The Level Of Water Awareness Of The Students In The College Of Agricultural Engineering Sciences In Duhok University, Kurdistan Region Of Iraq

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Abstract:
The current research aims at identifying the water awareness level of the students of the College of Agricultural engineering science in Duhok University in Kurdistan region of Iraq and determine the association between the water awareness level and some personal characteristics .

The sample of the research consist of (83) students representing 10 % of the total number of the study population. A scale of 24 items was prepared to measure the water awareness level of the respondents. A personal interview schedule was used for data collection and was applied during the academic year (2022-2023). The research found that there is a significant relationship between the level of water awareness of the students and stage of study. While the research found that there is no statistically significant relationship between the level of water awareness and each of (the number of family members, Reasons for attending college ,Parent's educational level, Scientific department, background, gender and age), Based on the results a number of the recommendations suggested .

Keywords: water awareness level, university students

Introduction:
For decades the ecological problems have been significantly increasing at all levels. They have preoccupied all nations and many local and international conferences have been held,a legion of intellectuals, scientists and laymen has been interested in them. The states strive to protect the environment through a series of actions (Ruzaiq, 2007). The world is sure today that the environment problem came up as an inevitable result of the policies pursued to achieve economic and social development. That required thinking of new methods and policies where balanced environment preservation should be considered (Al-Doski and Alsinayi , 2015)

Environmental protection needs international and local efforts aiming at planning policies that will contribute to the reduction of the various pollutions. Procedures and methods used to protect the environment are promoting environmental awareness among community members; preparation of professionals qualified in environmental protection; and enactment of laws that protect environment(Al-Azizi,2007).

Water is fundamental for economic growth and to the environment. Water has been identified as one of the most important natural resources and somewhat different from the rest because it is viewed as a key to prosperity and wealth , and nowadays, this important natural resource is facing great pressure due to the tremendous scientific and technological developments and the large increase in the population, as well as the uneven distribution of water resources on Earth(Augustine and Hanafiah,2019).

However, water depletion and contamination are among the main environmental problem faced worldwide in the 21st century. If the individual is not convinced of the importance of individual behavior in preserving the environment and the water resource, then reaching the desired solutions becomes difficult, and then the process of preserving them does not become a reality that we live in (Haleem, etal.2019).

Iraq and Kurdistan Region are currently going through a suffocating water crisis resulting from accumulations of neglect and misuse of water resources , in addition to the lack of water in the Tigris and Euphrates rivers and their tributaries due to climate changes and the drought prevailing in the Middle East and the lack of water sharing in a fair and equitable manner with the upstream countries Turkey and Iran. It is not possible to ignore the deterioration of the quality of the incoming water due to the return water from the upper river projects, in addition to the increase in salinity and pollution within Iraq itself. These pressures are also compounded by the impact of climate variability and accelerating climate change. As a result, there is growing realization of the urgent need to conserve water.

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The issue of water and its problems and awareness of it has become one of the most preoccupied issues in the whole world in general, and the Middle East in particular, due to what the world has been facing in recent years from a clear shortage in the quantities of available and usable water, which prompted governmental and non-governmental institutions at all levels to convene Many international conferences to discuss water issues and search for solutions(Al-Aabri,2011)..

This environmental and water awareness is achieved by raising the educational and cultural level, and teaching the individual how to deal with the environment and water resources, then making this awareness part of the behavior of the individual, the group and society, as preserving the environment and water is a collective responsibility that the individual bears part of(Al-Banna, etal., 2022).

Education is one of the effective means that can contribute to the development of water awareness in humans. Through education, it is possible to form desirable behaviors to deal with water gently and wisely(Sita, 2018). It has become necessary to include the issue of water and awareness of it among the most important responsibilities of educational institutions in the Kurdistan Region and Iraq, because it is expected that Iraq and the Kurdistan Region will suffer from a real water crisis in the future. And if water awareness is important for all segments of society, then students and youth represent the category that deserves attention, as they are a category on whom the country's future depends, and on which it is difficult to achieve its goals without them(Maarouf, 2010).

