

# EVALUATION OF RURAL TOURISM IN THE AREA OF BRČKO DISTRICT USING MULTI-CRITERIAL DECISION-MAKING METHODS

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## ABSTRACT

*The aim of the research in the paper is to evaluate the state of rural settlements in Brčko District with regard to the development of rural tourism. Together with the Tourism Department of the Brčko District, five experts from the field of tourism were selected and they evaluated the current state of rural settlements in this part of Bosnia and Herzegovina. The evaluations were processed using the fuzzy approach with the SWARA (Stepwise Weight Assessment Ratio Analysis) multi-criteria decision-making method. Using this method, the weights of the used criteria were determined, representing the degree of development of conditions in rural settlements. The results showed that "rural facilities and services" are the best developed in rural settlements, while the criteria related to feelings and experiences are the least developed. Based on this research, it is possible to implement measures to strengthen certain criteria that have not been adequately developed in order to further improve rural tourism in Brčko District.*

**Key words:** rural tourism, rural settlements, SWARA method, Brčko district.

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## INTRODUCTION

Rural areas suffer from the challenges of declining economic activity, restructuring of the agricultural industry, aging of the population and emigration of highly educated youth, and these areas are becoming less and less sustainable [1]. In order to improve the situation in rural areas, tourism is increasingly being accepted as an alternative means of revitalization. Tourism in rural areas is an instrument of development of these areas [2]. Rural tourism has great potential for the development of those areas. By visiting rural areas, tourists will stay in that area and buy products in that area, thus economically developing that area.

Rural tourism can be defined as a form of tourism that allows visitors personal contact with the warmth of the physical and human environment, and, as far as possible, participation in the activities, traditions and lifestyle of the local population [3]. When implementing this type of tourism, one should not only use accommodation facilities, but also restaurant, sports, recreational, thematic facilities and other facilities in the rural area such as: ethno-parks, adrenaline parks, ecological villages, ethno-villages and the like [4]. In this way, tourists will have a complete service, and their satisfaction with that service will be greater and they will be loyal [5].

In order to develop rural tourism, it is first necessary to evaluate the development of rural settlements. That evaluation is done on the basis of certain criteria and the assessment of those criteria. Therefore, in this paper, a multi-criteria evaluation of the quality of rural areas in the Brčko District, necessary for the development of tourism, will be carried out, which is also the goal of this paper. Achieving this goal will

be done by combining expert evaluation with Multi-Criteria Decision Analysis (MCDA). On that occasion, the fuzzy SWARA (Stepwise Weight Assessment Ratio Analysis) method will be used, which will determine the weights of the criteria based on their quality.

- By realizing this goal, the contribution of this paper will be in the following:
- Creating a model for examining the quality of conditions in rural settlements for the improvement of rural tourism,
- Examining the current state of rural settlements in terms of conditions for improving rural tourism,
- Giving guidelines as to which conditions should be improved in order to develop rural tourism in Brčko District.

Apart from the introduction, the paper is divided into five parts. In the literature review, an overview of previous research related to the improvement of rural tourism will be carried out. In the work methodology section, the way in which research will be carried out and the applied methodology will be explained. Part of the case from practice will focus on rural settlements in Brčko District. In the results of the research, the weights of the quality of the conditions prevailing in the rural areas of Brčko District will be calculated. In the part related to the discussion, guidelines will be given for the improvement of rural areas in order to achieve the development of tourism in Brčko District. In the conclusion, the most important research results will be given, as well as limitations and guidelines for future research.

## LITERATURE REVIEW

In their earlier research, Podovac, et al. [6] examined the possibility of improving rural tourism on the Goč mountain. Their research showed that it is necessary to improve the quality of accommodation facilities and the quality of added content of rural tourism. Puška et al. [7], using the example of four rural settlements in the Brčko District of BiH, evaluated the tourist potential of these settlements and gave guidelines for their improvement. They determined that the rural areas of the Brčko District of Bosnia and Herzegovina should use their potential in order to develop rural tourism in the District of Bosnia and Herzegovina. Lily, et al. [8] conducted research on rural tourism in China and found that tourists are concerned about the service capacity of rural settlements, and this should be improved in order to expand rural tourism.

