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Tourism and sustainable development of rural settlements in protected areas - Example NP Kopaonik (Serbia)

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ABSTRACT

With the formulation of tourism development strategies for the social and economic development of an area, rural tourism moved to a more complex phase of development. Numerous empirical studies have shown that different forms of rural tourism can have positive and negative effects on the natural and socio-economic context in the area where they are present. There are several methodologies for assessing the development of tourism in rural areas. One of the efficient and commonly used tools in preliminary decision-making phases and a precursor to strategic planning is SWOT analysis, which allows the identification of the best strategy that maximizes strengths and opportunities, and minimizes weaknesses and threats. In this study, a survey was conducted using the method of selecting respondents in order to diagnose the economic, social, cultural and environmental aspects with a focus on strengths and weaknesses in rural settlements in the area of National Park (NP) Kopaonik and its protection zone. Through the SWOT analysis, based on the attitudes of the local population, defined twenty indicators that determine the Sustainable Rural Development Index (SRDI). Research has shown that in area, the influence factor in strengths is higher in relation to the weaknesses, while the influence factor in opportunities is higher than in threats. The final result of the SRDI (0.63), shows that the current development of tourism is within the limits of sustainability and contributes to the sustainable development of rural settlements. The results of the research are the basis for the development of the strategy for future development of tourism in the research area.

1. Introduction

In 1987, The Brundtland Commission was the first to define sustainable development as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). In the same period, the harmonization of the tourism economy with the goals of sustainable development began (WCED, 1987). Due to the complex interactions between natural resources, tourism development and local communities, the central theme in rural areas is sustainable tourism (Palmisano et al., 2016). Despite the rich literature on this topic, the current direction of ecotourism poses challenges to sustainable development (Ocampo et al., 2018). An EU Rural Development Policy (EU) was created in order to help rural areas deal with a wide range of environmental, economic and social challenges (European Commission, 2013). Sustainable tourism indicators can provide essential guidance for decision-making in terms of developing priority strategies that are essential inputs for resource allocation and medium and long-term planning, among other activities (Ocampo et al., 2018). The key role of spatial planning is reflected in the realization of sustainable development (Mascarenhas et al., 2015). Planners and other stakeholders need to identify and analyze the linkage between plans, implementation efforts and the sustainability of outcomes (Berke and Conroy, 2000; Gillen and Scanlan, 2004), although monitoring planning policy is not an easy task to accommodate, as there are some inherent difficulties involved, both conceptually and methodologically (Mascarenhas et al., 2015).

Rural tourism, ecotourism, green tourism, responsible tourism, alternative tourism and other similar terms describe tourism activity in peripheral rural areas (Komppula, 2014). Tourism is also recognized as a sustainable way of developing a region with rich tourism resources (Jeong et al., 2014). The goals of ecologically sustainable tourism are:

- to improve material and non-material well-being of communities,
- to preserve intragenerational equity,
- to protect biological diversity and to maintain ecological systems

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and
- to ensure cultural integrity and social cohesion of communities (Lane, 1994).

Moscardo (1998) described three principles of sustainable tourism:

- quality (quality experience for visitors, improvement of the quality of life of the host community),
- continuity (of natural resources) and
- balance (between the needs of hosts and of the environment).

Mihalic (2016) proposed a new term "responsustable tourism" to emphasize that responsible tourism behaviors follow the concept of sustainable tourism. Tourism lands distribution was determined by elevation, slope, and distances to main roads, watersheds, and existing lands (Liu et al., 2018). With increased interest in developing local marketing in order to connect tourism strategies with social and economic development of the territory (Ray, 1998), rural tourism has entered a complex phase of development. This is indicated by empirical research where different forms of rural tourism can have positive and negative effects on the environment and on the socio-economic context in the area where they are present (Randelli et al., 2014). Tourism is sustainable when it is able to generate development that is compatible with both the needs of the tourist destination and its economic constraints (Paskaleva-Shapira, 2007; Timur and Getz, 2009), which means it is essential to respecting the ecosystem and cultural environment aligned with the growth of the territory (Romolini et al., 2017). The right balance between the needs of tourists and local and environmental communities requires a sustainable approach to the management of tourist destinations (Zolfani et al., 2015).

A meta-analysis of studies proposing sustainable tourism dimension in rural settlements and indicator themes that were published between 2000 and 2019 is undertaken. Studies were selected based on the criteria determined by the research questions. They had to be relevant and potentially applicable. Identified indicators also had to be validated through either expert opinions or by stakeholder inputs (i.e. interviews, workshops or surveys) in order to ensure their relevance. The search for candidate papers was conducted on online databases, "Google Scholar", "Scopus" and "Web of Science" using the keywords "indicators of sustainable tourism", "sustainable rural tourism" and "indicators of sustainability". The following studies were analyzed: studies that determined the indicators for measuring sustainable tourism (Choi and Sirakaya, 2005, 2006; Chávez-Cortés and Maya, 2010; Agyeiwaah et al., 2017), indicators for measuring sustainable tourism and local development in protected areas (Blackstock et al., 2008; Castellani and Sala, 2010), and indicators for measuring sustainable tourism in rural settlements (Hashemi, 2010; Blancas et al., 2011; Marzo-Navarro et al., 2015; Hashemi and Ghaffary, 2017; Abreu et al., 2019).

In a number of studies, SWOT analysis, i.e. an assessment of the factors of importance for the tourism economy was carried out. It is one of the most efficient and commonly used tools in the preliminary decision-making phases and as a precursor to strategic planning (Srivastava et al., 2005). It is reliable when it comes to strategic decision-making and determining the priorities of the sustainable development strategy (Arsić et al., 2017). SWOT analysis consists of assessing internal (strength and weaknesses) and external (opportunities and threats) factors (Matthews, 2004). It summarizes the current status and helps with devising a plan for the future. It is an efficient and structured planning method, which allows the identification of the best strategy. It is used in the case of strategy planning, in order to identify the potential and priorities of a project for the accomplishment of the development strategy (Buta, 2007). Being a research method generally used in business fields, it has been extended to natural resource management in order to assess the decision and policy directive in a systematic manner as well as to assess the sustainable tourism (NOAA, 2011). Evaluation of internal and external environmental factors is an important part of strategic planning which is crucial for adopting the strategies and it is becoming a component of sustainable ecotourism management (Ghorbani et al., 2015).