Universities and educational institutions are among the most appropriate means to achieve environmental education for students and raise the level of environmental awareness of the learner(Ibrahim ,2017). Therefore, educational activities must be directed towards the environment and environmental resources, preserving them and investing them properly, which deserves support with a general feeling and awareness of the challenges of the future environment. Therefore, a practical link is made between the learner and his environment and the preparation of a generation Able to protect their environment and its resources and serve future generations(Punzalan,2020).

Through the foregoing, the researchers see that raising the level of water awareness among students is an essential and important axis in the educational process, and the preparation of programs for water awareness and their implementation in universities and colleges of agriculture in particular has become one of the urgent necessities, so this research seeks to identify the level of water awareness for students of the College of Agriculture University of Duhok and identify some of the factors that affect it which will contribute in developing effective water conservation policies in Duhok governorate and Kurdistan region of Iraq.

Research objectives:
1- To identify the water awareness level of students in Agricultural engineering science (Soil &water science, Forestrydepartments).
2- To identify the association between the water awareness level and each of the following independent variable(Age, Gender,Background,Stage, Parent's educational level ,Department, Reason of attending college,and number of family members)

Research hypothesis:
There is no association between the water awareness level of students in Agricultural engineering science (Soil &water science and Forestrydepartments)as a dependent variable and each of the following independent variable Age, Gender, Background, Stage, Parent's educational level , Scientific Department, Reason of attending college ,and Number of family members).

Materials and Methods:
This Study deals with all the students in the college of Agricultural Engineering Sciences in Dohuk University in Kurdistan Region of Iraq which consist of 8 scientific departments , two scientific department (Soil &water science, Forestry) were selected randomly. A sample of 83 students was randomly selected representing 10 % of the study population.

A questionnaire was designed to collect the research data, it was consist of two parts , the first part included independents variables and the second part included a scale of (24) item to measure the water awareness level , Multiple choice questions was used .To measure the reliability of the scale Kurder-Richardson-21 formula was used with value (0.735). The data was analyzed by using SPSS 18 Program and a number of statistical methods were used such as : (Kuder-Richardson21, Percentages from frequency, Range, chi-square, Coefficient of contingency).

Results& Discussion:
1: Identifying the water awareness level in general:
The results of table (1) shows the water awareness level in general. 47 of the respondents, which represent 56.6265%, come with medium level of water awareness. While, 22 respondents represent 26.5060% make up low level of water awareness. In addition, 14 respondents, represent 16.8675% come with high level of water awareness.

Table (1) shows distribution of respondents according to their water awareness level

Water awareness level	Frequency	Percentage
Low (2-7)	22	26.5060%
Medium (8-13)	47	56.6265%
High (14-20)	14	16.8675%
Total	83	100

The results in table (1) showed that a majority of the respondents fell into the medium to low level of water awareness category. May be the reason is that the academic curricula in the faculties of agriculture lack the topics related to water, which requires the introduction of these topics within the curricula, especially in the two scientific departments studied. The results are not in line with the study of (Sita, 2018) .

Regarding the knowledge level of the respondents in the studied items , Table (2) illustrates that the three items came first in ranking according to the mean of each item are (The bond that holds water molecules together is called hydrogen bonding, The power of water dissolving many substances is due to the polarity of its molecules, and The percentage of fresh water on the surface of the Earth is 3% of the total water available on it) , The reason for this may be due to the fact that students possess a good amount of knowledge and information in these items related to water, which may have been acquired during the different stages of education on the one hand, or within some of the curricula related to the environment in the two mentioned scientific departments. Further, the results also showed the last three items were (small percentage of water decomposes to its primary elements at a temperature of 2700 Celsius degrees, Water has the ability to extinguish fires due to its high boiling degree, and The polarity of the water molecule results from the unbalanced distribution of electrons in the covalent bond). This indicates that the knowledge level of the respondents is insufficient with regard to these items, which requires focus on them in the future academic curriculums.

