INVESTIGATING THE EFFECTS OF ENVIRONMENTAL THREAT PERCEPTION AND ENVIRONMENTAL KNOWLEDGE ON ENVIRONMENTAL BEHAVIOUR? DO I LEARN WHEN I AM THREATENED? CASE OF NGO's

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ABSTRACT

In this study, the effect of environmental threat perceptions and environmental knowledge of the NGO members on the environmental behavior were examined with the help of a developed model. Relations between Environmental Threat, Knowledge and Behaviours of the NGO members have been investigated through Structural Equation Modeling (SEM). Results of the study that conducted on 437 participants indicate that environmental threat perception explains 39 % of the variance in the environmental knowledge. Besides, environmental knowledge has a mediator role to explain variance of environmental threat in environmental behaviour. Environmental threat perception and environmental knowledge explains together 56 % of the variance in the environmental behaviour.

Keywords: Environmental Threat, Environmental Knowledge, Environmental Behavior, Structural Equation Modeling (SEM), Çanakkale

INTRODUCTION

With the growing population, meeting peoples' necessities is getting a tougher problem. The great gap between over-consumption and regeneration of the natural resources created by developed and developing countries have accelerated the environmental deterioration (Alp Et al.2006:210). Since the last five decades, people have faced with huge variety of challenges related with environment such as poverty, starvation, lack of water and energy sources, global warming, depletion of ozone layer and pollution of the sea and rivers and so on (Chitra et al. 2003:105; Chen et al. 2010:28; Erdoğan et al. 2007:22). After the first and second industrial revolutions, process of "economic growth and maximum profit no matter how" interrupted the balance between human and environment. (Swarbrooke 1999:4). Economic activities that took place following these periods have reshaped the nature and human behaviour by impoverishing the ecological and social processes (Bozlağan 2002:56). However, as the environment has continued to worsen, people have become more aware of the need for the environment protection. Besides, developing countries have become more aware about the green movement for preservation of the environment (Chen et al. 2010:28). These developments have brought about a new period which is called "Sustainable Development Period". In the "Urban Sciences Terms Dictionary", sustainable development is described as "providing economic developments for both current and next generations through using natural and environmental sources with efficient ways" (Keleş 1998:112). With the time, these magical words, "Sustainable Development" have started to take place in all economical activities, mainly in "agriculture, industy, tourism industries. In these respect, tourism as a sub-sector in the development of national or regional, has a considerably significant relations with the sustainablity issues because its close interaction with environment and natural resources (Duran, 2011). Hence, putting the sustainability efforts into the tourism activities is an inevitable approach. According to Globe 90 conference held in Vancouver, *"sustainable tourism encourages an understanding of the effects of tourism on the natural, cultural and human environments"* (Swarbrooke 1999:10). Tourism industry obviously depends heavily on both natural and cultural resources. Consequently, in the region in which the natural and cultural environment suffered from over-consumption, tourism cannot be operated successfully in the long term (Demir ve Çevirgen, 2006: 99). Where we stand now is the point which needs the great attention and support of the locals in terms of tourism

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development. It is the fact that the society where the locals shortage of environmental knowledge, environmental action is to be taken is not an issue at all. However, dramatic increase in the number of NGO's and expanding role into the environmental issues have started to affect both people's and the governments perceptions about environment (Betstill et al 2005:65). A non-governmental organization or social societies are the organizations which are composed of voluntary people whose aim is to provide new and informative ideas for the benefit of their own societies (Ustakara 2009: 201). The expression left behind descriptions of the "NGO's or Civil Society are autonomy, volunteerism and organizing (Çoban 2011:38). With its environmental objective, extending of the peoples' environmental knowledge and the betterment of civic standards take the priorities for NGOs (Chitra 2003:106). In this research, environmental knowledge, perception of environmental threat and environmental behaviour of the NGO members have been examined so as to define the relations between variables. The reason for examining the tendency among the NGO members is to pre-assumption about their natural intention to concerning environmental issues. Civil organizations are one of the external factors for both set to governments and their continuousness (Talas 2011:388). Hence, increasing awareness of the NGOs is a significant weapon to deal with environmental challenges. Environmental consciousness of the locals such as NGO members, could definitely contribute to the conservation of the natural, cultural, historical and touristic values.

