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Implementation of contingent valuation method in evaluation of cultural ecosystem services in the eco-trails "Tsigansko gradishte-Sadilishteto" and "The Devil's Bridge" in the Rhodope Mountains

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Abstract: The main aim of the current research is to analyse and evaluate data about the supporting of the quality and quantity of the ecosystem services provided by two eco-trails "Tsigansko gradishte-Sadilishteto" and "The Devil's Bridge" and to discuss their future development. The study is completed by fulfilling a questionnaire survey, consisting of 12 questions. The survey for the first eco-trail is conducted among 25 respondents in the autumn of 2014. The second survey consists of the answers of 29 respondents. One of the key questions concerns the possibility of collecting an entrance fee for the eco-trail. The collected data will be compared with the ongoing admission fees for some of the most famous eco- and hiking trails in the world, such as the Inca Trail, leading to Machu Picchu, trails in Yosemite National Park, Red Rock Canyon, Hawaii, Yellowstone National Park and Grand Canyon Park.
Key words: ecosystem services, contingent valuation method, eco-trails

Introduction

Ecotourism in Bulgaria has been developing with an increasing rates in the last few decades and the main force behind this logical consequence of the post-communism in the country is the willingness of people to be closer to nature. More and more people today have an intensive, stressful life, they search for an outlet of their negative energy and ecotourism is a way for them to get the desired relaxation. Ecotourism is inextricably linked with the presence of eco-trails and that is why a number of eco-trails were created, the infrastructure of others was recovered and this led to the development of a palette of over 100 trails in Bulgaria. However, the creation and development of eco-trails does not always follow standards and criteria, which is a problem of the present time. There are some not well maintained and abandoned eco-trails, which has more than enough potential to become hot spots for mountainous tourism and be a source for municipalities' income. The fact that many eco-paths are located in protected areas adds even more weight to the issue for their maintenance.

The Bulgarian Association for Rural and Ecological Tourism (BARET) (http://www.en.baret-bg.org/) developed a program, concerning the Bulgarian eco-trails and theoretical foundations, focused on sustainability, were laid by Petrov and Kisselkova (1998) and Kisselkova and Petrov (2001). The research of Assenov et al. (2015) is a logical consequence of the investigation, concerning the issues about eco-trails in Bulgaria. The authors conducted an influential study in the territory of the eco-trail "Canyon Falls", discussing on the matter that an entrance fee should be introduced for the eco-trail and the current research is a continuation of the work in the Rhodope Mountains. The entrance fee for natural sites in the world isn't anything new (table 1), thus our country should follow this already established principle. As we can find out in table 1, full fees vary from US$1 for Diamond Head State Monument, Island of Oahu, Hawaii to US$80, annual pass for more than 2,000 federal recreation sites in America. Fees can be higher for foreign visitors than for locals (Monteverde Cloud Forest, Costa Rica) and they also differ, according to the type of vehicle visitors use. The administration of some of the exemplified natural sites (Inca Trail, Bushkill Falls) offer a discount for students and children. If we compare these fees with those for natural sites in Bulgaria, mentioned by Assenov et al. (2015) (Krushunski Waterfalls – 2 BGN, Devetashka Cave – 2 BGN etc.) we will find there are significant differences, but we also should not forget the magnitude contrasts.

Table 1. Entrance fees for different eco-trails and natural sites around the world

Eco-trails and natural sites	Full Fee	Discount
Inca Trail (including entry to the ruins of Machu Picchu)	**US$50**	Students under the age of 26 years old, **US$25**; Children under the age of 12 years old, **US$0**
Brandon Bay - Beach Marathon	Half Marathon - **€35**; 10k run: **€25** (including timing chip, tech tee **and** event medal)	
Monteverde Cloud Forest, Costa Rica	Foreigners, **US$20**	Costa Ricans and residents, **US$7**
Shenandoah National Park, Virginia	Annual Pass, **US$40** (Unlimited entry for one year to pass owner and passengers in	

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	same vehicle)	
Yosemite National Park	Individual (on foot, horseback, or bus) for 7 days, **US$15**; Automobile, 7 days, **US$30** April - October, **US$25** other months; Automobile, 1 year **US$60**	
Red Rock Canyon, Nevada	Car/Truck, 1 day, **US$7** per vehicle; Bicycle/Pedestrian, 1 day, **US$3**; Annual Pass, **US$30** per person	
Diamond Head State Monument, Island of Oahu, Hawaii	**US$5** per car or **US$1** per person for pedestrians	
America the Beautiful Passes (ticket to more than 2,000 federal recreation sites)	**US$80** annual pass	
Bushkill Falls (The Niagarra of Pensylvania)	Adults, **US$14,50**	Seniors, 62 years old or older, **US$13.50**; Children, 4-10 years old, **US$8**;
Yellowstone and Grand Teton National Parks	Vehicle 1-7 days, both parks, **US$25**; Individual, 1-7 days, both parks **US$12**; Annual pass to both parks, **US$50**	
Mount Rainier and Olympic National Parks	Entrance fee, **US$20**/car; Annual pass, **US$40** (only good at the park where it was purchased)	
Grand Canyon, Arizona	**US$30** per vehicle for a seven-day pass; Annual pass **US$60**	

Materials and methods

The objectives of the current research originate as a logical consequence of the study of Assenov et al. (2015) and they aim at analysing and evaluating data about supporting the quality and quantity of the ecosystem services provided by eco-trails "Tsigansko gradishte-Sadilishteto" (Rudozem Municipality) and "The Devil's Bridge" (Ardino and Banite Municipality), to discuss their future development and to consider the possibility of collecting an entrance fee for each one of them, in order to ensure their maintenance.