The subject of the research is determining the sustainability of tourism and rural settlements in the area of NP Kopaonik and its protection zone. The primary goal of the research is to determine, based on the opinions of the local population, whether the development of tourism is sustainable and whether it contributes to the sustainable development of rural settlements in a protected area, which is also a basic research issue. The research is aimed at the diagnostics of economic, social and cultural aspects, as well as aspects of the environment in the researched area. The determination and analysis of factors describing strengths and weaknesses and the discovery of factors indicating opportunities and threats is a contribution to the planning of sustainable tourism and the development of rural settlements in this protected area. The sustainable development concept introduced in the late 1980s did not consider the rights of local communities to participate in the management of their environment, while a more recent approach is to take into consideration environmental concerns and developmental needs while planning the development (Sharpley, 2006). This research was conducted on the basis of the European Charter for Sustainable Tourism in Protected Areas (1995), based on local development research in the marginal areas of the Lombardy region of Northern Italy (Castellani and Sala, 2010) and the Sustainable Rural Development Index in village Hajij, Iran (Hashemi and Ghaffary, 2017). In order to define the indicators for the assessment of the tourism development sustainability as well as the sustainability of rural settlements, the opinions of the local rural population from the point of view of social, economic and cultural aspects as well as the aspects of the environment specific for the area of research are taken into account. Through the SWOT analysis, based on the attitudes of the local population, defined twenty indicators that determine the SRDI.

The given index is used in order to assess the development process, and it may or may not move in a sustainable direction. Based on the adopted index, it is determined whether the development of tourism is sustainable and whether it contributes to the sustainability of rural settlements in the area of research. This study is significant because it relates to the protected area, where preserving natural area goes hand in hand with improving the quality of life of the local population. The final contribution of the study is to introduce a new participatory approach in assessing the sustainability of tourism and the development of rural settlements, which will, through the creation of development strategies for the protected areas, encourage the increase of socio-economic benefits and the preservation of nature and the environment.

2. Case study

The Kopaonik Mountain lies on an area between central and southern parts of Serbia. It belongs to a group of the highest (2017 m) and widest (2750 km^2) Serbian mountains and extends from the northwest to the southeast for about 80 km (Nešić et al., 2017). Kopaonik is the largest and most important winter mountain tourist destination in Serbia (Djordjevic et al., 2016). For the sustainable development of the settlement on Kopaonik, its location, i.e. distance from the larger cities, is important. The mountain center is located 368 km from Novi Sad, 279 km from Belgrade, 151 km from Kragujevac, 109 km from Priština and 130 km from Niš (Vukoičić et al., 2018) (Fig. 1).

In 1981, the Kopaonik surface of 11,810 ha, was proclaimed a national park. The NP Kopaonik is located in the areas of the municipalities of Raška and Brus, and the protection zone of NP in the municipality of Leposavić. NP with protection zone, includes 19 settlements. The settlements are mountainous, located at altitudes from 500 to 1600 m. (Government of the Republic of Serbia, 2009). Morphological structures are predominantly dispersed, where the families form individual morpho-physiognomic parts of settlements with

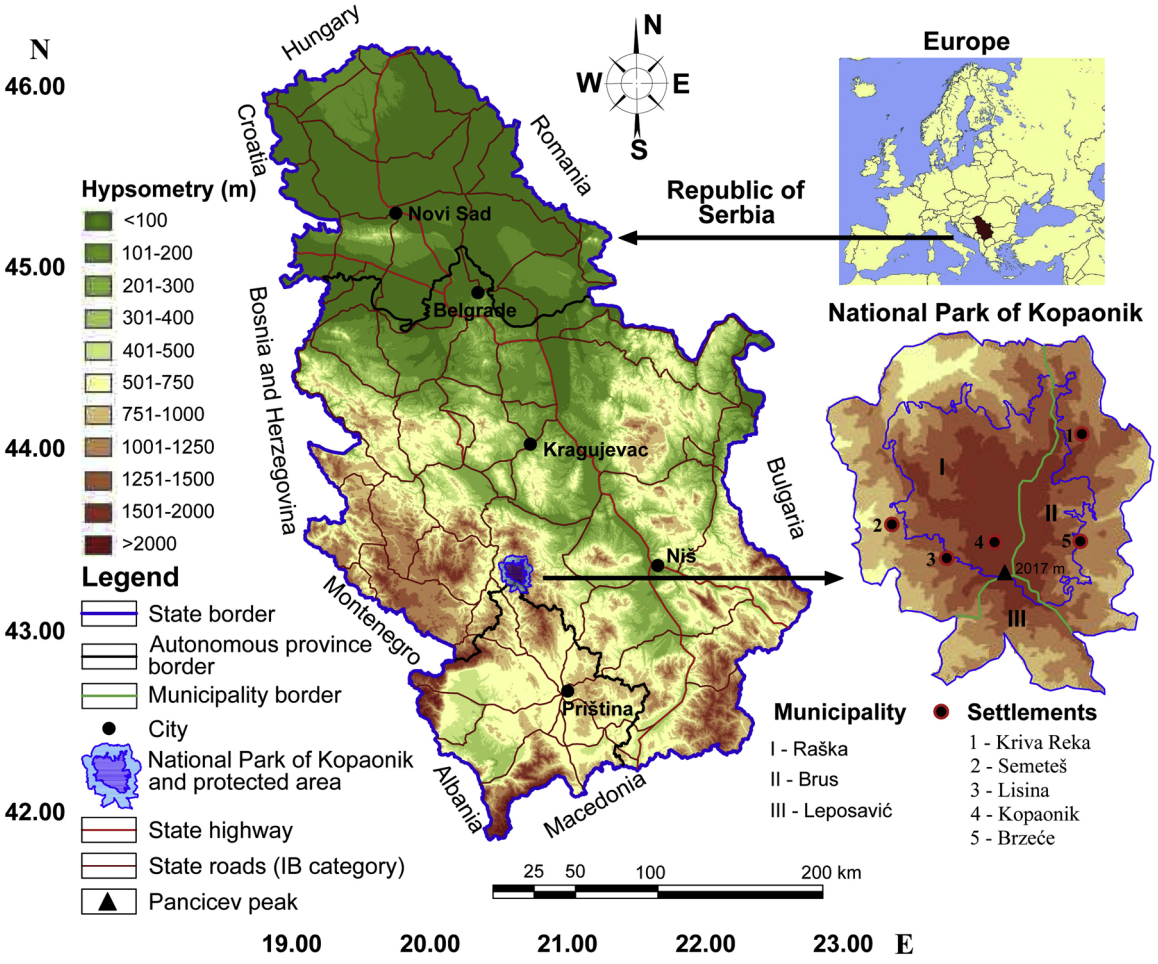

Fig. 1. Location map of the NP Kopaonik (Source:Authors; Source of hypsometry: CGIAR Consortium for Spatial Information, 2017).

grouped building objects. In the network of the researched area dominated by dwarf settlements (10 settlements with fewer than 100 inhabitants) and small settlements (3 settlements with a population of 100 to 200) (Government of the Republic of Serbia, 2016). The basic characteristic is the extremely low average density of the population of their territories, which is about 9 persons per km^2. According to the 2011 Population Census, in 19 settlements and 1057 households registered, there were a total of 2811 inhabitants. Only Jošanička Spa has the status of the urban settlement while other settlements are predominantly rural. In addition to the traditional rural settlements of Kopaonik, Brzeće and Lisina, new tourist settlements, with developed tourist function, new construction and low degree of protection and revitalization of ethno heritage and a lower degree of nature protection, have been created recently (Government of the Republic of Serbia, 2009). The Plan and the Management Program of the Public Company "NP Kopaonik" envisage the objectives of protection and development relevant to the sustainability of ecotourism development. Rural settlements that have a potential for the development of sustainable tourism in the investigated area are Kriva Reka and Semeteš, according to tourism values and equipment. Other rural settlements are still not completely affected by the strong development impact of tourism in the tourist center Kopaonik, with which they are poorly connected. They are lagging behind in accommodation capacities, public services, utility services, and they lack tourist and other infrastructure.

