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Assessment of Community Awareness and Knowledge of Environmental Law and Legislation in the Basrah Governorate (Iraq)

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ABSTRACT

The objective of this research is to address a gap in the existing literature by documenting the inadequate level of environmental awareness among diverse societal sectors and its detrimental effects on the environmental situation of Basrah Governorate, Southern Iraq. The current research examines the extent to which insufficient community awareness of Environmental Law No. 27 of 2009 contributes to the adverse environmental conditions in Basra Governorate. The results of this preliminary investigation indicated a widespread lack of awareness of environmental legislation across all societal sectors and the potential consequences of this lack of knowledge on environment-related attitudes and concerns among a statistically representative subset of the population. Principal component analysis (PCA) was used to analyze 309 responses to determine the association, similarity, and difference between responses to a series of questions. This survey revealed that people from all walks of life are not familiar with Iraqi Environmental Law. Moreover, the environmental concern was also found to be low. On the other hand, gender, social status, and educational level failed to provide consistent or conclusive results.

1. INTRODUCTION

Environmental behavior is often the result of awareness of the negative consequences that impact oneself, other humans, and non-humans [1]. Greater environmental knowledge can potentially change public attitudes, subsequently influencing a country's environmental laws and policies [2]. In the 2019 UNSDG Country Profile Report for the Arab Region, Iraq ranked 13th out of 21 Arab countries [3].

Many of the Sustainable Development Goals highlight that the shift from state security to human security requires the integration of environmental concerns into political and cultural rights [4, 5]. Little research in Iraq has focused on general environmental knowledge or the relationship between environmental behavior and awareness, or on attitudes towards the country's environmental laws, strategies, and policies. Following the fall of the previous regime in 2003, several reforms were implemented, including the establishment of the Iraqi parliament and constitution. The Ministry of Environment was also founded to oversee environmental rehabilitation and protection in accordance with laws enacted by Parliament.

The Ministry is responsible for developing environmental policy and plans to protect and promote the environment through the implementation of Environmental Law No. 27, 2009 [5]. Articles 9 and 26 of the Environmental Law mandate the state's responsibility to protect and enhance the environment. This encompasses preventing and combating pollution and other public hazards and ensuring rational use of natural resources.

With a population exceeding four million, Basrah Governorate is the second-largest city in Iraq. The city was severely impacted by the Iraq/Iran war from 1980 to 1988, as well as the first and second Gulf Wars in 1991 and 2003. The governorate continues to grapple with the aftermath of these wars, with environmental degradation posing a significant challenge to local and central governments. Health issues such as respiratory and skin diseases have become prevalent, while health institutions have reported an increase in congenital malformations in newborns and various types of cancer [6-10]. The environmental problems in the governorate are further exacerbated by its aged and deteriorating infrastructure, as well as high pollution levels resulting from oil production, export, and associated industrial processes.

The governorate's indiscriminate management practices have led to the accumulation of domestic waste in residential areas, open burning of collected solid waste, and the discharge of mostly untreated sewage into rivers. These practices have significantly worsened the pollution problem. A lack of public awareness prevents the citizenry from exerting pressure on the local government to solve these environmental issues. Furthermore, there is a shortage of non-governmental

organizations (NGOs) that can inspire and educate the public to play a more active role in environmental protection. Governments often fail to enforce environmental laws and other relevant policies through appropriate methods. As a result, citizens attribute environmental degradation solely to successive governments, overlooking environmental protection as a shared responsibility between the government and society.

The Environmental Law No. 27 of 2009 Public Awareness Survey in Basrah Governorate was designed to gather first-hand information to evaluate and support our hypothesis that the lack of enforcement of this law is due to widespread ignorance about it and a general lack of environmental awareness among community members. Consequently, there is a call for both local and national governments to reassess the law's efficacy and its application, as well as to develop the necessary environmental policy to immediately improve the environment, reduce adverse effects on community health and well-being, and curb environmental degradation.

