshka area. The collected soil samples were air dried crushed and sieved through a 2 mm sieve and kept to analysis:

The soil and water samples were physically analyzed according to (Klute, 1986) for. Chemical properties (i.e EC, pH, organic matter and soluble ions according to Page et al.(1982) to detect the changes that might take place in soil characteristics.

Wheat plants were cultivated in the experimental farm of Water Research Study Complex – Abu Simble (WRSC) in the first weak of November 2008 in plots. At the end of the experiment the plants were harvested, washed with distilled water, dried at 70 C° and ground, then representative portions were wet digested using a mixture of $HCLO_4$ and H_2SO_4 at rate of 1:1 to determine NPK and micronutrients (according to Page et al. 1982). The micronutrients (Cu, Fe, Mn and Zn) were determined by Inductively Coupled Plasma Spectrometer (ICP) Plasma 400.

Map 1: Locations of studied wells in Toshka area.



RESULTS AND DISCUSSION

1. General characteristics of water resources in Toshka area.

Data presented in Table 1 reveal that the min, max, and average pH values of all wells studied during 2007-2008 were 6.92, 8.17 and 7.55 obtained at wells No 9* and 10 compared to the pH values of Nasser Lake were 6.91, 7.77 and 7.24, respectively. While the min and max values of EC $dS.m^{-1}$ and TDS mgl^{-1} values of all wells were (0.93 $dS.m^{-1}$, 595.2 mgl^{-1}), (1.99 $dS.m^{-1}$, 1273.6 mgl^{-1}) obtained from wells No 3 and 12, respectively as well as Nasser Lake were recorded (0.69 $dS.m^{-1}$, 442 mgl^{-1}) and (0.97 $dS.m^{-1}$, 620.8 mgl^{-1}), respectively Zaky (2008) found that EC of Nasser Lake was 0.24 $ds.m^{-1}$. Regarding the soluble cations and anions of the collected water samples from all wells studied in Toshka at difference sites, are presented the highest values of cations are in the following order: Na > Ca > Mg then K this data agree with Zaky (2008). While anions are in the following order: SO_4 > Cl > HCO_3. Also, data in Table 1 reveal that the min, max and average of SAR were 2.56 at well No. 3, 5.54 in well 12 and 4.01 for average, respectively; and give a slight degree of restriction on the use of the water for

irrigation, as well as the SAR values of Nasser Lake were 2.85 and 3.74 of min and max, respectively with average 3.29.

Generally, Nitrate concentration increased in summer season. According to guidelines of FAO (1976) for using water for irrigation, show that NO_3-N concentration min, max and average were recorded (0.26, 2.16 and 1.21 mgl^{-1}), respectively comparison with Nasser Lake, the data showed that NO_3-N concentration were less than the permissible limits of problem.

Table 1: Some chemical properties of studied well's water in Toshka area.

Items	Water chemical analysis(mgl^{-1})					
	Wells			Nasser Lake		
	Min	Max	Aver.,	Min	Max	Average
pH	6.92	8.17	7.55	6.91	7.77	7.24
EC $dS.m^{-1}$	0.93	1.99	1.46	0.69	0.97	0.81
TDS mg/l	595.2	1273.6	934.4	442	620.8	518.4
SAR	2.56	5.54	4.01	2.85	3.74	3.29
Ca^{2+}	31	135	83.75	26	33	29.5
Mg^{2+}	10.9	62.4	36.65	6.7	9.4	8.05
Na^{+}	100	288	179.5	68	88	78
K^{+}	2	9	5.7	3	6	4.5
NO_3-N	0.26	2.16	1.21	0.14	0.36	0.25
HCO_3^{-}	80.6	199.8	144.3	61	95	78
$SO_4^{=}$	154.2	491	272.2	21.8	50.4	36.1
Cl^{-}	115.5	380.6	220.3	110.6	133	121.8

