

ENVIRONMENTAL KNOWLEDGE, CONCERNS, AND ATTITUDES AMONG CONSUMERS IN SAUDI ARABIA¹

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ABSTRACT

Although concern for environmental issues among policymakers in Saudi Arabia is not new, there have been no previous attempts to survey the general public on environmental issues. Our study fills this void by examining (a) the level of consumers' environmental knowledge, concerns, and attitudes in Saudi Arabia, and (2) the extent to which these vary across different socio-demographic segments of the population. Results from a structured self-administered survey conducted in the Eastern Province show wide variation in knowledge of global environmental issues in the population. Majority of consumers perceive threats to the local and global environments as very serious, feels that quality of the local and global environments is not quite good, and show a high level of concern for the environment. However, attitudes toward environmental protection are ambivalent. On the one hand, consumers believe that the environment needs protection, but on the other hand, do not think that environmental protection should be given priority in resource allocation decisions, as the benefits do not justify the costs.

On variations across socio-demographic segments, the results show age, education and nationality differences in consumers' environmental knowledge and perceptions of global environmental threats, and gender and nationality differences in their perceptions of local environmental threats and environmental concern.

1. BACKGROUND

In numerous surveys conducted in developed economies, concern for the environment easily ranks as one of the important social problems. In one such recent study in the U.S., Environmental Research Associates, a Princeton, N.J.-based research firm found that 87% of all Americans say they are concerned about the environment while a further 44% say they are very concerned (Phillips, 1999). Similar results have been reported in European countries and have formed the basis for improved environmental and consumer policies (Koopman, 1994). In Saudi Arabia too, concern for environmental issues is not new, and actually dates back to the early 1970s when environmental legislation became an integral part of the Kingdom's five-year development plans. Since that time, various pieces of legislation have been issued to protect various aspects of the environment.

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In the beginning environmental legislation was limited mainly to the protection of natural resources like forestlands, wild animals and birds. The Agricultural Quarantine Law (CM/207/ 1396 H), Animal Quarantine Law (CM/208/ 1396 H), Wild Animals and Birds Hunting Law (M/17/ 1398 H) and Forestry and Rangelands Law (M/22/ 1398 H) are examples of Royal decrees passed during this initial period. However, massive oil revenues in the late 70s and early 80s, ambitious infrastructure development projects, and a generally open and free-market economy combined to put Saudi Arabia firmly on the path of modernization. With this came modern production methods and new consumption habits that posed entirely different environmental challenges. During the 1980s, environmental legislation started focusing on issues such as mining, pollutant emissions, hazardous waste disposal, and protection of public utilities from waste disposal.² In 1990, a conference on environment and development in Saudi Arabia was held, culminating in the Saudi Environmental Awareness Project (SEAP) in 1995.

The success or otherwise of the SEAP itself has been the subject of analysis both in the popular press (Al-Bouq, 1995a; 1995b; 1995c) and in scientific journals (Al-Gilani and Filor, 1999). However, what is relevant for the present study is that SEAP grew out of a realization of the immense role that public environmental awareness can play in the success of any environmental policy. This role was explicitly recognized in the decision by Saudi authorities to charge the Meteorology and Environmental Protection Administration (MEPA) with the responsibility for creating environmental awareness among the Saudi public (Al-Gilani and Filor, 1999). The role of public environmental awareness in successful environmental policy-making was also duly recognized in the fifth five-year plan (1990-95) when it identified the lack of adequate public environmental awareness as one of the “key issues” affecting the plan’s environmental policy proposals.

In spite of this acknowledged role, however, virtually no formal research has been conducted in an effort to understand the level and nature of environmental awareness, concerns and attitudes among the population living in Saudi Arabia. The present study was conducted to fill this void.

2. STUDY OBJECTIVES

Environmental problems arise from two major sources in any modern society, namely production and consumption behaviors (Gooch, 1995; Stern, Dietz and Guagnano, 1995). Production-related causes include exploitation of non-renewable resources, emission of toxic chemicals and gases from production processes, and use of non-biodegradable product packaging, to name just a few. Numerous theoretical and applied studies in the physical sciences and related disciplines have addressed this source of environmental problems. In Saudi Arabia, a number of funded basic and applied research projects have also addressed production related environmental pollution, and have made recommendations that have formed the basis for some of the legislation described earlier.