2. MATERIALS AND METHOD

The survey was conducted in the city of Basrah, engaging individuals from various backgrounds. It sought information on participants' personal characteristics such as age, gender, education, and occupation, their knowledge of environmental legislation, specifically their familiarity with Iraqi Environmental Law (No. 27 of 2009), and their attitudes towards environmental issues. The research team interacted with individuals and groups at places of worship, religious gatherings, schools, and neighborhoods. They explained the survey's purpose, left it with participants, and later returned to collect responses. We endeavored to include as many women and youth as possible, across all ages, education levels, and professions, given that their perspectives are often overlooked. The questionnaire was distributed in 375 copies.

We received three hundred twenty-one (321) responses from the public, out of which three hundred and nine (309) were properly filled out. The responses were categorized by age, gender, qualification, occupation, and employment, and then statistically analyzed.

Principal Component Analysis (PCA), a multivariate statistical technique, was used in data analysis to identify the relationship among the questions in terms of similarity and difference in responses, as well as the relationship between these societal classes and their similarities and differences in relation to social status (gender, age, and education level) which may influence their responses.

3. RESULTS AND DISCUSSION

The number of male and female participants was statistically similar, with males slightly outnumbering females (52.4% vs 47.6%) (Table 1).

Participants' educational levels ranged from elementary school to bachelor's degree. Despite an overall employment rate exceeding 60%, a third of the female respondents were unemployed, compared to only about 6% of males (Figure 1).

The respondents' ages ranged from 20 to over 50 years. The age group <20 years had the fewest respondents (only 3% of 309 participants), followed by the age group over 51 (17%). The 41-50 age group had the largest proportion of respondents (33%), followed by the 31-40 and 21-30 years groups, respectively (Figure 2). This distribution is to be expected, as the age groups from 21 to 50 accounted for 80.3% of the total respondents and are typically the most active in family and social life.

Women outnumbered men in the survey up to the high school level. Male respondents with Master's and Doctoral degrees outnumbered female respondents (Figure 1). As anticipated, civil servants comprised the largest proportion of respondents; the majority of the workforce (both male and female) is either employed by the government or in private jobs (Figure 3). However, only male participants identified themselves as self-employed.

