

(2004/9/19 2003/12/17 )

	%50			
%20	—	-	%20	-
-	-	-	%10	- - -

## **Evaluation of Ground Water Quality in Hawi Al-Kanissa North of Mosul City, Iraq**

**Adel A. Belal**

*Center of Environment and Water  
Resources  
Mosul University*

**Mussab A. Al-Tamer**

*Department of Civil  
College of Engineering  
Mosul University*

### **ABSTRACT**

This study aimed to evaluate the water quality for a group of wells in hawi al-kanissa region north west of mosul city, the study revealed that 50% of wells under study is of calcium-sulfate type, 20% of calcium-magnesium-sulfate type, 20% of calcium-magnesium-sodium-sulfate type and 10% of sodium-calcium-bicarbonate-sulfate type Also the wells have a high permanent hardness and most of them classified as a doubtful to unsuitable for irrigation and some of them from the type of good to permissible, also the water of these wells is unsuitable for humane drinking.

(1988 ).

. . . 7000

(Mahmoud, 1981) .

.(Al-Rawi, 1990)

(Todd,1980) (Davis and Dewiest, 1966)

.(1988 )

2002

(5-3)

(15-5)

(Dug well)

(1)

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Na<sup>+1</sup>, (EC) pH  
 HCO<sub>3</sub><sup>-1</sup>, NO<sub>3</sub><sup>-1</sup>, Cl<sup>-1</sup> SO<sub>4</sub><sup>-2</sup>, PO<sub>4</sub><sup>-3</sup> K<sup>+1</sup>, Ca<sup>+2</sup>, Mg<sup>+2</sup>

(1) (APHA et al., 1985)

(3) (2)

Davis and Dewiest, ) 1948 Piper (Trilinear Diagram)  
 (2000 ) (1988 ) (1966

.(Al-Salim et al., 2001) (2000 )

(4) (Romani, 1981)

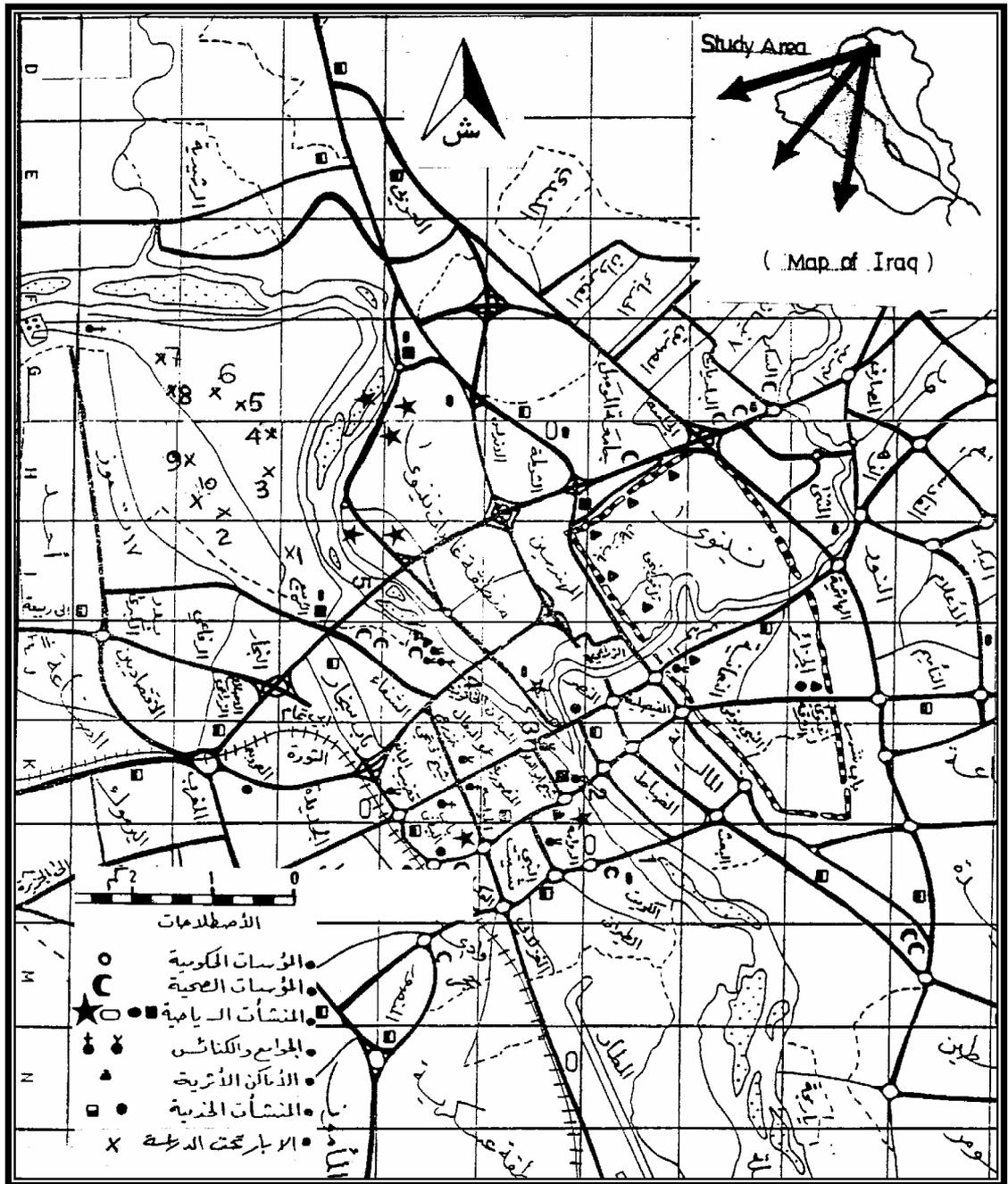
(epm)