The second source of environmental problems in modern societies (including Saudi Arabia) is the consuming public. By virtue of their purchase, consumption, and product disposal decisions, the general public directly or indirectly contributes to environmental problems. Indirectly, their product purchase decisions influence the types of products that manufacturers

² See Al-Gilani and Filor (1997) for a chronological listing of environmental legislation in Saudi Arabia between 1976 and 1996.

make, what production processes they adopt, and what materials they use in production. Directly, the public's pre-disposition to re-cycle product packages and to properly dispose off non-biodegradable trash, goes a long way to affect the quality of the environment. It has been estimated that 30%-40% of environmental degradation is attributable to household activities (Grunert, 1993).

Our focus in this study is on the general public side of the environment equation. Our objective is to examine the level of consumers' knowledge about environmental problems, the extent of their concern for the environment, and their attitudes toward environmental protection. We also seek to examine the extent to which these issues vary among different demographic segments of the population. Our emphasis is to provide descriptive information on the state of these important constructs among the general public, in the hope that our findings will help guide policy makers in the development of communication campaigns to address any deficiencies that the results might reveal.

3. LITERATURE REVIEW

The key constructs in our study are knowledge about environmental problems, concern for the environment, and attitudes toward environmental protection. We focus on these specific constructs because they relate to issues that have been deemed important in both the academic and public policy domains, and have attracted significant research attention over the years. Since the start of the environmental or green movement in the 1970s, hundreds of scholarly articles have appeared in the academic literature addressing these issues. This research has spanned a wide variety of disciplines, including marketing, psychology, and business ethics. Researchers have examined the level of environmental knowledge, concerns, attitudes, and behaviors in particular countries (e.g. Antil, 1984; Bech-Larsen, 1996; Daniere and Takahashi, 1999; Chan, 1999), across different national contexts (e.g. Bloom, 1995), and among specific demographic groups (e.g. Wehmeyer and McNeil, 2000; Benton, Jr, 1994; Newell and Green, 1997). Others have focused on developing psychometrically sound measures of the constructs (e.g. Antil and Bennet, 1979; Leigh, Murphy, and Enis, 1988; Bohlen, Schlegelmilch and Diamantopoulos, 1993; Schlegelmilch, Bohlen, and Diamantopoulos, 1996; Zimmer, Stafford, and Stafford, 1994).

Socio-demographic variables that have been the focus of this research effort include gender, education, age, and income. In one of the pioneering reviews of the literature, Van Liere and Dunlap (1980) concluded that socio-demographic variables are ineffective in explaining environmental concern and attitudes. Some studies subsequent to this review (e.g. Balderjahn, 1988; Samdahl and Robertson, 1989) have drawn similar conclusions. However, other researchers have found significant effects of socio-demographic variables on environmental concern and attitudes. For example, Benton Jr. (1994) found men to be more knowledgeable about environmental issues, and women to be more concerned about the environment. Schahn and Holzer (1990) and Wehmeyer and McNeil (2000) have also reported significant gender differences, with women being more environmentally friendly than men. In a more recent review of the literature on gender effects on environmental concerns, Davidson and Freudenburg (1996) conclude that the accumulated evidence suggests that women tend to express higher concern for the environment, but that this tendency is not universal.

Researchers have suggested that the inconclusive results found in previous studies could be partly explained by differences in measurement and national contexts of the studies. If that is true, then there is some justification for examining the nature of these effects also in the

Saudi context. In that case, our general premise is that there are socio-demographic differences in the levels of environmental knowledge, concern, and attitudes in Saudi Arabia. In line with the results of those studies that found significant socio-demographic effects, we hypothesize that men will be more knowledgeable about environmental issues but women will show higher levels of environmental concern. We also hypothesize that environmental knowledge, concern, and attitudes will be higher among highly-educated and high income earning respondents.

Given the large expatriate population in Saudi Arabia, we also examine the effect of nationality on our environmental variables, by hypothesizing that expatriates will be more knowledgeable about environmental issues, and exhibit higher levels of environmental concern and attitudes than Saudis.

