

Economic Valuation of Tatras National Park and Regional Environmental Policy

Ľ. Füzyová*, D. Lániková**, M. Novorolský***

Faculty of Business Management, University of Economics, Dolnozemska cesta 1, Bratislava, Slovakia

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Abstract

This paper contains results of contingent valuation (CV) and positional analysis (PA) surveys of Tatras National Park in Slovakia that were carried out in the summer 2007 on a sample of 627 respondents. Willingness to pay based on an open-ended CV survey was used to determine the recreational value of the park. The application of the PA concerning the choice of the most preferred scenario of future development showed that residents want changes focusing on tourism and creation of more job opportunities in the ecological economy. The implementation of the results into the regional planning and decision-making process was proposed through the internalization of externalities into taxes, a comparison with the current economic and social development plan, and the institutionalization of the "TANAP fund" financed by visitors' entrance fees, whose main function will be the conservation of the national park.

Keywords: contingent valuation, willingness to pay, conjoint analysis, positional analysis, decision making

Introduction

Currently there are many economic valuation approaches used to determine and assess environmental goods and assets. The classification of these approaches is based on the type of value being investigated. Market valuation methods evaluate environmental goods and assets in the same way market goods are evaluated. The methods mentioned above are influenced by market tools, especially prices, and thus the use value of environmental goods is expressed in monetary interpretation form. "In cases where market prices clearly do not reflect collective values (for example environmental and other effects for which there is no direct market), then shadow prices should be estimated" [1]. To measure effects without the market, another approach can be utilized – Non-market Valuation Methods – which take into account both use value as well as a "non-

use value held by individuals who derive satisfaction from the mere existence of a resource such as a mineral deposit, an organism, species or ecosystem, as well as from its bequest for the benefit of future generations" [2]. These methods are based on opinions and preferences of individuals with special emphasis put on non-use values and a combination of complex and interdisciplinary valuations.

The application of non-market valuation methods is a relatively undeveloped field in the Slovak Republic and environmental impact assessment (EIA) is preferred instead. "The central idea of the EIA is that if a project is likely to have serious environmental consequences, these should be examined before the development is authorized" [3]. Whereas the EIA assesses the environmental suitability of investments with the socio-economic and economic dimensions being absent, we decided to create a methodology consisting of non-market valuation methods that would enable us to evaluate the environment in a complex way, and could be used as a crucial element of the regional planning and decision-making process as well as successful environmental policy in the Slovak Republic.

*e-mail: fuzyova@dec.euba.sk

** e-mail: dlanikova@yahoo.com

*** e-mail: m.novorolsky@hotmail.com

Methodology

The applied methodology was based on both conventional and alternative methods with the monetary as well as non-monetary interpretation forms. Qualitative research techniques such as comparison, documentation, interviews, and observations that are basic elements of the most frequently applied qualitative method – case study research (utilized for the exploration of new economic effects) were used. Yin defines the case study research method as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” [4].

Contingent valuation method (CVM), conjoint analysis (CA) and positional analysis (PA) were chosen from alternative methods.

CVM is a highly significant method of the non-market valuation of environmental goods and assets based on hypothetical preferences. It is a so-called “method based on interview” [5], where a population sample (respondents) fills in an appropriate questionnaire to elicit respondent preferences, their willingness to pay (WTP) for the environmental value conservation or willingness to accept (WTA) a financial compensation for devaluation of the environment. “The value of WTP/WTA can be elicited in several formats: open-ended question, bidding game, payment card or ladder approaches, single-bounded dichotomous choice or referendum methods, double-bounded dichotomous choice, randomized card sorting procedure” [6]. WTP was solicited in the format of an open-ended research question.

The necessity to eliminate negative effects of this method such as the influence of the respondents’ financial position on their answers, or hypothetical aspect of stated preferences (there is no guarantee that respondents’ behaviour *ex post* will reflect stated preferences *ex ante*) required the use of valuation methods that do not directly ask people to state their values in the monetary interpretation forms. “In the case of CA, values are inferred from the hypothetical choices or trade-offs that people make” [7], and several techniques can be used in the survey: contingent ranking, paired comparison, choice experiments, etc. The contingent ranking technique was used in the survey. PA is a complex valuation method based on an assessment of the economic impact of investment alternatives or alternatives of the future development in a particular region. Respondents were asked to express their preference for one group of environmental assets and services or choose the most preferred scenario.