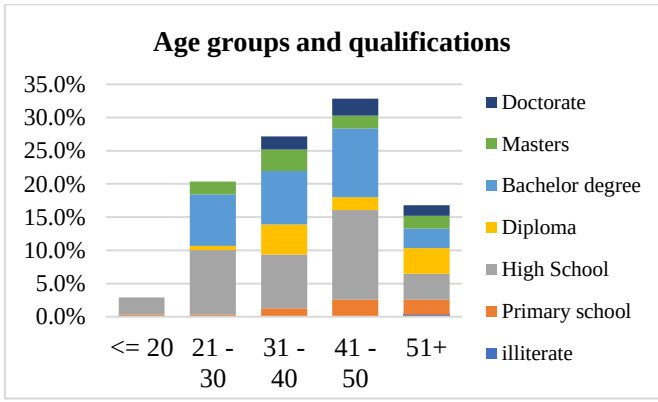

Figure 1. Age groups and education level of the respondents

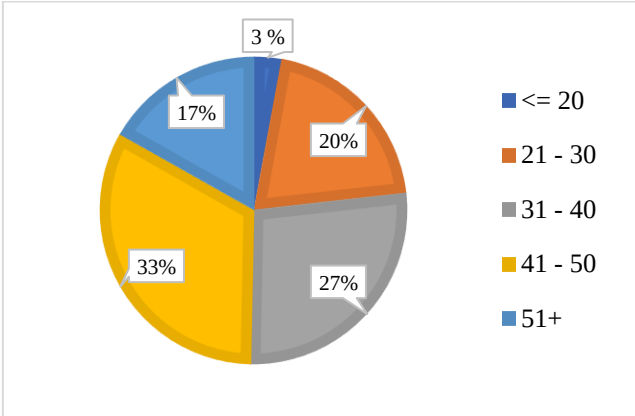

Figure 2. Percentage of age distribution among the respondents

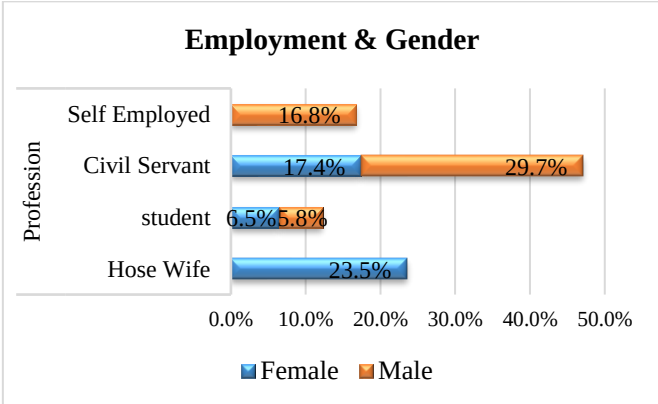

Figure 3. Male and female respondents and their employment status

Table 1. Frequency distribution of respondents and characteristics

Characteristics	Qualified (Education)		Unqualified (with no Qualifications)		Employed		Unemployed	
	n	%	n	%	n	%	n	%
Gender: Female (F)	147	47.4%	0	0%	54	17.4%	93	30%
Male (M)	162	52.3%	1	0.3%	145	46.8%	18	5.8%
Total	309	99.7%	1	0.3%	199	64.2%	111	35.8
X^2= p ≥ 0.5	-	-	-	-	135.513	-	-	-
Age group: < 20	9	2.9%	0	0%	1	0.3%	8	2.9%
21-30	63	20.3%	0	0%	27	17.1%	36	11.6%
31-40	84	27.1%	0	0%	61	19.7%	23	7.5%
41-50	102	32.9%	0	0%	69	22.3%	33	10.6%
> 50	51	16.5%	1	0.3%	41	13.3%	11	3.5%
Total	309	99.7%	1	0.3%	199	64.2%	111	35.8%
X^2 = p ≥ 0.5	105.920a	-	-	-	77.870a	-	-	-

In terms of employment and qualifications, men outnumber women. More than 20% of women identified as housewives as their profession. While more than 20% of men work in the private sector (self-employment), the remainder are government employees (Figure 3).

According to the PCA results, four primary factors are responsible for the data structure. Consequently, all data has been reduced to four variables (Principal components PCs) (depending on the Eigenvalue being greater than or equal to one) that account for 98.55% of the total variance of the data. The first group PC1 accounts for 48.78% of the total variance and exhibits clear correlations between the majority of the population's responses to the following questions: Q1, Q2, Q5A, Q5C, Q7C, Q8, Q14, and Q16. The majority of them gave negative answers to these questions. Almost all the respondents, as expected, were unaware of the Environmental Law. This is due to the government's failure to engage the wider society, environmental institutes, and relevant NGOs in any discussions during the law's development process. In addition, Parliament was unable to gauge the views of its constituents about the law and its impact.

Furthermore, after the environmental law was passed in Parliament, the government made no effort to inform and educate the public about the law, its significance, and the implications of fines, types, severity, and how they are applied to individuals and businesses. The respondent did not elaborate on the details in responses to questions Q8, Q14, and Q16. However, we concluded from the responses that household waste and street litter spoil from the beauty of the city. The other major issue they discussed was the smog caused by the city's solid waste, oil, and gas flares. The study [11] assumed that people in the developed world are concerned about environmental issues in a proactive (ecocentric) manner. People in the developing world, on the other hand, are (anthropocentric) reactive to environmental threats such as air and water pollution and other environmental threats in order to survive.

Furthermore, respondents believe that teaching environmental awareness in schools is less relevant and more difficult than teaching basic sciences and mathematics to their children. Clearly, they did not see environmental responsibility as a way of life that should be emphasised in all aspects of learning at all levels. Although they mention that environmental awareness is included in the subjects of science and religious studies.