4. METHOD

Data for the study were collected in a survey that was conducted in the Eastern Province of Saudi Arabia using a structured self-administered questionnaire. Questions focused on eliciting respondents' knowledge about global environmental issues, their perceptions of the seriousness of selected local and global environmental problems, their evaluations of the quality of their local and the global environments, and their attributions of the causes of local environmental problems. The questionnaire also included Likert statements to measure, among others, environmental concern and attitudes toward environmental protection.

Both English and Arabic versions of the questionnaire were used in the data collection. The questionnaire was initially developed in English and later translated into Arabic using the widely recommended back-translation procedure to ensure equivalence of the two questionnaires.

Sampling and Data Collection

The non-existence of sampling frames in Saudi Arabia and the associated problems in sampling have been documented elsewhere in the literature (e.g. Abdul-Muhmin, 1998). For this project, the situation was not any different. Consequently, for the data collection, we utilized a modified convenience sampling procedure using demographic quotas to ensure adequate representation of all demographic groups in the sample eventually selected. However, this was not very successful as females were very hard to reach for inclusion in the sample. Demographic characteristics of the realized sample are shown in Table 1.

Table 1
Sample Characteristics

Variable	Frequency	Percent
<i>Age</i>		
Below 18	12	5.2
18 – 25	78	33.9
26 – 30	62	27.0
31 – 35	22	9.6
36 – 40	13	5.7
41 – 45	21	9.1
46 – 50	12	5.2
Over 50	10	4.3
<i>Gender</i>		
Male	154	66.4
Female	78	33.6
<i>Education</i>		
Elementary	2	.9
Intermediate	7	3.0
High School	26	11.2
Diploma	23	9.9
University degree	165	71.1
Other	9	3.9
<i>Monthly Income</i>		
Less than SR 1,000	43	19.8
SR 1,000 - 4,999	79	36.4
SR 5,000 - 9,999	59	27.2
SR 10,000 - 14,999	20	9.2
SR 15,000 - 20,000	8	3.7
Over SR 20,000	8	3.7
<i>Nationality</i>		
Saudi	164	73.5
Expatriate	59	26.5

The questionnaires were distributed using the drop-off /pick-up method of questionnaire administration (Zikmund, 1997, p. 237). Research assistants distributed the questionnaires in shopping malls, workplaces, as well as to family members and friends. This method was chosen because the authors' experience with survey research in Saudi Arabia shows that it normally produces high response rates and lower item non-response. A total of 400 questionnaires were distributed, and 232 usable responses were received for a response rate of 59%.

Measurement

The key constructs in our study are knowledge of global environmental issues (KNOWLEDGE), concern for the environment (CONCERN), and attitudes toward environment protection (ATTITUDES). In addition to these, we also examined consumers'

perceptions of the seriousness of local and global environmental problems (SERIOUSNESS) and their evaluations of the quality of the local and global environments (EVALUATION). To measure the level of consumers' KNOWLEDGE, respondents were provided with six global environmental issues adapted from Bloom (1995), and asked to indicate how much they know about each issue compared to the average person in Saudi Arabia. A six-point category response scale was used ranging from "Nothing at all" to "Much more than the average person".

CONCERN and ATTITUDE are constructs that have been extensively researched, and for which a proliferation of measures can be traced in the literature. One of the pioneering measures in this regard is the Environmental Attitude and Knowledge (EAK) scale developed by Maloney and Ward (1973). Although this scale has been extensively used by other researchers, it was deemed inappropriate for our study because most of the items in the scale are irrelevant to the Saudi situation. In particular, the scale contains politically oriented statements such as writing to congressmen, joining environmental groups, donating to environmental foundations, etc that are clearly irrelevant in the Saudi context. Other scales that were consulted include those used by Van Liere and Dunlap (1981), Scott and Willits (1994), Bohlen, Schlegelmilch and Diamantopoulos (1993), Gooch (1995), Schlegelmilch, Bohlen, and Diamantopoulos (1996), Brown and Wahlers (1998). The comprehensive study by Zimmer, Stafford, and Stafford (1994) was also consulted for additional insights. But most of these scales had the same problem of irrelevance as the Maloney and Ward scale.

We finally adapted the scale used by Bohlen et al. (1993), and selected items from it that we considered relevant to the Saudi situation. An exploratory focus group discussion was also conducted with participants of an MBA class taught by one of the authors from which additional Saudi-specific items were identified for inclusion in the scale. A preliminary questionnaire was then developed and tested in a pilot survey. Minor initial problems with the questionnaire were then streamlined prior to administration in the main study.

