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The Use of Geographic Information Systems to Study the Validity of the Water Wells in the Sea of Najaf for the Use of the Structural and Human

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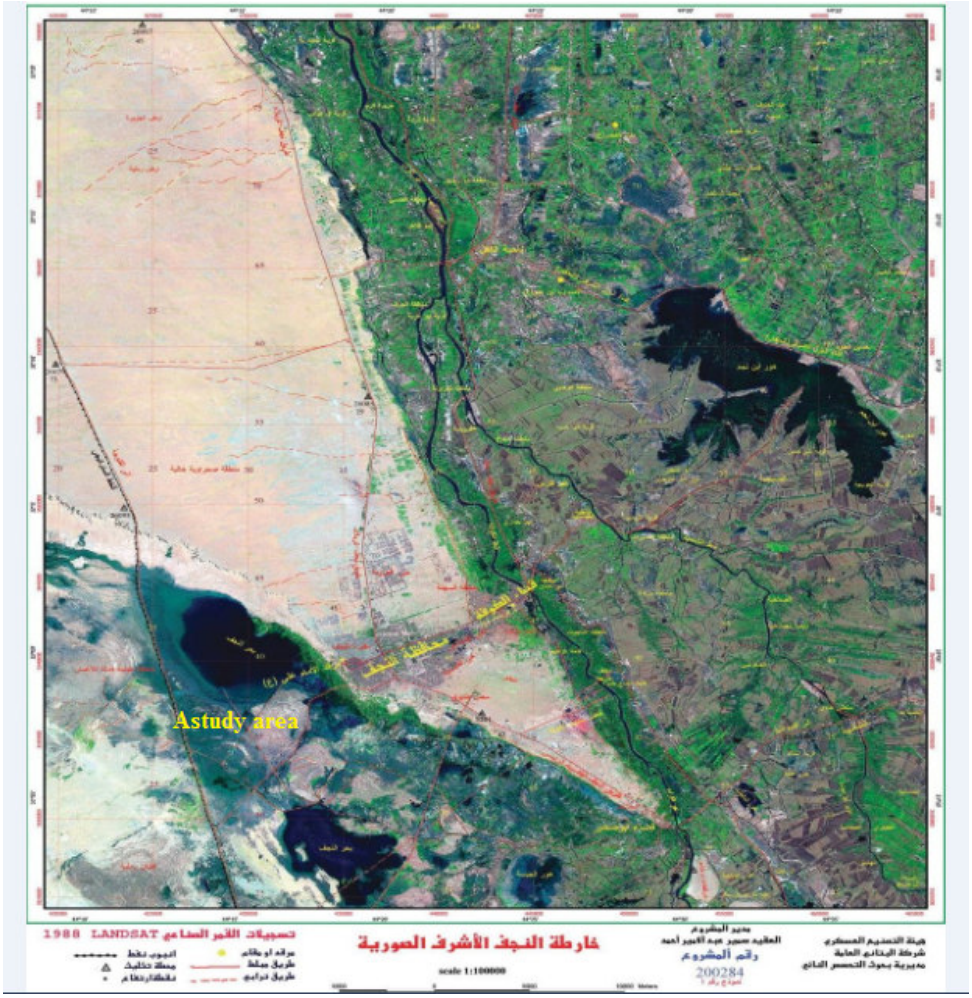
Abstract
This search aims to use the technique of the systems of Geographic information in analysis the characteristics (physical and chemical) of water a number of Najaf Sea wells that achieved its studying in the area of Najaf Sea through made test to the water for many years to compare the changes of characteristics (physical and chemical) to the underground water . It is also showed the scope of action the underground water on the environment and the different uses in the study's area because it is the mainly source to the human use and the capacity to put the solutions to improve the underground water to face the current deficit to the lack of water resources. After analyzed and compare these elements with the global descriptions and study the productive charts diagrams by using systems geographic information , we found this underground water is out of the world class standard for the water in use(humanity , agricultural and industrial) because there is high ratio of the dissolved salts and sulphates.
Keywords: the characteristics (physical and chemical) , underground water , The use of systems geographic information

