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Awareness to Environmental Pollution in Turkey

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Awareness to Environmental Pollution in Turkey

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Abstract

The main purposes of the study were to clarify the conceptual reference of environmental awareness and to investigate the relationship between some individual, socio-economic factors and awareness to environmental issues. In addition, the factors that affect the environmental awareness were also determined. Face to face interviews were done with 975 individuals 25 cities were chosen throughout Turkey, which means at least 2 cities from each region. The models were estimated by the ordered logistic regression. Environmental awareness were evaluated from the standpoints of water, air and soil. Among the pollution categories, people were mostly aware of the pollution in air. In policies related to converting sensitivity to environment to action the Turkish government and institutions should take into account gender, education, income, age, industrial city and number of information source.

1. Introduction

In the desire of using the environment with respect to the needs, human being changed the environment regardless of the living things, even themselves. The fact that unlimited and unconscious use of natural resources for the requirements and insensitive consumption habits of the people caused irreversible environmental destructions. Humanity is exploiting the resources massively instead of controlling the tools and means of production of these resources. This results in an inequity of access to these resources: 20% of humanity is consuming 80% of the natural resources. It would take the equivalent of four planets if everyone adopted this consumption pattern. Furthermore, some energy resources are becoming more and more expensive and difficult to extract. For half a century, the energy resources available on this planet have diminished exponentially because of the more and more energy-consuming human activities aiming at satisfying the so-called "well-being" and "comfort" of humanity. Since 1970, the world energetic setting is mutating and is facing a wide-ranging crisis. In brief, it is possible to say our planet and all its inhabitants are today threatened by a potential global ecological crisis.

Solving a problem particularly depends on understanding the problem and removing the causes. This is also valid for environmental problems. The anxiety felt towards future formed the basic factor for societies to more seriously attend the environmental problems. Human being, desiring to put their tomorrow under guaranty, started to be more sensitive to the environmental problems and these problems appeared in the agenda of the societies with different events and thus uncovered the consciousness towards environment. The interest shown to the environment, in view of the limited natural resources, reflects the importance of the sensitive balance between the human being and the environment. The importance of environmental awareness, environmental sensitiveness and environmental consciousness is indisputable for healthy human-nature relationships. The social roots of the coming global ecological crisis lie largely in the very structures of the present awareness of society for environment and the values inherent in the way they function. This study deals with determining the awareness for environment of the people in Turkey and the factors affecting the level of awareness.

Determining the awareness is the first step in the solution model of environmental problems. This model covers 1) eliciting the awareness for environment and the affecting factors, 2) providing a real sensitivity to environment by eligible education systems, 3) accesing the solved environmental problems. (Figure 1).

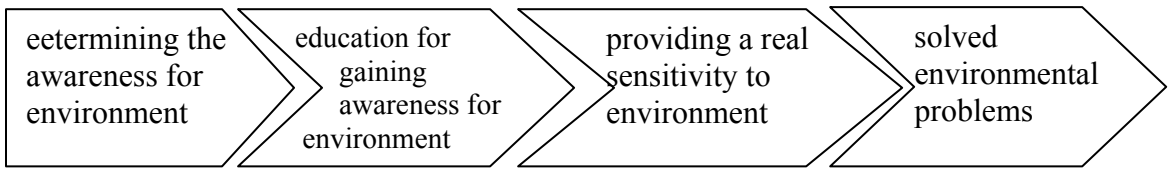

Figure 1. Stages of solving environmental problems

Individuals consist of society. As individuals get more aware for environment over time by means of well designed policies related to environment. With the renewability characteristics of the nature, a better natural balance will be formed (Doğan, 2003). Increasing the awareness and sensitivity for environmental pollution increases the demand for recyclable commodities. This extends the usage time of resources (Yücel et al., 2003).

This study was carried out to identify the level of awareness to environmental pollution in Turkey. The main purpose of the study is to clarify the conceptual reference of

environmental awareness. In this framework, the effects of socio-economic factors on the awareness for environmental issues are examined. Awareness for environment is measured as individual's views on the environmental pollution in terms of soil, air and water in a five point scale (1: strongly disagree, …, 5: strongly agree).

The study is expected to reveal the main points that may be benefited in well designed environmental policies for increasing awareness for environment.