For our measure of SERIOUSNESS, respondents indicated their perceptions of the seriousness of six local and five global environmental problems adapted from Bloom (1995). A four-point category scale ranging from "Not at all serious" to "Very serious" was used. In subsequent analysis we distinguish between perceived seriousness of local environmental problems (SERIOUSNESS-LOCAL) and perceived seriousness of global environmental (SERIOUSNESS-GLOBAL). The measure for EVALUATION consisted of two single-item measures (one for the local and the other for the global environment). Respondents indicated their overall evaluations on a 7-point semantic differential scale with anchors at 1=Very bad and 7=Excellent. Also for this construct, we later distinguish between EVALUATION-LOCAL and EVALUATION-GLOBAL. The items used for all constructs can be gleaned from the presentation of descriptive statistics under the analysis and results sections.

5. ANALYSIS AND RESULTS

In this section we present our analysis and results. The section is divided into two main parts. In the first part, we present descriptive statistics pertaining to respondents' level of environmental knowledge, their perceptions of the seriousness of environmental problems, their evaluations of environmental quality, their levels of concern for the environment, and their attitudes toward environmental protection. In the second part, we present analysis and results of our examination of the effects of gender, age, income, education, and nationality on these constructs.

5.1 Descriptive Statistics

Simple descriptive statistics (frequencies and means) were used to assess levels of the study constructs in the population. The results are presented in the sub-sections that follow.

5.1.1 Environmental Knowledge

Means and frequencies for consumers' responses to the questions on environmental knowledge are shown in Table 2 (Note that the issues are listed in order of decreasing mean scores). Overall, the results show large variation in consumers' reported knowledge of the issues included in the study. With the exception being global warming, there is an almost equal distribution of respondents who know less, more, or about the same as the average person for all other issues. Respondents report the highest level of knowledge for the effects of oil spills on marine life (mean of 4.11). This could be due to a recency effect of the oil well fires and associated environmental disasters of the 1991 Gulf war. It could also partly be due to the generally high profile given by the international media to oil spills in other parts of the world. The lowest level of knowledge is reported for the phenomenon of global warming (mean of 3.00), for which a significant proportion of respondents indicate they know nothing at all, and a further small majority indicates they know less than the average person.

Table 2

Self-Reported Knowledge of Global Environmental Issues

	Nothing at all (%)	Less ^a (%)	Same (%)	More ^a (%)	Mean ^b	S.D
1. Effects of oil spills on marine life	3.1	22.3	36.7	38.0	4.11	1.17
2. The ozone layer	5.2	25.8	35.8	33.2	3.92	1.21
3. Depleted uranium from military ammunitions	10.0	26.4	27.7	35.9	3.83	1.43
4. Endangered plant and animal species	5.2	37.0	26.3	31.4	3.80	1.26
5. Destruction of the rainforests	7.8	30.6	29.7	31.9	3.80	1.35
6. Global warming	27.3	29.9	25.1	17.7	3.00	1.52

Notes:

a. "Less" = "Much less" + "Less"; "More" = "More" + "Much more".

b. Scale: 1=Nothing at all; 2=Much less; 3=Less; 4>About the same; 5=More; 6=Much more.

5.1.2 Perceived Seriousness of Environmental Problems

Table 3 shows respondents' perceptions of the seriousness of local and global environmental problems. As before, within each category of problems the results are arranged in order of descending means. In general, respondents evaluate all the local environmental problems included in the study as serious in their respective local environments. For almost all issues (the exception being garbage disposal in the desert), the percentage of respondents indicating that the issue is serious exceed three-quarters of respondents. It is also noteworthy that a sizable proportion of respondents indicate that they don't know anything about depleted

uranium from military ammunitions. This factor was identified during the pilot test of the questionnaire when one well-educated respondent mentioned it as a factor that he deemed more important to environmental threats than garbage disposal.

For the global problems, a large majority of respondents (95%) believe that the most serious is damage caused to ocean waters and marine life by oil spills. In contrast, just over 60% of respondents perceive global warming as a serious problem, and about a quarter don't know whether or not it is a problem. These results are a reflection of the results relating to self-reported knowledge of the environmental problems, and could be indicative of a positive relationship between knowledge and perceptions.