Introduction

The underground water concerned as the natural sources on the globe . It is also From primary sources to continue the humanity life especially in the dry areas that this water used in different spaces in people 's life as drink and agriculture and construction and industrial works . The slop of Al-Najaf Sea in Iraq is concerned the mainly resources for the underground water because of available so much and it is easy to get it . This water is focus in the pores of the sedimentary rocks and the resource of these water rains and the continue rivers and the seasons rivers when the water is seeping to the soles of the ground , it is collected in the caves and this seep in depends on the kind of the soil and it is benefit from the underground water through digging the wells and we found in the area of Al Najaf Sea the wells from the kind saturated. The pressure in it is more than the air pressure that allow to water get out is very easy during the digging wells . from the seeping water from the superficial of the lane or from the sea water because of the slope the Najaf sea was a sea in the previous and it is effected directly on the specific and quantity the collection underground water, so it is necessary to make scientific researches to know the hydrogeology characterizes as chemical and physical through study some water of this wells by using the technique of remote sensing to study the productive diagrams for this characters and they are convenient to humanity different uses , the technique of remote sensing is concerned the modern techniques which is used to analyses the results of researches .

Study area

The slope of Al Najaf sea locates in the east pare and north east from the desert of the western plateau in Iraq and it is in the south and west south from the Najaf city center and the bigger long for the sea is in the direction south north . this slope is faraway 5 KM from Najaf city center in geographical position between two latitudes (33,45 - 32,4) north and two longitudes (44,29- 44,6) east in area about (435,8 KM ²) , there are four streams spill their water in the Najaf slope from Kufa river . Najaf slope has dry climate help to make the salts as shown in map No. (1).