Experimental Procedures

Questionnaires for five interest groups (visitors, residents, entrepreneurs and owners, state authority and municipality) were prepared in the first stage of the research. Questions were aggregated into five sections:

socio-demographic characteristics, economic activities in the locality and the corresponding environmental restrictions, protection of the environment versus economic interests in the region, willingness to pay for the environment, and the application of CA and PA that also contained a possibility to choose the most preferred scenario or create their own vision of the future development of the region. The pilot survey was carried out on a sample of 30 respondents.

The presented methodology was applied in Tatras National Park. The on-site survey was conducted from June 15 to September 30, 2007. Qualitative research techniques have a strong influence on the credibility of the results (only people interested in the problem are willing to fill out the questionnaire immediately without hesitation which leads to the results’ overestimation). Due to this fact, we conducted 80% of the survey personally, which helped us to gather a lot of valuable additional information. Three qualitative research techniques were used in the survey: a face-to-face interview (48.4%) with answers being written down on prepared questionnaires by an interviewer, a request to the interest groups to complete the questionnaires (46.1%), and a distribution and collection of the questionnaires by the Management of Tatras National Park (5.5%). The respondent sample was 1,000 adults with 627 questionnaires returned and correctly filled in.

The results of the research were statistically analyzed by SPSS – Statistical Package for the Social Science software, versions No. 9 and 13. For each variable, frequency analysis, standard deviation, mean, median, mode, analysis of variance as well as non-parametric Kruskal-Wallis test were determined. Detailed analyses were prepared to solve the problematic issues concerning the economic activities in the locality and the corresponding environmental restrictions. These analyses answered questions such as: which activities are absent in the region, what are the advantages of the national park existence in the locality, what has to be the priority in the region – protection of the environment or economic activities. Furthermore, the analyses discovered a willingness to pay for the environment and visitors’ attitude toward economic activities in the park. In the end, the implementation of the final results into the regional planning and decision-making process was proposed.

Results

CVM Results

CVM – willingness to pay (WTP) was used to determine the recreational value of the park and for the internalization of externalities into the regional taxes and fees. WTP was solicited in the format of an open-ended question without mentioning the payment vehicle. The non-parametric Kruskal-Wallis test was applied to compare the mean WTP of the five interest groups (visitors, residents, entrepreneurs and owners, state authority and municipality), to find out if it is sufficient for further evaluation to use the

total mean WTP of all interest groups. The results of the Kruskal-Wallis test show (Table 1) that the null hypothesis of similarities of the interest groups was rejected, because the value of the asymptotic significance (p-value) is 0.001, which is smaller than 0.05.

Therefore, the mean WTP of the individual groups was used to:

1. figure out the recreational value of the park:
 - a) using the visitors' willingness to pay for a better environment in the locality according to the following formula¹:

$$H_R = \frac{\sum WTP_{NJP} + \sum WTP_{VNNJ} \times D}{R_N} \times N \quad (1)$$

...where:

- H_R – is the recreational value of the park,
- WTP_{NJP} – is the visitors' willingness to pay for a better environment in the locality,
- WTP_{VNNJ} – is the visitors' willingness to pay an entrance fee out of those who were unwilling to pay for the better environment in the locality but were willing to pay an entrance fee,
- D – is the average number of days spent in the location by the visitor,
- R_N – is the number of respondents in the group of visitors, and
- N – is the total number of annual visitors.

The mean visitors' willingness to pay for the better environment in the locality was 329.71 SKK (Table 2). Provided that the TANAP is visited by 6 million visitors yearly, the recreational value of the TANAP based on visitors' WTP for the better environment is $2,332.0 \cdot 10^6$ SKK.

- b) using the visitors' willingness to pay an entrance fee to the TANAP according to the following formula:

$$H_R = WTP_V \times D \times N \quad (2)$$

...where:

- H_R – is the recreational value of the park,
- WTP_V – is the mean visitors' willingness to pay an entrance fee,
- D – is the average number of days spent in the location by the visitor, and
- N – is the total number of annual visitors.