Shi, [9] used an intelligent algorithm using neural networks to build a model for predicting the number of tourists in rural areas in China. On that occasion, the results showed that it is necessary to change marketing strategies and price strategies in order to improve rural tourism. Puška et al. [10] applied the methods of multi-criteria analysis in order to examine the rural tourism potential in Brčko District on the example of six rural settlements. In this way, they obtained results that show that rural settlements in Brčko District have potential for the development of rural tourism. Tirado Ballesteros and Hernández Hernández [11] investigated the challenges related to destinations located in rural areas, for example Castilla-La Mancha in Spain. Their results showed that public-private partnerships, marketing management skills and integration with activities in this rural area are a condition for improving this type of tourism.

Kostić and Stanišić [12] investigated rural tourism in Serbia and determined that these areas have preserved nature. The results of their research showed that it is necessary to make an adequate valorisation of the available potentials, as well as that the management of existing limitations can be an adequate condition for the improvement of tourism. Maksimović, et al. [13] investigated rural tourism on Stara planina. They determined that the development of rural tourism should be done in a planned way so as not to endanger the ecosystem of that area. Šarković [14] investigated how the media can be used as a factor in the development of rural tourism. Their results showed that the media play a major role in strengthening environmental awareness and that they influence the development of rural tourism

Wang [15] teaches rural tourism in China as an example for building an intelligent and integrated modern case of using Internet of Things (IoT). The results showed that the use of Internet of Things can improve rural tourism in China as more and more younger tourists visit these destinations. Ristić [16] examined rural tourism in Serbia, and then pointed out that there is a great importance of the development policies of the state in the development of these settlements. Through her research, she determined that comprehensive and continuous work on the reconstruction and development of rural areas is necessary. Zhang, et al. [17] determined that rural settlements are an important carrier for the quality development of rural tourism. They determined that it is necessary to use the spatial distribution of rural settlements in China in order to improve rural tourism

## METHODOLOGY

When examining the quality of rural settlements with regard to the application of rural tourism in Brčko District, expert decision-making was used. Together with the Department of Tourism of the Brčko District Government, five experts were selected, and they gave evaluations regarding the quality of rural settlements. Those experts rated the quality of the criteria for rural settlements, which ranged from the highest “very good” to the lowest “very low”, while using a seven-degree rating scale shown in the following Table 1.

*Table 1. Linguistic values and membership functions*

Linguistic values	Fuzzy numbers
Very low (VL)	(0,0,1)
Low (L)	(0,1,3)
Medium low (ML)	(1,3,5)
Medium (M)	(3,5,7)
Medium good (MG)	(5,7,9)
Good (G)	(7,9,10)
Very good (VG)	(9,10,10)

Linguistic values from this scale will be transformed into fuzzy numbers using the membership function. Then it will be processed using the fuzzy SWARA method and the weights of the main and auxiliary criteria will be determined. The reason for using fuzzy logic in the paper is an attempt to make the final decision as close as possible to human thinking [18, 19]. Given that previous researches do not know the wide application of this method of multi-criteria decision-making when it comes to the development of rural tourism, the importance of the application is greater for the research. The authors of the SWARA method are Keršulienė et al. [20]. SWARA has the following steps [21]:

Step 1. Identification and selection of criteria

Step 2. Sorting the criteria according to their importance from the most to the least important

Step 3. Determining the relative importance of criteria. Here, the criterion that has the greatest significance takes the value of one (1), while the value of the other criteria is determined in relation to their significance.

Step 4. Calculation of the value of the coefficient  $k_j$ , based on the expression:

$$k_j = \begin{cases} 1 & \text{if } j = 1 \\ s_j + 1 & \text{if } j > 1 \end{cases} \quad (1)$$

Step 4. Calculation of the value of the coefficient  $q_j$ , based on the expression:

$$q_j = \begin{cases} 1 & \text{if } j = 1 \\ \frac{q_{j-1}}{k_j} & \text{if } j > 1 \end{cases} \quad (2)$$

Step 5. Calculating the weight of the criteria  $w_j$ , based on the expression:

$$w_j = \frac{q_j}{\sum_{k=1}^n q_k} \quad (3)$$

The weight determination process will be done using the methodology set by the authors Štilić et al. [22]. First, five experts will evaluate the main and auxiliary criteria using linguistic values. Then those linguistic values will be transformed into fuzzy numbers [23, 24]. The next step is to determine the average fuzzy scores for the main and auxiliary criteria. After that, the ranking of the main criterion and auxiliary criteria is performed according to the average marks. At the end, the steps of the SWARA method phase are performed, which will be explained in detail in the research results.