Table 3

Descriptive Statistics for Responses to Seriousness of Selected Environmental Problems

	Don't Know (%)	Not Serious ^a (%)	Serious ^a (%)	Mean ^b	S.D
Local Environmental Problems					
1. Depleted uranium from military ammunitions	14.8	8.7	76.5	3.58	.78
2. Pollution caused by smoke from factories	2.2	10.5	87.3	3.52	.71
3. Pollution caused by chemicals in industrial waste	7.9	5.7	86.4	3.51	.66
4. People not disposing off garbage properly in the city	1.3	11.6	87.1	3.49	.77
5. Pollution caused by smoke from cars and other vehicles	0.9	12.1	87.0	3.41	.75
6. People not disposing off garbage properly in the desert	5.6	27.3	67.1	2.95	.89
Global Environmental Problems					
1. Damage to ocean waters and marine life from oil spills	0.9	4.3	94.8	3.63	.57
2. Depletion of the ozone layer	6.2	7.5	86.3	3.55	.71
3. Destruction of animal and plant species	2.7	12.9	84.4	3.28	.70
4. Destruction of rainforests	3.9	16.7	79.4	3.26	.82
5. Global warming	24.5	14.8	60.7	3.13	.73

Notes:

a. "Not Serious" = "Not at all serious" + "Not very serious" ; "Serious" = "Somewhat serious" + "Very serious" ;

b. **Scale:** 1=Not at al serious; 2=Not very serious; 3=Somewhat serious; 4=Very serious.

5.1.3 Evaluation of Environmental Quality

As indicated under the method section, respondents provided overall evaluations of the quality of the environment in their local communities and the world as a whole on a 7-point semantic differential scale anchored at 1=Very bad and 7=Excellent. Analysis of these

evaluations showed mean score of 3.78 (S.D. 1.53) for the local community and 3.76 (S.D. 1.48) for the global environment. The difference is not statistically significant. Thus, one may conclude that both the local and global environments are perceived by respondents to be equally in bad shape.

5.1.4 Concern and Attitudes

Means and frequencies for responses to the statements on environmental concern and attitudes toward environmental protection are shown in Table 4.

Table 4

Descriptive Statistics for CONCERN and ATTITUDE

	Disagree ^a (%)	Neutral (%)	Agree ^a (%)	Mean ^b	S.D
CONCERN (Concern for the Environment)					
1. The increasing destruction of the environment is a serious problem	3.4	9.1	87.5	4.375	.854
2. The environment is one of the most important issues facing the world today	9.5	15.5	75	3.966	1.027
3. Issues relating to the environment are very important to me	8.6	25	66.4	3.858	.994
4. There is too much unnecessary attention given in the media to global environmental issues	34.6	32.9	32.5	2.952	1.116
5. The importance of the environment is often exaggerated	63.6	21.5	14.9	2.298	1.122
ATTITUDE (Attitude Toward Environmental Protection)					
1. It is important for me that we try to protect our environment for future generations	2.6	7.8	89.7	4.353	.787
2. We should devote some part of our national resources to environmental protection	4.3	19.6	76.1	4.022	.869
3. We are not doing enough in this country to protect the environment	13.1	24.5	62.4	3.686	1.025
4. There are other more serious problems facing our society than the environment	25.2	33.0	41.7	3.252	1.101
5. The benefits of environmental protection do not justify the costs involved	36.2	30.6	33.2	2.935	1.255
6. There is really no need for anyone to worry about protecting the environment, since it can take care of itself naturally	84.5	9.9	5.6	1.694	.910
7. Environmental protection is a Western idea, and is not relevant for us in this country	84.1	8.2	7.8	1.677	.978

Notes:

a. “Disagree” = “Strongly disagree” + “Disagree”; “Agree” = “Agree” + “Strongly agree”;

b. **Scale:** 1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly agree.

As discussed in the method section, responses were on 5-point Likert category scales. The frequencies have been collapsed into three categories to make the presentation more lucid, and the variables are arranged in order of descending means.

5.1.4.1 Concern for the Environment - Taken together, responses to the statements relating to concern for the environment indicate a reasonably high level of environmental concern among consumers, insofar as they agree that destruction of the environment is a serious problem and that the environment is one of the important problems facing the world today. However, there also seems to be some level of apprehension about the amount of media attention being given to environmental issues.