The mean entrance fee that visitors were willing to pay was 54.13 SKK² (Table 2). The highest amount that visitors were willing to pay, ranged from 62 SKK to 69 SKK per

Table 1. Result of the Kruskal-Wallis test.

	WTP for better conditions
Chi-Square	18.787
degrees of freedom	4
p-value	0.001

Table 2. Mean WTP of the visitors.

	Mean visitor's WTP an entrance fee	Mean visitor's WTP for the better environment
N Valid	275	279
Missing	0	0
Mean	54.13	329.71
Median	50.00	100.00
Standard deviation	55.319	877.007
Minimum	0.00	0.00
Maximum	300.00	10,000.00

person per day, declared by visitors spending 2 weeks, 1 week, or 4-5 days in the area. The lowest amount was 32.86 SKK per person per day, as stated by one-day visitors (Table 3). The recreational value of the park based on visitors' willingness to pay an entrance fee to Tatras National Park is $2,111.1 \cdot 10^6$ SKK.

- c) using visitors' willingness to pay for a better environment and visitors' willingness to pay an entrance fee³:

$$H_R = WTP_{JP} \cdot 0.627N + WTP_V \cdot D \cdot 0.627N \quad (3)$$

...where:

- H_R – is the recreational value of the park,
- WTP_{JP} – is the mean visitors' willingness to pay for a better environment,
- WTP_V – is the mean visitors' willingness to pay an entrance fee,
- D – is the average number of days spent by the visitor, and
- N – is the total number of annual visitors.

The recreational value of the park based on visitors' WTP for a better environment and visitors' WTP an entrance fee to the national park is $2,564.0 \cdot 10^6$ SKK.

¹We had to consider that more than half of the visitors unwilling to pay for a better environment were willing to pay an entrance fee, and 41% of them thought that the income from the entrance fee should be used to improve the environment. Therefore, $(\sum WTP_{VNNJ} \times D)$ was used in the formula.

²Four visitors stated extremely high preferences. They were willing to pay a 500 SKK entrance fee. It is probable that they did not realize the necessity of paying the entrance fee to the national park every day. Therefore, their preferences were excluded from the evaluation.

³Results of the research show that 62.7% of visitors are willing to pay for a better environment as well as pay an entrance fee to the national park.

Table 3. Willingness to pay an entrance fee by number of days in the area – crosstabulation.

		Days in the area											Total		
		1 day		2-3 days		4-5 days		1 week		2 weeks		more than 2 weeks			
WTP an entrance fee	0	28	44.4%	8	18.2%	3	5.9%	11	19.0%	7	15.6%	4	22.2%	61	21.9%
	5	1	1.6%	0	0%	0	0%	0	0%	0	0%	0	0%	1	4.0%
	10	2	3.2%	3	6.8%	1	2.0%	1	1.7%	2	4.4%	0	0%	9	3.2%
	20	7	11.1%	9	20.5%	10	19.6%	8	13.8%	5	11.1%	4	22.2%	43	15.4%
	25	1	1.6%	0	0%	0	0%	0	0%	1	2.2%	0	0%	2	0.7%
	30	3	4.8%	1	2.3%	2	3.9%	3	5.2%	1	2.2%	0	0%	10	3.6%
	40	1	1.6%	2	4.5%	0	0%	0	0%	3	6.7%	0	0%	6	2.2%
	50	7	11.1%	15	34.1%	18	35.3%	11	19.0%	8	17.8%	5	27.8%	64	22.9%
	60	0	0%	0	0%	0	0%	2	3.4%	1	2.2%	0	0%	3	1.1%
	70	0	0%	0	0%	1	2.0%	0	0%	0	0%	0	0%	1	0.4%
	80	0	0%	0	0%	1	2.0%	1	1.7%	0	0%	0	0%	2	0.7%
	90	0	0%	0	0%	0	0%	1	1.7%	0	0%	0	0%	1	0.4%
	100	11	17.5%	5	11.4%	11	21.6%	14	24.1%	11	24.4%	3	16.7%	55	19.7%
	140	0	0%	0	0%	0	0%	0	0%	0	0%	1	5.6%	1	0.4%
	150	2	3.2%	0	0%	0	0%	3	5.2%	1	2.2%	0	0%	6	2.2%
200	0	0%	1	2.3%	3	5.9%	2	3.4%	4	8.9%	0	0%	10	3.6%	
250	0	0%	0	0%	0	0%	1	1.7%	0	0%	1	5.6%	2	0.7%	
300	0	0%	0	0%	1	2.0%	0	0%	1	2.2%	0	0%	2	0.7%	
Total		63	100%	44	100%	51	100%	58	100%	45	100%	18	100%	279	100%

