

## ENVIRONMENTAL EDUCATION IN TOURISM IN THE TIMIȘU DE JOS - COMARNIC RAILWAY SECTOR: THE ROLE OF RAILWAY TRANSPORT

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### Abstract

Sustainable tourism can be realized only through an ecological education, having as main concern the environmental education of the young generation. Greening and awareness raising activities must be properly implemented. The study is based on the results of the project "Young people and the natural environment", which involved questionnaires among 150 young people. The results highlight the negative effects of mass tourism, which lead to the need for the realization of educational strategies (information materials offered in tourist trains such as leaflets or mobile applications, social media pages), workshops for tourists in collaboration with local administrations or Bucegi Natural Park rangers. All these activities are based on the role of rail transport in environmental protection in the Prahova Valley, Timișu de Jos - Comarnic sector.

**Key words:** greening, educational strategies, the protection of the environment, conservation

### Introduction

Due to the rapidly evolving phenomenon of overtourism, the implications of tourism activities on the environment, and especially today's inherent climate change, environmental education is increasingly being promoted globally. After the Covid-19 pandemic, the tourism industry has experienced an impressive boom across the globe, developing rapidly and creating new forms of tourism. As tourism practices become more widespread, there tend to be marked changes in the environmental component (Kumar, 2010). Positive impacts are achieved in the economy, foreign exchange earnings, local development, infrastructure and facilities. As the highest share of negative impact of tourism is represented by environmental degradation through pollution of air, water and soil as well as destruction of natural ecosystems (fauna and flora). Thus, some tourism models are transitioning to more environmentally sustainable practices (Jones, 2023) while supporting and promoting an economically viable industry (Andrew Torsney, 2025)

Sustainable practices and increasing the range of positive environmental effects of any type of tourism is achieved through environmental education. Environmental education is education for global responsibility, by which it helps mankind in gaining a deep understanding of the environment and the problems we may face (Environment Agency, 2025). Tourism in the study area (Prahova Valley sector from Timișu de Jos to Comarnic), is predominantly based on mountain tourism, whether summer or winter. The natural setting delimited by the Bucegi Mountains and the Postăvaru Massif in the west and the Piatra Mare Massif and the Baiului Mountains in the east offers the opportunity to practice mountain tourism such as hiking and winter sports (Sorica slopes in Azuga, Kalinderu in Bușteni, the skiing area in Sinaia), as well as rest and relaxation tourism, including tourist resorts of national interest, such as Predeal, Azuga, Bușteni, Sinaia or tourist resort of local interest, Comarnic. The multitude of hiking trails and the presence of the Bucegi Natural Park attract thousands of mountain tourists every year. According to data provided by the Association for the Promotion and Development of Prahova Tourism, in the summer of 2023, the figures of 2019 were equaled, i.e. the county was visited by 57,129 tourists, of which 49,908 were Romanians and 8,221 foreigners. However, it is important to note that these data refer to the entire Prahova County, but given that most of the resorts analyzed are major destinations of the county, the tourist statistics reach the credibility variable. In contrast to natural tourism, the anthropic tourist heritage is smaller in scale. The transportation system is an essential component within the tourism phenomenon, thus rail transportation in the study area is the most accessible and efficient means of transportation. Railways have long been recognized as one of the most environmentally friendly means of mass transit, offering lower carbon emissions, energy efficiency and reduced congestion compared to other modes of transport.

However, there are still many challenges to overcome in order to provide continued sustainability in the context of environmental impacts, especially related to wildlife and habitat protection (J. Milewicz, 2023). The railway sector Timișu de Jos - Comarnic is part of the international CF 300 railroad, which connects Bucharest (Romania's capital), central Romania with Budapest and Vienna, attracting a large number of tourists. The CF 300 Magistrala, on this sector is crossed by electric trains (being an

electrified double track), as well as diesel trains (Jipa, 2024). According to CFR Călători S.A. (2025), 75 pairs of trains run daily through the main resorts, 48 pairs of trains through Comarnic and only 12 pairs of regio trains through the Timișu de Jos hc station, which gives tourist accessibility both nationally (from the center and southeast of the country) and internationally from Hungary and Austria.

## Material and methods

The methodology consists in applying the social survey method, using the quantitative scientific research instrument, questionnaire. It was applied to 150 young people within the project "Young people and the natural environment". Quantitative and empirical data were centralized and processed in the form of graphs (Microsoft Office - Excel), and open-ended questions were processed in the form of word clouds in the online software Voyant Tools. In addition, methods such as the SCOPUS database data mining method, the cartographic method (using vector and raster data in ArcMap 10.6.1 software), the observation and comparison method were used to document and validate the results.

