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## AN ATTEMPT AT ECONOMIC VALUATION OF ENVIRONMENTAL VALUE OF 'GÓRA ZAMKOWA' IN OLSZTYN BY THE METHOD OF TRAVEL COSTS

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**ABSTRACT:** The aim of the work was the economic valuation of the natural environment of 'Góra Zamkowa' in Olsztyn, which is part of the "Eagle's Nest" Landscape Park in southern Poland. In the research, the travel cost method was used, which was based on the results of the survey. Primary sources were collected from 135 respondents selected randomly. Thanks to information from respondents, it was estimated that the economic valuation of environmental value of 'Góra Zamkowa' is approximately PLN 1.04 million.

**KEY WORDS:** travel cost method, natural environment value, valuation

## Introduction

The natural environment is the basis of human existence. It provides many components used in consumption and production processes, affecting health, life and social well-being. The environment, being a public good, should be protected and its value should be estimated. Assistance in this area is the valuation of the value of the environment through a cost-benefit analysis. The valuation of the natural environment through direct methods (hedonic prices, travel costs), indirect (conditional valuation, experimental economics) or cost methods (impact – effect, substitution, replacement, preventive, compensation, lost opportunities) causes many reservations, but such attempts are the most justified, because the natural environment really gives some value to the people living in it and in many cases it is necessary to estimate this value.

## An overview of literature

Human well-being depends on many factors of a social, economic and environmental nature. Among them, the natural environment is of key importance. It represents everything that occurs in the environment of the living or inanimate object, and everything that of these objects is in the interactions (Bartkowski, 1991). It supplies goods for immediate consumption and production to the society and allows normal functioning. Śleszyński believes that the environment additionally absorbs the side effects of human social and economic activities (Śleszyński, 2000). It all creates the different conditions of human life. In connection with the fulfillment of such important functions by the natural environment, it is necessary to protect it. Nature protection is understood as a process that includes all the components of the environment and various forms of human activity, to preserve, restore and ensure the sustainability of living and inanimate nature. Its main objective is the rational management of resources, protection of water and air cleanliness, appropriate landscape shaping and proper management of space (Dobrzańska, 2010).

The valuation of components of the natural environment and their expression in economic value have become more and more important. But, the majority of society believes that the natural environment is priceless. However, every economist will recognize that if something does not have a price, there is no value that can be compared with other economic goods (Panasiuk, 2018). Users of goods and services given by the environment should know their value (Marks-Bielska, Zielińska, 2014). The valuation of the environment and its natural resources reminds that they are not free

goods and allow to determine the rate of their depletion (Wróblewska, 2014). The good value consists of two aspects: usable and non-usable. The usable aspect occurs when the consumer uses or is able to use it. It can be of direct character (harvesting, tourism, scientific research) or indirect when using a good for another good. The non-usable aspect results from the very satisfaction of the existence of good and it is an optional value, inheritance and existence for future generations (Żylicz, 2018; Zawilińska, 2014).

The main purpose of the valuation is to determine what benefit or loss a given unit will incur as a result of changes in the quality of the environment. The fear of losing the environmental resources and related benefits causes that people use the environment in a prudent manner (Zydroń, Pruchlat, 2014). However, for many components of the environment, it is difficult to express their value in money. It is worth emphasizing that the expression of environmental resources in money clearly and directly determines the willingness of the society to incur expenditures and the degree of involvement in environmental problems (Becla et al., 2012).

The economic valuation of the environment has advantages and disadvantages. The main advantages include: determination of the estimated value for goods that were previously not priced; the basis for incorporating non-market goods into business practice; introduction of non-market goods for the social analysis of costs and benefits, which allows to reduce the risk of arbitrary decisions, thanks to the fact that the majority of environmental effects will be expressed in economic terms; supporting administrative activities that serve to protect the environment (Śleszyński, 2018; Piątek, 2012).

## Research methods

The purpose of the work is to determine the estimated economic value of the natural environment of Góra Zamkowa in Olsztyn, which is part of the landscape park of the Eagles' Nests in the province of Silesia. The Travel Costs Method (TCM) was used to achieve the goal. The TCM is used to value non-market goods such as heritage, culture or the natural environment (Centeno, Herrero Prieto, 2000; Czajkowski et al., 2015), which are important elements of the tourism because they decide about an attractiveness for visitors and help to create a demand for touristic services. This method is used to determine the tourist and recreational value of natural areas, as well as to undertake economic and political activities resulting in changes in the environment (Piątek, 2012). The TCM uses the observed data, which is perceived as an advantage, in contrast to methods based only on hypothetical assumptions like for example the contingent valuation method (Common et al.,

1999). In the travel cost method, the value of the environment is identified with two basic elements, which are: travel costs (petrol, car depreciation, tickets) and time costs (travel time, time in a given place). In the case of time, two approaches are taken into account. In the first approach, travel time is interpreted as the time of lost opportunities (in this case it is estimated that the value of time used for travel equals the cost of travel). In the second approach, travel time is considered part of the time of recreation (this is not considered a time of lost opportunities). In this situation, the cost of time to reach the place is 0 PLN.