Table (2) shows Order of the water awareness level Items according to the mean of each item

No.	Items	Rank
1	The bond that holds water molecules together is called hydrogen bonding	1
2	The power of water dissolving many substances is due to the polarity of its molecules	2
3	The percentage of fresh water on the surface of the Earth is 3% of the total water available on it.	3
4	The General United Nations assembly has approved that World Water Day be held every year on March 22	4
5	The specific heat of water is 4180 J /kg	5
6	Water dissolves molecules of other substances by interfering with water molecules	6
7	When water reacts with metal oxides, hydroxides are produced	7.5
8	Sometimes the water smells like rotten eggs because it contains gas So_2	7.5
9	The best way to deal with wastewater is to treat it and reuse it	9
10	Wastewater can be used after the necessary treatment according to international standards for irrigation purposes	10
11	The ionization rate of water, when compared to the ionization rates of other compounds, is very weak	11
12	The pH of pure water is 7	12.5
13	The angle between the two covalent bonds in a water molecule is 104 degrees	12.5
14	The surface tension of water helps reduce the free surface area	14
15	The high boiling point of water is due to the thermal energy expended in breaking the hydrogen bonds between water molecules	15
16	Digging additional wells to meet the increasing demand for water is not considered a way to rationalize water consumption in agriculture	16
17	The survival of organisms in frozen areas is not due to the relatively high viscosity and surface tension of water.	17.5
18	The density of water in the solid state is less than in the liquid state, due to the low temperature of the molecules	17.5
19	The water molecules in solid ice is hexagonal	19
20	The solubility of salt in water is not considered a benefit of increasing the specific temperature of water	20
21	It is difficult to decompose water molecules into their primary elements in natural conditions because of the presence of the covalent bond inside the water molecule and the arrangement of its atoms in an angular manner.	21
22	small percentage of water decomposes to its primary elements at a temperature of 2700 Celsius degrees	22
23	Water has the ability to extinguish fires due to its high boiling degree	23.5
24	The polarity of the water molecule results from the unbalanced distribution of electrons in the covalent bond	23.5

2: Identifying the association between water awareness level and some independent variables:

Table (3) the correlation between water awareness level of the respondents and selected independent variables.

Awareness level / Independent variables	(2-7) Low	%	(8-13) Medium	%	(14-20) High	%	X^2	rc
Age								
(20-22)Years	13	15.663	7	8.434	2	2.410		
(23-25)Years	29	34.940	13	15.663	5	6.024	**5.3445**	**0.0278 N.S**
(26-28)Years	13	15.663	0	0.000	1	1.205		
Gender								
Male	7	8.434	17	20.482	2	2.410	**3.0161**	
Female	15	18.072	30	36.145	12	14.458		**0.0351 N.S**
Background								
Rural	8	9.639	15	18.072	4	4.819		**0.0177**
Urban	14	16.867	32	38.554	10	12.048	**2.278**	**N.S**
Parent's educational level								
Illiterate	4	4.819	9	10.843	3	3.614		
Primary	5	6.024	8	9.639	4	4.819	**9.428**	**0.033**
Mid school	1	1.205	7	8.434	1	1.205		**N.S**
High school	9	10.843	12	14.458	2	2.410		
Bachelor	2	2.410	9	10.843	4	4.819		
Diploma, Master and Doctoral	1	1.205	1	1.205	1	1.205		
Department								
Soil& water science	9	10.843	16	19.277	5	6.024	**1.6245**	**0.0191**
Forest	13	15.663	31	37.349	9	10.843		**N.S**
Stage	19	22.892	34	40.964	5	6.024		
Third							**11.837**	**0.368****
Fourth	3	3.614	13	15.663	9	10.843		
Reasons of attending college								
According to high school average								
According to personal desire	19	22.892	39	46.988	10	12.048	**2.829**	**0.0196**
	3	3.614	8	9.639	4	4.819		**N.S**
No. of family member								
(2-5)members	1	1.205	8	9.639	3	3.614	**5.1573**	**0.0258**
(6-9) members	17	20.482	34	40.964	9	10.843		**N.S**
(10-13) members	4	4.819	5	6.024	2	2.410		

(N.S: Non significant)(** significant at 1% level)

As shown in table (3) that at 0.01% level of significance, the research hypothesis (Ho$_2$) that there is no significant relationship between the awareness level of the respondents and the stage variable is rejected (rc= **0.368****). This suggests that there is a significant positive relationship between the awareness level of the respondents and the stage variable. This may be due to the changes made in the curriculums in the past two years. Furthermore, it is in line with the study of (Saber,2018) and (Haleem, etal.2019).