The research was conducted by the use of a questionnaire, which is a version of the contingent valuation method, applicable to the evaluation of the ecosystem/landscape goods and services. The survey for eco-trail "Tsigansko gradishte-Sadilishteto" was conducted among 25 respondents in the autumn of 2014 and the second second survey, regarding "The Devil's Bridge" eco-trail consists of the answers of 29 respondents. The questionnaire includes 12 questions, organized in a way to acquire information about the personal profile of the respondents, their position about the presence or lack and origin of ecological problems in their municipality, the likelihood of maintainance of the eco-trail by municipality's own funds, the possibility for collecting an entrance fee and the amount of this fee. The team that collected the responses of the respondents was qualified and experienced enough to obtain the most accurate and objective answers possible.

Results

The interpretation of the respondents' answers are presented in the following lines. First, we will discuss the results of the survey in eco-trail "Tsigansko gradishte-Sadilishteto" and after that we will move to the visitors of the other eco-trail "The Devil's Bridge". The gender structure of the respondents (fig. 1a) shows that females are prevailing, but the numbers are close to equality. The difference can be classified as occasional, because respondents were chosen randomly. The age structure (fig. 1b) shows the highest percentage belongs to presumably the most active and healthy people, who normally go hiking.

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Fig. 1. Sex (a) and age (b) structure of respondents

a) b)

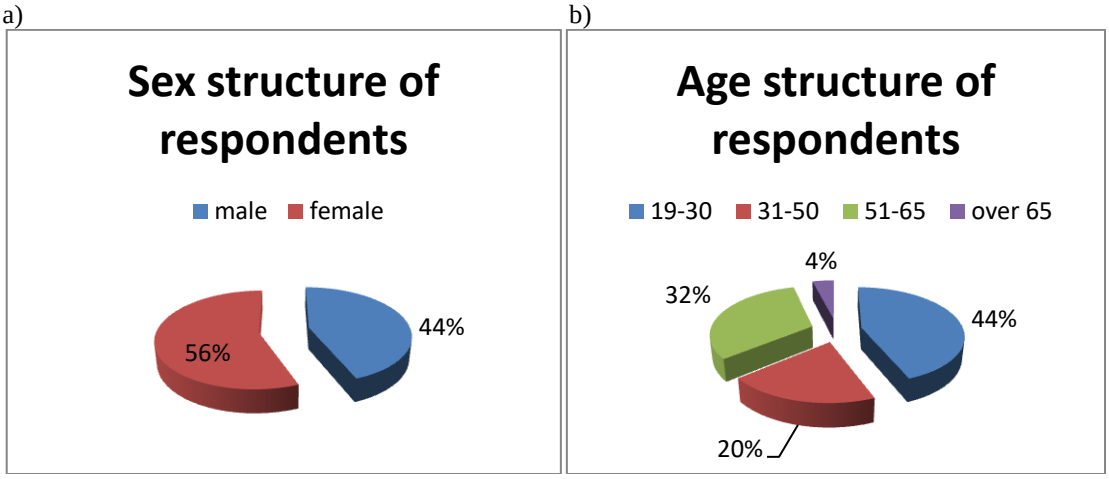
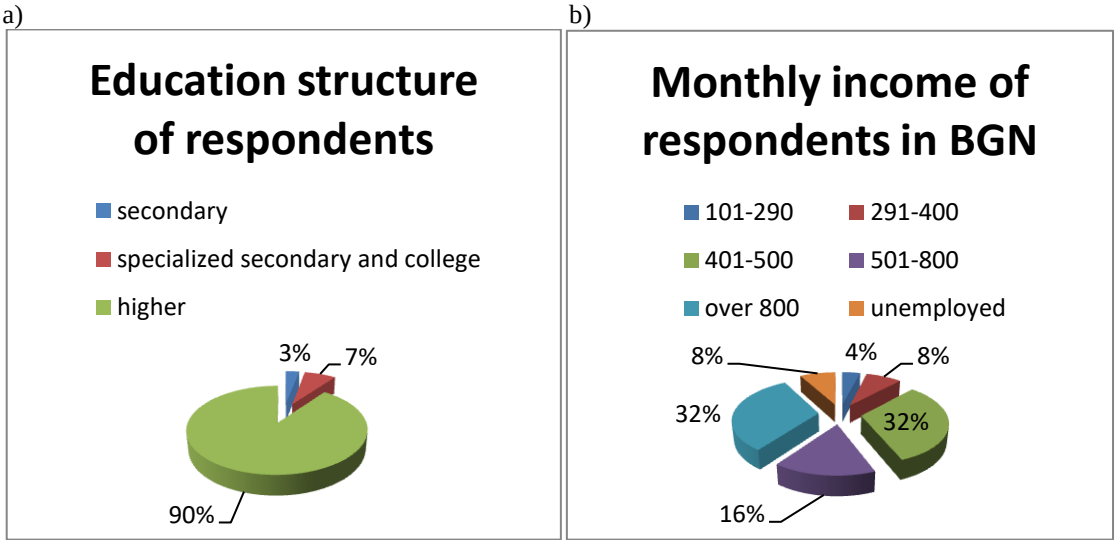