LITERATURE REVIEW

With the increasing precedence over the environmental challenges over the last decades, the attitudes and awareness of the people towards the environment have begun to be examined by the researchers (Oğuz et al. 2011:34). Researchers have developed various behavioural models to explain the relationship between environmental sensitivity, environmental attitude and action (Yılmaz 2011:271). When the objectives of the 1977-Tbilisi Intergovernmental Conference on Environmental Education have been examined, five major agents such as awareness, sensitivity, attitudes, skills and participation can be seen as the catalysers for the environmental education (Harold et al. 1990:257-258). It is the fact that there is a strong negative relationship between existing environmental problems and shortages of environmental education (Çabuk 2003:191). Similarly, traditional thinking in the field of environmental education claims that "the more people have higher level of environmental education, the more likely it is to favourable attitude they show", that is, if the humankind were more knowledgeable, they would show more responsible behaviours towards environment (Harold et al. 1990: 258).

Moreover, evolutional behaviour model which involves major and minor variables is given in the Figure1. The model is composed different predictors of the environmental behaviour that are given in different levels. The minor and major variables which are under the entry-level and empowerment variables categories are expected to predict citizenship behaviour, as a result. While the knowledge is at the forefront of the traditional theoretical model, empowerment variables and entry-level variables do not cover the knowledge of the environmental issues as major variables. Despite, both entry-level and empowerment variables put the environmental sensitivity (awareness) and intention to act to the forefront of citizenship environmental behaviour.

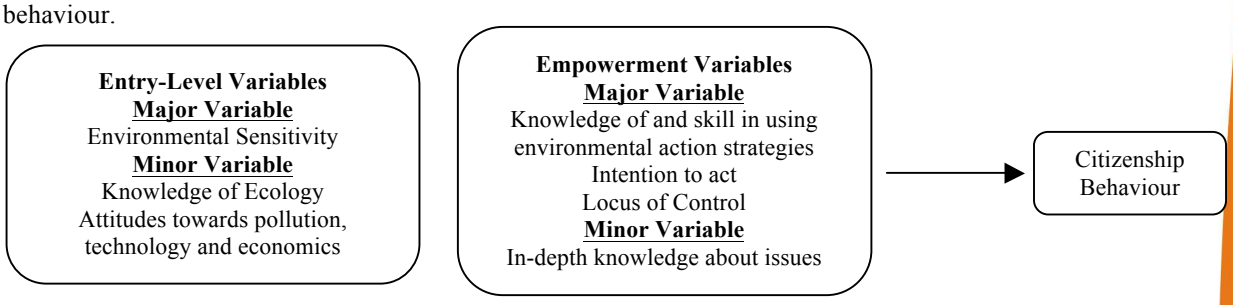

Figure 1. Environmental Behaviour Model (Hungerford, H. R.; Volk, T. L. (1990:260)

Researchers have been dealing with the relations between environmental knowledge, environmental awareness, environmental attitudes, environmental behaviours and environmental sensitivity over the long period. When the papers have investigated, it has been seen that most of the sample area were chosen from schools, universities and teachers. Hence, this research can be a different than previous ones with its distinguished sample area which is composed of the members of NGOs in the city of Canakkale. Observation on the environmental behaviour and knowledge of the school children might be a true address to understand the quality of the environmental education. However, members of the NGOs have a more distinctive characteristic than others with their identities belong to a social organization. A person who is a member of a social society, should have higher sensitivity about the preservation of the environment, hence, more positive behaviours are expected. The level of awareness of the potential environmental threats, at least.

The relations between environmental behaviours, attitudes, knowledge and tendency to buy green products have been examined by the Yılmaz et al. (2011) and (2009) with Structural Equation Model (SEM),

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Oğuz et al. (2001) with descriptive statistics, Çabuk et al. (2003) and Pe'er et al. (2007) with difference tests, Alp et al.(2006), Chen and Chai (2010) and Zecha (2010) with multiple regression analysis and Vlaardingerbroek et al. (2007) with correlation tests. All these studies above have done over the students or pre-service teacher students. Yılmaz et al. (2009) have examined the effects of environmental sensitivity and behaviour on purchasing ecological products. According to the analysis, environmental sensitivity has been found as a mediator variable for effect of environmental behaviour on purchasing green products. The results from the multiple linear regression analysis of the study of Chen and Chai (2010) it is understood that the personal norms are the most important contributor to the attitude towards ecological products. As a intercultural comparison study, Zecha (2010) and Vlaardingerbroek et al. (2007) have searched for a difference in the knowledge, behaviour and awareness of the students from different countries. As a result, while Zehca (2010) put the cultural influences into the theoretical concept of environmental awareness, Vlaardingerbroek et al. (2007) put the lack of environmental knowledge and awareness of the Lebanese students as a significant factor for the environmental oriented behaviour.