(4)

Alkaly ) (G1)

(G2) (earth Ca,Mg  
 (Residual Carbonate)

(Romani, 1981).



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:

(Todd, 1980).

: (Sodium percentage %Na)

$$\% Na = \frac{(Na + K)}{Ca + Mg + Na + K} \times 100 \dots\dots\dots(1)$$

(Sodium Absorption Ratio)

(SAR)

:

$$SAR = \frac{Na}{\sqrt{Ca + Mg / 2}} \dots\dots\dots(2)$$

Todd, ).(epm)

(2) (1)

(Raghunath, 1988) (Davis and Diewst, 1967) (1980

(2)

(SAR) (%Na) (1)

(%Na)

3 2 1 )

%60

%20

(6 4)

%20 (10 9 5

(SAR)

(10 9 6 5 3 2 1)

(3)

(USDA)

%80

(2000 ) .

(%10 %70 %20)

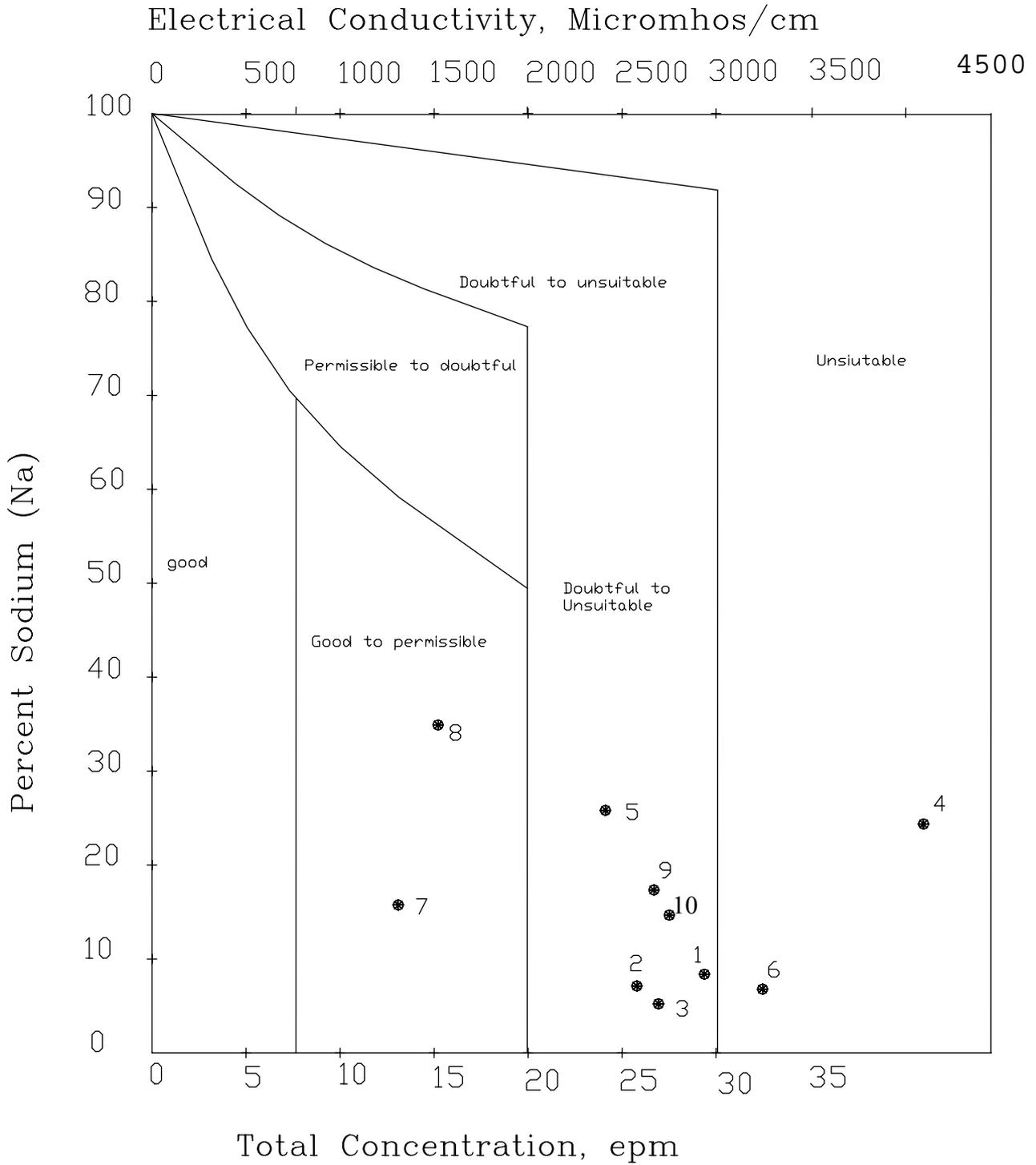
(C<sub>4</sub>-S<sub>2</sub>) (C<sub>4</sub>-S<sub>1</sub>) (C<sub>3</sub>-S<sub>1</sub>)