In order to do all this, it is necessary to create a decision-making model. In the decision-making model, the main and auxiliary criteria were used, which were adapted from the research: Zhu, et al. [25], Mikulić, et al. [26], Topolansky Barbe, et al. [27], Yan et al. [28], Peng & Tzeng [29], Mijajlović, et al. [30] Puska et al. [7]. In total, four main criteria and fifteen auxiliary criteria were used. These criteria are presented in the following figure 1. Based on this model, the current state of rural settlements in terms of the implementation of rural tourism will be evaluated.

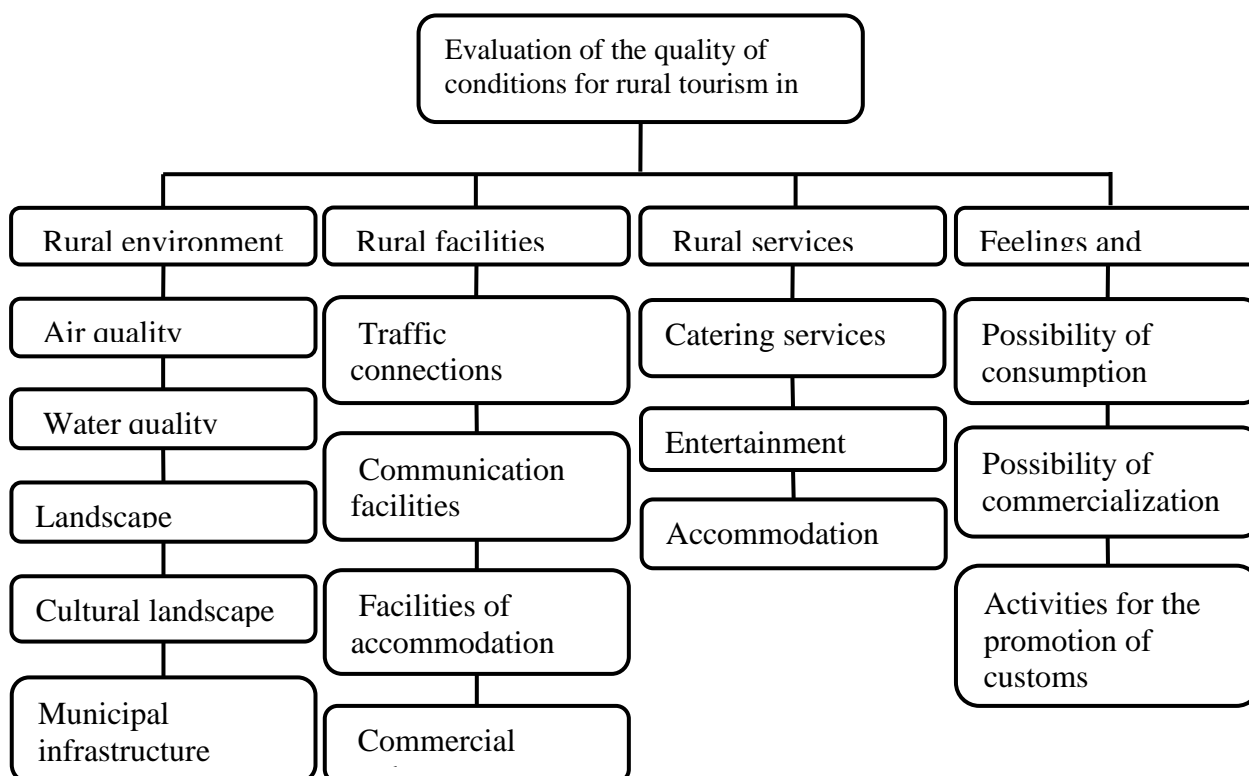


Figure 1. Decision-making model

## AN EXAMPLE FROM PRACTICE

Rural settlements in the surroundings of Brčko District have the specificity of today's rural environment. The municipality of Brčko District includes one urban and 62 rural settlements. The population is divided by urban-rural structure in the ratio: 47.3% urban and 52.7% rural population. The development of the tourist offer in rural settlements in Brčko District requires the will and active involvement of rural households, but also the support of the authorities in ensuring quality conditions and incentives for improving services. Rural tourism is not so widespread in Brčko District, so it needs to be improved.