With regard to min, max and average of Bicarbonate of all wells were recorded (80.6, 199.8 and 144.3 mgl^{-1}), respectively; these values were not out of standard levels of Low 48 year (1982). (Within the range 20-150 mg/l), except well No 9 is recorded 199.8 mg/l, the degree of restriction on the use of wells for irrigation is light level according to FAO (1976) guidelines. Concerning the analytical Data in Table 2 show that the min, max and average of (Fe, Cu, Zn, Mn, and B) were (0.13, 0.29 and 0.2 Fe), (0.03, 0.04, and 0.03 Cu), (0.05, 0.08 and 0.06 Zn) , (0.04, 0.09 and 0.06 Mn), and B (0.268, 0.39 and 0.31 mg/l), respectively; compared to Nasser Lake, the data show that, the (Fe, Cu, Zn, Mn and B) are in the permissible limits of recommended maximum concentration of trace elements in irrigation water (maximum 5 mg/l Fe, 0.2 mg/l Cu, and 0.2 mg/l for both Mn and Zn and 1 mg/l for B) according to Ayers and Westcot (1985). The concentration of elements in irrigation water were in the permissible limits

Table 2: Some heavy metals contents of studied wells water in Toshka area.(mgl^{-1})

Items	Wells water samples			Nasser Lake (control)
	Min	Max	Average	
Fe	0.13	0.29	0.20	0.11
Cu	0.03	0.04	0.03	0.02
Zn	0.05	0.08	0.06	0.03
Mn	0.04	0.09	0.06	0.02
B	0.268	0.39	0.31	n.d*

n.d* not detected

General characteristics of soil samples in Toshka area.
Some chemical properties of studied soils.

Data presented in Table 3 show the some chemical properties of studied soils in Toshka area. The soil reaction (pH) values in all soils were ranged between (7.17 to 8.80) in well's soil of (WRSC and 9*) in subsurface layer at depth of (40-60 and 60-80cm), respectively. Soil reaction tends to be moderate to alkaline in most wells soil at different depths. These results could be confirmed by those obtained by EL- Aziz (2005).

Table 3: Some chemical properties of studied soils (meq.100g^{-1}

Parameter	Min	Max	Average
pH	7.17	8.80	8.23
EC dS.m^{-1}	0.53	18.67	5.13
Ca^{2+}	0.12	4.84	1.11
Mg^{2+}	0.05	1.47	0.45
Na^{+}	0.34	11.91	3.27
K^{+}	0.02	0.26	0.11
HCO_3^{-}	0.09	2.41	0.60
$SO_4^{=}$	0.33	10.29	2.94
Cl^{-}	0.12	5.77	1.39
Gypsum%	0.80	6.43	2.67
O.M%	0.14	0.93	0.35
$CaCO_3$ %	5.08	17.51	11.54
CEC meq100 g^{-1}	3.08	17.62	8.06
ESP %	26.67	72.61	50.90

The electrical conductivity EC ds.m^{-1} of soil extract in all well's soils studied were ranged between 0.53 ds.m^{-1} in Experimental farm (WRSC) in sublayer at depth of (40-60cm) to 18.67 dS.m^{-1} in well's soil No 11* in surface layer at depth of (0-20cm) with an average 5.13 dS.m^{-1}, soil salinity were increased with depth in most soil studied and most of these soils are classified under the S_4 soil suitability for agriculture. These results could be confirmed by those obtained by Shoman (2002), AL-Sharif (2004) and EL-Aziz (2005).

Considering the analytical data in Table (3) Show that, the cations in all wells soil studied were followed these order: $Na^{+} > Ca^{++} > Mg^{++} > K^{+}$, while the anions were followed the order: $CL^{-} > SO_4^{--} > HCO_3^{-} > CO_3^{--}$. These results could be confirmed by those obtained by EL-Hamdi (1990) and Maher (2003) and EL-Sayed (2001).

Data in Table 3 show that the min and max value of gypsum content were ranged between (0.80 to 6.43 %, the min value of gypsum % was found in well (10*), while the max value of gypsum was found in well 9.

The organic matter content (%) in studied soils ranged between (0.14 % to 0.93 %) while the min and max values of organic matter were found in the soil irrigated with studied well of 9 and Exper., farm of WRSC) respectively. Also, calcium carbonate content were ranged between 5.08 to 17.51 % in well (9* and 11*) respectively. On the other hand, the cation exchange capacity (CEC) was ranged between (3.08 in WRSC to 17.62

meq/100g in well 11) respectively. Finally, Exchangeable sodium percentage (ESP %) were ranged between (26.67 to 72.61 %), in soils of wells 10 and 11 respectively, in surface layer at depth of (0-20cm).

Nutrient status of the studied wells soils in Toshka area.