2. To internalize externalities into the regional taxes and fees, the average WTP values of both residents and entrepreneurs were used. The results of the survey show that respondents' willingness to pay for better environmental conditions as well as their willingness to actively participate in planning and decision making in the region was surprisingly high. The mean WTP of residents was 645.40 SKK, even though we had excluded extremely high preferences (e.g. WTP 100,000 SKK – resident runs his own business in the locality) from the evaluation. The resident respondents indicated that from an environmental perspective they would invest the contributed money into rescue operations of rare species and the preservation of biodiversity. Concerning economic activity development, residents declared the necessity for an infrastructural modernization of the town of High Tatras. Residents are willing to support specific investment projects such as construction of a shopping mall, a palace of culture and science, or a swimming pool.

Despite the fact that 68.8% of entrepreneurs were unwilling to pay for the better environment, the average value of entrepreneurs' WTP was 1,043.75 SKK. Entrepreneurs would prefer investment into activities supporting their intentions e. g. improvements of the transport infrastructure and information systems in the locality and implementation of tour guide services.

Externalities exist in cases where it is not possible to identify the particular individuals who are negatively affected by the actions of others, but where public goods which accrue at large are affected, e.g. in the case of biodiversity, if a given ecosystem disappears, the negative impact of each individual might be too small to warrant individual action, but nevertheless the total impact, due to the large numbers of individuals affected, might be considerable and require policy intervention. "Most instruments developed by environmental economists and regulators to correct for external problems have been studied in the context of environmental pollution. Examples include the imposition of artificial shadow prices in the form of environmental taxes or charges which reflect the damage to public goods, the better definition of property rights with the enabling markets, and the payment for subsidization of behaviours more sympathetic to public interests, etc." [8].

In 2004, following the transfer of competencies to municipal authorities in Slovakia, a new law came into effect as of January 2005 – Act No. 582/2004 on Municipal Taxes and Fees for Waste Management and Small Construction Waste. According to this regulation, "a municipality has to charge local fees for residential waste processing and small construction adjustments from all residents. In addition to these fees, municipality and provincial

authority may introduce local optional taxes that will be further specified in general regulations” [9]. The municipality may introduce, for example: special property taxes, dog taxes, taxes for using public areas, accommodation taxes, construction taxes, etc. The provincial authority may introduce a local road tax. Both municipal and provincial authorities may introduce those taxes according to their own local terms and requirements.

Based on the aforementioned facts and legislation, in the case of shopping mall construction in the locality, households could participate in the project through the implementation of a construction tax paid by residents instead of investors during an assigned period of time (e.g. a 5-year period). The annual construction tax rate, according to the municipal regulation of the town Vysoke Tatry No. 7/2007 from December 2007 concerning local real estate taxes, is 110 SKK for each square meter of a built-up area [10]. There are approximately 1,500 households in the locality that are willing to contribute 645.40 SKK on an annual basis, which means that the residents are able to pay construction tax for a shopping mall spreading across an area of 8,800 m².

A similar internalization can be made into a road tax paid by entrepreneurs according to regional regulation No. 8/2005 of the “Presov” provincial authorities. Whereas the entrepreneurs would invest the contributed money primarily into transport infrastructure development, the road tax for the entrepreneurs could be increased by 1,043.75 SKK [11].

Conjoint Analysis Results

Conjoint Analysis (CA) and Positional Analysis (PA) do not directly ask people to state their values in a monetary interpretation form. Thus, it is possible to find out real preferences of the respondents. As part of the CA, people had to express their opinion concerning the development of fifteen activities which could change the future development of the region and should have the biggest financial support

from private, public, and European Union (EU) funds and programmes (e.g., LIFE – EU’s financial instrument supporting environmental and nature conservation projects throughout EU). Activities were chosen according to the specification of the main economic and ecological problems of the region.