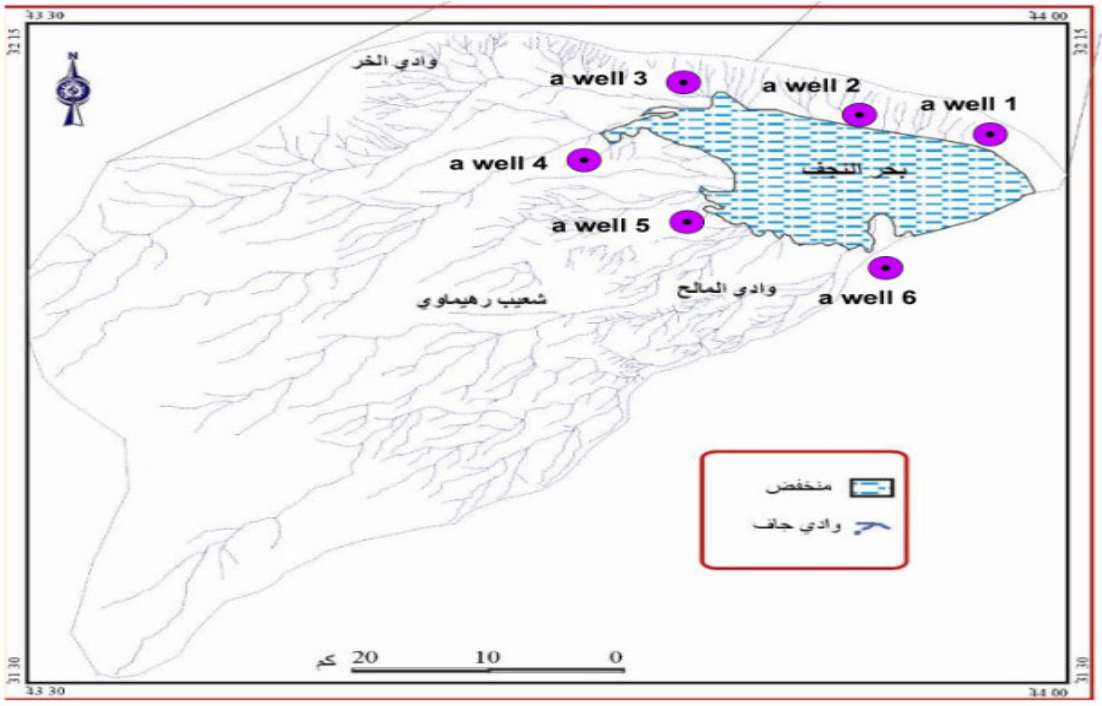
Map no (1) the study area

The target of the research

The research aims to study the Chemical and physical characteristics for the water of some wells in the Najaf sea slope and the range of convenient water to the different humanity uses and put the suitable solutions through the research recommendations to improve these water through use the geographic information system (ARC GIS).

Procedures

The style of work has reduced on practical side through determined (6 wells) in the study area as shown in map No. (20 the take the chemical and physical testsfor the period from 1995 to 2000 therefore the available results which have taken to the technical Department to the water resources office in Najaf province and calculate the ratio of reading as shown in table No. 1 .



Map No.(2)shows wells under study sites

WELLS	PH	TDS Mm/lt	EC Micromesh/cm	الايونات السالبة PPM)(			الايونات الموجبة PPM)(			
				HCO3 ppm	Cl ppm	SO4 ppm	K ppm	Na ppm	Mg ppm	Ca ppm
1	7.5	3883	4573	198	1114	1343	25	414	139	476
2	7.6	3972	3990	193	1172	1423	28	403	133	371
3	7.5	3306	4678	210	1234	1545	31	434	179	410
4	7.6	3992	4655	202	1090	1380	27	412	146	488
5	7.6	3943	4713	195	1177	1418	28	427	139	466
6	7.5	4090	4700	221	1205	1601	31	443	182	406

Table (1) well water rate analysis period (1998-2000) the source of groundwater circle – Najaf

The theoretical side depended on entering the results that we had got it from the program of (GIS Arc map 10) , the work of important analysis about these results through draw the diagrams sheet and produce the necessary maps to explain characteristics these wells waters and compare the results with tables global descriptions tables as shown in the tables 2,3,4 .

تركيزT.D.S(ملغم\لتر)	Class Water
1000-0	Fresh Water
10000-1000	Brackish Water
100000-10000	Saline Water
100000- أكثر من	Brine Water

Table (2) international standards for dissolved salts

العسرةCaCo3(ملغم\لتر)	Class Water
75-0	Soft
150-75	Moderately hard
200-150	Hard
300 اكثر من	Very hard

Table No. (3) of brackish College

المواصفات العراقية	المواصفات الأمريكية	المواصفات القياسية العالميةWHO1983		العناصر الرئيسية جزء
الحد الأعلى	الحد الأدنى	الحد الأعلى	الحد الأدنى	بالمليون
				الايونات الموجبة
-	20	-	-	K
200	200	-	-	Na
50	125	150	30	Mg
200	200	200	75	Ca
				الايونات السالبة
250	250	600	200	CL
400	250	400	200	SO4
-	500	-	-	HCO3
				الأملاح الذائبة الكلية
100	1000	1500	500	TDS
8.5	-	-	-	PH
500	-	-	-	العسرة الكلية

Table (4) standards for drinking water

Class Water	Water Type
Excellent	C_1S_1
Good	C_1S_1, C_2S_1, C_2S_2
Permissible	C_1S_3, C_3S_1
Marginal	CSS_3, C_3S_2, C_3S_3
Poor	C_1S_4, C_2S_4, C_3S_4, C_4S_1, C_4S_2
Very Poor	C_4S_3, C_4S_4

Table (5) water quality for agricultural irrigation (Source: (Richards, op.cit., P.16))

1-The electric connect value

The electric connect has relationship in salt constriction to the most water to determine the sold dissolve materials in the water and there was clear different in the value of the electric connect that between (3760 – 6500) MHO / CM) this result refer to the underground water in these wells basal as shown in fig. No. 1 . then the dissolve salt between (3000-5000Mlg / litter) as shown fig. No.2 that ensure this water has a high salt. But the acid degree (PH) between (7- 7.8) as shown in the fig. No. 3 this shown this is a basal water.