Data in Table 4 show that the min values of total NPK were recorded (80.33, 72.00, 121.33 $(mg.kg)^{-1}$at wells No (10*, 11* and 6) in surface and subsurface layer at depths of (40-60, 0-20 and 40-60cm), respectively. While the max value of total NPK were (174.33, 304.0, 317.0 mg/kg) in wells No (3, 11 and 12) in surface and subsurface layer at depths of (0-20, 40-60 and 0-20cm), respectively; with an average (103.6, 134.9 and 209.5 $(mg.kg)^{-1}$.

Table 4: Min, max and average of nutrients in studied soil irrigated with each studied wells in Toshka area.

Items	Total macro and micronutrients $(mg.kg)^{-1}$			Available macro and micronutrients $(mg.kg)^{-1}$		
	Min	Max	average	Min	Max	average
N	80.33	174.33	103.6	0.43	3.70	1.26
P	72.00	304.0	134.9	1.29	2.23	1.67
K	121.33	317.0	209.5	27.0	103.0	72.1
Fe	1805.0	7786.7	3994.4	2.58	59.0	1.63
Cu	16.67	130.7	47.8	0.03	0.45	0.16
Zn	72.0	271.7	141.9	0.03	0.72	267.8
Mn	193.3	360	267.8	0.06	1.27	0.63

On the other hand, the min values of available NPK were (0.43, 1.29, 27.0 mg/kg) were found in wells No (11, mubarak and 9), respectively, in surface and subsurface layer at depths of (40-60, 20-40 and 20-40cm), respectively. While, the max values of available NPK were (3.70, 2.23 and 103.0 $(mg.kg)^{-1}$, in wells No 3, 10 and 10, respectively; with an average (1.26, 1.67 and 72.1 $(mg.kg)^{-1}$, respectively.

Also, Data in Table 4 show that the min values of total (Fe, Cu, Zn and Mn) were (1805.0, 16.67, 72.0 and 193.3 $(mg.kg)^{-1}$, respectively, in surface and subsurface layer at depths of (20-40, 20-40, 0-20 and 0-20 cm), in wells soil No (11*, 10, 12 and 11), respectively. While, the max values of total (Fe, Cu, Zn and Mn) were (7786.7, 130.7, 271.7 and 360.0 $(mg.kg)^{-1}$, respectively. In surface and subsurface layer of well's soil No 3, 6, 3 and 4, respectively.

Concerning the max values of available (Fe, Cu, Zn and Mn) were (59.0, 0.45, 0.72 and 1.27 mg/kg), respectively. In wells soil (6, WRSC, 12 and WRSC), respectively. While the min values of available (Fe, Cu, Zn and Mn) were recorded (2.58, 0.03, 0.03 and 0.06 $(mg.kg)^{-1}$in subsurface layer at depth of (20-40cm) were found in (10, 11*, 10 and 10), respectively.

Finally, macro and micronutrients (NPK and Fe, Cu, Zn and Mn $(mg.kg)^{-1}$ in the studied soils in Toshka area were found poor in their available contents of NPK and Fe, Cu, Zn and Mn. These results agree with Tandon (1995).

The productivity of the studied soils and some nutrients uptake.

Productivity of the studied soils.

Data in Table 5 show that the length of plant at harvest cm, length of hyacinth and number of hyacinths/m^2 were 57, 96 cm and 418 respectively. While the weight of biological kg/m^2, straw kg/m^2, grain kg/m^2 and weight of 1000 grain were recorded 1.03,0.64, 0.38 kg/m^2 and 35.35 g), respectively. On the other hand, under the Toshka condition the total productivity of wheat plant reached about 10.75 ardab Fed^{-1}.

Table 5: Average means of wheat yield parameters.

Length of plant at harvest cm.	Length of hyacinth cm.	Number of hyacinths/m^2	Biological weight kg/m^2	Weight of straw kg/m^2	Weight of grain kg/m^2	Weight of 1000 grain "g"
57	9.6	418	1.03	0.64	0.38	35.35

Some nutrients content.