The Results of the table shown also that at 0.05% level of significance, the research hypothesis (Ho$_2$) that there is no significant relationship between the awareness level of the respondents and the variables (Age, Gender, Background, Parent's educational level , Scientific Department, Reason of attending Agriculture college ,and number of family members) is accepted . This suggests that there is no significant positive relationship between the awareness level of the respondents and the mentioned variables . May be the reason for this is that the largest percentage of the respondents belong to the categories of low or medium water awareness, and this means that all of them need to improve their information about water problems and issues and raise their level of water awareness regardless of the variables mentioned.

Recommendations :
In light of the results of the current research, the researcher recommends several recommendations, the most important of which are: The need to pay more attention to including water issues and problems in the general education curricula, in an appropriate manner , Interest in holding seminars, conferences and workshops in the field of developing water awareness.
coordination between the colleges and other community institutions in the field of dissemination of water awareness among community members, The necessity of activating the print, audio and visual media in the field of raising the level of Water awareness , organizing celebrations for various environmental days, especially World Water Day. Complementing the results of the current research, the researchers suggest the need to conduct more studies on water issues and awareness of their dimensions in other colleges and institutions in Duhok and kyrdistan region of Iraq.

References:
1. Al-Aabri,Zaher Muhammad ,2011.The extent to which the concepts of water education are included in social studies textbooks for grades (5-10) of basic education in the Sultanate of Oman, Master Thesis, College of Education, Sultan Qaboos University.

2. Al-Azizi, Ahmed .2007.The Comprehensive Geographical Encyclopedia of the Arabian Gulf - Sultanate of Oman. Be a Model for Water Resources Management. Al-Raya Center for Publishing and Information, Cairo.

3. Al-Banna,Ahmed Abdullah Al Sagheer , Al Samalouti ,Majida M. A. , Ali,Jamalat M. A. and Issa,Adel S.A. 2022. visualize that the development of awareness of water among schoolchildren Elementary school in the light of some contemporary society challenges. The Educational Journal for Adult Education, Faculty of Education, AssiutUniversity.Vol.4(4).10.21608/altc.2022.293624

4. Al-Doski, Abid Ali Hasan and Alsinayi, Mijda Bahzad Mohammad.(2015).Forest and Rangeland Staff' Training Needs in Iraqi Kurdistan Region and Correlation to Personal and Occupational Factors.*Alexandria Science Exchange Journal (ASEJ)* .Vol.36.No.3.P:249-261.10.21608/ASEJAIQJSAE.2015.2910.

5. Augustine, Ellyson and Hanafiah, Marlia. (2019). Awareness level of water resource conservation of university students. Water Conservation and Management. 3. 18-21. 10.26480/wcm.02.2019.18.21.

6. Haleem,Azhar M.,Badry, Rana M. and Mohammed Sukainah J.2019.Assessment the water awareness among primary students before and after applying educational program, a case study withinBaghdadcity.*Alfateh journal*.No.80.//http://www.alfatehmag.uodiyala.edu.iq

7. Ibrahim ,Jamal Hassan Al-Sayed.2017. "A suggested geographic unit in Arab water security for the development of water concepts, awareness of water security, and creative solution to problems among students of technical education," Journal of Educational and Psychological Sciences, University of Bahrain, Scientific Publishing Center, Volume (18), Issue (2).

8. Maarouf, MuwafaqArafa .2010 .The level of water awareness among students, science teachers in the faculties of education in the Palestinian universities in Gaza. Master Thesis, College of Education, The Islamic University of Gaza

9. Punzalan, C. H. (2020). Evaluating the Environmental Awareness and Practices of Senior High School Students: Basis for Environmental Education Program. Aquademia, 4(1), ep20012. https://doi.org/10.29333/aquademia/8219.

10. Saber, NianN.2018.Environmental awareness among the students of the University of Sulaimani and its relation with some variables.*alfatehmag.uodiyala.edu.iq*.

11. Sita, Aram KurekKarabidian. 2018. The level of water environmental awareness among Basra University students. Al-Kut Journal of Economics and Administrative Sciences. Wasit University.Vol.42.