Ranked activities can be gathered into the following five major groups: environmental activities (preservation of biodiversity, scenery, soil erosion, and alpine vegetation), economic activities (tourist industry, logging, local industry, and agriculture), activities referring to the socio-economic development of the region (employment, business profit, and income of individuals), activities concerning environmental management and municipality (waste processing economy and regulation of transport) and support of the traditional folklore and sightseeing. The respondents were asked to rank activities from the most to the least favourite. Fig. 1 shows preferences of all interest groups.

The group of environmental activities was the most important to all interest groups except for entrepreneurs, who expressed their support only to the scenery (from the group of enviro-activities), the most supported activity of all fifteen. The most preferred from the above-mentioned group were scenery, preservation of biodiversity, and alpine vegetation.

The economic activities were on the edge of interest for all interest groups. An exception was the tourist industry, which ranked the second most preferred activity of all. The fourth position was taken by employment, which constitutes a part of the activities referring to the socio-economic development of the region. Alpine vegetation, support of the traditional folklore and sightseeing, regulation of transport and waste processing economy followed.

Significantly different preferences were declared by the visitors, who gave their support to environmental activities, to traditional folklore and sightseeing and to the development of tourist industry in accordance with our expectations. The residents and the municipality preferred the tourist industry to scenery and employment, but each group

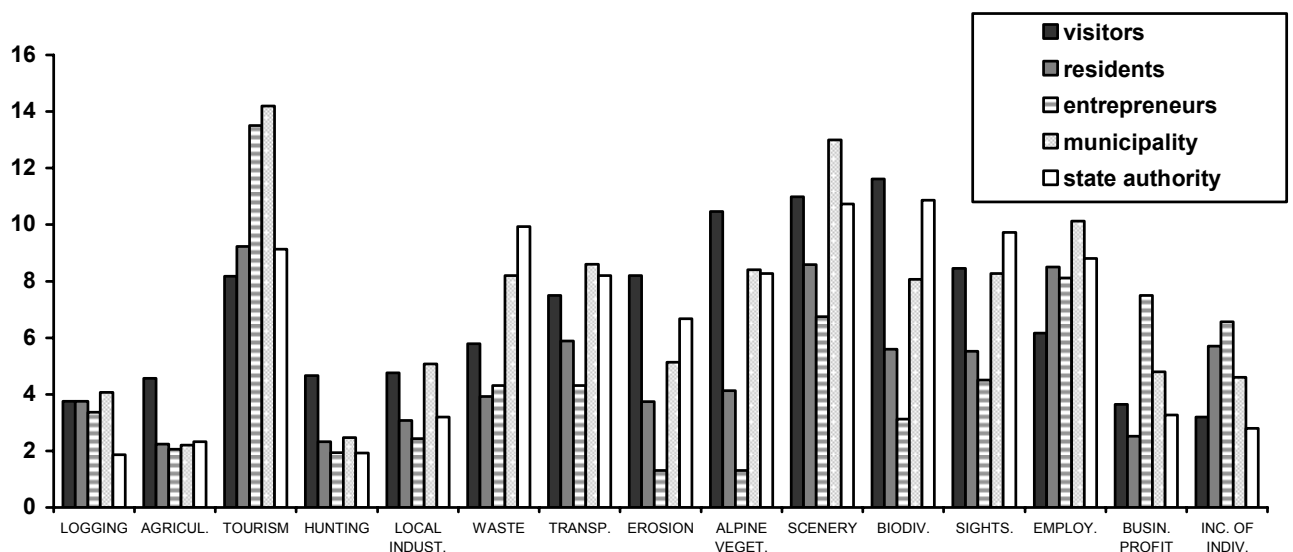


Fig. 1. Preferences of all interest groups concerning the development of 15 activities.

has a completely different view on the development and category of tourism. The entrepreneurs voted for the development of a tourist industry and socio-economic activities.

Positional Analysis Results

In this part, three scenarios of the future development of the region were offered to the respondents.