METHOD

Aim of the study and Survey Instrument

The aim of this study is mainly composed of two objectives, first of which is to examine the perception of environmental threat of the NGO members in Canakkale. The second aim is to explore how environmental threat and knowledge is related to environmental behaviours. A total of 120 NGO make up the sample for this study. To determine optimal sample size "The level of acceptable sampling risk method" has been used. Because the ratios about the environmental threat, knowledge and behaviour is unknown, the values of p and q are accepted as 0,5, and standard error is determined as ± 1.96 under the acceptable level of significance of 0,05 %. Consequently, sampling size calculated as 384 people. Challenges to get questionnaires back have lead to the authors to making a face-to face data collection. The survey instrument for this study was developed using the previous studies of Aydemir (2007), Veysel et al. (2009) and Veysel et. Al (2011). Initially the reliability, accuracy and validity of the scales were meticulously investigated and then the questions were developed in accordance with the aim of the study. The behaviours, knowledge and awareness have been measured with 39 questions on a 6-point Likert-Scale (0=Have no knowledge, 1=Strongly Disagree, 5=Strongly Agree). Remained questions have been composed of categorical characteristics of the participants. At the first step, the survey instrument was pilot tested with 38 NGO members. According to the pilot study, some of the questions that have not understood clearly, extracted from the scale and then the questionnaires modified were applied to NGO members. As a result, 457 questionnaires were collected during the period; however, 20 questionnaires were eliminated due to missing or incorrect data entry. Finally 437 valid respondents have been included into study.

Research Method and Hypotheses

Data were analyzed using Spss 15.0 (SPSS, Inc., California) and Lisrel 8.74 (Scientific Software Int., Lincolnwood) statistical packages. For data entry and analysis of categorical characteristics of the participant Spss 15.0 and for the causal relationships among the variables Lisrel 8.74 statistical packages have been used. As Jöroskog and Sörbom (1993) mentioned before; in addition to directly observed variables, researchers are interested in latent variables that are not directly observed but through other variables, which, are observed directly in the process of scale developing. Accordingly, Structural Equation Modelling (SEM) has been used to test causal relationships between latent and observed variables. SEM accept that the there is a causal relations between latent variables and these latent variables can be put forward through directly observed variables. (Yılmaz 2004:79; Fox 2002:11). In this context, previous theoretical concepts have been examined. Based on the relationships and discussing given in the study of Harrold et al. (1990-260), the following research model and related hypotheses are suggested in Figure 2.

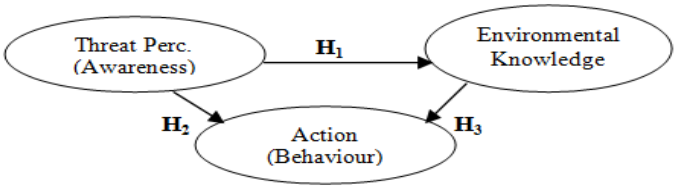

Figure 2.Proposed Research Model: Environmental Action

H_1.There is a positive relationship between Environmental Threat perception and Environmental Knowledge.
H_2.There is a positive relationship between Environmental Knowledge and Environmental Action.
H_3.Environmental Knowledge has a mediator role to explain positive relationship between Environmental Threat perception and Environmental Action.

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EMPIRICAL STUDY

Demographic Profile of the NGO Members

The demographic variables of NGO members indicates that the 62,7 % of the particapants are males and 61,6 % are married. Almost 35 % of the participants are a member of a Environmental NGOs and 44 % of have revealed that they have joined in a training or conference about environmental issues before. Besides 73,2 % of the particapants have claimed that they have been in an environmental activity in past. Avarage of the sample age has been found as 38. Reliability and Item Analysis of the scale is shown in the Table 1, below.