5.1.4.2 Attitudes Toward Environmental Protection - The results for attitude toward environmental protection in Table 4 are indicative of somewhat ambivalent attitudes. On the one hand, respondents appear to be in favor of the need for human efforts to protect the environment. They generally agree that the environment should be protected, and that some national resources should be devoted to this effort, and they disagree with the statements that environmental protection is a Western idea and that the environment can take care of itself. On the other hand, a reasonable proportion of respondents feel that there are more serious problems facing Saudi society today than the environment, and that the benefits of environmental protection do not justify the costs involved.

5.2 Socio-Demographic Differences

Socio-demographic differences in levels of the constructs were assessed through one-way analysis of variance (ANOVA) procedures. The need for lucidity in presentation of results makes it imperative to compute summary scores for multi-item constructs prior to any ANOVA analysis. A common approach in the literature is to sum up or average the scores on measures of each construct. This is a straightforward exercise for formative measures. For reflective measures, however, the reliability of construct measures needs to be established prior to any such summing or averaging process. Our measures of KNOWLEDGE and SERIOUSNESS are formative. Therefore, for these constructs, we summed up respondents' scores on all issues pertaining to the particular construct. On the other hand, the measures of CONCERN and ATTITUDE are reflective, requiring that we establish their reliability prior to summing or averaging. We achieved this through confirmatory factor analysis (CFA) with LISREL 8.51 for Windows (Joreskog and Sorbom, 2001).

The initial results showed a good fit of the CFA model for CONCERN but not ATTITUDE. In particular, composite reliability and average variance extracted were unacceptable for the ATTITUDE construct. There were also a significantly large number of items with unacceptable item reliabilities. Specification searches and exploratory Principal Components (PC) analysis led to a higher-order formulation in which ATTITUDE was a second-order factor related to three underlying first-order factors that we named (1) relative importance of environmental issues (REL_IMPORTANCE), (2) anti environmental protection (ANTI-PROTECTION) and (3) pro environmental protection (PRO-PROTECTION). For the purpose of this study, demographic differences were examined for these three first-order factors rather than the second-order attitude factor.

Table 5

ANOVA Results for Gender Differences in Environmental Issues

	Summary Statistics	ANOVA		Means
		F (1, 230)	p	
1. KNOWLEDGE	0.552	.458	22.52	21.95
2. SERIOUSNESS-LOCAL	5.919	.016	18.82	20.18
3. SERIOUSNESS-GLOBAL	2.122	.147	15.59	14.91
4. EVALUATION-LOCAL	4.798	.029	3.94	3.47
5. EVALUATION-GLOBAL	0.454	.501	3.81	3.67
6. CONCERN	5.610	.019	3.98	4.23
7. REL_IMPORTANCE	0.011	.915	2.90	2.92
8. ANTI-PROTECTION	0.813	.368	4.35	4.25
9. PRO-PROTECTION	0.131	.718	4.18	4.21

Notes: Sample sizes: Male = 154; Female = 78

5.2.1 Gender Differences

Table 5 shows results of the ANOVA comparison between males and females on the study constructs. The results show statistically significant differences between males and females in their perceptions of the seriousness of local environmental problems, their evaluation of the quality of the local environment, and their concern for the environment. In general, females perceive local environmental problems to be more serious [$F (1, 230) = 5.92$; $p < 0.05$], and are more concerned about the environment [$F(1, 230) = 5.61$; $p < 0.05$] than males. On the other hand, males perceive the quality of the local environment to be much better compared to females [$F (1, 230) = 4.80$; $p < 0.05$].

5.2.2 Age Differences

Table 6 shows results of the ANOVA comparison among different age groups on the study constructs.

