Assessing the Ecological Footprint of Natural Science Students: A Case Study of Düzce University

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Abstract

People are consuming the nature's products and services because all people act on earth. The concept of ecological footprint is accepted as an important indicator of sustainable life issue and calculating human impact on nature. Education should be started from the relevant part of the society which are the natural science students in order to enable people to realize the negative effects they have on nature and to direct them to reduce their ecological footprints. Educators and youngsters working in the field of natural sciences, adopting sustainable living principles as a way of life, are accepted as the most effective stakeholders creating environmental awareness and understanding the importance of the subject. In this study, ecological footprints were calculated and evaluated according to the consciousness and consumption habits of Düzce University forestry faculty landscape architecture and forest engineering students. In the study, ecological footprint calculation questionnaire was used as the data collection tool. Full counting method was used in the data collection stage. A questionnaire was applied to the students. Descriptive and descriptive statistical methods were used to analyze the data. As a result of the calculations, suggestions were made to reduce ecological footprint averages and to increase environmental awareness.

Keywords: Ecological Footprint, Environmental Impact, Sustainability, Düzce

1. Introduction

In the last century, the global climate change concept, which has arisen as a result of increasing greenhouse gas emissions due to increasing population growth, industrialization and intensive migration to the city, has brought with it a series of problems that threaten environmental sustainability, such as the degradation of the landscape observed all over the world (Atabay vd. 2014). Many environmental protection policies have been produced for the solution of these problems. All policies, international workshops, symposiums, etc. that have been carried out and made related to global climate change. They are united under one single goal: sustainable environment and healthy life.

One of the concepts that comes up with sustainable life is the ecological footprint. Resources are consumed as a result of human activities and waste occurs. The main aim of the paper is to calculate the ecological footprint of natural science students in Turkey. This information is critical important because of the natural science students have much more knowledge about ecological issues than other students. In this context, the ecological footprint is defined as an ecologically productive earth, which is necessary to reproduce the resources consumed, to transform waste into harmless, to produce energy, to absorb the carbon dioxide caused by fossil fuels, and to be a certain, ecologically productive earth (Schaller, 1999; Marin, 2004; Wilson & Anielski, 2005). The ecological footprint provides indications for the impact of human activity on nature. Ecological footprints of individuals in a particular area can be measured (Keleş vd. 2008; Schaller, 1999). The results obtained from the measurements made with the collected data are concrete values. These tangible values are a more effective training tool in the development of environmental awareness. In this context, it is aimed to increase the environmental awareness of young people by means of the ecological footprint calculation questionnaire, which is carried out according to the consumption habits of the students who are studying in natural sciences. With the results obtained, it has been contributed to the literature by making recommendations on the reduction of ecological footprint averages.

2. Material and Methods

This study was carried out on 250 students studying at the Department of Landscape Architecture and Forestry Engineering of the Faculty of Forestry of Düzce University. Ecological footprint assessment questionnaire was used to calculate the ecological footprint of the students who were educated in natural sciences. The questionnaire consists of two parts. In the first part, a total of 25 questions were asked to the participants about their departments, gender, place of residence, heating system and size, electronic home appliances used, nutrition and transportation habits. In the second part of the survey, there are 29 questions in the categories of food, goods and services, transportation, shelter, health, attitudes and behaviors towards environment, which are prepared according to the components of ecological footprint. The survey questions were created by adapted to the conditions of Turkey to the questions on the Global Footprint

Network (GFN) website (https://www.footprintnetwork.org/). The footprint scores of each participant calculated from the GFN website. Calculated scores used as a single variable in the survey. The other data obtained from the survey evaluated by using the IBM Statistics SPSS 22 program and descriptive statistical analysis. Descriptive statistical methods were used in the analysis of data determined according to students' consciousness and consumption habits. Frequency and percentage analysis, t test, ANOVA and results are explained. There is also made some comparisons between gender and departments.

3. Results and Discussion

The universe of the study is composed of all students studying at the Department of Landscape Architecture and Forest Engineering of the Faculty of Forestry of Düzce University. 250 people participated in the survey. The average of the ecological footprint of the students surveyed was 3.81 kha. This value is lower than the United States average (10,3), but higher than Brazil (3,1), Germany (5,3) and South Africa (3,2), China (1,2) (Wackernagel et al. 1999).

It was found that the calculated ecological footprint was composed of 29% food-borne, 22% travel-borne, 24% domestic-sourced, and 25% other sources. The ecological footprint of the students of Landscape Architecture was calculated as 4.02 kha and the forest engineering students were calculated as 3.6 kha. The ecological footprint of the students of Landscape Architecture was determined to be more than the forest engineering students. The ecological footprint of female students is calculated as 4,3 kha, while the ecological footprint of male students is calculated as 3,74 kha. The fact that the female students have more population in the landscape architecture department explains that the ecological footprint of the landscape architecture department is higher than the forest engineering department.

According to the analysis, the ecological footprint amount of the students taking natural science education is statistically different according to the gender, the department, urban or rural quality of the place where they live. Results are shown below tables 1, 2.

Table 1. T-test results for departments according to ecological footprint means

Factor	Department	N	Mean	Std. Deviation	Std. Error Mean
Ecological footprint	Forest engineering	162	5.2768	3.70751	.29129
	Landscape architecture	88	6.3675	5.02678	.53586

Independent Samples Test for Departments		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Ecological footprint	Equal variances assumed	-1.953	248	.052	-1.09075
	Equal variances not assumed	-1.788	139.434	.076	-1.09075

Table 2. T-test results for gender according to ecological footprint means

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Ecological footprint means	Male	119	5.1258	4.01986	.36850
	Female	131	6.1466	4.39183	.38372

Independent Samples Test for Gender		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Ecological footprint	Equal variances assumed	-1.911	248	.057	-1.02088
	Equal variances not assumed	-1.919	247.984	.056	-1.02088

4. Conclusion

In this study, it is aimed to increase the environmental awareness of all higher education students, especially students in the field of natural sciences, and the next generation in the light of the findings obtained by calculating Ecological Footprints of Düzce University Forestry Faculty and Forestry students. Environmental awareness is expected to be high when engineers and architects trained in natural sciences play a key role in the development of sustainable development and social environment. In order to increase their awareness about ecological footprint concept, sustainable life, ecological footprint and changing of consumption habits and return to nature should be included in teaching plans. Similar studies can be applied in other higher education programs and comparative studies can be done. Beginning from the education at the primary and secondary level, the adoption of the awareness of environment and nature conservation at a young age and the prevention of excessive and unnecessary consumption should be part of national education policies.

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