## Results

Sustainable tourism can only be achieved through environmental education, with environmental education of the young generation as the main concern. Greening and awareness raising activities must be properly implemented. However, in the context of the involvement of rail transportation, one can also talk about other activities or strategies that aim to raise awareness among tourists and mitigate the negative effects resulting from mass tourism. Thus, the project "Young people and the natural environment" is an educational strategy, with the role of environmental protection and conservation, by raising awareness and informing young people about the negative effects of tourism on the environment and mitigating them with the most sustainable means of transportation in Romania, the train (Nature Talks, 2021). Following the questioning of young people, they believe that the most negative effects of mass tourism are: overcrowding of tourist resorts and road traffic on National Road 1, carbon dioxide pollution from road traffic, degradation of local resources, both subsoil, soil and local community, but also degradation of the natural landscape through various constructions, affecting biodiversity.

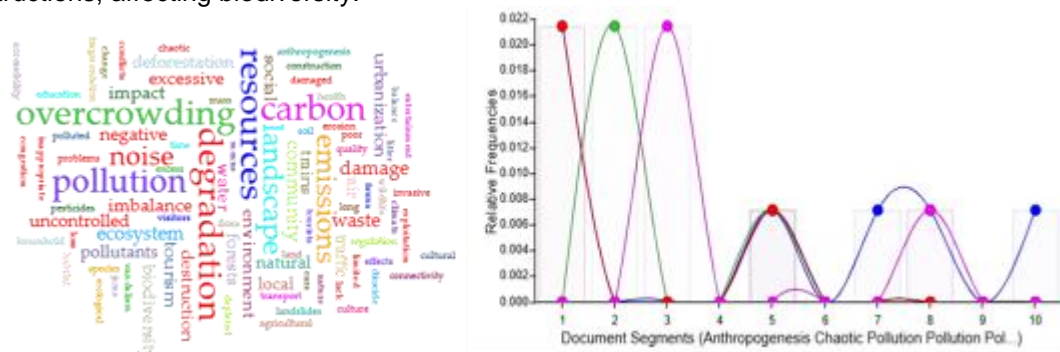


Fig. 1 The negative effects of mass tourism in the analyzed sector  
Source: Result of the questionnaire, 2025

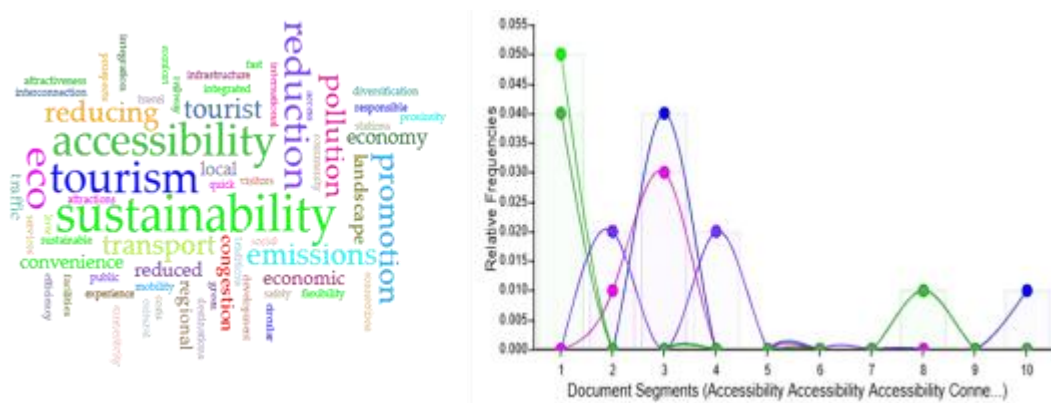


Fig. 2: The positive effects of mass tourism in the analyzed sector Source: Result of the questionnaire, 2025

In terms of environmental education, the respondents considered that the positive impact that rail transport has on tourism is represented by: sustainability, reduction of carbon dioxide emissions and pollution, accessibility in the area, reducing congested road traffic, as well as promoting eco-tourism and environmentally friendly means of transportation (**Chyba! Nenalezen zdroj odkazů.**).

In the context of preventing or mitigating negative impacts on the environment, environmental education aims to raise awareness and inform the public about them. Thus, young people believe that environmental education could, to a large extent, prevent the environmental implications of all forms of pollution (Fig. ).

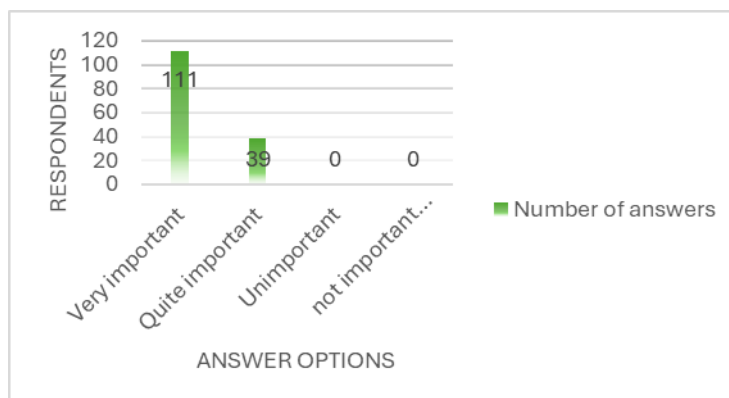


Fig. 3: the importance of environmental education in preventing the negative effects resulting from tourism and transport

Source: Result of the questionnaire, 2025

## Discussion

According to a report by the European Environment Agency, rail is the most environmentally friendly mode of transport with the least negative environmental impacts: direct emissions from diesel trains are significantly lower than other modes of transport, electric trains are much more energy efficient and generate low greenhouse gas emissions over long distances (representing 0.4% of total transport emissions in 2018)

(European Environment Agency, 2020) (Fig. ).