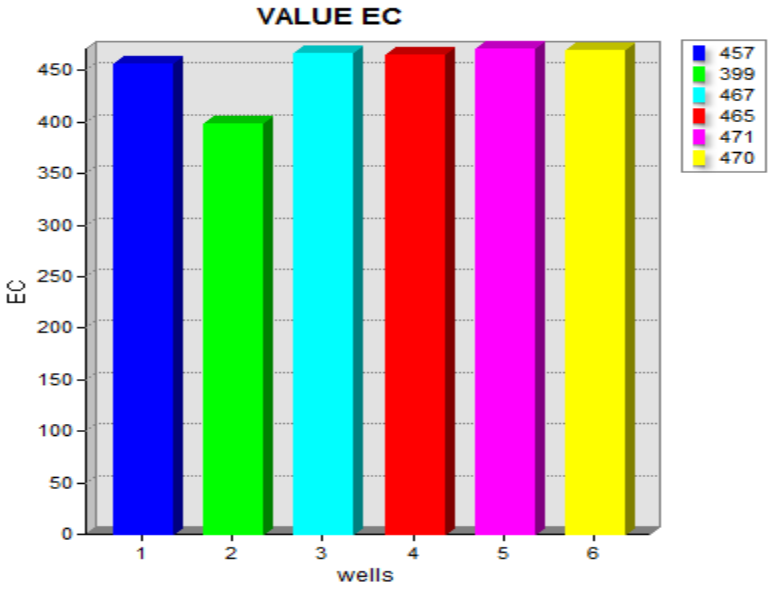


Figure (1) the value of the electrical conductivity

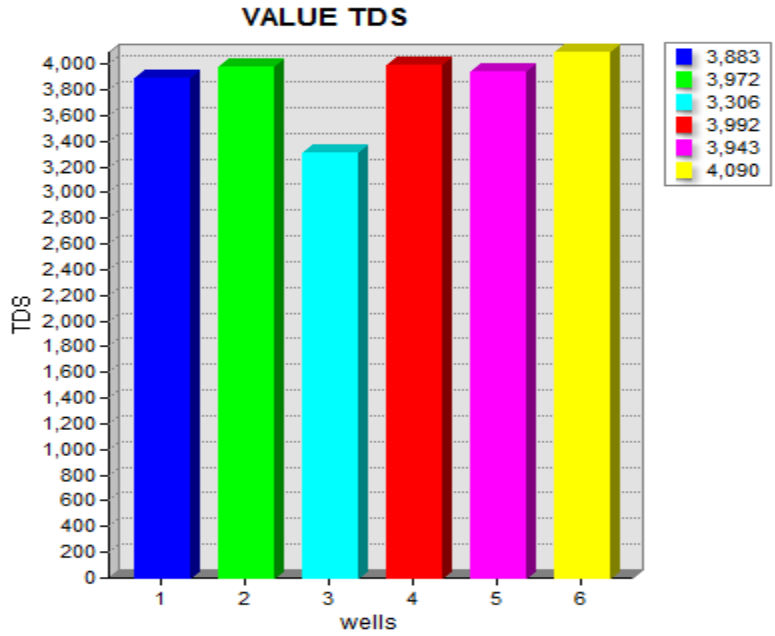


Figure (2) the amount of dissolved salts

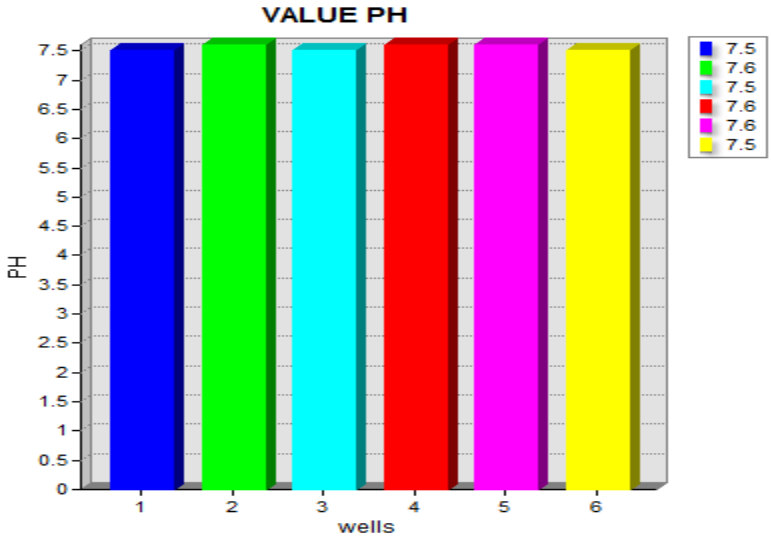


Figure (3) the degree of acidity

2- The positive ION value

On depending on the values of tables we found the value of coliseum (ca) witch representative the positive ION is increasing in all the water wells in the space of study between (371-488) part of million as shown in fig. No4.