The paper is structured as follows: The first section includes the introduction. Material and method, particularly the ordered logit model, are presented in the second section. The third section describes the consumer chacarteristics and discusses ordered logit model estimations. The last section summarizes our concluding remarks and policy recommendations.

2. Data and Method

Face to face interviews were done with 975 volunteer respondents in 25 cities chosen throughout Turkey, at least 2 cities from each geographic region. Environmental awareness was evaluated in terms of air, water and soil. To quantify the awareness for environmental pollution, Likert scale was used. In the study, four regression models were estimated for general environmental pollution, air pollution, water pollution and soil pollution in which the dependent variable is the belief that the individual perceives there is a pollution in general, air, water and soil respectively. Independent variables of the models are socio-economic characteristics, interest for environmental activities and dummy variables.

The models were estimated by the Ordered Logistic Regression (OLR). OLR is a statistical technique that can sometimes be used with an ordered (from low to high) dependent variable (Agresti, 1990; Isigicok, 2003). The dependent variable used in this study will be the awareness of environmental pollution. The estimated values were used to predict a response value (Hosmer and Lemeshow 2000).

Ordered logistic model form;

$$\text{logit}(p_1) \equiv \log \frac{p_1}{1 - p_1} = \alpha_1 + \beta' x$$

$$\text{logit}(p_1 + p_2) \equiv \log \frac{p_1 + p_2}{1 - p_1 - p_2} = \alpha_2 + \beta' x$$

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$$\text{logit}(p_1 + p_2 + \ldots + p_k) \equiv \log \frac{p_1 + p_2 + \ldots + p_k}{1 - p_1 - p_2 - \cdots - p_k} = \alpha_k + \beta' x$$

$$\text{and } p_1 + p_2 + \cdots + p_{k+1} = 1$$

This model is known as the proportional-odds model because the odds ratio of the event is independent of the category j. The odds ratio is assumed to be constant for all categories (Borooah, 2002).

It simultaneously estimates multiple equations. The number of equations it estimates will the number of categories in the dependent variable minus one. OLR provides only one set of coefficients for each independent variable. Therefore, there is an assumption of parallel regression or is called the proportional odds assumption. Ordinal logistic regression assumes that the coefficients that describe the relationship between, the lowest versus all higher categories of the response variable are the same as those that describe the relationship between the next lowest category and all higher categories. That is, the coefficients for the variables in the equations would not vary significantly if they were estimated separately. The intercepts would be different, but the slopes would be essentially the same in only one model (Barak at all., 2005) . If this was not the case, we would need different models to describe the relationship between each pair of outcome groups. We need to test the proportional odds assumption. The null hypothesis of this chi-square test is that there is no difference in the coefficients between models.

3. Findings and Discussion

Descriptive statistics of the variables used in the ordered logistic models are give in Table 1 The households interviewed have an average household size of 4 individuals and a monthly income TRY 1838. Average individual is 23.3 years old, has high school education (11 years). Among those interviewed, 62 percent of individuals are not married and 66 percent are male.

Table 1. Descriptive statistics of the variables

VARIABLE		Mean	Std.Dv.	Median	No of Individuals	%
Dependent Variables						
GENEP	Agree with the existence of a general environmental pollution	4.34	.95	5		
WATERP	Agree with the existence of a water pollution	3.89	1.14	4		
AIRP	Agree with the existence of an air pollution	4.16	1.02	4		
SOILP	Agree with the existence of a soil pollution	3.52	1.24	4		
Independent Variables						
GENDER	Gender	.66	.47	1		
	1: Male				330	33.8
	0: Female				645	66.2
EDU2	University graduation	1.25	.43	0		
	0: not graduated university				725	74.35
	1: graduated university				250	25.64
INCOME	Monthly income*	1838	294	1		
	low income group (<1001 YTL)				548	56.21
	middle group (1001-5000 YTL)				308	31.59
	hingh income group (>5000 YTL)				119	12.21
AGEGRP3	Age groups	23.3	1.21	17		
	young (< 21)				610	62.56
	middle (21-40)				246	25.23
	old (>40)				119	12.21
MARST	Marital status	1.66	.47	0		
	0: not married				606	62.15
	1: married				304	31.17
HOUSEHOLD	Hauselhold size	4.45	1.38	4		
PROF	Profession	3.38	1.13	4		
INDCITY	Industrialized town	.68	.46	0		
	0: not lives in industrialized town				633	64.92
	1: lives in industrialized town				342	35.07
INFSOURCE	Number of information sources on environment	4.38	1.66	5		
MEMBERES	Membership to associations for environment	1.77	.42	0		
	0: not member				177	18.15
	1: member				598	61.33
ACTPROT	Active support to environmental activities	1.76	.42	0		
	0: did not				597	61.23
	1: did				181	18.56