In order to improve these conditions, it is possible to implement more models of rural tourism in rural settlements. The Brčko District government has provided guidance on how rural tourism should be developed through the following two forms:

- System of Katun tourism;
- Ethno-boarding system or rural tourism activity.

The first model is developed in the specific environment of the tourist "katun". It is a newly built or adapted and modified part of the village settlement fund, where tourists are accommodated, and very refined and rich content of the stay is organized. Most often, this type of activity is carried out by a rich and urban-life-saturated clientele. The second model, through share ownership, cooperatives, lending or some other type of financial support, is defined by a certain number of rural householders who put a part of their residential and commercial buildings into the function of tourist accommodation. Potential users are mostly a clientele of medium paying capacity, most often families, but also young people, adventurers, researchers, supporters of healthy and preserved nature, etc.

In certain zones of Brčko District, it is possible to combine these two models of offer under certain program conditions, with clear norms and standards. Through these two models, the tourist offer would be enriched, and rural settlements would be more competitive on the market. Here, it is necessary to take advantage of the hospitality of the rural population, their customary, folkloric and old craft forms, the preparation of food and entertainment according to the various traditions of the people of Brčko District. In this way, a competitive type of tourist product could be ensured. The contribution to this would be in raising the standard of living of the population in the rural settlement of Brčko District.

The designed program of these two tourist product models could very quickly become competitive on the BiH market. First of all, it is affordable for a good part of the impoverished population in the cities, and with marketing activity it could prove to be a call for domestic socializing and relaxation. In addition to nature and healthy food, the villages in Brčko District have a rich ethnographic offer, with diverse architectural and ethnographic material, but also intangible heritage, as well as potential archaeological parks.

## RESEARCH RESULTS

In order to determine the state of rural settlements in terms of carrying out tourist activities, an expert opinion was used. The experts gave their evaluation of how rural settlements were developed and this is presented in table 2.

*Table 2. Expert assessment of criteria*

Criteria	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5
Rural environment(C1)	MG	M	M	ML	MG
Air quality(C11)	ML	MG	M	L	VL
Water quality (C12)	M	ML	MG	ML	ML
Landscape (C13)	MG	M	MG	M	MG
Cultural landscape (C14)	M	M	M	M	L
Municipal infrastructure (C15)	ML	ML	L	M	M
Rural facilities (C2)	G	G	M	MG	G
Transport connectivity (C21)	MG	MG	MG	MG	L
Communication facilities (C22)	G	G	M	M	G
Accommodation and recreation facilities (C23)	ML	ML	M	M	ML
Commercial outlets (C24)	VL	ML	L	ML	VL
Rural services (C3)	MG	MG	M	M	MG
Hospitality services (C31)	M	M	ML	M	ML
Entertainment (C32)	VL	L	VL	M	VL
Accommodation services (C33)	ML	ML	L	ML	ML
Feelings and experiences (C4)	M	M	ML	ML	M
Ability to spend (C41)	L	ML	L	L	L
Possibility of commercialization (C42)	VL	L	L	L	L
Activities for the promotion of customs (C43)	MG	M	M	M	MG

After transforming the linguistic values into fuzzy numbers, the average values of these ratings are calculated (table 3). The average value is used to give all experts the same importance in the evaluation. If the average value was not used, then the evaluations of individual experts would be more valued in relation to the evaluations of other experts and their evaluations would have a greater influence on the final result.