Obtaining information on travel costs and time spent on recreation requires making an interview with tourists. Therefore, in the estimation of the economic value of Góra Zamkowa in Olsztyn, questionnaire surveys were carried out. The information was obtained through direct and interactive conversation with respondents. The research was carried out in July, August and September 2017. The time of research was deliberate, as it is the period of the greatest intensity of tourists. Information collected from 135 respondents selected randomly.

The survey consisted of 13 questions divided into four groups. The first group were questions to characterize the respondents (their sex, age and place from they came). The second group of questions was related to the estimation of the value of time spent on recreation. It was proposed to jointly determine the value of time allocated to recreation by calculating the free-decision fund. The fixed costs of the household budget were deducted from the monthly earnings, and the remaining amount was divided into the number of working days, resulting in the amount of daily pay. The next step was to compare the daily pay with the amount of time spent on the whole travel. The daily pay rate has been multiplied for the duration of stay in the area of the analyzed facility. Using this information, the amount of earnings was calculated, which the tourist is willing to give up for recreation in the analyzed park. The third group of questions was aimed at determining how time travel to the facility is treated. The fourth part of the questions concerned the determination of the object's value in terms of time spent on recreation.

Two approaches were used to estimate the economic value of Góra Zamkowa in Olsztyn. In the first of them, it is assumed that each trip to the research area comes from the need to consume its values, which gives some benefits. The need for benefits is related to the costs of reaching a given place. The amount of the cost of reaching, or the amount of funds that respondents are willing to spend on visiting the object, is the lower limit of the object's value. This value is supplemented by the value resulting from staying in the area of the analyzed park, which is associated with the consumption of the cultural value of the object.

The lower limit of the object's value is expressed as the cost of travel back and forth. In the case of travel costs, the cost of time and transport has been taken into account. Time is not expressed in the form of money, while the cost of transport has a monetary value. The lower limit of the value of Góra Zamkowa is the total cost of travel, transport and stay. To calculate the lower limit of the value of Góra Zamkowa in Olsztyn, Bartczak's works were used (Bartczak, 2018). Due to the available data, a correction was made and the following formula was used:

$$TCRp = (2 \cdot D \cdot Cr1) \cdot V, \quad (1)$$

where:

*TCRp* – the total ride costs of one person per year,

*D* – the distance from the respondent's place of residence to the analyzed object in km,

*Cr1* – the average unit cost of ride for one person during one visit,

*V* – number of visits per year.

Due to inaccurate ride costs given by respondents, the following assumptions were made:

- a) cost of ride for people using the car is equal to 0.834 PLN/km (it was determined based on Polish transport legal regulations) (Minister Transportu, 2007),
- b) cost of ride for people traveling by bus was the same as using a car (0.834 PLN/km), because it was a private transport,
- c) for people coming by bicycle or on foot, the value of the coefficient was PLN 0,
- d) about 48 thousand people a year visit the Góra Zamkowa in Olsztyn (Regional Tourist Office, 2018).

In the final stage of the research, the social value of the examined object was also determined. It was calculated as the multiplication of an average unit cost of ride per one respondent by the average annual number of tourists visiting this object. The research was carried out in the village of Olsztyn in its part called as Góra Zamkowa. It is located a few kilometres southeast of Czestochowa. Olsztyn together with Góra Zamkowa are part of the "Eagles' Nests" Landscape Park.

## Results of the research

The survey was conducted among 135 people visiting Góra Zamkowa in Olsztyn. The respondents were divided in terms of the frequency of visits to the facility. Two groups were separated. The first group consisted of tourists who came to the mountain area for the first time. They did not answer the

question: Are they going to come again? The reason for the affirmative answer was the distance that affects the rarity of being in this region. They were respondents living more than 80 km from Olsztyn. The second group consisted of respondents living in places close to Castle Hill at a distance of 1 to 60 km. The frequency of visits to the facility by these people ranged from several to a dozen times a year. Representatives of both groups visiting the Castle Hill were inspired by a unique atmosphere, a picturesque location among the white rocks and green hills, and the possibility of spending time actively with their families. Due to the frequency of visits, a second group was selected for further analyzes. Total there were 104 people.