The research included the rural settlements located in the area of the NP Kopaonik and in its protection zone, which were transformed into tourist resorts and centers due to the existence of tourist potentials and the development of tourist functions. Those settlements are Kopaonik (in NP), the center of mountain tourism in Serbia, owning the international ski center status since 1981, and the settlements of Brzeće, Lisina, Semeteš and Kriva Reka (in its protection zone), which today represent the secondary tourist centers of Kopaonik. The development of tourism that seeks economic sustainability is often in conflict with the conservation of nature and environmental protection, and the segment of the sustainable development of rural settlements is an indispensable one. It is therefore of utmost importance for the research area to determine whether tourism and its development are sustainable and whether they contribute to the sustainable development of rural settlements.

3. Protection and planning of NP Kopaonik - overview

Exceptional nature, represented by specific species, habitats and ecosystems, was the basis for Kopaonik, to be designated a national park. The Law on the National Park brought in 1981, placed Kopaonik under the protection of the state as a natural good of exceptional importance, I category (Government of the Republic of Serbia, 1981). Irrational land utilizations cause negative impacts on the environment (Qu and Long, 2018). From the perspective of environment and ecology, land suffers due to human activities that transform nature. For the protected area, in 1989, Spatial Plan of the NP Kopaonik was adopted, which for the first time determined the boundaries of the protection regimes and protection zone of NP. In the following periods, the boundary of the NP and boundaries of protection regimes were more or less harmonized with newer geodetic substrates, current legislation and modern space transformations (Table 1).

The current status of the NP Kopaonik is determined by the Law on National Parks brought in 2015, by which the area within 16 cadastral

Table 1
Overview of the areas covered by NP and the regime for protection by various planning and legal acts.

Planned and legal acts		I degree of protection	II degree of protection	III degree of protection	Total NP	Protection zone of NP
Law on NP brought in 1981	ha	/	/	/	11,809.91	/
	%	/	/	/	100	/
Plan adopted in 1989	ha	698.34	3,610.51	7,501.06	11,809.91	19,984.85
	%	5.91	30.57	63.52	100	/
Law on NP brought in 1993	ha	/	/	/	11,809.91	/
	%	/	/	/	100	/
Plan adopted in 2009	ha	1,459.05	3,941.46	6,706.52	12,106.03	20,538.27
	%	12.05	32.56	55.39	100	/
Law on NP brought in 2015	ha	1,481.77	3,583.53	6,903.74	11,969.04	/
	%	12.38	29.94	57.68	100	/
Plan adopted in 2016	ha	1,470.9	3,600.4	7,007.9	12,079.2	20,404.7
	%	12.2	29.8	58.0	100	/

municipalities in the territories of the municipalities of Raška and Brus, defined as NP (Government of the Republic of Serbia, 2015). This law establishes the boundaries of spatial units with protection regimes, I, II and III degree. In 2016, the third Spatial Plan of the Special Purpose Area of the NP Kopaonik (amendments) was adopted. This plan, done on the digital cadastre-topographic basis, using GIS technique, determined the precise boundaries of the NP (Government of the Republic of Serbia, 2016). In accordance with the Law on Nature Protection, three degrees (regimes) of protection have been established, with measures of protection, prohibition and limitation of works and activities, for the purpose of ecological sustainability of the area. The space surrounding NP Kopaonik, was defined as the protection zone of NP Kopaonik (Fig. 2). The international status of the NP has not been determined, and according to the categorization of the International Union for Conservation of Nature IUCN, it belongs to the second category (Government of the Republic of Serbia, 2016).

The I degree of protection regime (strict protection), represents the most valuable and most preserved parts of the NP (Government of the Republic of Serbia, 2016). In this category there are 13 nature reserves (Fig. 2) and 27 nature monuments (Government of the Republic of Serbia, 2016). The use of natural resources and construction are prohibited. Activities are limited to scientific research, monitoring of natural processes and controlled visits for educational, recreational and general cultural purposes, as well as implementation of protective, sanitation and other necessary measures, without economic activities. **The II degree protection regime** (active protection), covers parts with partially changed ecosystems of great scientific and practical significance, and especially valuable areas and facilities of the geoheritage. Management interventions are permitted in order to preserve, restore and overall improve the protected area. Traditional activities and limited use of natural resources are permitted in a sustainable and strictly controlled way. Anthropogenic uses are limited and controlled (construction of residential, industrial, trade, tourist accommodation facilities, etc., is prohibited). Areas with partially and completely altered ecosystems, areas and objects of geoheritage, scientific and