- Scenario A_0 was an alternative with special changes made neither to the quality of the environment nor to the development of the locality.
- Scenario A_1 was an alternative with changes concerning implementation of the ecological economy focusing on eco-tourism and job creation.
- Scenario A_2 was markedly focused on the protection and conservation of the countryside.

If respondents could not identify with any of the proposed scenario, they could suggest their own vision of the future development of the region or whatever combination of items were used in scenarios.

The first alternative, A_0 , is focused on maximal business exploitation of the locality, development of mass tourism⁴, construction of modern hotels, ski-lifts and ski-tracks with a tendency to decrease the level of the environmental conversation in the town Vysoké Tatry. The A_1 alternative is looking for a balance between economic development and nature through sustainable development and eco-tourism considering capacities of the national park (NP). The A_2 alternative enforces limitation of the economic activities in the area of the NP, restrictions concerning individual automobile transportation and focuses on protection, exploration and educational services.

The biggest support (66.2%) from the 627 respondents was given to scenario A_1 , which asserts changes concerning the ecological economy. The most preferences were given to this scenario by the residents (74.2%). Other interest groups varied between 53 and 59.5%. The present situation is the most convenient for the municipality (33.3%) and entrepre-

neurs (25%). An ecologically oriented scenario was supported by 6.5% of all interest groups, with the exception of the visitors (13.3%) and municipality (0%) (Fig. 2).

Result Implementation into Regional Environmental Policy

“Revealed or stated preferences can be useful information for current decision-making, but can also serve as a message and some indication for future policy goals and priorities” [12]. Therefore, the aim of our research was to create an appropriate methodology based on non-market valuation methods, application of this methodology and implementation of the results into the regional planning and decision-making process. The results of our applied research were used as follows:

- a) A proposal of the institutionalization of the “TANAP (park) fund”. Based on the empirical research results (the average value of the visitors’ willingness to pay an entrance fee into the park was 54.13 SKK) and acquired experience, an entrance fee in to the park and the establishment of the “TANAP fund” controlled by a supervisory body were suggested. An executive body would be the board of management, consisting of representatives of the state authority, municipality, entrepreneurs, residents, and scientists. The main function of the fund will be the management of the national park and its conservation. Strict rules will be set concerning the allocation and investment of income. 60% of the income will be retrospectively used to solve problems of the national park and to protect the environment in the region and the remaining 40% will support activities proposed by representatives of the municipality, entrepreneurs, residents, and scientists to be approved by the supervisory body. A three-year investment plan will be elaborated based on results of modern environmental economics research studies that will guarantee participation of all interest groups in life and development of the region,

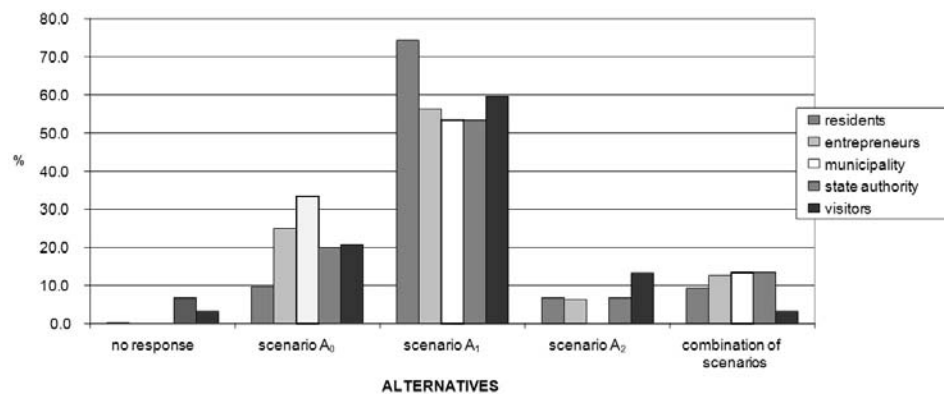


Fig. 2. Preferences of all interest groups concerning scenarios of future development.

⁴An uncontrolled development of mass tourism can lead to serious damage of the environment e.g., “synantropization of phyto-coenoses” (an expansion of invasive alien species caused by human-induced changes to the environment) or traffic air pollution and resultant increase of the ground level ozone concentration.