*1 US $=1.16 TRY

Ordered logistic models were estimated for 4 different standpoints:

1. A general model of general awareness for environmental pollution
2. Model of awareness for water pollution
3. Model of awareness for air pollution
4. Model of awareness for soil pollution

Table 2. Ordered Logistic Regression Estimations for Awareness of General Environmental Pollution

Dependent variable: GENEP (general environmental pollution model)					
	Coef.	Odds Ratio	Std. Err.	F	
GENDER	-.3428079	.7097745	.1397368	-2.45	**
EDU2	.2839904	1.32842	.1638277	1.73	*
INCOME	-.2165082	.805326	.0916502	-2.36	**
AGEGRP3	.2374932	1.268066	.108676	2.19	**
INDCITY	.3964833	1.486588	.1369954	2.89	***
INFSOURCE	.0841356	1.087776	.0387861	2.17	**
HOUSEHOLD	-.0359248	.9647129	.1309211	-0.27	
MARST	-.0000108	.9999892	.0002605	-0.04	
PROF	.0003406	1.000341	.0002346	1.45	
MEMBERES	-.0001408	.9998592	.0002416	-0.58	
ACTPROT	.0001762	1.000176	.000243	0.73	
/cut1	-3.77299		.522287		
/cut2	-1.862963		.4612262		
/cut3	-1.492767		.457916		
/cut4	.283932		.4540872		

Number of obs	975
LR chi2(11)	46.29
Prob > chi2	0.0000
Log likelihood	-1005.6917
Parallel line (chi2)	28.67

Test of Parallel Lines were done for all the OLR models. This test is commonly referred to as the test of parallel lines because the null hypothesis states that the slope coefficients in the model are the same across response categories. Since the ordered logit model estimates one equation over all levels of the response variable, the test for proportional odds tests whether one-equation model is valid. Since we failed to reject the null hypothesis, we conclude that the assumption holds which means that only one OLR model is valid for each model.

According to the general model, for gender, -0.342 is the ordered log-odds estimate of comparing males to females on expected general environmental awareness (**genep**) given the other variables are held constant in the model. The ordered logit for males being in a higher **genep** category is -0.342 less than females when the other variables in the model are held constant. The odds ratio is interpreted as a 0.709 change in the odds ratio when there is a one-unit change (that is to be males) in gender. Notice that a 0.709 change is actually a decrease, because odds ratios less than 1 indicate a decrease. It shows that females more aware of

environmental pollution than males. For a one unit increase in education (**edu2**), the odds of high **genep** versus the combined lower **genep** are 1.32 times greater, given the other variables are held constant in the model. Educated persons were found to be more aware than less educated ones. From the view of income, one unit increase in income would result in a 0.216 unit decrease (coef.= - 0.216) in the ordered log-odds of being in a higher **genep** category while the other variables in the model are held constant. If income increases by one unit, the odds of high awareness level of general environmental pollution (**genep**) versus the combined lower **genep** are 1.24 times (1/0.805=1.24) decrease than lower income group. This means if income increases, awareness of environmental pollution decreases as well. As for age (**agegrp3**), for a one unit increase in **agegrp3**, the odds of high **genep** versus the combined lower **genep** are 1.26 times greater, given the other variables are held constant in the model. Also, older people were found to be more aware than younger generations. For industrialized city (**indcity**), the odds of high **genep** versus the combined lower **genep** are 1.49 times greater, given the other variables are held constant in the model. People that live in industrial cities were found to be more aware than not. Regarding the number of information sources (**infsource**), a one unit increase in **infsource**, the odds of high **genep** versus the combined lower **genep** are 1.09 times greater, given the other variables are held constant in the model. People that get information from more sources were found to be more aware than others.

Generally speaking, people in Turkey are aware of environmental pollution. In policies related to converting sensitivity to environment to action the Turkish government and institutions should take into account gender, education, income, age, industrial city and number of information source.