Increased environmental knowledge is expected to change environmental attitudes, and environmental knowledge and attitudes are expected to influence environmental policy [12, 13]. Environmental awareness [14] is a prerequisite for pro-environmental behaviour and sustainable environmental management. However, Iraq, like other developing countries, has conducted very limited research on general environmental knowledge or the relationship between environmental knowledge and attitudes [2, 15].

The PC2 represents 24.006% of the total variance with a correlation between questions Q3 and Q7B respondents from the surveyed population. They responded positively to these questions despite their pessimistic; most of the people we spoke with were a mix of municipal and environmental inspectors. This demonstrates a clear misunderstanding of the roles of various government departments. However more importantly, it demonstrates that the environmental police have been ineffective at monitoring environmental abuses and following up on the application of environmental law.

PC3 accounted for 16.125% of total variances in Q7A-Q12 relationships. Even those who believe there is no point in reporting environmental incidents because the response is either slow or non-existent. In the case of PC4, which accounts for 13.398% of the total variance, it demonstrates the uniqueness of the responses to question Q5B (Have you been accused of any environmental violations by the Environmental Police?). The responses to this question varied among the group and did not resemble the responses to the other questions for which correlations were discovered (Figure 4 and Table 2).

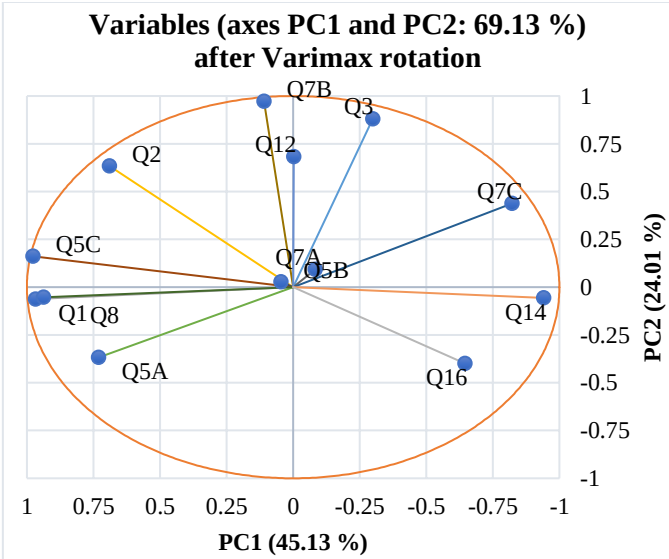

Figure 4. Component loadings for PC1 and PC2 after varimax rotation

Table 2. Squared cosines of the variables after Varimax rotation

	PC1	PC2	PC3	PC4
FE (female employed)	0.284	0.000	**0.595**	0.006
FHW (female, housewife)	0.001	0.236	0.001	**0.754**
FS (female student)	**0.531**	0.015	0.210	0.214
MW (male worker)	**0.414**	0.170	0.237	0.134
ME (male employed)	0.281	0.007	**0.489**	0.134
MS (male student)	0.011	**0.819**	0.089	0.080

Note: Values in bold correspond for each observation to the factor for which the squared cosine is the largest.

For the second group, survey responses were summarized into (PCs) based on gender and age group. These components accounted for 86.897% of the total variance in the data. PC1 accounted for 20.86% of the total variance in the data studied. This indicates a strong correlation between questions Q12, Q14, and Q16 in terms of similarities and differences in their responses. While PC2 accounted for 19.471% of the total variance, it revealed a strong correlation between questions Q1, Q2, Q5B, and Q5C in terms of similarities and differences in responses. PC3, which accounted for 20.421% of the overall variation, demonstrated a strong correlation in responses to Q7B, Q7C, and Q8. While PC4 accounted for 17.142% of the total variance in the data, there was an apparent correlation between questions Q3, Q5A, and Q7A (Table 3 & Figure 5).