(Raghunath,1988)

:1

Sample	Teste	pH	EC. Mhose/cm $\times 10^6$	TDS Mg/l	TH Mg/l	Cations				Anions				SAR	%Na
						Na <sup>+1</sup> Mg/l	K <sup>+1</sup> Mg/l	Ca <sup>+2</sup> Mg/l	Mg <sup>+2</sup> Mg/l	HCO <sub>3</sub> <sup>-</sup> Mg/l	NO <sub>3</sub> <sup>-1</sup> Mg/l	Cl <sup>-1</sup> Mg/l	SO <sub>4</sub> <sup>-2</sup> Mg/l		
1		7.05	2990	3220	2130	90	7	561	178	356	0.02	108	1850	0.85	8.7
2		7.15	2750	2966	1990	60	3.5	605	117	311	0.11	80	1700	0.85	6.4
3		7.01	2780	2866	1795	45	7	433	174	299	nil	122	1350	0.5	5.6
4		7.17	4340	4654	2440	385	7.5	409	347	384	0.005	330	2475	3.4	25.7
5		7.12	2590	2716	1610	245	5.25	387	158	317	nil	130	1225	2.7	25.1
6		7.18	3300	3174	1840	50	5	391	204	311	0.05	304	1375	0.51	6
7		7.48	1355	1342	825	75	3	204	77	226	12.45	110	375	1.1	16.9
8		7.24	1529	1288	855	205	10	218	77	329	11.1	128	325	3.0	34.7
9		7.12	2730	2768	1510	140	4.75	265	207	317	0.02	177	1150	1.6	17.1
10		7.09	2760	2262	1480	120	4.75	329	161	268	nil	152	900	1.4	15.3

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(Todd, 1980) .

Na%

:2

(USDA) :3  
( Raghunath, 1988) (Davis and Dewiest, 1966) .





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:

(Sawyer, 1977)

(2)

. \ (2440-825)

:2

(Al-Layla et al., 1977) (Sawyer, 1970)

( \ ) $\text{CaCO}_3$	
55-0	
100-56	
200-101	
500-201	

:

(3)

(Davis and Dewiest,1967)

\ (4654-1288)

.(1)

(Davis and Dewiest, 1967) .

:3

1000-0	( )
10000-1000	
35000-10000	
35000<	

:

(4)

.

(2000 ). 1985 (WHO) :4

9.2-6.5	8.5-7	PH
1500	500	TDS
600	200	Cl <sup>-</sup>
400	200	SO <sub>4</sub> <sup>-2</sup>
150	50	Mg <sup>+2</sup>
200	75	Ca <sup>+2</sup>
500	250	TH. As CaCO <sub>3</sub>

:

.1

.2

- - %20 - %50 .3

- %10 - - - %20

.4

.5

.6

.7

%80 (USDA) .8

%60 %20 .9

%20 %20

.....

.1988

. 168

.1988

. 152

.2000

. 108

.2000

. 102

.1990

.206-196

18-12

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