*Table 3. Average fuzzy evaluations by experts*

Criteria	Average fuzzy number		
Rural environment (C1)	3.40	5.40	7.40
Air quality (C11)	1.80	3.20	5.00
Water quality (C12)	2.20	4.20	6.20
Landscape (C13)	4.20	6.20	8.20
Cultural landscape (C14)	2.40	4.20	6.20
Municipal infrastructure (C15)	1.60	3.40	5.40
Rural facilities (C2)	5.80	7.80	9.20
Transport connectivity (C21)	4.00	5.80	7.80
Communication facilities (C22)	5.40	7.40	8.80
Accommodation and recreation facilities (C23)	1.80	3.80	5.80
Commercial outlets (C24)	0.40	1.40	3.00
Rural services (C3)	4.20	6.20	8.20
Hospitality services (C31)	2.20	4.20	6.20
Entertainment (C32)	0.60	1.20	2.60

Accommodation services (C33)	0.80	2.60	4.60
Feelings and experiences (C4)	2.20	4.20	6.20
Ability to spend (C41)	0.20	1.40	3.40
Possibility of commercialization (C42)	0.00	0.80	2.60
Activities for the promotion of customs (C43)	3.80	5.80	7.80

Since the average fuzzy scores have been determined, the weights are calculated using the fuzzy SWARA method (table 4). First, the criteria that received the highest score are determined, and then the criteria are ordered according to the value of the fuzzy number. Using the example of the main criteria, the method of forming the weights of the criteria for this research will be explained. The criterion with the highest rating is set as the first criterion and is assigned a value of  $s_j$  one (1) in this case it is criterion C2, then this value is calculated for the next criterion and this value is obtained by subtracting the average value of criterion C3 from the average value of criterion C2. In this way, the values of  $s_j$  for all criteria are formed. Coefficient  $k_j$  is calculated by adding one (1) value of coefficients  $s_j$ . Then the values of prominent importance ( $q_j$ ) are calculated. or the first criterion, the value  $s_j$  is rewritten. Value  $q_j$  for criterion C3 obtained by dividing the value  $q_j$  from criterion C2 y the value  $k_j$  from criterion C3. The  $q_j$  values for the other criteria are also obtained in the same way. The next step is to calculate the sum for the values of  $q_j$ , and to calculate the weights of the criteria. Criterion weights are obtained by dividing individual values  $q_j$  with the total sum of values  $q_j$ . After that, the defuzzification is calculated, that is, the fuzzy number is converted into a real number, after which the final weights are obtained.

*Table 4. Calculation of weights for the main criteria using the fuzzy SWARA method*

	$s_j$	$k_j$	$q_j$	$w_j$	$w$
C2	1.00	1.00	2.00	2.00	2.00
C3	1.60	1.60	2.60	2.60	2.00
C1	0.80	0.80	1.80	1.80	2.00
C4	1.20	1.20	2.20	2.20	2.00
			3.39	3.39	3.81

Using the above-mentioned approach, weights are formed for all criteria and auxiliary weights, and local ranking orders within the main criteria and between main criteria and global ranking orders for auxiliary criteria as a whole are calculated (table 5). The local rankings show that criterion C2 (rural facilities) received the highest weight from the main criteria, while criterion C4 (Feelings and experiences) received the lowest weight. These results show us that in the case of rural settlements in the Brčko District, rural facilities are the most developed, while the criterion of feelings and experiences is not sufficiently developed, that is, this criterion is the least developed.

Observing the weights for auxiliary criteria within criterion C1 (rural environment), it can be seen that auxiliary criterion C13 (Landscape) received the highest value, while auxiliary criterion C11 (Air quality) received the lowest value. For the main criterion rural facilities, the auxiliary criterion C22 (Communication facilities) received the highest weight, while the auxiliary criterion C24 (Commercial outlets) received the lowest weight. For the main criterion of rural services, the auxiliary criterion C31 (Catering services) received the highest weight, while the auxiliary criterion C32 (Entertainment facilities) received the lowest weight. For the main criterion of feelings and experiences, the auxiliary criterion C43 (Activities for the promotion of customs) received the highest weight, while the auxiliary criterion C42 (Possibility of commercialization) received the lowest weight).

When looking at the global rankings of the auxiliary criteria, auxiliary criterion C22 (Communication facilities) received the highest weight, followed by auxiliary criterion C21 (Transport connectivity), while auxiliary criterion C42 (Possibility of commercialization) received the lowest weight.

