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Estimation of factors affecting the recognition the environment institutions by individuals with the Logit Model

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Abstract
In this examination, the individuals' information about the environment who live in the centre of Tokat, Turkey is examined. In this context, it is examined the individuals' knowledge level about environmental institutions by considering dependent variables in order to define the factors affecting this phenomena by using the Logit analysis. In this analysis; education statue, income level, and the variables of the environmental problems those can be defined are meaningful and its value is founded as positive. This result shows that if the level of meaningful variables increases, the estimation to know the institution dealing with the environmental problems will increase. It is wanted to emphasize the importance of the education on the basis which create a conscious society with this study.
Keywords: Environment, information, individuals' information, logit model

Introduction

Making the society conscious about the environment, it is necessary to point which elements are effective about the forming environmental consciousness. With such as these studies, the factors which are effective on the society consciousness can be defined as quantitative. This department supplies to increase the number of these quantitative studies that they have to be done.

One of the main reasons came up with the problems related to the today's environment in Turkey is a lack of getting information and being conscious. A society which is not educated and lack of consciousness can't understand the world in which it lives will be used after itself. However, the environment isn't a fortune that comes from our ancestors, it is a trust which is necessary to be

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preserved, improved, and delivered from generation to generation with a good pleasure. Due to the fact that there is a quality of education in Turkey and giving the conscious that tries to find out the problems which people face protecting the environment is known by a big part of the society as a subject that doesn't care adequately.

In the role and participation of the public for figuring out various environmental issues, environmental sensitivity and consciousness have a high importance. A social environmental tendency can be seen a serious and an important beginning as it should be in every part, the public attendance where it should be in environmental part, working out the problems, but not everything. For a supplying the public attendance making cooperation and common labors with the public institutions, civil public organizations, local administrations, and mas-media are inevitable to improve and spread environmental consciousness in public opinion on a rational and regional basis. By taking into consideration the role of public and their participation at the solution of environmental problems, the environmental sensibility and importance of the environmental awareness; to recognize the environmental organizations by individuals who lived in Tokat province, to identify the factors which influenced in this direction and to determine the level of consciousness were aimed in this study.

Material and Method

Within the research, the sampling body was selected as 502 individuals, and the margin of error (percentage) of the representation to the general mass was calculated. When the information on general mass and if the general mass is greater than 100.000 (According to census of 2010, 127.988 (TurkStat, 2010) household persons in Tokat city center was based on) the margin of error may be calculated in a certain confidence interval (Laajimi and Briz, 1992, ref: Şengül and al., 1998).

$$n = \frac{Z^2 \times p \times q}{e^2}$$

p: Probability that the unit in question realizes in main population (during this study, because there wasn't any similar study and in order to find maximum samples that represent the general population, this ratio is taken as 50 %).

n: 251

q: 1-p

e: error notion

t: confidence interval

p: 0,50

q: 0,50

Z: 95 % (the table value of 95 % confidence interval =1,96)

The margin or error according to the formula 1,

$$e = \sqrt{\frac{Z^2 \times p \times q}{n}} \qquad e = \sqrt{\frac{1{,}962^2 \times 0{,}50 \times 0{,}50}{251}}$$

$\boldsymbol{e} = 0{,}062$

The data in this research was obtained by conducting a survey among a total of 502 persons in the city of Tokat in 2010. A preliminary work was carried out by making a restricted number of randomly selected persons fill in the survey forms. The sample size, preferred as 502, will deviate at maximum 4.37 % from the main population at 95 % importance level.

Logit models were used in this study. Logit models are the special circumstances of generalized linear model created under certain conditions. In this case, in the study, some of the independent variables are not decomposed into constant, or appropriate (relevant) classes, then the logistic regression analysis should be used instead of the log-linear. In the same time if some of the variables are taken as if dependent, then, Logit Model is suitable. In this case logit model is recommended for using to ensure condition to remain at 0 to 1 (Gujarati 2005).

In this study, logit econometric model is used to suppose the knowledge probability of institutions that deal with the individuals' environmental problems. In this model, defining the probabilities of these institutions is called a function of independent variable set.logit model is presumed by the maximum likelihood method (MLE) which has huge important properties with the cause of coherence and asymptotic normal distribution. This model is linked to independent variables' vector (X_{ij}) which is related to the variable j , individual *i*, unknown β parameters of the probability of defining the institutions.

This probability is defined as below:

$$P_i = F(Z_k) = F(\alpha + \beta X_{ij})$$
$$= 1/[1+\exp(-Z_t)] \qquad [1]$$

In equality [1];

$F(Z_i)$= cumulative logistic functions' value of index Z_i 's each possible value

P_i = is a probability of defining the institutions while individuals' demographic, economic, and social character information is data.