Fig. 2 points out the educational differences (a) and the dissimilarities, according to the monthly income of the respondents (b). 90% of the surveyed are with higher education (fig. 2 a), which is quite normal, following the fact that more educated people in contrast with less educated ones prefer using eco-trails. The fact that only 3% of the respondents are with secondary education and no one with primary education adds weight to that assumption. The monthly income (fig. 2b) is another proof of that thesis. Most of the respondents earn higher salaries, which is a direct link to the higher education. The fact that 8% of the respondents fall in the unemployed count is worrying and an explanation for their presence along the eco-trail may be explained by the lack of occupation.

Fig. 2. Education structure (a) and monthly income (b) of respondents

a) b)



The next questions in the questionnaire reflect the attitude of the respondents, when it comes to the existence of ecological problems (fig. 3 a) and the very origin of that issues (fig. 3 b). According to 88% of the surveyed, there are ecological problems in their municipality, while 12% gave a negative reply. That number is quite high, considering the fact that there, of course, are ecological issues within the municipality of Rudozem. A possible explanation for that high percentage lays in the way of thinking of some of the respondents who tend to share the opinion that when landscapes are so picturesque and the air in the mountain is clean, there can't be any ecological problems. When we analyze the replies, concerning the origin of the ecological problems (fig. 3 b), we come across the fact that most of the people (29%) direct the issues to the municipality and the same situation is observed in the article by Assenov et al. (2015). The regional institutions are the second to be blamed and the least of the respondents (11%) think that the ecological problems are of European and global level. The same opinion about the overall origin of the problems, related with the environment, is shared also by the authors of the research.

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Fig. 3. Existence (a) and origin (b) of ecological problems

a) b)

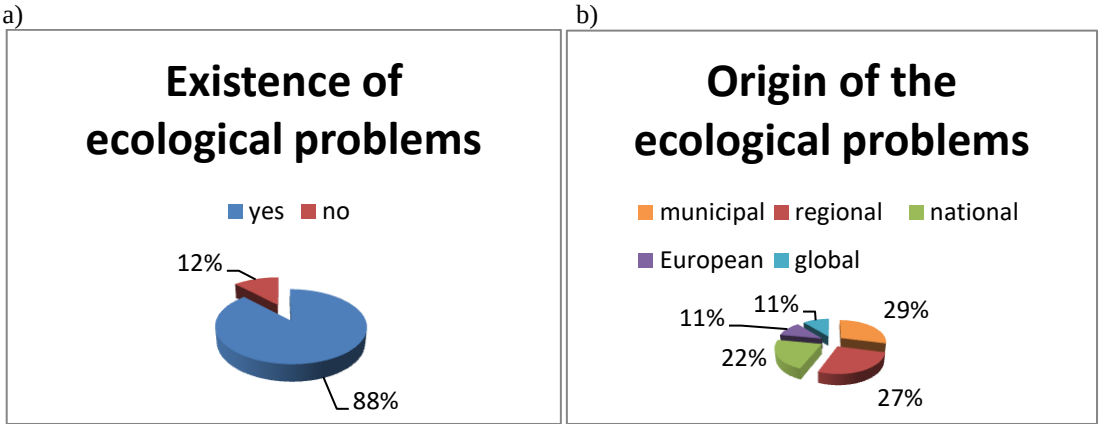
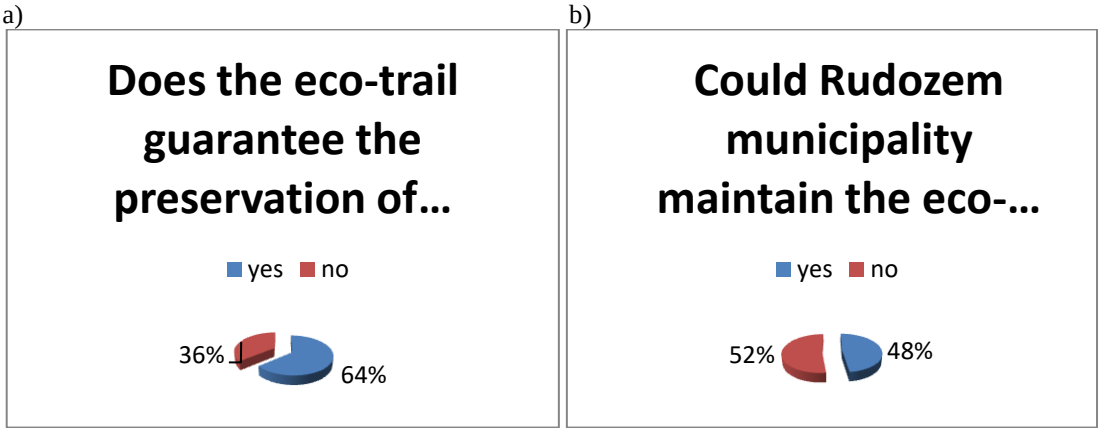