- b) an internalization of the results into regional taxes and fees, and
- c) a comparison with and a status checkpoint of a current plan of economic and social development (PESD) of the town Vysoké Tatry was conducted focusing on developmental areas, determined to be the most important to support and develop by the survey respondents:
 - 1) an area of the tourist industry,
 - 2) an area of environmental activities – preservation of the environment and cultural heritage and
 - 3) an area of social infrastructure.

Based on a comparison of the PESD with the results of our survey we can state that the plan is very well prepared according to the principles of sustainable development with a lot of details and its basic formulations correspond to the results of our applied research. But it is important to state that there are either disagreements concerning the implementation approaches or an absence of the realizations of some parts of the plan. The same features were discovered while examining interest group preferences concerning the development of the activities in the region. There is no major disagreement among the interest groups with regard to the specification of the needed activities, but the groups have completely different views on the method and form of its realization. This was possible to find out only thanks to the participation of all interest groups in the applied research using the non-market valuation methods. “Implementing conservation strategies based on economic incentives requires extensive and constant communication with the local participants about the program” [13]. It follows that the participation of all interest groups in the life of the region is crucial to start the planning process. Only in this way it is possible to eliminate the tension between the interest groups and maintain sustainable development of the region.

Discussion

The results of the economic-environmental evaluation applied in the Vysoké Tatry region show a high willingness to pay for a better environment in the park among the respondents, as well as a high willingness to pay an entrance fee into the national park by the visitors. Both of these were used as a sufficient base to determine the recreational value of the national park and possible incomes from tourism in the region. The identification of the economic importance of the national park is the information that could be used in the regional planning and decision-making process because it reflects social (non-use) values that are impossible to determine by typical accounting methods.

The infrastructural modernization of the town Vysoké Tatry, the development of sanatoriums and treatment centres and activities supporting tourism gained the biggest support of the respondents. A shortage of money was cited most frequently as a barrier to realize the proposed activities. None of the interest group showed an interest in canceling the protection of the national park, although they do

not see any economic advantages of its existence. An overall majority of the visitors expressed their opinion that economic activities realized in the national park are harmful for the environment, thus degrading its attraction. On the other hand, they think of economic activity development as an unfortunate necessity.

An alternative oriented towards sustainable development and conservation of the environment for the future generation was chosen from the scenarios of the future development of the region. The concept of sustainable management of the natural resources and eco-tourism in national parks is not new, since one of the initiators of the oldest European border parks (Pieniny National Park, Tatras National Park), Polish scientist Prof. Wallery Goetel, recommended as much more than 75 years ago. What is new is the urgent need to implement the above-mentioned ideas.

The respondents ranked activities that could change the future development of the region and should have the biggest financial support of private as well as public funds, in the following order: scenery, tourist industry, preservation of biodiversity, employment, alpine vegetation and folklore and sightseeing. Considering the strong support for the development of the tourist industry and tour guide services by all interest groups, it is very likely that special educational programs for tourists as well as interactive guidelines will need to be developed and implemented. Such activities will certainly contribute to the growth of a local labour market and improved employment levels.

Based on empirical research, the results propose real possibilities for its implementation into the planning and decision-making process through the internationalization of the results into regional taxes, the institutionalization of the “TANAP fund” and an adjustment of the current Plan of economic and social development of the town Vysoké Tatry. “Without valuation, it may be difficult to set an appropriate payment level, or even to determine whether the program is worth implementing at all” [14].

The basic requirement of sustainable development – the participation of all interest groups in the planning of the region’s future – was achieved thanks to the innovative approaches in the evaluation of the environment that were used in the applied methodology. The values of the environmental goods were inferred from the preferences and opinions of the interest groups – consumers. Decisions based on the preferences and opinions of consumers, taking into account intrinsic and social values expressed by the interest groups, intensify democracy and transparency of the decision making. Furthermore, economic efficiency is also reflected in a larger number of

- a) prepared and supported developmental projects,
- b) good quality services for the residents,
- c) developmental projects realized in cooperation with the economic and social partners and residents involved in sustainable development programs and projects.

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