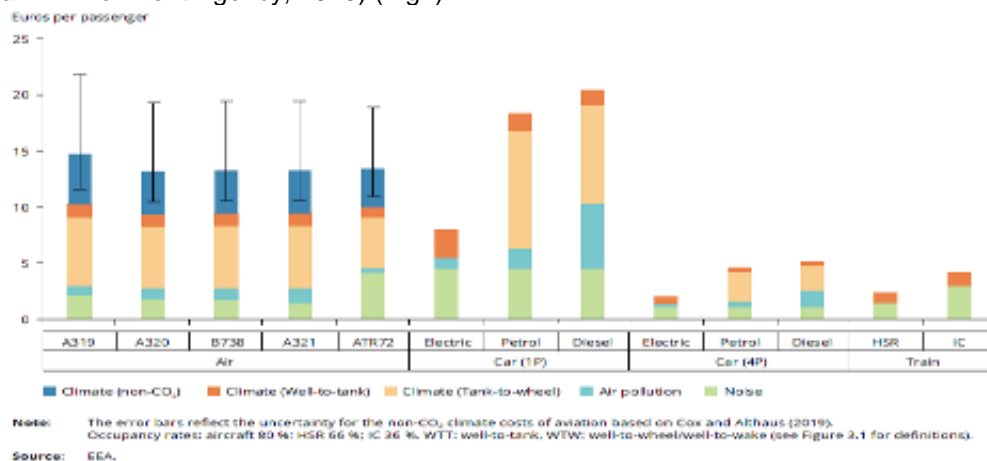


Fig. 4: Emission costs of different transport modes (500 km)

Source: European Environment Agency, 2020

Thus, by translating this problem to young people, environmental education could have long-term effects, since its primary aim is to educate future adults in all aspects of human activity on the environment. In this respect, strategies or programs that have environmental education at their core will gain ground. Introducing environmental education programs in schools has positive effects. In countries such as Germany, Croatia, Switzerland, Sweden, France, sustainable development or environmental education is integrated into the school curriculum (Edupedu, 2022). In Romania, in addition to this strategy and starting point for educating young people, rail transport companies can support this approach by disseminating educational materials, such as leaflets and brochures, mobile applications, social media pages or even workshops for tourists, in collaboration

with local administrations or rangers of Bucegi National Park. This aspect was positively appreciated by young people (Fig. ).

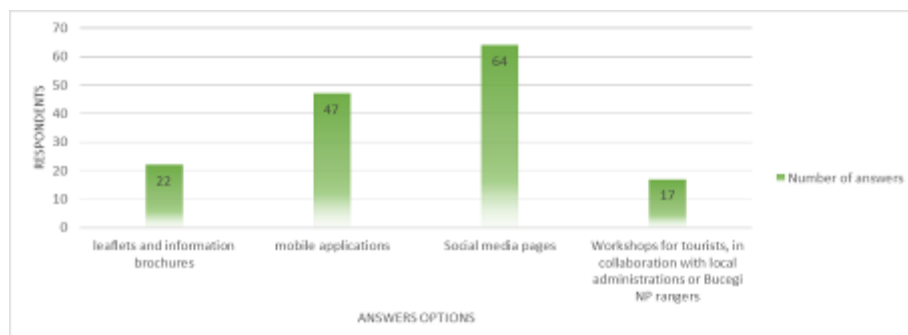


Fig. 5: Types of educational materials considered most effective to promote sustainable tourism using the train

Source: Result of the questionnaire, 2025

## Conclusion

Environmental education is the key to sustainable tourism, highlighting its importance for young people in promoting tourism that minimizes negative impacts on the environment and encourages responsibility towards nature. According to the answers given by 150 young people, the main problems caused by mass tourism include pollution, overcrowding and landscape degradation. Rail transport is perceived as environmentally friendly and helps to reduce these problems. Trains, being less polluting than road transport, are seen as an environmentally friendly alternative in the Timișu de Jos - Comarnic area, with low carbon emissions and high energy efficiency. Measures proposed to promote environmental education include distributing information materials (leaflets, mobile apps), organizing workshops with local authorities and involving young people in awareness-raising activities.

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## Souhrn

Článek se zabývá úlohou environmentálního vzdělávání a železniční dopravy při podpoře udržitelného cestovního ruchu v oblasti Timișu de Jos - Comarnic. Zaměřuje se na zvyšování povědomí mladých

lidí a snižování negativních dopadů masového cestovního ruchu prostřednictvím využití vlaku jako dopravního prostředku šetrného k životnímu prostředí.

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