Fig. 4a reflects the understanding of the people about the preservation of ecosystem services that nature provides, by the eco-trail. 64 % of the respondents gave a positive answer of the question. The other replied negatively, which reflects the fact that they don't understand the meaning of the term ecosystem services and that percentage (36%) is high, which means that, although the survey had also an educational purpose, educational seminars should be considered. The other part of fig. 4 (b) displays the division of respondent's opinions about the maintenance of the eco-trail by municipality's funds. Almost full parity is observed here and the prevailing negative answers (52%) reflect the common opinion that eco-trails are the least concern of a small municipality and funds are spent for other necessities.

Fig. 4. Preservation of ecosystem services (a) and maintenance of eco-trail (b)

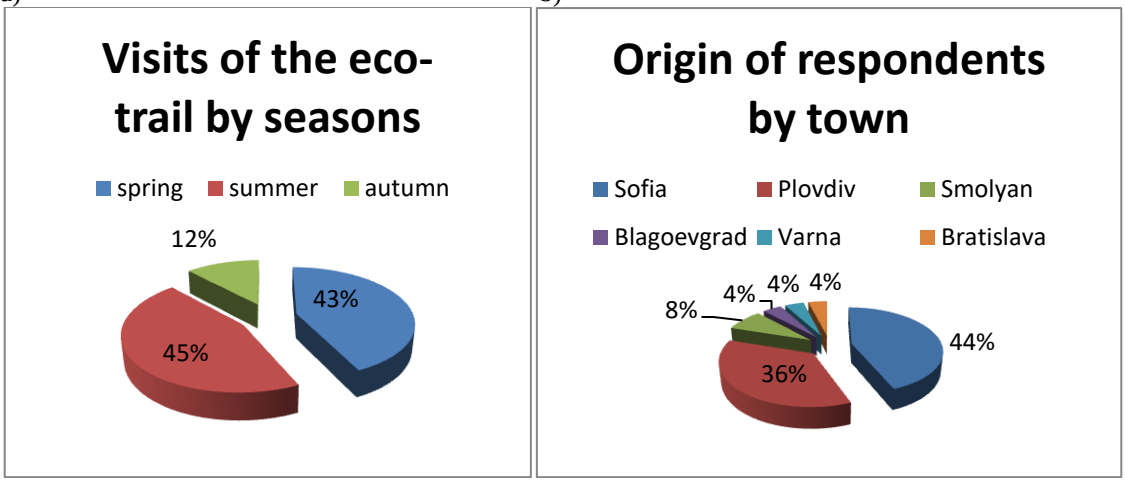
a) b)



The respondents visits of the eco-trail (fig. 5a) are more common during the summer (45%) and spring (43%) and the other 12% of them use the ecosystem services, provided by the trail's nature in the autumn. The replies follow a logical pattern – the most visits are during the hottest months while and there are no in winter. 84% of the respondents (fig. 5b) come from the three largest cities in the country. An interesting fact is that 4% of the visitors come from abroad – the capital city of the Slovak Republic.

Fig. 5. Visits by season (a) and origin of visitors by town (b)

a) b)



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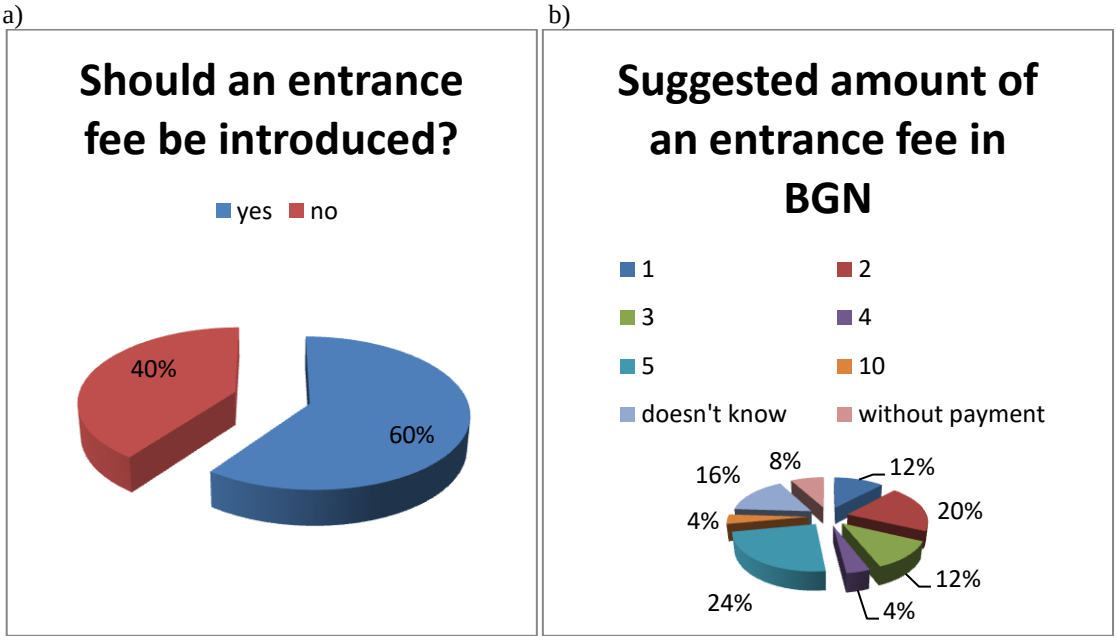
The replies of the last two questions reflect respondents opinion about the entrance fee. Fig. 6a is related to the presence or lack of an entrance fee. According to 60% of the surveyed a payment should be introduced in order to preserve the cultural ecosystem services the eco-trail provides. Fig. 6b reflects the suggested amount of an entrance fee in BGN. 5 BGN (24%) is the most common sum, that the visitors point, 2 BGN are the hypothetical choice of 20% of the respondents and 12% think that the entrance fee should be 1 or 3 BGN. 16% of the surveyed don't know the total amount, although they are convinced that a payment for entering the eco-trail have to be provided.