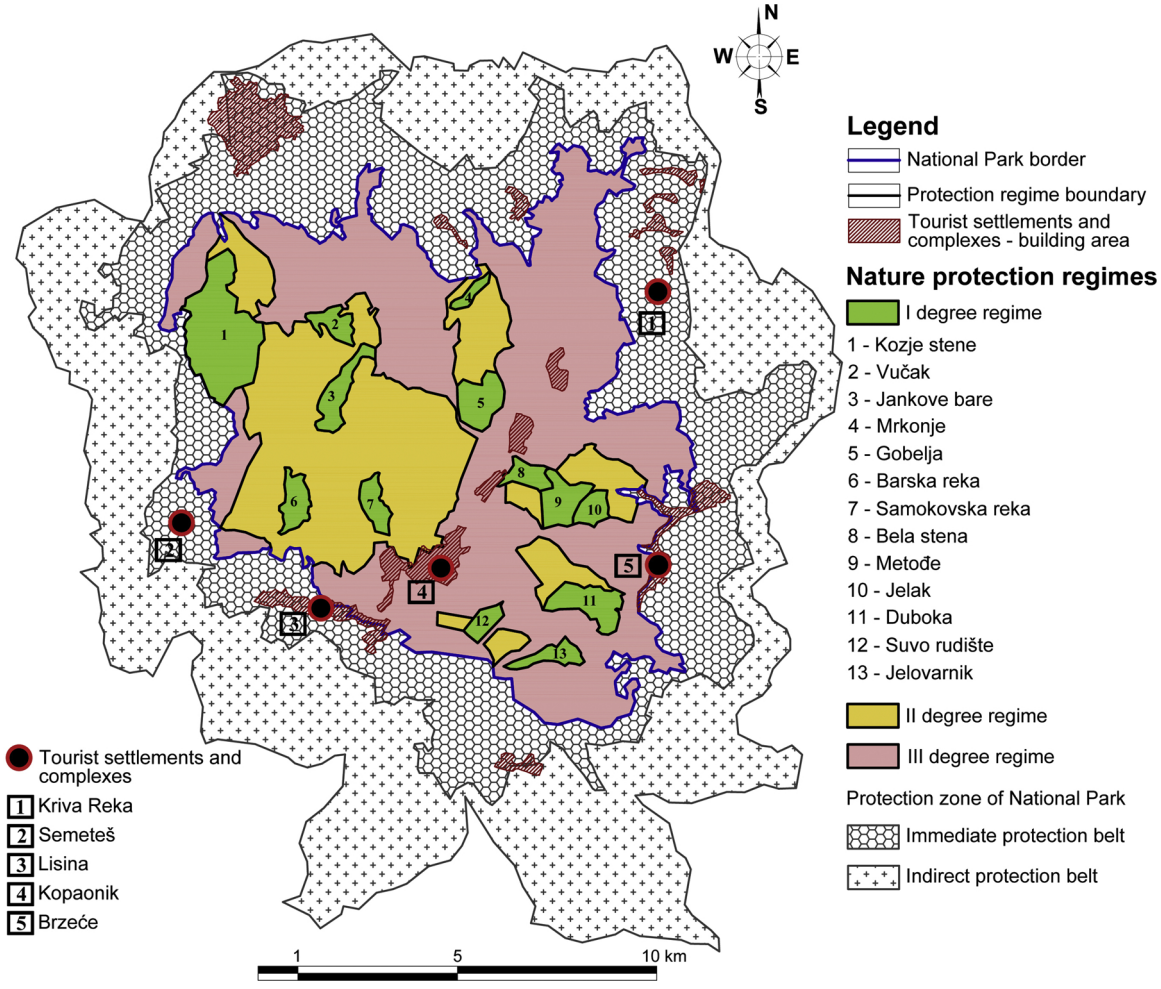

Fig. 2. Protection regimes within NP Kopaonik and its protection zone (Source: Authors).

practical significance belong to the **III degree protection regime** (proactive protection). The space is intended for sustainable and controlled spatial development. Planned development in this zone implies improvement of the economic and living conditions of the local population. On the one hand, this means selective and limited use of natural resources, preservation and improvement of the environment and cultural-historical values. On the other hand, it involves the development of functions and activities based on sustainability principles, the construction of tourist, catering and accommodation facilities, the development of villages and the improvement of rural households, the construction and maintenance of tourist infrastructure and suprastructure in accordance with the planning documentation. The area outside the NP, previously defined as a **protection zone**, has the role of preventing and mitigating external influences that may adversely affect NP.

Spatial plans for the area of Kopaonik were adopted in 1968, 1989, 2009 and 2016. The prevailing functions, due to which spatial plans of this area were made, were natural and environmental protection and tourism development. Since the beginning of the tourism planning in Kopaonik, the Regional Spatial Plan of the ten Kopaonik Municipalities adopted in 1968, and further planning documents insisted on the uniform distribution of tourist content between the mountain and submountain areas (Table 2). However, the focus of development remained on Suvo Rudište (Kopaonik settlement). Among other complexes, Brzeće started to be built and despite the planning predictions, a large volume of weekend construction was completed in Lisina, along the NP border. Of the 30,000 tourist beds envisaged in the Plan adopted in 1989, some 15,000 are planned in the NP and 15,000 outside (in the protection zone). Out of these, until 2009, about 10,500 accommodations were built in the area of the NP, but not with the planned distribution along the sites, but at Suvo Rudište about 10,000 instead of the planned 8000. In the protection zone of NP, near Suvo Rudište and ski resort, without utility equipment, a large weekend settlement "Lisina-Čajetina" with about 10,000 accommodations (Plan envisaged only 1000), and about 1000 foundations, appeared practically unplanned. Also, about 2500 accommodations were built in Brzeće. Although 12,500 accommodations were supposed to be built in Kriva Reka, Semeteš and other settlements of the NP protection zone, almost nothing has actually been built. Due to the violation of the provisions of this Plan (concerning the planned scope of construction, planned distribution of tourist contents by locations, planned infrastructure and utility equipment), in 2009, another Plan for NP Kopaonik was prepared.

By the Spatial Plan of the Special Purpose Area of NP Kopaonik adopted in 2009, at the request of the protection service, the number of accommodations in the NP has been reduced to 12,400, and the number of accommodations outside the NP has been increased to 30,000. For the settlement "Lisina-Čajetina" at the border of the NP, foresees the stopping of further construction, infrastructure and utility equipment, construction of public service content, and transformation of settlements into secondary tourist center, converting cottage houses into boarding houses. There was an attempt to reduce the construction pressure on Suvo Rudište, due to which vicinity a weekend settlement was formed. In relation to the planned accommodations from the Plan adopted in 2009, until 2016 and the development of the new Plan, about 11,000 accommodations were built in the NP area, but not according to the planned distribution along the sites (about 10,250 instead of the planned 8000 in Suvo Rudište). Alongside the NP boundary, in an unplanned weekend settlement "Lisina-Čajetina" no new construction has been recorded. Instead, in accordance with the provisions of the Plan adopted in 2009, the weekend houses are transformed into boarding houses and larger apartment buildings are built. According to the trend of planning and equipping, this settlement is turning into a secondary tourist center. Approximately 2500 of the planned 4500 accommodations were built in Brzeće, while practically nothing was achieved from the planned construction in Kriva Reka, Semeteš and other settlements outside the NP (Government of the Republic of Serbia, 2016).

The need for harmonization with the new legal basis (the Law on National Parks brought in 2015), the initiative for the development of new ski infrastructure, the different distribution of tourist accommodations and content by sites and the EU guidelines for directing sustainable tourism development and nature protection, brought about the Amendments to the Plan adopted in 2009. The new Plan was adopted in 2016, and there have been some changes in the concept of development and protection of mountain areas, which affects the harmonization of the construction of tourist centers and the functions of ski resorts with requirements and more stringentenvironmental protection regimes and standards. Sustainable capacities of the NP were determined, measured by the maximum number of simultaneous users. The plan concept has divided the development of mountain tourism in two parts: the tourist complexes in the NP and tourist settlements outside the NP. According to the assessment of the ecological capacity of the protected area, the limit of 18,500 tourist accommodations in the territory of the NP was determined, while the focus of the tourist accommodation was moved to the area beyond the boundaries of the NP with 31,900 accommodations envisaged. In accordance with the initiative of Public Company "Ski Resorts of Serbia", the development of new ski infrastructure is planned in accordance with the previously prepared "Analysis of the possibilities for development of ski infrastructure". This Plan has also increased the accommodation capacity in the NP, although in the earlier periods there were requirements for reducing the number of accommodations in the NP and increasing it on the area outside the NP. The assessment of the ecological capacity in this Plan was based on positive experiences and norms of the development of mountain centers and nature protection in the European Alps.