Ordered logistic model estimations for water, air and soil are given in table 3. **edu2** and **gender** are statistically significant in all of the models. **infsource** is in the water pollution model; **infsource, prof** and **actprot** in the air and the soil pollution models are statistically significant.

Table 3. Ordered Logistic Regression Estimations For Awareness Of Water, Air and Soil Pollution

	WATERP (water model)			AIRP (air model)			SOİLP (soil model)		
	Coef.	T	Odds Ratio	Coef.	t	Odds Ratio	Coef.	t	Odds Ratio
GENDER	-.4793 ***	-3.71	.6191	-.5335 ***	-3.96	.5864	-.4152 ***	-3.30	.6602
EDU2	.6109 ***	4.06	1.8421	.4807 ***	3.13	1.6172	.7583 ***	5.11	2.1345
INCOME	-.0177	-0.21	.9824	-.1093	-1.25	.8964	-.0769	-0.93	.9259
AGEGRP3	.1216	1.24	1.1293	.0355	0.36	1.0362	-.0224	-0.23	.9777
INDCITY	-.1470	-1.13	.8632	-.0273	-0.21	.9730	.0728	0.58	1.0755
INFSOURCE	.0699 **	1.96	1.0724	.0715 **	1.91	1.0741	.0486	1.37	1.0498
HOUSEHOLD	.0809	0.68	1.0843	-.0316	-0.26	.9688	-.0710	-0.60	.9314
MARST	.0002	1.11	1.0002	-.0002	-0.82	.9997	-.0003	-1.57	.9996
PROF	.0002	1.31	1.0002	.0005 **	2.41	1.0005	.0006 ***	2.71	1.0005
MEMBERES	-.0001	-0.37	.9999	-.0003	-1.64	.9996	-.0002	-1.12	.9997
ACTPROT	.0002	1.15	1.0002	.0003 *	1.71	1.0003	.0004 *	1.86	1.0004
/cut1	-2.5336			-3.930			-2.3746		
/cut2	-.5522			-1.7936			-.3862		
/cut3	.0034			-1.2663			.3426		
/cut4	1.6290			.4336			1.6560		
parallel line chi2	44.76			41.53			45.12		

Gender is significant for all models. Negative coefficient means females are more sensitive than men. The estimates in the output are given in units of ordered logits, or ordered log odds. So for **gender**, we would say that for a one unit increase in **gender** (i.e., going from 0 to 1), we expect a -0.48 decrease respectively in the log odds of **waterp, airp** and **soilp**, given all of the other variables in the models are held constant. Females are 1.61 times more aware than males for waterp; 1.72 times more aware for airp; 1.52 times more aware for soilp, given the other variables are held constant in the model.

For a one unit increase in education (**edu2**), the odds of high of **waterp**, **airp** and **soilp** versus the combined lower are 1.84, 1.62 and 2.13 times greater respectively, given the other variables are held constant in the model. Educated persons were found to be more aware than less educated ones as in the **genep** model.

Regarding the number of information sources (**infsource**), one unit increase in **infsource**, the odds of high **waterp** and **airp** versus the combined lower are 1.07, 1.07 and 1.04 times greater respectively, given the other variables are held constant in the model. People getting information from more sources were found to be more aware for water and air models.

From the view of environmental protest activities, if **actsprot** one unit change (from 0 to 1), the odds of high awareness level of airp and soilp versus the combined lower

respectively are 0.03 % and 0.04 % times increase. It is not significant for water model. The other independent variables are not significant for each three models.

4. Conclusion

This study examines the awareness for environment in Turkey in the basis of sensitivity of people to environmental pollution. Pollution was dealt with in three category as water, air and soil pollution. The analysis showed that the people were significantly aware of the environmental pollution. Among the pollution categories, people were mostly aware of the pollution in air.

Gender is a significant factor affecting the awareness for environmental pollution. Females are more aware than males. Educated persons were found to be more aware than less educated ones. People would like to get information about environmental issues. Active protestors are more aware for environmental pollutions than the others, as expectedly. However, contrary to the expectation, membership to the environmental associations is not an effective characteristic on the awareness for environmental pollution.

In policies related to converting sensitivity to environment to action, it may be suggested that the government and institutions should take into account gender, education, income, age, industrial city and number of information source.

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