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The role of traditional ecological knowledge practices in the conservation of the Divjakë-Karavasta National Park Forest ecosystem.

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Introduction

Through traditional ecological practices, local communities ensure the sustainable utilization and management of different ecosystem services. To have effective biodiversity conservation, it is important to consider the local knowledge, its intergenerational transmission, limitations in the use of natural resources, and sustainable use of biodiversity inside and outside of a protected area. This study examines the role, evolution, and local perceptions of impacts on forest ecosystem diversity conservation. Our objective in this case study is to comprehend the development of traditional ecological knowledge in the Divjak-Karavasta National Park by gathering information on local management techniques and their effects on the state of the forest ecosystem. Results suggest that the perception of local communities for landscape change and traditional knowledge are vital for the sustainability of natural resources. During our fieldwork, we discovered that the forest's infrastructure was lacking—open trails and the road system, for example, since the closed routes were not being maintained. Several issues make it difficult to build recreational and educational facilities and increase the intensity of the forestry economy. According to this study, rural communities can provide valuable information about environmental changes, and future conservation initiatives may consider this to halt biodiversity loss.

Material and Methods

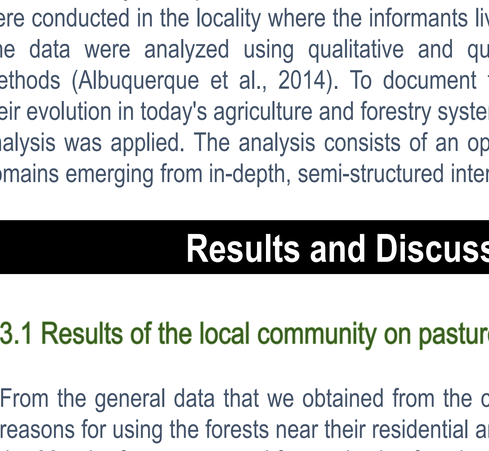
2.1 Study area: was conducted in the territory of the Divjak Municipality that is affected by the National Park area. The area is well known for its natural beauty and diversity. The main activities for generating income include Production and cultivation of crops (vegetables, fruit trees, fodder, cereals); Livestock breeding (cattle, sheep, goat, pigs, horses); Fishing (in the Karavasta lagoon); Tourism (in Karavasta lagoon, Divjaka beach, forest ecosystems). In our study area, the forests are close to the local community's residences and interspersed with agricultural lands. The interviews were conducted with the relevant interest groups, which include: the territory of the city of Divjake for the first study area; villages: Grabjan, Hallvaxhias, Gërmenj, Shenepremte, Xengë, Mize, Kryekuq, Zharrnec, Këmishtaj, Kamenicë, Gur, Remas, Muçijas, Karavasta, Bedat, Babunjë, Gradishte, for the second study area; and Sulzotaj Village for the third study area.

2.2 Data collection: To document traditional practices and perceptions of landscape change in the study area, a qualitative data collection method was used. In particular, for all relevant traditional practices identified, in-depth interviews were conducted to comprehensively document the traditional ecological knowledge associated with them. Selected participants are appointed as experts in one of four activities identified as relevant during fieldwork: cattle grazing, hunting, timber harvesting, and the collection of non-timber forest products. Respondents were able to provide information on two or more areas of knowledge. We conducted a total of 100 interviews with the local community for a period of time from March to June 2023. All interviews were conducted in the locality where the informants live or in their workplaces. The data were analyzed using qualitative and quantitative data analysis methods (Albuquerque et al., 2014). To document traditional practices and their evolution in today's agriculture and forestry systems, a detailed qualitative analysis was applied. The analysis consists of an open coding of knowledge domains emerging from in-depth, semi-structured interviews.

Results and Discussion

3.1 Results of the local community on pasture management.

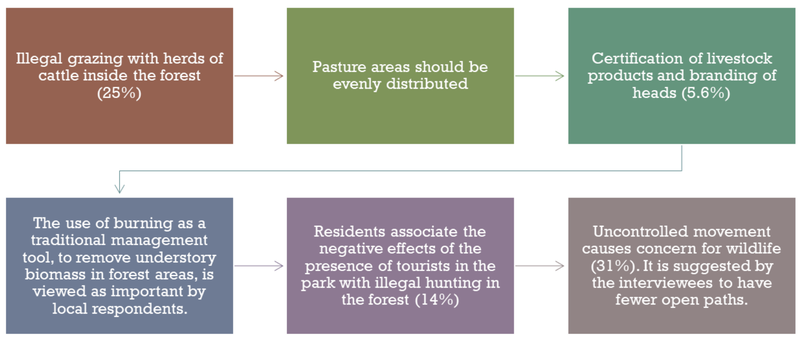
From the general data that we obtained from the conducted interviews on the reasons for using the forests near their residential areas, they show that: before the 90s, the forest was used for productive functions (construction material and heating, artistic products, in factories, means of transport, fences, agricultural work tools, etc.); already, 64% of them indicate that in the area under study, forests exercise an ecological and protective function (we use them for rest purposes and guides, recreational activities, exploration of flora and fauna, etc.). A traditional management practice with a perceived impact on the diversity of the forest ecosystem in the study area is animal husbandry. According to our respondents, the organized grazing system applied before the 1990s has played a positive role in maintaining the forest habitat mosaic in the landscape of this area, as regular cattle breeding prevented the encroachment of the grassland shrubs. Of the 40% of informants who own livestock, they stated that the purpose of keeping them was to provide products for family consumption (Figure 1).