Table 1. Mean, Standard deviation and Cronbach's Alpha Coefficients

Statements			
Var.No	**Environmental Threat Based on Waste Threat Perception (Cronbach Alfa= ,800. Grand Mean = 4,53)**	Mean	Std. Deviation
1	Solid Waste	4,44	,840
2	Industrial Pollution	4,62	,743
3	Air pollution in Industrial Regions	4,50	,882
4	River Pollution	4,51	,918
5	Chemical Pollution such as pesticides.	4,59	,769
	Environmental Threat Based on Genetic-Biotechnology Perception (Cronbach Alfa= ,74. Grand Mean = 4,42)		
6	Nuclear Energy Production	4,22	1,171
7	Loss of Biological Diversity	4,43	1,004
8	Genetically Modified Foods (GMO)	4,47	,956
9	Countries with Nuclear, Chemical, Biological Weapons	4,45	,881
10	Using chemicals in the mining process	4,53	,805
	Environmental Threat Based on Climate Change (Cronbach Alfa= ,785. Grand Mean= 4,63)		
11	Global Warming	4,68	,710
12	Water Shortage	4,66	,678
13	Desertification-Deforestation-Erosion	4,65	,616
14	Ozone Depletion	4,52	,762
	Environmental Knowledge Based on Knowledge of Nuclear and Genetic (Cronbach Alfa= ,65. Grand Mean= 4,10)		
15	Electromagnetic waves have harmful effects on the genetic constitutions.*	3,76	1,141
16	Genetically modified products have harmful effects on humankind. *	4,24	1,143
17	Nuclear power plants have negative effect on lively life.	4,21	1,079
18	Nuclear Power Plants are dangerous since the methods used in nuclear energy generation results in "Hazardous waste and radiation"	4,19	1,092
	Environmental Knowledge- Based on Knowledge of Rain Forests and Greenhouse Gas (Cronbach Alfa= ,80. Grand Mean= 4,08)		
19	Rain forests are the most bio diverse ecosystems on Earth.	4,14	1,007
20	Increasing of rain forests end up with decrease in the level of oxygen in the atmosphere.	4,31	,900
21	Increasing in the ratios of Greenhouse gases in the atmosphere trigger to global warming.	4,08	,964
22	Habitat degradation contributes negatively the most to the biological diversity.	4,07	1,062
23	Carbon dioxide is a causing problem for global warming due to accumulating in the air.	3,94	,917
24	A species which is only found in a given region or location and nowhere else in the world, called as "Endemic".	3,95	1,014
	Environmental Knowledge- Based on Knowledge of Renewable Energy (Cronbach Alfa= ,65. Grand Mean= 4,08)		
25	Burning of fossil fuels cause to global warming by contributing to increase the greenhouse gases in the atmosphere.	3,75	1,059
26	Advantages of the wind roses for generating energy exceed the disadvantages.*	4,16	1,081
27	Renewable energy sources will be the green energy sources of the future.	4,31	,960
	Environmental Oriented Behaviour (Cronbach Alfa= ,873. Grand Mean= 4,06)		
28	I am willing to take action in environmental protests.	4,03	,913
29	Countries should be protested no matter who are they.	4,27	,947
30	I warn the people around me to being conscious about conservation of the ecological balance.	4,23	,721
31	I am willing to participate in scientific workshops such as conferences, meetings and symposiums.	4,19	,739
32	I am willing to take action in campaign or works of voluntary agents.	4,13	,775
33	I recycle paper, glass and /or metal waste products at home or school as possible as.	4,56	,732
34	I prefer eco-friendly or life cycle products as possible as.	4,14	,820
35	I avoid flowing chemicals into the sewerage systems.	4,00	,902
36	I prefer purchasing products that have energy efficiency.	4,30	,735
37	I prefer purchasing light bulbs that has energy efficiency.	4,46	,721

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38	I avoid purchasing products from companies which are not eco-friendly	4,06	,886
39	I use renewable energy in my home, as long as I have availability.	4,48	,699

*These statements are designed in reverse coded in the question form.

While Environmental Threat perception and Environmental Knowledge latent variables have evaluated with three dimensions, environmental oriented behaviour latent has examined through single dimension. All the factors have been found reliable to continue following analyses. The highest Cronbach`s Alpha were achieved with 0.80 for the Waste Threat perception and Knowledge of Rain Forests and Greenhouse Gas. In the scale, Environmental Threat Based on Climate Change has the highest mean with 4,63. It is the fact that Global warming, water shortage and deforestation threats have been claimed as the biggest source of threat (4,68±, 710; 4,66±,678; 4,65±,616). Despite these perceptions, harmful effects of Electromagnetic waves on genetic compositions and negative effects of burning fossils on global warming have been perceived relatively low (3,76±1,141; 3,75±1,059). As a brief, while the NGO members highly agree in Environmental Threats ($\bar{x}$ =4,52), level of agreement is getting relatively lower in the stage of environmental action ($\bar{x}$ =4,06).