Z_i = βX_{ij} and

α = fixed term

Index number is a direct combination of βX_{ij} independent variable and quality [2] is as below:

$$Z_i = \log[P_i/(1-P_i)] = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + \beta_n X_{in} + \varepsilon_i \qquad [2]$$

In this quality;

i = $1,2,\ldots,I$ Individuals

j = $1,2,\ldots,n$ Independent variables

Z_i = $i.$ Log odd value of choice for observation and the index level of unobserved

X_{ij} = $i.$ Individual, $j.$ explanatory variable

β = Parameters that can be estimation

ε = Error term

In logit model, Odds and Odds ratio are important concepts. Odds (or possibility) is the ratio of a probability. As shown in Equation 2; Odds is defined as the ratio of the number of realized events to the number of non-realized events. Xi variable is interpreted as how many units changes of the odds ratio of the dependent variable if a unit changes. An odds ratio greater than 1indicates that probability of the realization of event is increasing; an Odds ratio less than 1 indicates that probability of the realization of the event is reducing (Morgan & Teachman 1988).

In equality [2], dependent variable is a logarithm of odds rates when it makes a choice about individuals whether they identify the environment institutions or not. Estimation parameters don't represent the turning in independent variables. The changes of these probabilities depend on original probabilities and so all independent variables and at the beginning origin value of their coefficients. For logit model, the probability which is in independent variables X_{ij} is measured for vicissitude which brings $Y_i = 1(P_i)$:

$$(\partial P_i / \partial X_{ij}) = [\beta_j \exp(-\beta X_{ij})]/[1+\exp(-\beta X_{ij})]. \qquad [3]$$

However, as many independent variables when independent variables depend on quality $(\partial P_i / \partial X_{ij})$, X_{ij} doesn't exist due to being intermittently and being lack of steady changes. In this case, the probability changes are estimated in their alternative values, and is measured as below:

$$(\partial P_i / \partial X_{ij}) = [P(Y_i \ \ X_{ij} = 1) - P(Y_i \ \ X_{ij} = 0)]/[1-0]. \qquad [4]$$

It is intended to define the factors that affect whether dealing with the individuals' environmental problems.

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With this study, EC (environmental consciousness), AGE (age), ED (education), GEN (gender), IN (income), PO (place of residence), ENP (environmental problem), PRE (protecting environment) are used as independent variable.

The model's general form used in the study is as in Formula 5,

$$\Pr ob_i = \beta_0 + \beta_1 EC + \beta_2 AGE + \beta_3 ED + \beta_4 GEN + \beta_5 IN + \beta_6 PO + \beta_7 ENP + \beta_8 PRE \quad [5]$$

It is possible to divide the independent variables into two groups as social demographic measuring the environmental consciousness. This modeled EC, ENP, PRE variables environmental conscious. It is followed by as below while defining these variables.

To find the EC variable, a survey is done among the individuals. According to the results, while these individuals who took 43 or below points are admitted as having the low environmental consciousness, the rest who took 44 and more is admitted as conscious individuals. Grading of questions for environmental consciousness were made using Likert Scale. As a result of grading, individuals were divided into 2 groups; the individuals having low environmental conscious and the individuals having high environmental conscious.

Names of the environmental problems are asked defined by the individuals, while finding the ENP, and according to this, the individuals who didn't mention about these problems are called '0'; the other individuals who mentioned one or two problems are called '1'; and the rest who mentioned three or more problems are called '2'.

PRE is a variable that can measure the individuals' sensitivity about the environment. If they don't endeavor to protect it, they are called '0'; if they do, they are called '1'.

In the Table 1, giving the variables which are used in the model, some of these statistics are given.

Findings and Discussion

According to the examination 57.96% is men, and 42.04% is women.

The results of the formed model are shown in the Table 2. When looked the "Chi-squared coefficient" the logit model's meaning can be seen. Looking the "t values", ED variable 10%, IN and ENP variables 5% are found as important. The other variables aren't found meaningful in the definition of the linked variable.

When the table 2 is examined, the ED's coefficient can be seen positively. This positive coefficient shows the probability of identifying the institutions dealing with environmental problems will increase while the individual's education level increase. The marginal probability coefficient of variables is counted as 0.306. When the education level increases 1%, the probability of identifying the institutions increases 0.306.

When the education make positive changes in individuals' life, it will be effective on the following conditionals (Kızılaslan & Kızılaslan 2005a).

With the education, it can be said that societies will develop in every department more than before. In Turkey, the 98% of students are in public schools (Akyüz 2001). The writing- reading average is still lower than the developed countries. According to the Turkish Statistics Institution data given in 2000, the unlettered average is 12.75%. (TurkStat 2008).