Fig. 6. Introduction (a) and amount of entrance fee (b)

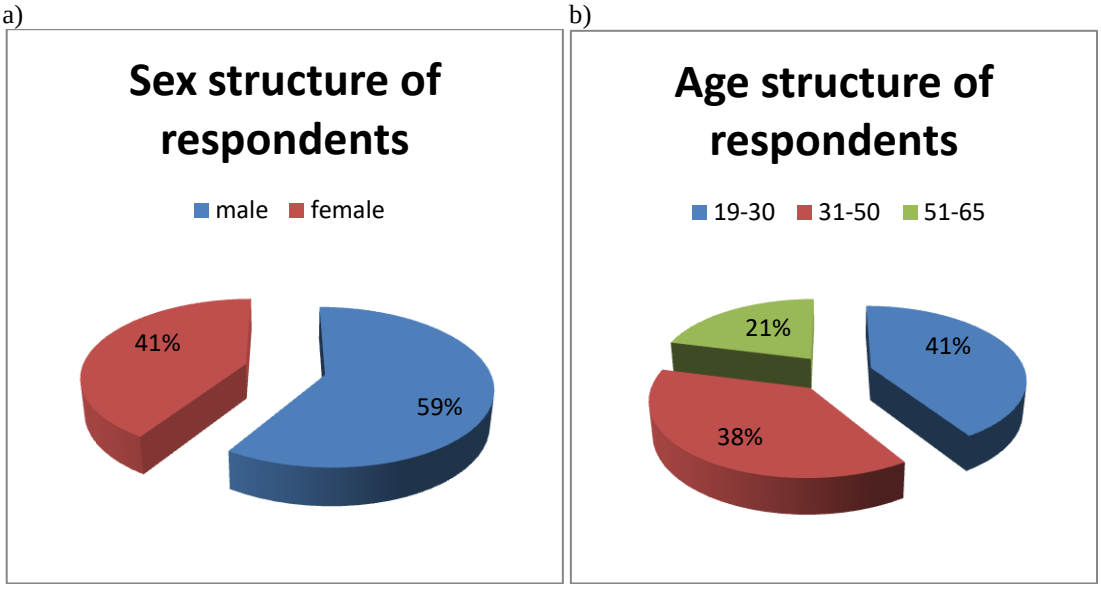
a) b)



The responses of the visitors of the eco-trail "The Devil's Bridge" differ in some way of those of respondents in the previous eco-trail. Fig. 7 (a) represents the gender structure and the number of males is prevailing here (59%), while females are only 41% compared to the 56% in the other eco-trail. The age structure (b) also follows the same pattern, presented in the previous eco-trail – most of the respondents are a part of the most physically active part of the population, thus they are capable of going safely along the trail.

Fig. 7. Sex (a) and age (b) structure of respondents

a) b)



The education structure (fig. 8a) of the respondents again reflects the fact, that better educated people go along eco-trails. 66% of them are with higher education and there are no with primary education. Fig. 8b lead us to the conclusion that people with higher wages – 70% earn at least 500 BGN, tend to go along eco-trails and the 7% of the unemployed also show that there are some respondents who find a way for spending their time.