The scale that is developed from the conceptual models and literature was tested by using Confirmatory Factor Analysis (CFA). CFA is a process that produces method over Exploratory Factor Analysis. With this method, researchers try to define how much goodness of fit is obtained between expected and observed model (Büyüköztürk et al. 2010:275-276). In this context, second-order CFA for Environmental Threat and Environmental Knowledge and first-order CFA for Environmental Behaviour have been used. The goodness of the model fit that all the relations are tested have been found χ^2/df=3.45 ve RMSEA=0.075 for the Environmental Threat Perception, χ^2/df=3.53 ve RMSEA=0.076 for the Environmental Knowledge and χ^2/df=3,66 ve RMSEA=0.078 for the for Environmental Oriented Behaviour latent variables. These results reveal that the goodness of the fit index is acceptable.

Structural Equitation Model

After the CFA, structural model has been established. First of the results have indicated the need for modification due to variables 32 and 31 of the Environmental Behaviour. This problem led the authors to modify these variables. Repeated model test has resulted in good fit for the model (χ2=1613,14, χ^2/df=2,33, CFI=0,730, P-value=0,0000, RMSEA=0,055, NFI=0.94, NNFI=0.96, PGFI=0.88, CFI=0.96, IFI=0.96, RFI=0.93, RMR=0.048) As it is well known, Chi-square Goodness of Fit is sensible of the sample size and so some other fit indexes are suggested as well. The results (χ^2/df=2,33, RMSEA=0,055, NFI=0.94, NNFI=0.96) reveal that the covariance of the mass and sample are indifferent from each other, consequently, good fit is obtained in the model (Büyüköztürk 2010:268). The structural model (Figure 3) which composed of the relations between Environmental Threat, Environmental Knowledge and Environmental Action reveals coefficients in standardized form.

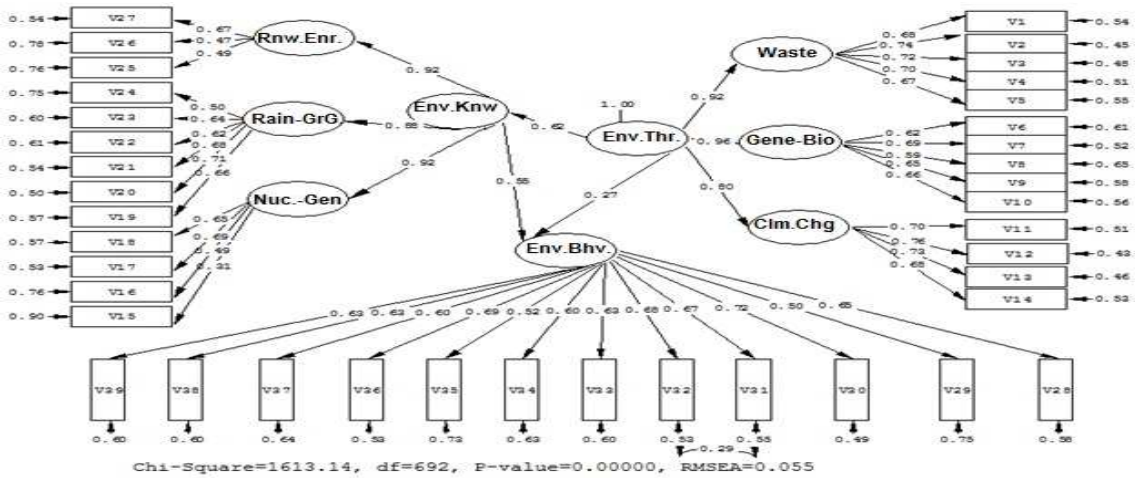

Figure 3. NGO Members' Structural Environmental Behaviour Model

Relations between variables have been tested with t-statistics and the lowest t- statistic value has been found 4,25 for Environmental Threat and Environmental Action latent variables. As a result, the structural model has produced support for all three of the hypothesis. Hypothesis, Paths, Standardized parameters and t-values are shown in the Table 2. As a result, when we have analysed the outputs, it has been found out that Environmental Threat has a positive effect on Environmental Knowledge (β=.62 p<,001) and has leaded to increase 0,62 unit in Environmental Knowledge. At the same time, Environmental Threat perception of the participants explains 39 % of the variation in Environmental Knowledge, meanly, $\mathbf{H_1}$ is supported. Besides, Environmental Knowledge has a positive effect on Environmental Action-Behaviour (β=.56 p<.,001) and has leaded to increase 0,56 unit in Environmental Action, meanly, $\mathbf{H_2}$ is supported. As a last, whether

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Environmental Knowledge of the participants has a direct effect on Environmental Threat has been tested. As a result Environmental Knowledge has been found as a mediator variable to effect of Environmental Threat on Environmental Behaviour. Environmental threat and knowledge explain % 56 of the variation in Environmental Behaviour together, that is, **H_3** is supported ((β=.62, β=.56 p<.,001). To sum up, while Environmental Knowledge has a direct effect on Environmental Action, Environmental Threat has an effect on Environmental Action through Environmental Knowledge.