4. Methods

The deficit of statistical data, outdated records and lack of existing literature of similar studies for the investigated area are the reasons for the research to be conducted through the questionnaire and data gathering on the field from the local population. Accordingly, the methodological selection suitable for this data was on SWOT analysis and Sustainable Rural Development Index (SRDI). The research was carried out in the period from October 2018 to December 2018. Data processing of field research in this paper was carried out according to the methodology used by Hashemi (2010), later improved by Hashemi

Table 2
Overview of the number of accommodations foreseen by the planning documents.

Locations	Foreseen number of accommodations		
	Plan adopted in 1989	Plan adopted in 2009	Plan adopted in 2016
In National Park	14,000	12,400	18,500
Beyond National Park, total	16,000	30,000	31,900
-in secondary tourist centers	/	14,000	27,000
-in rural tourist settlements	/	16,000	4,900
Total	**30,000**	**42,400**	**50,400**

and Ghaffary (2017). This method, often used in qualitative studies, relates to selective or subjective judgment characterized by the goal of obtaining a representative sample by involving individuals to contribute to the achievement of research objectives. Samples were made in order to achieve convincing confirmation of the obtained data, i.e. theoretical saturation. Sampling was done using the method of selecting the participants (respondents) among the local rural population, who are familiar with the subject and purpose of the research, the current legislation, and who live, invest and participate in the development processes within the investigated area, which gives the study a special value. Only one respondent from a household, representing household, participated in the research, and the total number of samples was 112. The respondents aged between 40 and 59 (72.9%), with secondary (58.6%) and high (301%) education, were the most numerous. The questionnaires were distributed in the field by the authors, who directed and instructed other interested locals, encouraging them to participate. The aim was to obtain a representative sample where subjective and selective judgment (perception) can be quantitatively expressed through the questionnaire containing open-ended and closed-ended questions. The quality of life of the local population in the research area is directly influenced by the basic dimensions of sustainable development (ecological sustainability, economic efficiency and social responsibility). Thus, they were considered the most valuable representatives and people who are most familiar with the area, local opportunities and social, ecological and economic needs.

The questionnaire consisted of two sets of questions. The first set was comprised of closed questions, 42 in total (Table 3) and it was based on the social and economic needs of local communities. Based on the Likert* scale, the answer to each question is given on a scale from 1 to 5. The second part is comprised of four open-ended questions about the strengths and weaknesses, opportunities and threats to the development of sustainable tourism and sustainable development of rural settlements (under the impact of tourism) in NP and in its protection zone. Using the qualitative SWOT analysis, respondents' responses were collected. SWOT analysis can be conducted at different levels (national, regional, and local) to gain a holistic understanding of the potential of a destination (Collins-Kreiner and Wall, 2007). This analysis allows the identification of the best strategy that maximizes strength and capabilities and minimizes weaknesses and threats (Hill and Westbrook, 1997). Strengths and opportunities represent the values and appeal of the assessed site, and weaknesses and threats refer to the constraints of tourism development (Yan et al., 2017).

Data processing was carried out in the IBM SPSS Statistics No. 21, the program that loads data, performs analyzes, and gives output results. Based on the answers to the first set of questions, their average values, which are in the second part connected to the defined parameters according to their affinities, are determined, after which the factor of influence (weight) for each of the 20 parameters is determined. After data processing, the second set of questions, the relative frequency was derived as quantitative data from SWOT analysis (Hashemi, 2010; Hashemi and Ghaffary, 2017). In each category (strengths and weaknesses, opportunities and threats), five most important parameters would be used as indicators (20 in total). Each indicator can have a value from 0 to 5 according to its relative frequency (Hashemi, 2010; Hashemi and Ghaffary, 2017).

Using qualitative approach, high participation of local rural population and expert management of the author, 20 variables (indicators), adapted to local specifics, are defined. In many cases, integrated sustainability indicators are developed within a participatory process (Castellani and Sala, 2010). Participation is a completed methodological form with valuable data on local specificities of rural population and settlements, which point to local economic, social and ecological needs. The authors proposed a SRDI based on 20 variables, defined for the needs of this paper, in order to explore the possibility of quantitative measurement of strengths, weaknesses, opportunities and threats related to the development of sustainable tourism and sustainable development of rural settlements (under the impact of tourism) in NP and in its protection zone. This Index provides the opportunity to redefine sustainability in the attitude of the local population (Hashemi and Ghaffary, 2017).

SRDI is a composite index of socio-economic and environmental development. Using the methodological procedure, statistical analysis and determination of the mean values for open-ended and closed-ended questions, relative frequency for open-ended questions and the influence factor for parameters arising from open-ended and closed-ended questions, objectification, subjective input perceptions and determination of sustainability was searched for through the preliminary determination of objective indicators and results. For all 20 indicators,

Table 3
Local social and economic needs (based on the Likert scale).

Number	Questions (item)	Average (0-5)
1	House equipment	2.83
2	Satisfaction with living conditions	3.29
3	Employment	2.52
4	Job satisfaction	2.76
5	Satisfaction with income	2.38
6	A sense of economic scarcity	3.11
7	Identifying natural potentials	3.33
8	The desire for education in tourism	3.44
9	A stable economic future based on tourism	3.63
10	Income from the collection and sale of medicinal herbs and forest fruits	2.57
11	Income from the production and sale of souvenirs	2.38
12	Satisfaction with revenues from the sale of domestic products	2.46
13	The influence of the promotion of mineral and thermo-mineral waters on the development of tourism	2.86
14	The presence of investments from local self-government	2.32
15	Satisfaction with the promotion of tourism potentials	2.85
16	Recognizing the importance of tourism for development	3.54
17	Expected new business investments	3.33
18	Interest in the reconstruction of existing facilities in the household	3.33
19	Belief in a better future	3.07
20	The presence of the happiness factor	3.39
21	Impact of education on a lifestyle	3.41
22	Highlighting traditional and cultural values	3.38
23	Transferring the customs to the descendants	3.6
24	A sense of lack of social solidarity	2.96
25	Evaluation of social solidarity	2.49
26	The desire to migrate	2.02
27	Satisfaction with infrastructure	2.54
28	Satisfaction with communication services	3
29	Satisfaction with water supply	2.91
30	Regulation of riverbeds	2.6
31	Satisfaction with public services	2.55
32	Satisfaction with cultural content	2.68
33	Necessity for modernization in technical and technological sense	2.99
34	Necessity of development and revitalization of infrastructure	3.29
35	Satisfaction with access to information	2.89
36	Satisfaction with the manners of preserving the environment and natural resources	2.52
37	Impact of pollutants on the environment	2.7
38	Satisfaction with hunting and fishing controls	2.64
39	The control of deforestation	2.7
40	Satisfaction with the chance of employment	2.61
41	Satisfaction with the efficiency in obtaining a permit for the construction and operation of tourist facilities	2.32
42	Use of opportunities for education in tourism	2.69

* The Likert Scale is a five (or seven) point scale which is used to show a level of agreement from strong agreement to strong disagreement regarding an individual attitude toward a particular statement.

weighted reliability (an average) was calculated based on the influence factor determined from the results of the first and second part of the questionnaire. Thus, the weighted average of the values of twenty indicators is the SRDI. If the ratio between the value of the results and the index values is directly proportional (parameters in the power and opportunity categories), then the result has a positive value. On the other hand, if the ratio between the value of the results and the index values is inversely proportional (parameters in the weakness and threat categories) then this result has a negative value. The SRDI is calculated by Eq. (1) (Hashemi and Ghaffary, 2017):

$$\mathrm{SRDI}=\frac{1}{20}\left(\sum_{i=1}^{5} S_i M_i + \sum_{i=1}^{5} O_i M_i - \sum_{i=1}^{5} W_i M_i - \sum_{i=1}^{5} T_i M_i\right) \quad (1)$$

Where: *S* - strengths, *W* - weaknesses, *O* - opportunities, *T* - threats, *M* - factor of influence, and *i* – index of the sum. The SRDI, based on the Eq. (1), can be positive or negative. The positive value points to a sustainable development indicator, and the negative value indicates the tendency towards an unsustainable situation. If the positive value is higher, the sustainability is higher.