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Fig. 8. Education structure (a) and monthly income (b) of respondents

a) b)

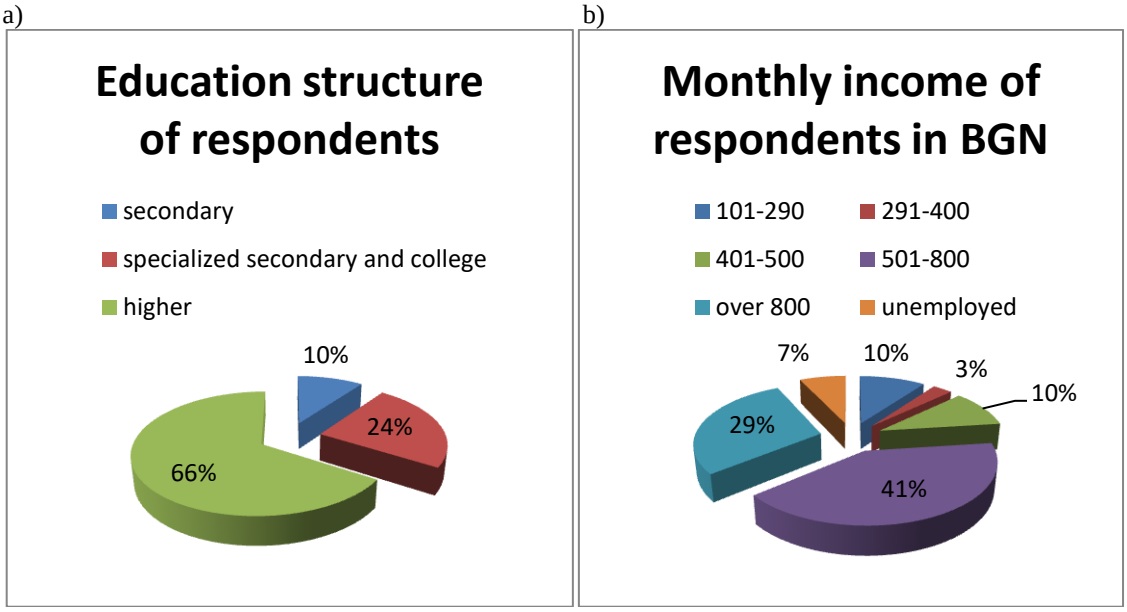
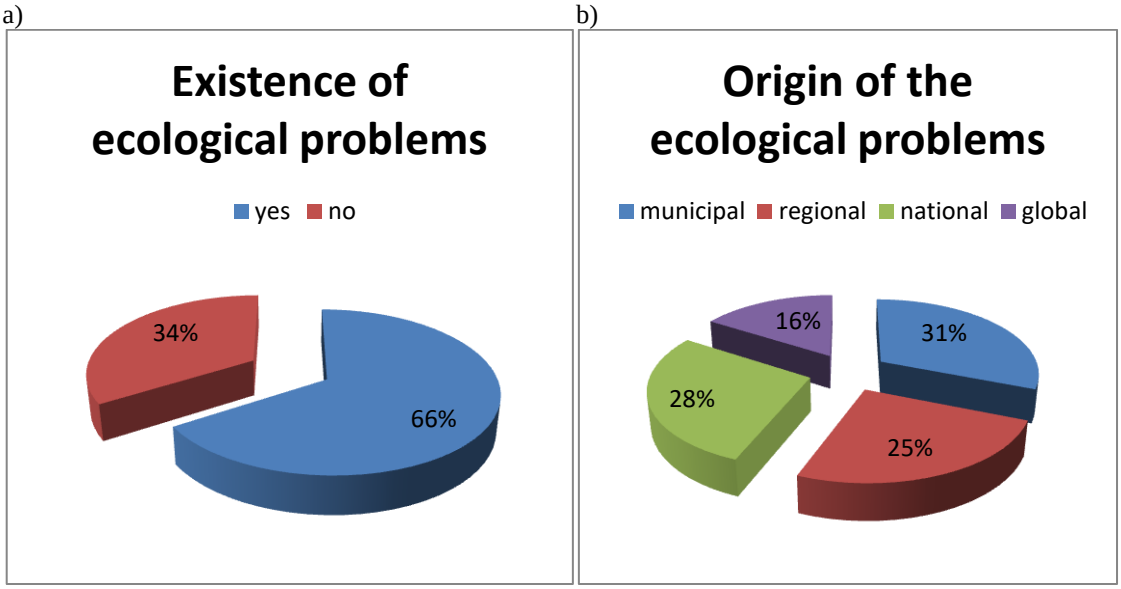


Fig. 9 shows respondents attitude, concerning the existence (a) and origin of environmental problems (b). The first part of the figure reflects the higher percentage – 66% of the surveyed who share the opinion that ecological problems are existing in the municipality, while the others doesn't think in the same way. 31% of the respondents think that the origin of the environmental issues should be addressed at municipal level, while according to 16% of them, the ecological problems are at global level. No one thinks that the issues are with European origin.

Fig. 9. Existence (a) and origin (b) of ecological problems

a) b)



The answers next question of the questionnaire (fig. 10a) show the same trend as the replies in the other eco-trail. 69% share the opinion that the eco-trail guarantees the preservation of the ecosystem services, while an interesting moment here is that more respondents (17%) do not know what answer to give than those who gave a negative reply (14%). The municipality cannot maintain the trail on its own, according to 55% of the surveyed (fig. 10b). 42% of them give a positive reply and there also people here, as well, that do not know what to answer (3%).