Table 2. Hypothesis, Paths, Standartized parameters and t values

Hypothesis	Paths	Standardized Parameters	t-values	Result
H_1	Env.Threat → Env.Knowledge	0.62	9,55	Supported
H_2	Env.Knw → Env.Act.	0.56	7,81	Supported
H_3	Env.Threat → Env.Know. → Env.Act.	0.62- 0,56	9.55;7.81	Supported
Structural Equations	Env.Knw = 0.62*Env.Threat Env.Act = 0.54*Env.Knw + 0.26*Env.Threat	$R^2 = 0.39$ $R^2 = 0.56$		
Reduced Form Equations	Env.Knw = 0.62*Env.Threat Env.Act. = 0.60* Env.Threat	$R^2 = 0.39$ $R^2 = 0.37$		

DISCUSSION OF RESULTS AND IMPLICATIONS

Most of the previous studies regarding to environmental behaviour have dealt with the effect of independent variables such as environmental knowledge, sensitivity, attitudes, intention to act and demographic variables on environmental action-behaviour. Most of the data collection areas has been chosen from educational institutions mainly students and pre-service teachers. However, this study that was conducted on NGO members matters to reveal environmental behaviours. In the study Oğuz et. al. (2011), on higher education, students have revealed so little importance to the issues at global warming, water shortage and deforestations. Yet, these issues have been perceived as the biggest source of threat for NGO members, respectively (4,68 ±,710; 4,66 ±,678; 4,65 ±,616). These results strengthen the reason why the both perceptions and knowledge of the NGO members on environmental problems have been examined. Similarly, while environmental behaviour scores of the students are intermediate ($\bar{x}$ =2,99) in the study of Veysel et al. (2011), same scores have obtained above average ($\bar{x}$ =4,06) in our research. It is obvious that the NGO members have higher sensitivity and knowledge to pursue social, economic, environmental and economic issues. Even the NGOs are divided into so many different aspects; social, cultural and environmental sensitivities are common. In terms of touristic destination, a destination where the people have knowledge of environment, tourism development cannot be operated with pure economic purposes. For the sectors that are heavily relied on environment such as tourism, increasing of the environmental consciousness is one of the key situations to do improve sustainability and affectivity. Hence, newly appeared tourism types such as eco-tourism, green tourism, agro-tourism and rural tourism should be encouraged for the visitors.

With the SEM method that is allows to test the hypotheses and produces significant findings related to causality relation between variables, it has been understood that environmental behaviour can be explained through environmental threat and environmental knowledge. Environmental threat explains 39 % of the variance in the environmental knowledge. As a result, it can be said that the feeling of threat from environmental problems take importance place in our environmental knowledge. However, environmental knowledge has a mediator role to explain variance of environmental threat in environmental behaviour. Environmental threat perception and environmental knowledge explains 56 % of the variance in the environmental behaviour. Furthermore, factors those constitute the Environmental Knowledge and Environmental Threat, have great relationships with the latent variables. As it can see in the Figure 3, Knowledge of Nuclear and Genetic, Knowledge of Rain Forests and Greenhouse Gas and Knowledge of Renewable Energy have strong effect on Environmental knowledge (β=.92 , β=.88, β=.92 p<.,001). Similarly Environmental Threats based on Waste, Genetic-Biotechnology and Climate Change, have strong effect on Environmental Threat as well (β=.92, β=.96, β=.80 p<.,001). Therefore, it can be said that the observed variables are capable to explain latent variables. Hence for the further studies, researchers may try to collect data with the same variables. The hypotheses inferred from theoretical backgrounds indicate the validity of the results because of goodness of SEM model fit through fit indexes. For the further investigations, effect of environmental attitudes, environmental sensitivity and intention to buy eco-friendly products on environmental action can be involved into the model and more complex research can explain clear relationships between variables. Furthermore, a comparative study between environmental and non-environmental NGOs might be useful to learn influencing factors on environmental behaviours.

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