In a completed study, the gender isn't effective on the ecologists' approaches and behaviors, but the environmental education is found as an important factor for forming the ecologists' approaches (Işıldar 2008).

In another study, it is understood that the environment consciousness is in adequate, and environmental education should be taken to the informal education comprehension, especially it should start from the beginning of school programs (Kızılaslan & Kızılaslan 2005b).

The sing of IN coefficient is positive. This means that the more individuals' income increases, the more the probability of defining the institutions related to the environment increases. The marginal probability coefficient of IN is 0.434. When the individuals' income increases 1%, the probability increases 0.434.

In a completed study, the individuals who are more higher in economic statue tend to attend activities which develop social-economic well being (Kızılaslan & Almus 2002).

When ENP's coefficient is examined, it is seemed as positive. There is a right relationship way between specifying environmental problems, and the probability of defining the institutions. This probability increases among the individuals who know the environmental problems more. ENP's marginal coefficient is found as 0.849. When environmental problems increase 1%, the probability increases 0.849. As known, probability calculations take part between 0 and 1. Being close 1 means the relationship between dependent and independent variable is high. In other words, this means an individual's probability on defining the institutions is high.

Protection of the natural environment is a task that cannot be accomplished by the public administration and enterprises alone. Most experts and politicians as well as the public believe that participation and collaboration of citizens in environmental decisions and actions are vital to achieve this task. Free access to the relevant information is a major prerequisite for a substantiated and efficient involvement of citizens. To reach this objective, corresponding directives and laws have been adopted on the international (e.g. European)and national level (Düpmeier & Geiger 2006).

In a study, it is emphasized that the knowledge given about environment education isn't adequate, and individuals see themselves inadequate in this case, but they have a willingness approach to learn (Yücel & Morgil 1999).

Conclusion

Dealing with the environment and defining the institutions related to this subject are related to the individuals' education level, social- economic factors like income. Forming a good environment consciousness is emphasized once again that it can be only with a well educated society. In this subject, especially in Turkey, the government which carries out the huge part of education will have a lot of tasks. With rising education, the writing- reading rate, the education level of society should be increased fast, for this reason emphasizing environmental problems and taking part in the programs which are leading, enlightening to make public conscious such as sports, dramas, documentary, etc., have an important value on media organizations programs in Turkey. The environmental institutions' efforts shouldn't be separated from this. According to the principle, a healthy society can improve itself in a healthy society. It is necessary that the individuals should be provided to understand the relationship between their social- economic and cultural development and a healthy environment.

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Table 1. The variables' distribution

Variables	Standard Deviation	Number	%
Dependent variables	0.488		
Unidentifing environmental institutions=0		197	39.24
Identifing environmental institutions=1		305	60.76
Independent Variables			
Consciousness(EC)	0.428		
lower environmental consciousness=0		381	75.90
higher environmental consciousness =1		121	24.10
Age(AGE)	1.103		
18-25=1		133	26.49
26-30=2		124	24.70
31-39=3		135	26.89
40-+=4		110	21.91
Education (ED)	1.398		
Illiterate=1		26	5.18
Literate=2		30	5.98
Primary School=3		99	19.72
Secondary School=4		77	15.34
High School=5		173	34.46
University=6		97	19.32
Gender (GEN)	0.494		
woman=0		211	42.03
man =1		291	57.97
Income (TL) (IN)	1.082		
500-999=1		170	33.86
1000-1999=2		126	25.10
2000-4999=3		133	26.49
5000-+=4		73	14.54
Place of residence (PO)	0.481		
Villages and slums=0		182	36.25
City center=1		320	63.75
Environmental problems(ENP)	0.634		
unmentioned=0		106	21.12
mentioned 1 or 2 problems=1		300	59.76
mentioned 3 or more=2		96	19.12
Protecting (PRE)	0.500		
People who don't make efforts=0		248	49.40
People who makes effort =1		254	50.60

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Table 2. The coefficents and marginal probabilities in the Logit Model

Variables	Coefficient	t- Value	Marginal Probability
Fixed term	-0.673	-1.240	0.160
EC (conscious)	-0.211	-1.102	0.502
AGE (age)	0.400	0.044	0.951
ED (education)	0.129**	1.782	0.306
GEN (gender)	0.283	1.478	0.672
IN (income)	0.183*	2.059	0.434
PO (place of residence)	-0.122	-0.619	0.289
ENP (environmental problems)	0.358*	2.381	0.849
PRE (protection)	-0.286	-1.521	0.681
Chi-squared: 20.19382; Significance level : 0.0962; Log likelihood function :-326.1541; Restricted log likelihood:-336.2510.			