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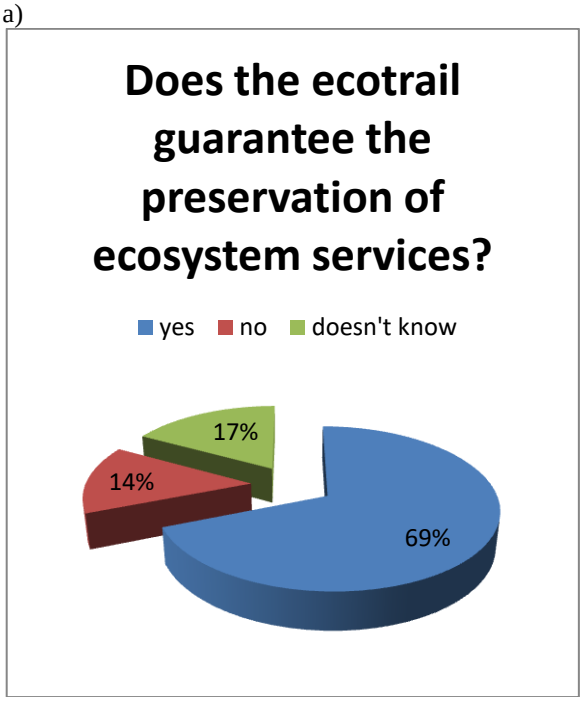
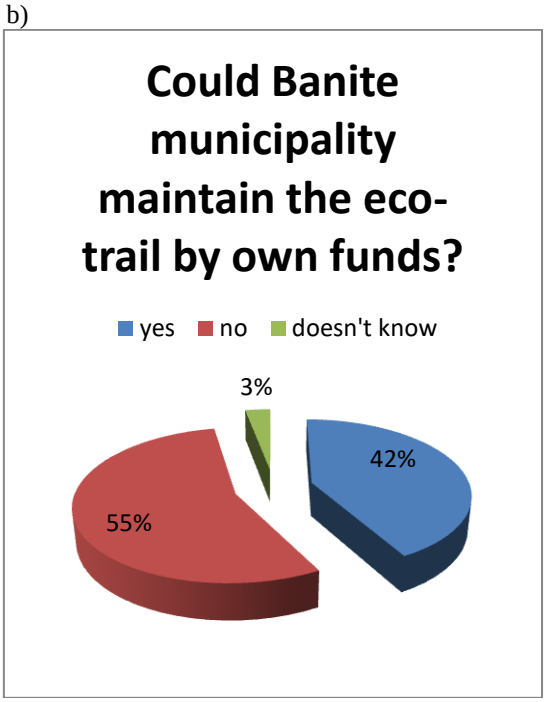
Fig. 10. Preservation of ecosystem services (a) and maintenance of eco-trail (b)

a)



b)



There are some differences when we compare the results in the current eco-trail with those of the "Tsigansko gradishte-Sadilishteto" eco-trail. Most of the respondents here (48%) visit the trail in autumn (fig. 11), while 29% come during the summer. Another contrast come from the presence of winter visitors (5%) at "The Devil's Bridge" eco-trail, who despite the colder weather, prefer this season.

Fig. 11. Visits by season

Fig. 12 shows us the origin of the surveyed by town. Most of them come from Sofia (24%) and Kardzhali (21%). The presence of people from Banite (11%), Ardino (11%) and Rudozem (3%) is not a surprise, because of the close proximity of these settlements to the eco-trail. 11% of the respondents are citizens of Kirklareli (Turkey), thus the trail's fame reaches beyond the borders of the country.

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Fig. 12. Origin of visitors by place of living