What kind of livestock do you have, main breed, herd/flock size? Details of the pastoral system. Does the traditional pastoral system differ from today's animal husbandry?.....

Figure 1. Data on livestock activity.

Results and Discussion



The grazing system has not changed, but the number of livestock has decreased, so meadows and grazing fields have turned into barren lands with thorns (*Rubus ulmifolius* Schott.) or other harmful plants (17%).

The Park is the object of many visitors for its biodiversity assets and the beauties it offers. When asked if burning is used to open up new grazing land, about 45% of the interviewees (Figure 2) indicate that it is no longer preferred to use it, compared to before *"In our area, controlled burning of bushes and land is not used agricultural*" (female, 59 years old). There are paths created for their normal passage, but what is noticed in some cases is the lack of maintenance of these paths (Figure 3). Tourists have a positive impact (the paths are kept clean), increasing the economic activity of the area and its promotion (47.2%). Residents associate the negative effects of the presence of tourists in the park with illegal hunting in the forest (14%).

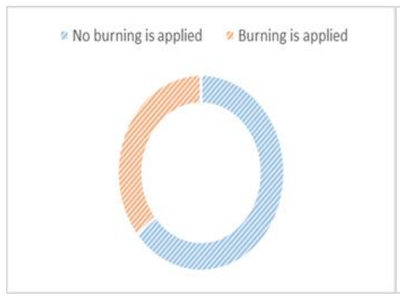


Figure 2. Use of burning as a management tool.

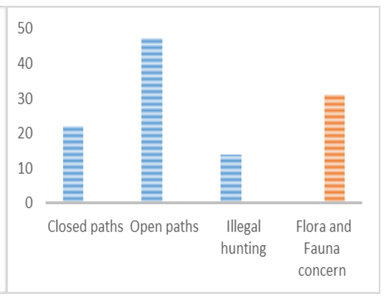


Figure 3: The role of visitors in the forest

The perception of the interviews on the usefulness of cattle grazing for the preservation or not of forest habitats was mainly that of its inutility for forest habitats because it affects the destruction of biodiversity (the spread of foreign species through manure) as well as damages the forest vegetation (Figure 4). According to our interviews, "*Grazing in the same place destroys the forest vegetation (rotational grazing is necessary)*" (male, 27 years old). Damage to the saplings of species such as oak strips the trunk of the wood from the horned bark. If cattle like a certain species, they completely eradicate it, destroy the future of the forest, and do not allow natural renewal and regeneration. "*Small cattle consume saplings in young forests; it should not be allowed during the period of sapling development*" (male, 36 years old).

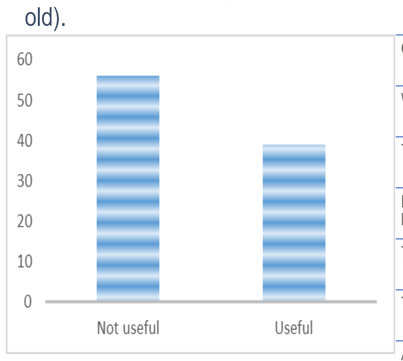


Figure 4. Perception of the interviewees on the usefulness of cattle grazing for the preservation of forest habitats

Challenges
We do not have an organized animal breeding system
The number of cattle has decreased
Meadows and grazing fields have turned into barren lands with thorns or other harmful plants (17%)
To create livestock farms (2.8%)
To have a rational use of pastoral resources (3%)
As a form of prevention (19.4%) is the fair application of fines
An increase in the number of security and monitoring staff,
More frequent awareness meetings with the local community, etc.

3.2 Results on hunting activity within the protected area and in the forests around it

What do you hunt, method, reason for hunting? Is it necessary to apply for a hunting permit? Does the hunting system carried out in the past differ from today? Is hunting frequent in the area? .....

About the hunting activity: 44.5% of the interviewes answered "*I don't hunt, I am completely against this activity*".

19.5% of them who confirmed that the hunting of animals and birds is not allowed in the protected area, except that of fish with hooks and nets with buds allowed for mainly recreational purposes but also for family consumption and not for trade.

There is also controlled hunting (13.9%), that is, according to a certain calendar, which is carried out for recreational purposes and has wild birds as its object.

Some of the species that are preferred by hunters according to the interviewees (8.3%) are: *Mountain Cap, Wild Pigeon, Short-eared Woodpecker, Turtle Dove, Partridge, Rabbit, Various Ducks.* etc.

14% confirmed that this activity was carried out by licensed persons on state property paying a fee that they have a license, respect the season and the allowed rates.