The surveyed tourists were asked the question of how many people they came together. There were 219 people altogether for 104 persons questioned. The most numerous group were pairs (43% of responses). A high share concerned individuals. The share of families with children was 24%. From the obtained data, it can be concluded that the object attracts diverse groups of tourists.

In order to determine the value of the environment by time, respondents were asked to provide an approximate travel time. The time of traveling the respondents to Góra Zamkowa was divided into three compartments: up to 30 min, from 30 min to 1 hour, from 1 hour to 3 hours. The largest share of respondents concerned the first and the third time interval and was respectively 46% and 47%.

Another question was related to the frequency of visits. Here, the answers are divided into four groups. Most of the respondents visit the facility several times a year, their number was 42%. The next place was filled by respondents who come to Góra Zamkowa once a year (27%). The respondents included people who came there for the first time. These were people whose distance to the research facility was over 50 km.

In the next question, respondents were asked to give the length of time they spend in Góra Zamkowa. Four intervals have been proposed: up to 30 min, 31-60 min, from 1h to 3h, and more than 3 h. 66% of all respondents in the examined facility stayed for 2 hours. 30% spent over 3 hours, and the duration of stay up to 1 hour and up to 2 hours covered 2% of the surveyed group of people. Respondents, if they come to the site of the tested object, try to spend more time here.

The key problem regarding the valuation of the environment value in the adopted method is to determine the cost of travel. Respondents were asked to provide an estimated cost of travel. Most people reported that the cost of travel is PLN 0 (38% of respondents). They were people who came by bicycle or came on foot. For 25% of respondents, the cost of reaching the tested facility was from 1 to 30 PLN, and for 24% of people it was above 61 PLN.

In order to determine the total annual ride cost of one person, the given formula was used by (Bartczak, 2018). The sum of transport costs for all respondents amounted to PLN 4725.44. The average ride cost per respondent was PLN 21.57. The minimum value that the respondents incurred was PLN 0, while the maximum value of costs incurred amounted to PLN 158.46. The minimum value of time that a single respondent spent on recreation was PLN 0 for people under 19 years of age. These people did not have their own income. However, the maximum value that tourists were willing to pay was PLN 56.70. The average value that the respondents declared was PLN 29.15. The total value of time spent in the park for all respondents was PLN 3031.37. The total value, which included travel costs and time spent on recreation for all respondents during the year amounted to PLN 7756,8.

At the end, the social value of the examined object was calculated. For this purpose, the amount of PLN 21.57/person was multiplied by 48 180 persons (i.e. the unit cost of ride of one person passing through the average number of tourists visiting the examined facility during the year – in accordance with the assumptions adopted in the research methodology). The result of the multiplication is PLN 1039242.60 and it is the social value of Góra Zamkowa in Olsztyn calculated in accordance with the travel cost method.

## Conclusions

The attempted evaluation of the value of Góra Zamkowa environment allowed the following conclusions:

- Góra Zamkowa is a part of the Eagles' Nests Landscape Park located in Olsztyn. It is characterized by the presence of rocky limestones in the form of monadnocks, numerous caves, unwooded hills with xerothermic grasslands, all creating few kilometers of paths. They provide the opportunity to admire beautiful landscapes for tourists, spending time actively with family, and provide recreation with nature.
- Góra Zamkowa was mainly visited by tourists whose distance to their place of residence was from 31 to 40 km. Among them, the largest age group were people between 31 and 40 years of age, and the largest share were respondents visiting the park several times a year.
- The average travel costs amounted to PLN 21.57, while the average value of time devoted to recreation is PLN 29.15. Travel expenses for all respondents amounted to PLN 4725.44, and the value of time devoted to recreation was 3031.37 PLN.
- The object's value is measurable, although it is characterized by variability depending on the respondent. This is due to the different value of the

two main components: the frequency of visits and the coefficient of travel costs.

- Based on the response from surveyed tourists and using the travel cost method, the social value of Góra Zamkowa in Olsztyn was estimated at PLN 1039242.60.

### The contribution of the authors

Hanna Adamska – 50% (conception, literature review, analysis of data).

Anita Głąb – 20% (acquisition of data, analysis of data).

Stanisław Minta – 30% (conception, analysis and interpretation of data).

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