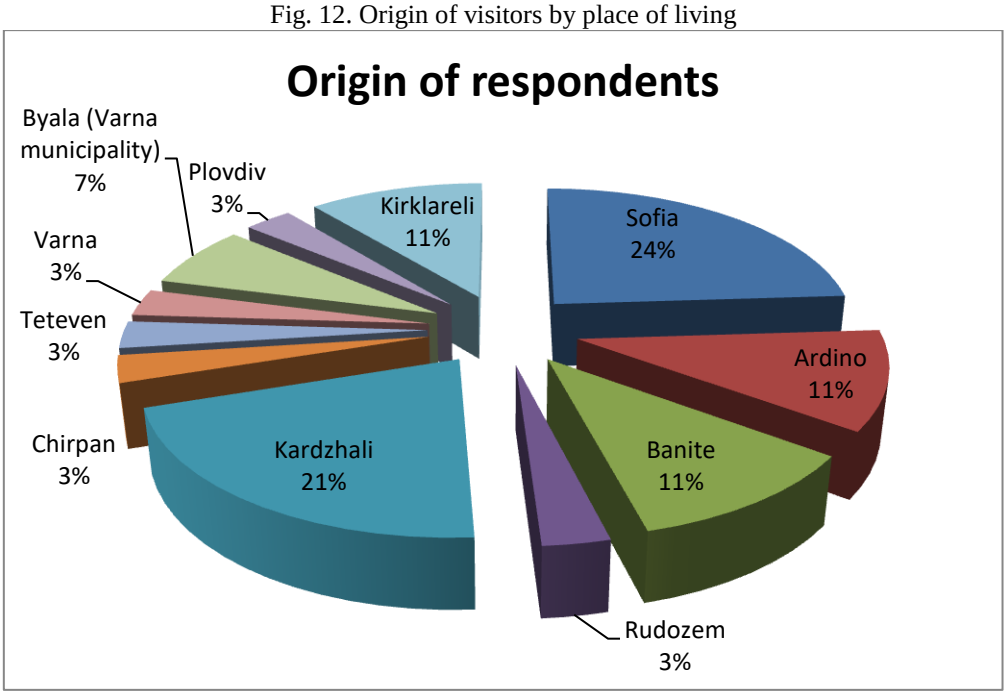
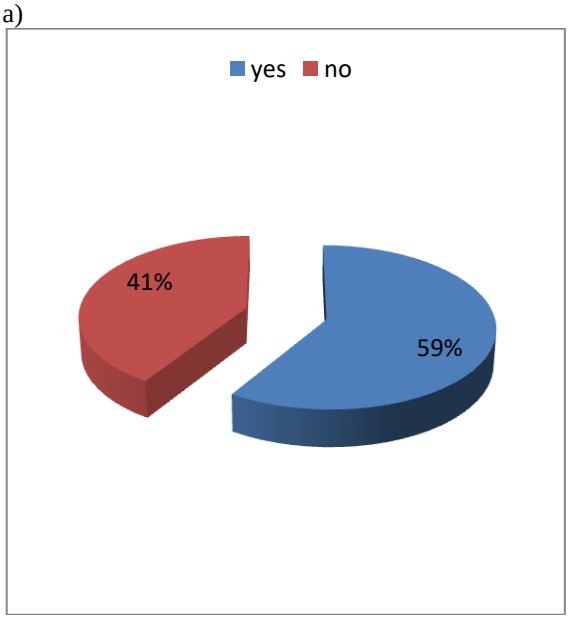


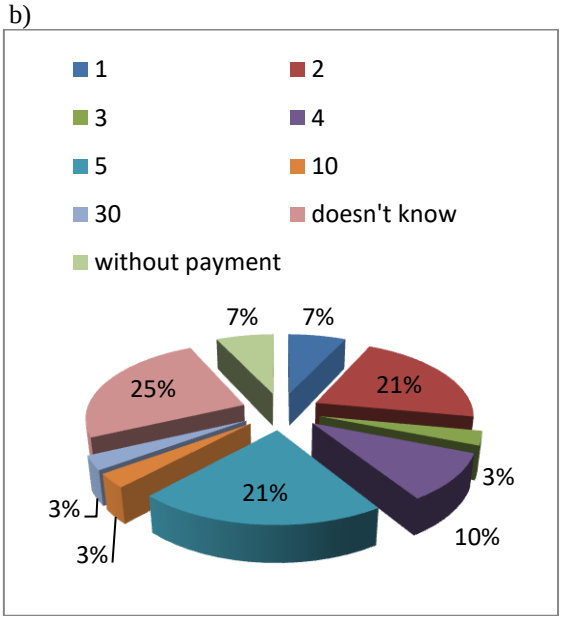
Fig. 13a reflects the responses, concerning the introduction of an entrance fee to the eco-trail. According to 59% of the respondents a payment should be introduced in order to protect and sustain the richness of the eco-trail, while the other 41% of the people disagree with them. Again 5 BGN is the reply of most respondents (21%) when the amount of payment is regarded, along with the same number of people (21%), who think that the fee should be 2 BGN (fig. 13b). However, 25% of the surveyed – the highest share of them are sure that an entry fee should be introduced, but they do not seem to know which is the most proper payment. 3% of the respondents share the opinion that the entrance fee should be 30 BGN, which is considered to be quite high amount of money by many others. It is possible that this suggestion is made by people with bigger salaries, who can afford this sum, but according to the authors this would be inappropriate.

Fig. 13. Introduction of an entrance fee (a) and amount of payment in BGN (b)

a)



b)



Conclusions

The current research is a continuation of the efforts by Assenov et al. (2015) to explain the necessity of introducing an entrance fee for eco-trails in the country, in order to guarantee their maintenance and future existence of the ecosystem/landscape services they provide. The two eco-trail, included in the present study: "Tsigansko gradishte-Sadilishteto" and "The Devil's Bridge" are examples of visited trails, situated in the southern part of Bulgaria and their investigation led to the development of several conclusions, regarding the research:

- it can be used as another example in favor of the introduction of an entrance fee for eco-trails in order to guarantee their preservation;

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- it confirms the rule unwritten rule that people who are more educated and wealthier tend to visit eco-trails;
- eco-trails are undoubtedly a way to get closer to nature and to recognize ecological problems;
- it acknowledges for one more time the fact there are respondents who are not aware of the concept of ecosystem/landscape services and practical education should be considered;
- 5BGN is the most indicated amount of money that would be appropriate to be used as a payment for visiting the eco-trails and this is a sum, reasonable enough to support the trails;
- its successfulness proves to be a good base for expanding the range of similar studies;

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