53% expressed concern about the presence of controlled permits and higher fees, in order to further curb illegal hunting

Results and Discussion

According to 19.5% of the respondents, in the 1997s we had indiscriminate hunting; also, foreign hunters, especially the Italian ones until the 2000s harmed the fauna of this area. Meanwhile, 66.7% of the interviews believed that the hunting system has changed because hunting with illegal means has increased, such as hunting with lights at night, hunting with stimulators, poisoning, dynamite, and by unconscious and problematic people. The reasons for doing this hunting are not only for consumption but also for trade.

3.3 Results on Timber management

Timber harvesting is a management practice with positive effects for the conservation of natural ecosystems (72.2%)

What types of trees do you harvest? What harvesting method do you use? What is the destination of the harvested timber? Does the technique of cutting timber used in the past differ from that used today? Is this area affected by illegal logging due to the ban?

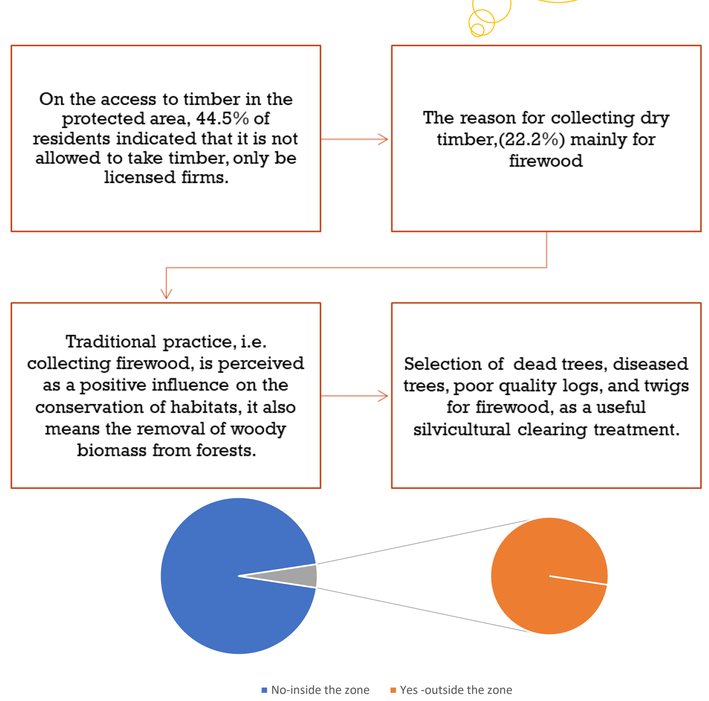
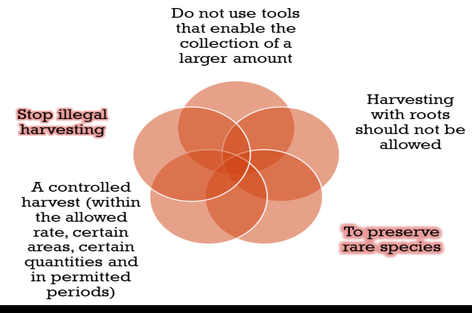


Figure 4. Data on the presence of illegal logging inside the protected area

On the presence of illegal logging, in general (22.2%) we have an awareness of the residents of the area with the increase and strengthening of the protected areas system (Figure 4). However, although logging is not allowed within the protected area, 55.6% of respondents indicate that sporadic illegal logging occurs, mainly for firewood and personal work tools but not for trucks and motor vehicles. The indiscriminate cutting outside the areas designated as non-protected areas is worrying.

3.4 Results on non-timber forest products that are collected from the residents of the area

Harvesting of non-timber forest products helps: to clean the land, but also for the provision of medicinal products, it is seen as an employment opportunity for many families (41%). The main destination of this collection is for personal use in 16.7% of cases, while the products that are allowed to be sold outside the Central Park area are sold by licensed companies that export them abroad, such as soft pine. On the existing criteria for the collection of non-wood products, 39% of the interviewees state that no type of regulation is applied.



Conclusion

The objective of this research was to understand how the abandonment of traditional land use activities in rural areas leads to a simplified habitat landscape and to describe the ecological consequences of the driving forces associated with this abandonment process. In general, the local understanding is that the disruption of traditional practices adapted to the carrying capacity of the natural resources of the study area has had negative implications for the conservation of habitat and species diversity. Our results illustrate a range of traditional management practices reported to be beneficial to biodiversity and economically profitable, which can be explored for the development of effective regional conservation strategies. Furthermore, the overlap of local perceptions and scientific reports is consistent with conservation approaches that encourage the combination of local ecological knowledge and ecological science to assess effective biodiversity outcomes (Berkes and Turner, 2006; Hernández-Morcillo et al., 2014; Joa et al., 2018; Morales-Reyes et al., 2018). These findings may be particularly relevant for landscape-oriented conservation policies that aim to prevent biodiversity loss resulting from the abandonment of traditional land uses. We recommend further research to assess the potential of local knowledge to monitor environmental landscape change..

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