With regard to the presented data in Table 6 revealed that, the values of NPK were (2.37,0.220 and 0.391%) for grain; (0.91,0.025 and 1.945%) for straw and (0.76,0.036 and 0.533%) for roots; While, micronutrients (Fe, Cu, Zn and Mn) in wheat plant cultivated in Toshka area, Iron content were (120.20, 146.40 and 752.50 mg/kg) in grain, straw and roots, respectively; Copper content were (9.0, 0.4 and 1.60 mg/kg) in grain, straw and roots respectively; according to Tandon (1995) reported that, that the critical limits of Cu is (4 ppm) and the toxicity limits of Cu that the critical limits of Cu is (4 ppm) and the toxicity limits of Cu concentration in plant tissues exceeds about (20 ppm) while the sufficient limits were ranged between (9 to 18 ppm). Also, data revealed that there is lacks of copper content in wheat plant in straw and roots which recorded (0.40 and 1.60 mg/kg) respectively, excluding grain ((9.00 mg/kg) was in the sufficient limits.

Table 6: some nutrients in wheat plant cultivated in Toshka area.

Wheat plant analysis	Macro conce., %			Micro conce., (mg/ kg)			
	N	P	K	Fe	Cu	Zn	Mn
Grains	2.37	0.220	0.391	120.20	9.00	32.3	7.740
Straw	0.91	0.025	1.945	146.40	0.40	13.6	15.60
Roots	0.76	0.036	0.533	752.50	1.60	58.10	11.70

Zinc in wheat plants were recorded (32.2, 13.6 and 58.10 mg/kg) in grain, straw and roots, respectively; According to Tandon (1995) reported that the sufficient limits of Zn in wheat plants ranged from (11to 20 ppm, higher at 21-40 ppm and toxic limits 41-150 ppm) that is reveal that the amount of Zn at root zone (58.10 mg/kg) lay in toxic limits (41-150 ppm). Also, data in Table 6 showed that the Mn content in wheat plant were (7.74, 15.60 and 11.70 mg/kg) in grains, straw and roots respectively., According to Tandon (1995) the sufficient limits of Mn in wheat plant were ranged from (181 to 621 ppm) that is mean there is lacks of Mn for plant growth.

REFFERANCES

Abrol, I.P. (1986). Salt affected soils. an over view. Approaches for Incorporating Drought and Salinity Resistance in Crop Plants. In: V. I Chopra and R. S. Paroda (eds.)Oxford and IBII Publishing Company, New Delhi, India.

AL-Sharif, A. (2004). Studies on some low lying areas of heavy textured soils in Toshka Region. Egyptian Jornal of soil Sci. 44(2):227 - 238.

Ayers, R. S. and D. W. Westcot, (1985). Water Quality for Agriculture Irrigation and Drainage PP. 29. Rev. 1 Food and Agric. Organ. of U.K. Rome.

EL-Nabawy, A. M. (1995). Study on ion absorption by different by varieties of wheat plants under saline conditions. MSc.. Thesis, Fac. of Agric., Cairo Univ., Egypt.

EL-Aziz. S. H. (2005). Effect of removing free ions oxides on cation exchange capacity of some soils of Southern Valleys of Egypt. Assiut Jornal of Agricultural Sciences. 36:4, 115-124.

EL-Hamdi, A.R. (1990). Pedochemical studies on soils of some depressions in the western Desert" Ph.D. Thesis. Fac. of Agric., Moshtohor, Zagazig, Univ.

EL-Sayed, A. (2001). Pedochemical studies on some soils of Tushka Area, Egypt. Ph.DThesis Fac. of. Agric., Zagazig, Univ., Egypt.

Elwan. S. M. (2009). Pedological and mineralogical studies on Toshka soils. M.Sc. Thesis, Soil Depart, Fac. of Agric., Menofiya Univ.

FAO (1976). A Framework for Land Evaluation." FAO soils Bulletin NO. 32, Rome

Khader, M.Y. and Hussien,T.M.(2003). Soil and water suitability forsustainable Agricultural Development in south Valley, (Tushka Area), Egypt. J.SOIL Sci43(2):223-242..

Klute, A. (1986). Methods of Soil Analysis. Part 1. Physical and Mineralogical methods (2^{rd} ed) Amer. Soc. Agron. Monograph no. 9 Madison, Wisconsin, USA.

Lauchli, A. and Epstein, E. (1984). How plants adapt to salinity mechanisms of salt tolerance in plants Calif. Agric. 38:18-2

Low, 48 (1982). The Implementary Regulations for Law 48-1982 Regarding the protection of the River Nile and waterways from pollution. Map. Periodical Bull., 4:12-35.

Maher, A.O. (2003).Soil mapping and Land suitability studies in EL-Kharga Oasis, Egypt. Ph.D.Thesis, Fac. of Agric. Cairo Univ., Egypt.