Table 3. Squared cosines of the variables after Varimax rotation

	PC1	PC2	PC3	PC4
Q1	0.002	**0.516**	0.381	0.015
Q2	0.003	**0.539**	0.046	0.005
Q3	0.001	0.008	0.147	**0.413**
Q5A	0.000	0.069	0.016	**0.570**
Q5B	0.011	**0.328**	0.001	0.170
Q5C	0.005	**0.687**	0.008	0.120
Q7A	0.085	0.005	0.062	**0.614**
Q7B	0.000	0.059	**0.674**	0.122
Q7J	0.033	0.010	**0.750**	0.000
Q8	0.247	0.128	**0.338**	0.146
Q12	**0.931**	0.011	0.033	0.001
Q14	**0.612**	0.149	0.046	0.043
Q16	**0.783**	0.023	0.153	0.008

Note: Values in bold correspond for each variable to the factor for which the squared cosine is the largest

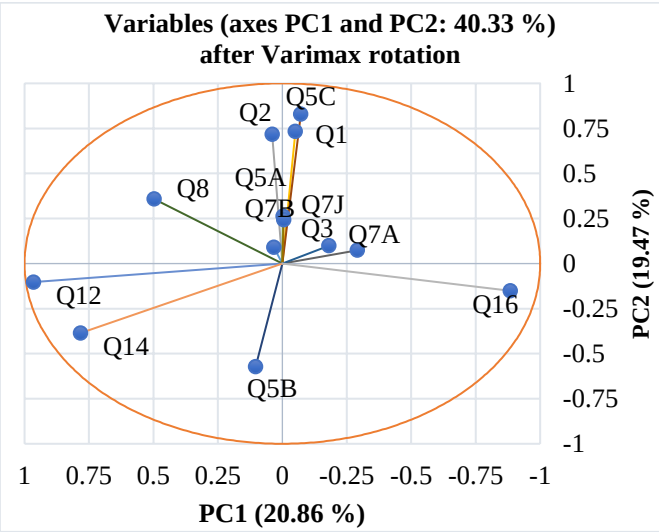

Figure 5. Component loadings for PC1 and PC2 after varimax rotation

The representative sample revealed a weak correlation between gender and age (F65, M35, and the M45, M55 and the F35, M65 and the M25, F45, F55). In other words, the relationship between age and gender had no effect on how the group responded to the questionnaire. Probably the inconsistency is a result of the different ways of thinking of each age group, which varies from person to person.

For the third group, data were divided into four principal components based on gender and qualification, representing 85.108% of the total variance of the data. PC1 was responsible for 27.875% of the total variance, with questions (Q5B, Q7A, Q12, and Q14) demonstrating a positive correlation among all respondents. While PC2 accounted for 20.849% of the total variance and demonstrated a correlation in response to questions (Q2, Q5C, Q16). PC3 accounted for 14.726% of the total variance, with an apparent correlation in responses to questions (Q1, Q3, Q5A, and Q8). In contrast, PC4 accounted for 16.58% of the total variance, with an apparent correlation between respondents and questions (Q7B and Q7J) (Figure 6 & Table 4).