By computing the individual values of the categories, using the Eqs. (2–5), their influence is compared. These values in more detail indicate the disadvantages and needs of the community that can be eliminated by the modification strategy (Hashemi and Ghaffary, 2017).

$$S=\sum_{i=1}^{5} S_i M_i \quad (2)$$

$$W=\sum_{i=1}^{5} W_i M_i \quad (3)$$

$$O=\sum_{i=1}^{5} O_i M_i \quad (4)$$

$$T=\sum_{i=1}^{5} T_i M_i \quad (5)$$

A larger number of parameters defined through two parts of the participation, which through a complex mathematical and statistical analysis gain their factor of influence on the 20 SRDI indicators, make this index complex and objective. Participation makes it real, and the openness of the index to the attitudes of local respondents who can modify the parameters, makes it dynamic and adaptable to local needs and changes. It directly assesses the effects of tourism development on the development of rural settlements and indicates whether this leads to a sustainable development. It is therefore an appropriate means of evaluation, which falls under the research objectives.

5. Results

The results of the first part of the questionnaire, which is made up of close-ended questions, on local social and economic needs are presented in Table 3.

A total of 42 closed-ended questions were answered by the respondents on a five point scale (Linkert scale) on the basis of which the average value of each question was calculated. These questions, grouped by their similarity, define in detail 20 necessary parameters for determining the SRDI, so their average value is taken in order to determine the influence factor (value) of each parameter. Table 4 shows parameters, related questions and influence factor based on the results of the first part of the questionnaire.

When it comes to all the advantages and disadvantages, opportunities and threats derived from the questionnaire, influential factors are important at all levels of social and economic needs, so each SWOT analysis parameter has a different value. Table 5 lists the parameters and their quantitative value (average) derived from the Likert scale that determined the influencing factor of each indicator.

The second part of the questionnaire is made up of 4 open-ended questions about the strengths and weaknesses, opportunities and threats in the development of rural settlements of the explored area under the influence of the development of tourism. According to the relative frequency, each parameterreceived a value from 0 to 5. In each category (strengths, weaknesses, opportunities and threats), only five important parameters are separated and used as indicators. The results of the survey are presented within the SWOT analysis (Table 6) and used in order to perform weighted reliability (Table 7) for the five important indicators in each category (strengths, weaknesses, opportunities and threats).

The strongest side in the development of sustainable tourism in rural settlements of the research area is the status of protection which is directly related to the degree of preservation of natural values and their promotion. The weakest side is the insufficient ecological awareness of the population, the decline in birth rate that is directly related to the migration of the fertile population and the lack of infrastructure and utility equipment in rural settlements. The development of rural tourism, the production and sale of domestic products give the possibility of employment of the local population, and the promotion of a sustainable way of life in the village are the main opportunities for the development of the settlement. The endangering of natural resources, as well as the lack of wastewater treatment systems, results from the overall level of environmental awareness of the local population, and most often these threats are justified by the lack of financial resources and total awareness of their importance. Opportunities for the development of the settlement as well as threats relate to the natural values that are part of the NP and its protection zone.

The weighted reliability is derived by assigning different influence factors (based on the influence factor from Table 5 and the value from Table 6) to the five important indicators in each category (strengths, weaknesses, opportunities and threats) (Table 7). In this SWOT analysis, most indicators retained their positions as in the first analysis, i.e. the strengths retained their positions. In the case of weaknesses, the main problem is reduced birth rate in settlements, followed by insufficient environmental awareness, while the lack of education of the population is given greater importance in the development of ecotourism than to the lack of infrastructure facilities and uncontrolled construction of residential and commercial facilities. Most indicators for the development of sustainable tourism remained at the same level of reliability, though the priority was given to the promotion of rural life in relation to the employment of the local population. Regarding the area protected by law, as a threat in the list of indicators, the change of the overall business and environmental awareness, and insufficient information on the significance of natural values are given advantage in relation to the lack of financial resources and development funds.

The quantitative value of the strengths and weaknesses, opportunities and threats is derived from Table 7 with the help of the Eqs. (2–5).

$$\mathbf{S}=\sum_{i=1}^{5} S_i M_i = 53.71 \quad (6)$$

$$\mathbf{W}=\sum_{i=1}^{5} W_i M_i = 48.52 \quad (7)$$

$$\mathbf{O}=\sum_{i=1}^{5} O_i M_i = 56.3 \quad (8)$$

$$\mathbf{T}=\sum_{i=1}^{5} T_i M_i = 48.92 \quad (9)$$

The results show that from the point of view of the local population, there are more strength indicators (53.71) than the weakness indicators (48.52), while the opportunities for the future (56.3) are much higher than the threats (48.92). The results indicate that the Kopaonik tourist

Table 4
Parameters, related questions and their influence factor.

Number	Parameter	Number of related questions (item) from Table 3	Influence factor
1	Nature conservation	7 and 36	**2.93**
2	Traffic connections	27	**2.54**
3	The impact of promoting tourism values on the development of tourism	13 and 15	**2.86**
4	Real income from the sale of domestic products	10, 11 and 12	**2.47**
5	Level of environmental conservation	36	**2.52**
6	Level of environmental awareness of the population	37, 38 and 39	**2.68**
7	Negative impacts on birth rates	4, 6, 19, 20 and 26	**2.87**
8	Level of infrastructure and utility equipment	27, 28, 29, 30, 31, 33 and 34	**2.84**
9	Education of the population	8, 17, 21 and 42	**3.22**
10	The influence of society on the possibility of uncontrolled construction of buildings	24, 25 and 41	**2.59**
11	Possibilities for development of rural tourism	1, 2, 5, 9 and 18	**3.09**
12	The effects of organic production on the development of rural tourism	10 and 12	**2.52**
13	Satisfaction with the efficiency in obtaining a permit for the construction and operation of tourist facilities	41	**2.32**
14	The impact of tourism on the employment of the local population	3 and 40	**2.57**
15	Promotion of tourism values in order to develop rural tourism	13, 15, 22, 23 and 32	**3.07**
16	Anthropogenic impacts on natural resources	38 and 39	**2.67**
17	Impact of pollutants on the environment	37	**2.7**
18	Satisfaction with the way of preserving the environment and natural resources	36	**2.52**
19	The presence of investments from local self-government	14	**2.32**
20	Availability of information on the significance of natural tourism values	7, 16 and 35	**3.25**

center had a decisive role in the expansion of tourism in rural settlements of the protected area. SRDI values are obtained by Eq. (1).

$$\mathbf{IORR} = \frac{1}{20}\left(\sum_{i=1}^{5} S_i M_i + \sum_{i=1}^{5} O_i M_i - \sum_{i=1}^{5} W_i M_i - \sum_{i=1}^{5} T_i M_i\right) = 0.63 \quad (10)$$

The positive value of SRDI points to a sustainable development indicator. The final result is 0.63, which shows that the current development of tourism is within the limits of sustainability and contributes to the sustainable development of rural settlements. It also suggests that the research area has a perspective for the development of sustainable tourism which leads to the sustainable development of rural settlements.