*Table 5. Rank order of main and auxiliary criteria*

Criteria	Expert 1	Local rank	Expert 2	Global rank
Rural environment (C1)	0.1300	3		
Air quality (C11)	0.0839	5	0.0180	13
Water quality (C12)	0.1600	3	0.0348	8
Landscape (C13)	0.4885	1	0.1059	4
Cultural landscape (C14)	0.1648	2	0.0357	7
Municipal infrastructure (C15)	0.1029	4	0.0226	10

Rural facilities (C2)	0.5791	1		
Transport connectivity (C21)	0.2580	2	0.1994	2
Communication facilities (C22)	0.6315	1	0.4882	1
Accommodation and recreation facilities (C23)	0.0852	3	0.0659	5
Commercial outlets (C24)	0.0261	4	0.0200	12
Rural services (C3)	0.2341	2		
Hospitality services (C31)	0.4885	1	0.1198	3
Entertainment (C32)	0.0907	3	0.0206	11
Accommodation services (C33)	0.1905	2	0.0445	6
Feelings and experiences (C4)	0.0591	4		
Ability to spend (C41)	0.0931	2	0.0055	14
Possibility of commercialization (C42)	0.0608	3	0.0035	15
Activities for the promotion of customs (C43)	0.4885	1	0.0289	9

## DISCUSSION

For the development of tourism in rural settlements, it is necessary to have certain conditions [31]. The results show us that in rural settlements there is a well-organized infrastructure in terms of traffic and communication connections. All rural settlements have access to the Internet, and all settlements are relatively easy to reach. However, these facilities are rarely used for the purpose of developing tourism in the Brčko District of Bosnia and Herzegovina. In addition, it is necessary to strengthen rural capacities for receiving tourists. Two models can be used here, namely the Katun tourism system and the ethno-boarding system, with the fact that the ethno-boarding system is easier and faster to apply in Brčko District.

After rural facilities, rural services were valued the most. Experts said that rural settlements in Brčko District have good catering services, but they lack entertainment facilities in those settlements. Almost every rural settlement has a certain event that is organized once a year [10]. When these events are held, there is entertainment content in those rural settlements, when there are no such events, there is nothing that could attract additional content. The tourist offer should not be exclusively built on these events, but it is necessary to provide year-round entertainment. In this way, tourists would be given entertaining content to see and participate in at every moment.

After rural services comes the rural environment. According to experts, rural settlements in the Brčko District of Bosnia and Herzegovina have a good natural environment, but that environment is not preserved. Rivers have become sewers, and in winter days there is a greater amount of smog created by heating residential buildings. That is why it is necessary to carry out environmental actions to preserve the natural resources available to these rural settlements. It is necessary to work on the sewage collectors and purify the waste water [7]. In addition, the Brčko District Government must subsidize the use of ecological sources for heating residential buildings.

The lowest rated of all these criteria for the condition of rural settlements in terms of tourism is the criterion of feelings and experiences [32]. Here, the auxiliary criterion of activity on the promotion of customs is highlighted, which received the highest value in this main criterion. This is because the rural settlements in the Brčko District cherish their traditions and customs [2]. However, problems arise when a tourist wants to buy something. The commercialization of goods produced in these settlements is not well developed. There are no shops with souvenirs or local products for tourists to buy and thus develop the local community [4]. There are classic shopping centres and shops where everyday goods are sold. That is why it is necessary to strengthen local crafts and handicrafts characteristic of certain rural settlements. In this way, tourists can visit that settlement and buy something that would associate them, and later remind them of that settlement, so that they would visit that settlement again.

## CONCLUSION

The aim of this paper was to examine the development of rural settlements in terms of the implementation of rural tourism. This research has shown that rural settlements have potential for tourism development. Those potentials are currently expressed through rural facilities and services. In addition, this research has also shown what needs to be strengthened in these rural settlements in order to work on improving tourism.

The obtained results showed that rural settlements in the Brčko District have potential for the development of rural tourism, but it is necessary to work on it. Rural settlements cannot do this alone, they need institutional support from the Brčko District Government.

Limitations in conducting this research are mainly focused on the fact that all rural settlements were observed at the same time. Future research should examine the conditions of individual rural settlements. In future research, it is necessary to examine the basis on which certain rural settlements would build their tourist offer and what should be improved in them.

In order to strengthen rural tourism in the Brčko District of Bosnia and Herzegovina, it is necessary to approach it systematically, where activities on the development of this type of tourism would first be planned in strategic documents, and then activities on the implementation of these strategies would be carried out. Only with such an approach and the support of the Government of the Brčko District of Bosnia and Herzegovina, can rural tourism in rural settlements be adequately improved.

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