Table 6

ANOVA Results for Age Differences in Environmental Issues

	Summary ANOVA Statistics		Means		
	F (2, 227)	p	25 years & below	26-40 years	Over 40 years
1. KNOWLEDGE	5.904	.003	20.84 ^b	22.92 ^a	23.95 ^a
2. SERIOUSNESS-LOCAL	0.978	.378	18.90	19.56	19.77
3. SERIOUSNESS-GLOBAL	3.259	.040	14.83 ^a	15.37 ^a	16.42 ^b
4. EVALUATION-LOCAL	2.030	.134	3.54	3.81	4.09
5. EVALUATION-GLOBAL	0.482	.618	3.86	3.65	3.81
6. CONCERN	1.567	.211	3.96	4.11	4.18
7. REL_IMPORTANCE	4.147	.017	2.69 ^a	3.08 ^b	2.98 ^{a, b}
8. ANTI-PROTECTION	0.419	.658	4.25	4.35	4.35
9. PRO-PROTECTION	2.315	.101	4.07	4.21	4.35

Notes:

1. Sample sizes: 25 years & below = 90; 26 – 40 years = 97; Over 40 years = 43
2. Means with different superscripts are significantly different at $\alpha=0.05$ in post-hoc tests using the Scheffe procedure; those with the same superscript are not.

For the sake of clarity in the presentation, responses to the eight age categories used in the questionnaire were collapsed into three categories as shown in the Table. The results show differences among the three age groups in terms of their knowledge of global environmental problems, perceived seriousness of global environmental problems, and beliefs about the relative importance of environmental issues. The pattern of group means indicate that, in general, older respondents feel they are more knowledgeable about global environmental problems [$F(2, 227) = 5.90$; $p < .005$], and perceive global environmental problems as more serious [$F(2, 227) = 3.26$; $p < .05$] than younger respondents. Perceived relative importance of environmental issues is higher for middle-aged respondents (26-40 years old) than older and younger respondents [$F(2, 227) = 4.15$; $p < .05$].

5.2.3 Education Differences

Results of the comparison between respondents with different educational backgrounds are shown in Table 7.

Table 7

ANOVA Results for Effect of Education on Perception, and Attitudes Related to Environmental Issues

	Summary Statistics	ANOVA Means		
		F	p	University
1. KNOWLEDGE	5.944	.016	22.88	20.96
2. SERIOUSNESS-LOCAL	0.001	.980	19.27	19.29
3. SERIOUSNESS-GLOBAL	10.613	.001	15.81	14.25
4. EVALUATION-LOCAL	11.048	.001	3.99	3.27
5. EVALUATION-GLOBAL	0.013	.909	3.75	3.78
6. CONCERN	0.007	.934	4.07	4.06
7. REL_IMPORTANCE	2.028	.156	2.96	2.77
8. ANTI-PROTECTION	3.940	.048	4.38	4.16
9. PRO-PROTECTION	1.499	.222	4.22	4.10

Notes: Sample sizes: University degree = 165; Others = 67

Respondents with a university education report a higher level of knowledge of global environmental issues, and perceive local environmental problems to be more serious. However, they also (rather seemingly inconsistently) believe the local environment is of higher quality, and are slightly more anti-protectionist than those without a university education. University graduates higher perceptions of local environmental quality may be explained by the fact that these generally tend to live in the best neighborhoods in their cities. It is much like saying that the environment as at now is of good quality, but it is under threat, and something needs to be done about it.

5.2.4 Nationality Differences

Table 8 shows statistically significant differences between Saudis and non-Saudis in virtually all variables except perceived quality of the global environment, perceptions of relative importance of environmental issues, and anti-protectionism.

Table 8

ANOVA Results for Differences Between Saudis and Non-Saudis in Perceptions, and Attitudes, Related to Environmental Issues

	Summary ANOVA		Means	
	F (1, 221)	p	Saudi	Non-Saudi
1. KNOWLEDGE	5.213	.023	21.82	23.75
2. SERIOUSNESS-LOCAL	17.923	.000	19.95	17.42
3. SERIOUSNESS-GLOBAL	11.099	.001	14.95	16.63
4. EVALUATION-LOCAL	11.182	.001	3.59	4.34
5. EVALUATION-GLOBAL	1.960	.163	3.67	3.98
6. CONCERN	4.322	.039	4.00	4.23
7. REL_IMPORTANCE	1.585	.209	2.89	3.07
8. ANTI-PROTECTION	0.207	.650	4.31	4.36
9. PRO-PROTECTION	7.489	.007	4.10	4.40

Notes: Sample sizes: Saudi = 164; Non-Saudi = 59

Specifically, non-Saudis report higher levels of knowledge about global environmental problems [$F (1, 221) = 5.21$; $p < .05$], perceive global environmental problems to be more serious [$F (1, 221) = 17.92$; $p < .001$], perceive the quality of their local Saudi environments to be much better [$F (1, 221) = 11.18$; $p < .005$], are more concerned for the global environment [$F (1, 221) = 4.32$; $p < .05$], and are more pro-environmental protectionist [$F (1, 221) = 7.49$; $p < .05$]. It is only for perceived seriousness of local environmental problems that Saudis score higher than non-Saudis [$F (1, 221) = 11.10$; $p < .005$].