6. Discussion

Since the SRDI is positive, the development of tourism can become one of the basic plans for the sustainable development of the rural settlements on Kopaonik. With the good promotion of natural and anthropogenic tourism values, the number of tourists would rise as well as the desire for new business investments and the return of the population. As a result, weaknesses will become strengths, while threats will become opportunities through the expansion of tourism based on sustainable development. The research has confirmed that the parameters of the weaknesses as well as the parameters that are the main threat have a smaller influence factor than the parameters of the strengths and the opportunities that are given to the sustainable development of

Table 5
SWOT analysis including influence factors.

Number	Indicator	Parameter	Influence factor
Strengths			
1	National Park status	Nature conservation	2.93
2	Good traffic connection	Traffic connection	2.54
3	Constant promotion of tourism values	The impact of promoting tourism values on the development of tourism	2.86
4	Traditional quality domestic products	Real income from the sale of domestic products	2.47
5	Preserved environment	Level of environmental conservation	2.52
Weaknesses			
1	Insufficient ecological awareness of the population	Level of environmental awareness of the population	2.68
2	Reduced birthrate	Negative impacts on birth rate	2.87
3	Lack of infrastructure and utility equipment	Level of infrastructure and utility equipment	2.84
4	Lack of education of the population	Education of the population	3.22
5	Uncontrolled construction of residential and commercial buildings	The influence of society on the possibility of uncontrolled construction of buildings	2.59
Opportunities			
1	Possibility of rural tourism development	Possibilities for development of rural tourism	3.09
2	Organic product sales	The effects of organic production on the development of rural tourism	2.52
3	Construction of tourist infrastructure	Satisfaction with the efficiency in obtaining a permit for the construction and operation of tourist facilities	2.32
4	Possibility of employment of the local population	The impact of tourism on the employment of the local population	2.57
5	Promoting life in the countryside	Promotion of tourism values in order to develop rural tourism	3.07
Threats			
1	Endangering natural resources	Anthropogenic impacts on natural resources	2.67
2	Lack of wastewater treatment plant	Impact of pollutants on the environment	2.7
3	Change in overall business and environmental awareness	Satisfaction with the way of preserving the environment and natural resources	2.52
4	Lack of financial resources and development funds	The presence of investments from local self-government	2.32
5	Insufficient information about the significance of natural values	Availability of information on the significance of natural tourism values	3.25

Table 6
SWOT analysis of the impact of tourism expansion on the development of rural settlements of the research area.

Number	Parameter used as indicator	Relative frequency	Value (0-5)	Number	Parameter used as indicator	Relative frequency	Value (0-5)
Benefits				**Weaknesses**			
1	National Park status	99.2	4.96	1	Insufficient ecological awareness of the population	80.6	4.03
2	Good traffic connection	85	4.25	2	Reduced birthrate	75.6	3.78
3	Constant promotion of tourism values	75.2	3.76	3	Lack of infrastructure and utility equipment	64.2	3.21
4	Traditional quality domestic products	74.6	3.73	4	Lack of education of the population	63.6	3.18
5	Preserved environment	66.8	3.34	5	Uncontrolled construction of residential and commercial buildings	58	2.9
Opportunities				**Threats**			
1	Possibility of rural tourism development	93	4.65	1	Endangering natural resources	89.8	4.49
2	Organic product sales	91.4	4.57	2	Lack of wastewater treatment plant	77.4	3.87
3	Construction of tourist infrastructure	90.6	4.53	3	Change in overall business and environmental awareness	73.8	3.69
4	Possibility of employment of the local population	74.6	3.73	4	Lack of financial resources and development funds	67.4	3.37
5	Promoting life in the countryside	67.2	3.36	5	Insufficient information about the significance of natural values	57.6	2.88

Table 7
SWOT analysis sorted by weighted reliability.

Number	Indicator	Weighted reliability
Strengths		
1	National Park status	14.53
2	Good traffic connection	10.8
3	Constant promotion of tourism values	10.75
4	Traditional quality domestic products	9.21
5	Preserved environment	8.42
Weaknesses		
1	Reduced birthrate	10.85
2	Insufficient ecological awareness of the population	10.8
3	Lack of education of the population	10.24
4	Lack of infrastructure and utility equipment	9.12
5	Uncontrolled construction of residential and commercial buildings	7.51
Opportunities		
1	Possibility of rural tourism development	14.37
2	Organic product sales	11.52
3	Construction of tourist infrastructure	10.51
4	Promoting life in the countryside	10.32
5	Possibility of employment of the local population	9.6
Threats		
1	Endangering natural resources	11.99
2	Lack of wastewater treatment plant	10.45
3	Insufficient information about the significance of natural values	9.36
4	Change in overall business and environmental awareness	9.3
5	Lack of financial resources and development funds	7.82

tourism and rural settlements in the research area. The development of tourism is considered a means of economic growth, because the economic parameters are dominant in the category of opportunity. The decrease in birth rates and migration of the population from these settlements is the biggest weakness caused by the lack of infrastructure and utility equipment. With the education of the population and greater awareness of the significance of natural values that are the basis of tourist potentials on Kopaonik, the construction of tourist infrastructure and the development of communication technology would directly affect the threats and the growth of employment and income rates, all of which affects the improvement of social well-being and sustainable rural development.