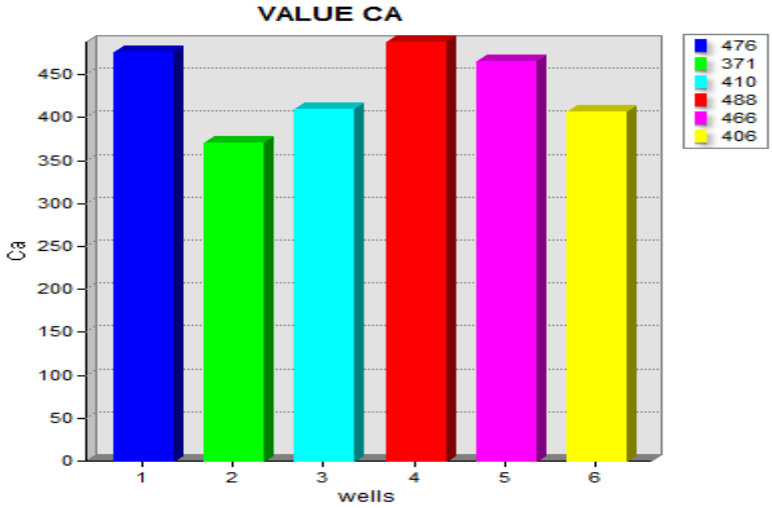


Figure (4) the value of calcium Ca

3-The negative ION value

We notice the increasing the sulphate it is between (1343-1601) as a part of million in fig. a number 5. And other elements that representative (chloride , bicarbonate magnesium, sodium and potassium) their value is reduced and the coliseum and sulphate in this water wells because of dissolve the Jepson rocks in study area which concerned from mainly resources to calcium and selphat as show in the fig. ((6, 7 , 8and 9).