6. SUMMARY, CONCLUSION, AND DISCUSSION

This study was designed to achieve two main objectives. The first was to examine the extent to which consumers in Saudi Arabia are knowledgeable about global environmental problems, their perceptions of the seriousness of local and global environmental issues, their evaluations of the quality of the local and global environments, and their levels of concern for the environment, and attitudes toward environmental protection. The second objective was to examine the extent to which the levels of these issues vary across different demographic segments of the population.

For the first objective, the study results show wide variation in knowledge of global environmental issues among consumers in Saudi Arabia. However, the majority of consumers perceives threats to the local and global environments as very serious, and feels that quality of the local and global environments is not quite good. Possibly due to these perceptions,

concern for the environment is relatively high among the general population. However, attitudes toward environmental protection are generally ambivalent because on the one hand, consumers indicate a belief that the environment warrants protection, but then do not think that environmental protection should be given priority in resource allocation, as the benefits of do not justify the costs involved.

Our findings pertaining to the second objective are summarized in Table 9. On gender differences, we found significant effects for only three constructs. Women perceive threats to the local environment to be more serious, quality of the local environment to be more terrible, and are generally more concerned for the environment than men. The latter result is particularly consistent with the general findings from previous studies that have examined the effect of gender on environmental concern (Davidson and Freudenburg, 1996). Inconsistent with previous findings, however, we did not find women to be less knowledgeable than men.

Table 9

Summary of Findings Pertaining to Socio-Demographic Differences in Environmental Issues

	Gender	Age	Education	Nationality
1. Knowledge of global environmental issues		√	√	√
2. Perceived seriousness of local environmental problems	√			√
3. Perceived seriousness of global environmental problems		√	√	√
4. Perceived quality of local environment	√		√	√
5. Perceived quality of global environment				
6. Concern for the environment	√			√
7. Relative importance of environmental issues		√		
8. Anti environmental protection			√	
9. Pro environmental protection				√

“√” indicates that significant differences were found

For age differences, the results show that older respondents are more knowledgeable about global environmental issues, and they perceive threats to the global environment as more serious. This is a reasonably intuitive finding. However, the results also show that middle-aged respondents are more likely to believe that the environment is relatively less important. This finding is quite interesting when considered within the context of the relatively high media attention being given to unemployment and Saudization in the Kingdom. Respondents in the middle age groups are the ones who have been more affected by this unemployment

problem, and that could account for their tendency to agree with the statement that there are other more pressing issues than the environment in Saudi Arabia. Indeed, the opening question in our questionnaire asked respondent to indicate in free response format what they consider to be the most important problem faced by Saudi Arabia. Of the 124 respondents who provided opinions, 29 respondents (23.3%) mentioned unemployment as the most serious problem. In contrast, 23 respondents (about 18.5%) mentioned environment related problems.

Another way to interpret the summary in Table 9 is to look at demographic differences across specific constructs. For example, for environmental knowledge and perceived seriousness of global environmental threats, significant differences are found across age, education and nationality groups but not gender. Similarly, for perceived seriousness of local environmental threats and environmental concern, there are differences across gender and nationality groups but not age and education. In that case, it is worth noting that perceptions of the quality of the global environment are equally bad among all socio-demographic groups.

7. LIMITATIONS AND FUTURE RESEARCH

The following limitations of our study need to be noted. First, data collection was limited to the Eastern Province. As such caution should be exercised in interpreting the findings. The study needs to be replicated in the Western and Central Provinces.

Furthermore, our study was limited to an examination of environmental knowledge, concerns, and attitudes among the general public. The concerns and practices of businesses were not included. As such, the present study can best be viewed as a small component in a broader research program to address the level of environmental awareness, concerns, and attitudes among individuals and business firms in the Kingdom of Saudi Arabia.

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