Although the SRDI value is positive (0.63) and, according to the methodological setting, indicates the state of sustainable development, a low, threshold value indicates that the result can be conditionally considered as a sustainable development indicator. The result undoubtedly indicates that in this area tourism development is sustainable and influences the sustainability of rural settlements, but also calls for caution and accountability of managers and institutions in the future, which, in case of irregular and wrong decisions, could lead to an unsustainable situation. Therefore, the identification of strengths, weaknesses, opportunities and threats in a qualitative approach by local stakeholders has a great practical contribution. The index, in addition to the characteristics of the current development through strengths and weaknesses, points to future threats and opportunities. This can be the starting point for NP's management and managers towards design development plans and strategies that rely on recognizable strengths and which would seek to exploit all identified development opportunities and connect with strengths. Also identifying basic weaknesses and threats moves the focus of management and manager's interest towards taking appropriate actions and measures, i.e. the preparation and adoption of special rules and regulations in order to eliminate the possible threats by taking preventive measures, thus turning

weaknesses into forces. The quantitative measurement of all indicators of SRDI and individual values of all SWOT categories allows for their comparison, provides a clear picture of the impact of categories and provides a better understanding of the needs of local communities. On the basis of quantitative values, one can easily notice the weakest segments of sustainability, the greatest weaknesses and threats that can become the subject of some future research. This can be used in order to modify strategies that will lead to a higher positive index value. Thus, SRDI contributes to the improvement of planning and participation of local stakeholders in the development and planning process.

So far, there have been no similar surveys in the area of NP Kopaonik, that would accurately determine whether the current development of tourism is within the limits of sustainability, whether it contributes to the sustainable development of rural settlements, and what is the perspective for the sustainable development of tourism and rural settlements in this protected area. It is particularly important to point out that the survey was conducted in a space that has the status of a protected natural asset, i.e. status of NP, which is often categorized by the public as the most degraded protected natural asset. Ecologists, non-governmental organizations and their media support, as well as the unprofessional public, generalized the problem of threatening the NP with over-construction and inappropriate construction, which began to be transmitted and adopted as de facto in the public, without prior exact, scientific and professional checks. Therefore SRDI, as a composite and scientifically based index, is suitable for quantitative expression, i.e. sustainability measurement and exact check of the generalized problem. The significance of this study is reflected in the fact that the SRDI quantitative values are determined by a qualitative approach, by the participation of the local rural population (respondents) whose responses are collected and analyzed. The assumption about the scientific relevance and objectivity of the results of this research arises from the complex procedure, which was used in order to obtain final results, as well as the already mentioned features of the used and upgraded method, which characterize its scientific relevance and which are the main reason for its selection.

In addition to the positive values of the index, and other collected analytical data indicate that development is within the limits of sustainability (especially ecological sustainability). Except in the Kopaonik settlement, Suvo Rudiste complex (1.4% of the NP area), where overcrowding of planned capacities has been recorded, over-construction and inappropriate construction is not significantly present in the area of NP or in its protection zone, except for the unplanned construction of cottage-type buildings in Lisina. Very small part of the investigated area is covered by this construction, therefore it can be concluded that there is no over-construction and inappropriate construction in the NP Kopaonik and its protection zone, which categorizes the entire area as degraded. Also, by reviewing the current method of planning and protection of NP, it has been established that there is a long tradition of responsible planning and protection, which evenly directed the development of tourism outside the strict protection regime and dimensioned construction capacities towards ecological sustainability. Therefore, the causes of such construction cannot be sought in planning documents and legislation (their lack or inadequacy), but in their non-implementation.

In that direction, it is necessary to apply the Rulebook on Internal Organization of the NP Kopaonik, implement the NP Kopaonik Management Program, the NP Kopaonik Fishing Area Management Program, the Rulebook on Protection of Forests and Fire Facilities in NP Kopaonik, the Spatial plan for special-purpose territory of NP Kopaonik and its amendments, as well as all urban plans that have been developed in accordance with this Plan.

As the quantitative expression of the index allows an absolute comparison of the final value with the values obtained by its application in similar analogous case studies, future research can lead to the determination of the sustainability of settlements of other NP in Serbia or settlements in some other protected natural areas, based on indicators established in this paper. Thus, the results of this study would be comparable and the sustainability of the protected area settlements would be hierarchically classified according to the SRDI. In such a hierarchical system, the positioning of NP Kopaonik would clearly show whether the publicly accepted claim that the nature of the NP is degraded by excessive and inappropriate construction presents only a generalized problem, deliberately placed to adversely affect the image and competitiveness of the tourist destination (if the SRDI value is higher compared to others), or the sustainability values are significantly lower than the other results of future potential studies. It is significantly used in monitoring the effect of future sustainability plans, comparing new index values with the current ones after a certain period of time.

7. Conclusion

Current trends in tourism development pose challenges for sustainable development through a wide range of environmental, economic and social aspects. Tourism is sustainable when it is able to generate development that is compatible with the economic and social needs of an area under protection and its environmental constraints. On the basis of SWOT analysis, this paper proposes 20 indicators (5 in each category), which determine SRDI as a method for determining (analyzing) the sustainability of tourism and rural settlements under its influence in the protected natural area (NP Kopaonik and its protection zone). Indicators are defined as being participatory, by local rural population, through a questionnaire with 42 closed-ended questions and a SWOT analysis with 4 open-ended questions, along with the authors' guidance. Sustainability is quantitatively expressed on the basis of proposed indicators and with SRDI. On the example of NP Kopaonik, among the parameters that emphasize the possibility for a sustainable development of the settlement, the development of tourism stands out because it is considered a means of economic growth, followed by the sale of organic products. Due to the accelerated tourism development, as a potential threat, the damage to natural resources in an area protected by law stands out. Research has shown that in the area, the influence factor is higher in strengths in relation to weaknesses, while the influence factor in opportunities is much higher in relation to threats. The final result is 0.63, which shows that the current development of tourism is within the limits of sustainability and contributes to the sustainable development of rural settlements. The results of the research are the basis for the development of the strategy for the future development of tourism in the area of Kopaonik and its protected area.

SRDI is a complex index of socio-economic and environmental development, participatory and dynamic, i.e. open and adaptable to respondents' attitudes. This, together with a complex statistical-mathematical and methodological process, with numerous weighting (influencing) factors and weighted values that reduce subjectivity, makes the indicators and the index real and objective. It directly assesses the effects of tourism development on the development of rural settlements and indicates whether this leads to sustainable development. Therefore, it represents an appropriate evaluation tool, which falls under the research objectives. It can have practical and scientific application in analog case studies (in protected areas), using these indicators and index, illustrated by the use of the example of NP Kopaonik. The proposed indicator system allows for the evaluation of the sustainability of tourism and rural settlements under its influence in protected areas and natural areas from different points of view (i.e. social, economic and environmental). At the same time, this system represents an important instrument that improves decision-making abilities of local agents and facilitates tourism planning, given that it provides information related to issues that NP's management must conduct to achieve sustainable tourism.

Being solely based on perceptions of the respondents is one of the often accentuated weaknesses of this methodology. The results, in addition to the aforementioned strong sides of the methods and the careful sampling, leading to real results, depend on the selected sample, which

is the main limitation of the method. Changing the composition of the samples can also result in the change of the results. This methodology could be improved by introducing the third part of the research, as control (objective) measures, in which the objective state of the social, economic and environmental aspects of development will be presented on the basis of official statistics and performed measurements. That would allow the control of the results from the first and second part and have an influence factor on the final weighted index result.

Submission declaration

This manuscript describes original work and is not under consideration by any other journal.

Declaration of Competing Interest

None. Authors state that they don't have any conflict of interest to declare.

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