Page. A.L, R.H.Miller and D.R.Keeny. (1982). Methods of Soil Analysis part II. Chemical and microbiological properties (2^{nd} ed.) Amer. Soc. Agron. Monograph no. 9 Madison. Wisconsin. USA.

Shoman, M.M .(2002). Evaluation studies on some soils of some desert areas designated for agriculture expansion .M.Sc. Thesis, Fac. of Agric., Moshtohor, Benha branch, Zagazig Univ., Egypt.

Tandon, H.L.S. (1995). Micronutrients in soils, Crops and Fertilizers A Source Book Cum Directory. Pp: 1-138. Fertilizer Development and Consultation Organization: New Delhi, India.

Yousif. K. M. (2006). Mineralogical and chemical studies of soil profiles from South Toshka Area with emphasis on their suitability for Agricultural "Ph.D. Thesis, Fac of Science. Cairo. Univ, Egypt

Zaky, D.F. (2008). Soil in Delta Valley and Toshka. A comparative chemical study. .M.Sc. Thesis, Fac of Science. Helwan Univ., Egypt.

تأثير نوعيه مياه الآبار على بعض خواص التربة والإنتاجية في منطقه توشكي

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****المعامل المركزية للرصد البيئي- المركز القومي لبحوث المياه- شبرا المظلات- مصر**

يهدف هذا البحث إلى عمل رصد شهرى لمده عام من أكتوبر 2007 وحتى ديسمبر 2008 لدراسة جوده مياه الآبار بمنطقه توشكي والتي تقع على طول امتداد ترعه الشيخ زايد ومقارنتها بمياه بحيرة ناصر (كنترول)، أيضا دراسة بعض الخواص الكيميائية للأراضي التي تروى بهذه المياه. وكذلك دراسة محتوى هذه الأراضي من العناصر الكبرى (النتروجين، الفسفور والبوتاسيوم) والعناصرالصغرى(الحديد، النحاس، الزنك، والمنجنيز) و إنتاجية نبات القمح (جيزة 168) ولتحقيق ذلك أقيمت التجربة بالمزرعة البحثية بمجمع البحوث والدراسات المائية –أبو سمبل 2007-2008 باستخدام نظام الري المحوري.

وتتلخص أهم النتائج فيما يلي:

1- أشارت النتائج إلى أن درجه الحموضة والقلوية لمياه الري لجميع الآبار قيد الدراسة تقع في المدى الطبيعي(6.92 , 8.17).

2- تراوحت قيم درجه التوصيل الكهربي لجميع الآبار المدروسة في مدى 0.93 الى1.99 ديسيمنز لكل متر ومجموع الأملاح الكلية الذائبة في مدى 595.2 إلى 1273.6 مليجرام لكل لتر.

3- كانت نتائج ترتيب الكاتيونات في مياه الآبار كما يلي :الصوديوم > الكالسيوم > الماغنسيوم > البوتاسيوم. بينما كانت الأنيونات :الكلوريدات > الكبريتات > البيكربونات .كما وجد أن تركيز النترات في مياه الآبار كانت في حدود النسب التي لا تسبب أي خطورة.

4- كانت درجه قوام الأراضي طميية رمليه، كما تراوحت درجة الحموضة والقلوية للتربة ما بين (7.17 , 8.80).

5- محتوى الأرض من الجبس وقع فى مدى 0.80 إلي 6.43% والمادة العضوية 0.14 إلي 0.93% كذلك السعه التبادلية الكاتيونيه 3.08 إلى 17.62 ملليمكافىء لكل 100 جرام تربه.

6- كانت نتائج ترتيب الكاتيونات والانيونات كما يلي :الصوديوم > الكالسيوم > الماغنسيوم. بينما كانت الأنيونات الذائبة: الكلوريدات > الكبريتات > البيكربونات.

7- تشير النتائج أن إنتاجية الأرض من القمح وصلت 10.75 أردب / الفدان.

8- كذلك أوضحت النتائج أن محتوى نبات القمح من العناصر الكبرى والصغرى كان أقل من الحدود الطبيعية.

9- مما سبق من نتائج هذة الدراسه يتضح ان الارض فقيرة فى محتواها من العناصر الغذائية وبالتالى فقد انعكس ذلك على انتاجية الارض:ويوصى بامدادها بالعناصر الغذائية عند زراعتها.

قام بتحكيم البحث

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