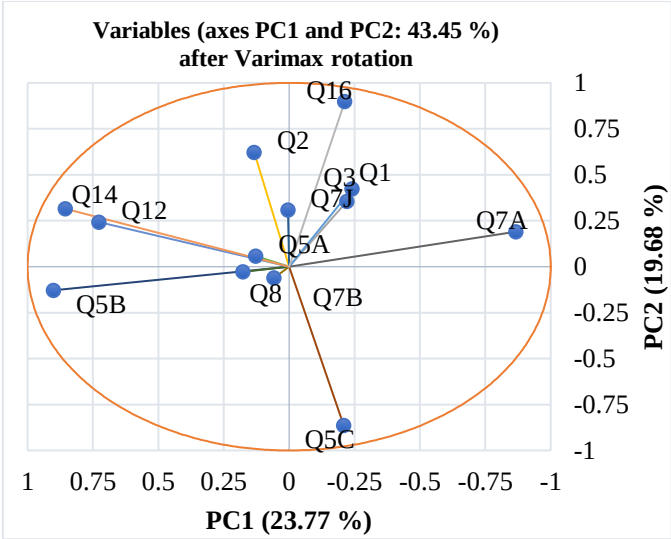

Figure 6. Component loadings for PC1 and PC2 after varimax rotation

Table 4. Squared cosines of the variables after Varimax rotation

	PC1	PC2	PC3	PC4
Q1	0.049	0.126	**0.638**	0.005
Q2	0.018	**0.387**	0.170	0.266
Q3	0.058	0.179	**0.389**	0.012
Q5A	0.016	0.003	**0.866**	0.006
Q5B	**0.813**	0.017	0.018	0.042
Q5C	0.044	**0.746**	0.006	0.004
Q7A	**0.752**	0.036	0.016	0.005
Q7B	0.003	0.004	0.064	**0.790**
Q7J	0.000	0.095	0.026	**0.833**
Q8	0.031	0.001	**0.522**	0.312
Q12	**0.529**	0.059	0.025	0.268
Q14	**0.733**	0.099	0.001	0.006
Q16	0.045	**0.807**	0.027	0.098

Note: Values in bold correspond for each variable to the factor for which the squared cosine is the largest.

There was an apparent correlation between gender and qualification (FD, FB, MB, FHS, MD, MHS, and FMSC) in their questionnaire responses. While females with only a

primary school certificate (FP) and those with PhD degrees (FPhD) did not show any correlation or similarities to the other groups, this was reflected in their distinct and unique opinions in the way they responded to the questionnaire (Table 5). In their study of university students from five Arab countries, the study [16] discovered that gender, class, and parental education have a weak, inconsistent, or inconclusive effect on respondents' levels of environmental concern.

Environmental education is the process by which people learn about environmental issues, how to solve them, and how to take action to improve their environment [17, 18]. This means that people must learn skills in order to be motivated to solve environmental problems and become more involved in the conservation and sustainability of the ecosystem. This lack of knowledge led the community to believe that environmental issues are the government's responsibility and not the responsibility of each individual in the community. Members of the public argue that "it is their responsibility to keep their homes clean and safe, and that the government should collect and dispose of household waste appropriately and take action to protect the environment," frequently ignoring the fact that they litter the streets with water bottles and plastic bags and encroach upon the natural environment through logging and poaching.

Table 5. Squared cosines of the variables after Varimax rotation

	PC1	PC2	PC3	PC4
FB	0.002	**0.270**	0.189	0.026
FD	0.043	0.016	0.028	**0.758**
FHS	0.001	0.099	0.006	0.054
FMSc	0.236	0.244	0.012	**0.384**
FP	**0.598**	0.309	0.005	0.037
FPhD	0.213	0.283	**0.356**	0.127
MB	**0.065**	0.022	0.059	0.000
MD	0.070	0.002	**0.359**	0.201
MHS	0.029	0.076	**0.476**	0.005

Key: F (Female), M (Male), P (Primary school), HS (High School), D (Diploma), B (Bachelor), MSc (Masters), Ph.D. (Doctorate).

4. CONCLUSION AND RECOMENDATIONS

Due to neglect, warfare, a lack of knowledge and education, and, most importantly, a lack of suitable environmental legislation, Iraq struggles to manage its environmental resources [19-21].

Lack of awareness leads to a general lack of environmental protection and, on occasion, environmental abuse at both the individual and societal levels. With the assistance of global environmental organizations, the state has a responsibility to increase environmental education and awareness among the public. The current study's accurate portrayal of society's attitudes toward the environment presents a strong argument for the need of prompt and decisive action. People must acquire the required motivating abilities in order to address environmental problems and contribute to the preservation and sustainability of the ecosystem.

Based on the conclusion, the following recommendations were put forward:

i. The Government needs to create policies to increase awareness of the link between non-renewable energy and climate change.
ii. Environmental courses should be mandated in all primary, secondary and tertiary institutions to increase environmental literacy.
iii. The government should create incentives to increase environmental awareness and discourage activities that destroy the environment through targeted rebates, subsidies, and taxes.
iv. People should set goals to reduce environmental damage through tree planting, consumption preference, waste disposal best practice, and an environmentally friendly lifestyle.
v. Governments should engage with NGOs to promote environmental awareness campaigns and encourage eco-friendly lifestyles.

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