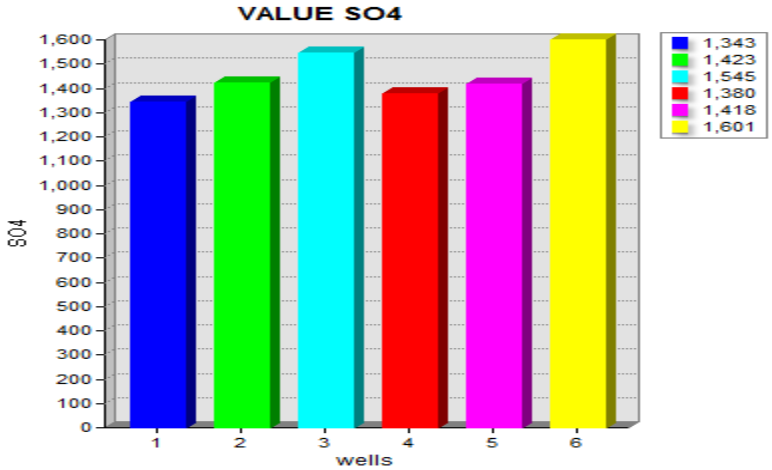


Figure (5) the amount of sulfates so4

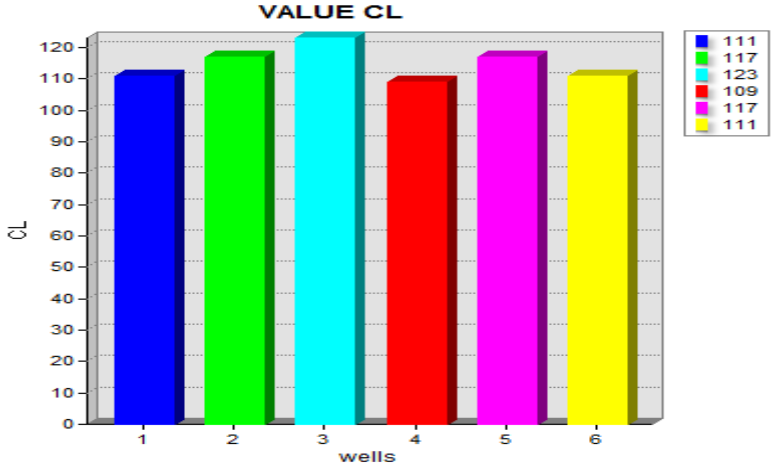


Figure (6) the value of chlorine CL

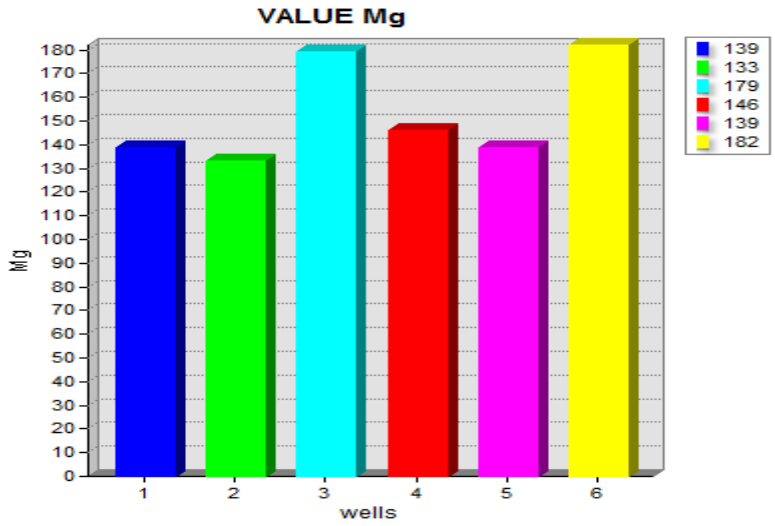


Figure (7) Mg value

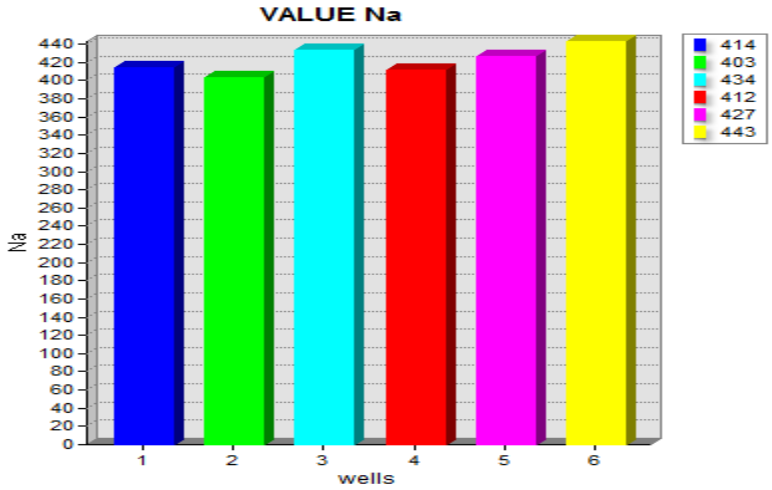


Figure (8) sodium value Na

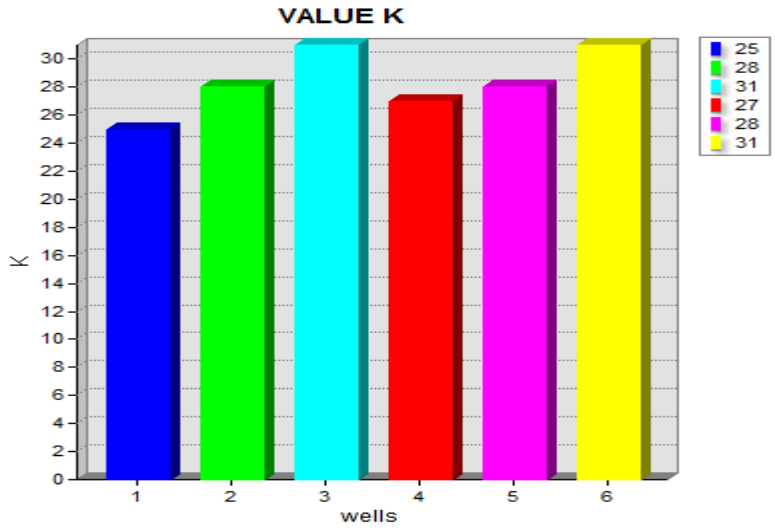


Figure (9) Potassium K value

The results

We can evaluate the purify Najaf sea waters for different uses as the following :

1- The humanity uses

We can determined the scope of purify using the Najaf sea waters purpose of human use through compare the results with standard global and adopted by the global right organization as the table No1 through the compare with this descriptions we found the water of these wells are not good for the human uses.

2- The agricultural use :

The adoption of classified Richards as shown in the table (5) to determine the extent of water wells validity of the study area for agricultural use, which depends on the value of the electrical conductivity and the value of (SAR), according to the results were classified as electrical conductivity (C4) as the sodium absorption (SAR) is less than (15) All wells in the study area is located within the class (C4S1) according to the classification Richards, a type very wretched for agricultural use .

3-The construction of Use:

Due to the presence of high concentration of sulfate dissolved in water wells in the study, this water is not suitable for use in the construction of the fact that the sulfate material high impact in concrete materials, which lead to erosion and damage to buildings.

Conclusions

1-The rain of the primary sources of funding for water Najaf Sea region, helping to exploit this water for different uses for being close to the earth's surface .

2-During the study found lack of validity of the water wells in Najaf Sea region of the human and agricultural and construction work as well as affected by sulfates and other minerals for use .

3-During the study found that the source of the salts in the wells of the study area water is the presence of gypsum blocks located in the region which are melting due to rainwater and rivers .

Recommendations

1-A government program for the development of improved water quality and groundwater exposed rid of dissolved salts to improve soil quality and agricultural quotient .

2-The possibility of developing a strategy for desalination projects and water wells used for drinking purposes and to encourage those who dwell .

3-The ongoing follow-up wells and perform necessary maintenance and regular check-ups of water in them.

4-The possibility of converting a low Najaf Sea to the lake to store water as a precaution when the strategic need to reduce waste in the waters of the Euphrates River .

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