

The impact of tourism on coastal protected areas. Case study: Corbu (Romania)

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Impactul turismului asupra zonelor costiere protejate. Studiu de caz: Corbu (România). Turismul reprezintă o activitate practică tot mai des în zonele costiere protejate din întreaga lume, iar efectele negative ale acestuia constituie o prioritate pentru actualele politici de mediu. Scopul analizei constă în studierea impactului pe care turismul îl generează în aria protejată a comunei Corbu. Metodologia studiului a inclus aplicarea unui chestionar cu un număr de 23 de respondenți, privind impactul pe care industria ospitalității îl are după opinia vizitatorilor, dar și analiza de tip scenariu a posibilelor direcții de dezvoltare durabilă viitoare a turismului. Rezultatele studiului au evidențiat disfuncționalitățile apărute în zona analizată ca urmare a reglementării ineficiente a presiunii generate de activitățile umane. Concluziile analizei subliniază necesitatea unei dezvoltări sustenabile a comunei Corbu printr-un proces de guvernare participativă.

Cuvinte cheie: sustenabilitate, politici de mediu, management, mediu costier, criză climatică.

The impact of tourism on coastal protected areas. Case study: Corbu (Romania). Tourism is an increasingly practiced activity in protected coastal areas all around the world, and its negative effects are a priority for the current environmental policies. The purpose of this analysis is to study the impact that tourism generates in the protected area of the Corbu commune. The methodology of the study included the application of a questionnaire with a number of 23 respondents, regarding the impact which hospitality industry has according to the opinion of visitors, but also the scenario-type analysis of possible future development directions. The results of the study highlighted the dysfunctions which appear in the analyzed area as a result of the ineffective regulation of the pressure generated by human activities. The conclusions of the analysis emphasize the need for a sustainable development of the Corbu commune through a participatory governance process.

Keywords: sustainability, environmental policies, management, coastal area, climate crisis.

1. INTRODUCTION

Coastal areas continue to remain, even today, an important pillar in the preservation of our ecosystems, both marine and terrestrial. The importance of protecting them cannot be more current, in the context in which the pressure of human activities becomes more and more visible, often to the detriment of the natural environment (Fothergill et al., 2019). Thus, one of our most crucial duties nowadays as researchers, is to make sure that the needs of our society are outlined in a sustainable way, and the current consumption of resources does not exceed the support capacity of our Mother Nature, on which we all depend (Micheli, Niccolini, 2013). Of course, this was never easy to achieve. The increasing trend of industrialization of the communities from the last century was gradually replaced by a vertiginous development of the tertiary sector, where tourism plays a key role in providing new jobs, revitalizing the local economy and satisfying the need for leisure, so important for the generations living in the current age of speed (Văidianu et al., 2020).

Currently, it is already obvious that coastal tourism has become one of the favourite branches of tourists in organizing vacations, and this aspect is determined by the general belief that the seaside offers the best opportunities when it comes to leisure, physical activity and even medical treatments for many diseases (Wong, 1998). Much of this affinity for visiting coastal areas dates back to more distant historical periods, when people often went on pilgrimages to holy places or performed different treatment cures at various thermal springs located on the seashore (Gormsen, 1997). But, at the same time, it is very important not to forget that the coastal areas represent, after all, the limit between two domains of life: the continental and the marine. These areas often overlap with state borders, which puts even greater pressure on them, therefore, it would not be wrong to consider that their good management can only be achieved through a participative governance, where the state institutions must collaborate closely in order to more easily identify the optimal solution for sustainable development (Assche et al., 2020).

The main problems identified in most of the coastal areas from all over the world are very complex and diverse, beginning from the lack of political involvement, which often fluctuates depending on the interests of the governing parties, and reaches up to the lack of funds and human resources, which also play an important role for the investments intended to ensure an efficient sustainable development. Of course, on these aspects we can also add the inexistence of an effective legal framework, key institutions far too uninvolved, or too incompetent in decision-making and, last but not least, the lack of support from the population, without none of the measures intended to improve the dysfunctions encountered inside the communities could be implemented (Micheli, Niccolini, 2013).

Knowing these aspects, it is very easy to later understand the importance of the general objectives which the European Commission has established with the aim of gradually developing the sustainable development of the maritime space. They aim to reduce military conflicts and create synergies between different activities. The end of armed conflicts in the coastal areas definitely leads to an increase in the level of economic development of the regions by attracting different sources of investment, the latter being encouraged by predictability, transparency and better legal security (Parris et al., 2003). Then, we also mention the need to have a closer cross-border cooperation, supported by European policies for the development of energy from renewable sources, the creation of navigational routes, as well as mutual support in the placement of submarine cables and pipelines. Last but not least, perhaps the most important objective, which makes possible, on a long term, the implementation of all the others, is the protection of the environment, implemented by assigning new protected areas, calculating the impact on the ecosystems and also changing the opportunities for multiple uses of the maritime and coastal space (European Commission, 2014).

Of course, when we discuss the establishment of protected areas, tourism is often brought up. The results of some scientific studies carried out in the protected marine region of Nha Trang Bay from Vietnam, highlighted the fact that tourism, as we all know, has always represented a key activity in creating alternative jobs for communities in protected coastal areas, but it should also be mentioned that, if not properly regulated, it can also bring with it a negative impact for local communities, if the state does not support local entrepreneurs more, in order to prevent the monopolization of the entire protected territory at an economic level (Pham, 2020). In an ideal scenario, tourism, in protected areas, can represent a way of creating a connection between visitors and local heritage, establishing a beneficial relationship between local communities, the protected area and specific economic services. Of course, when we are faced with a complex natural, social and economic background, this ideal is very difficult to achieve, making the effective interaction between all state institutions even more important (Navarro, 2019).

Also, one last aspect that should be mentioned is the fact that the typology of human activities practiced in protected coastal areas is not the only major problem encountered. The expansion of uncontrolled tourism and the non-application of environmental legislation can also bring into question the danger of excessive real estate development, thus urbanizing an area whose wilderness should have been preserved (Mejjad et al., 2022).

Thus, we reach to the general objective of this analysis, which proposes to study the impact generated by the tourist activities in the coastal area of the village of Corbu, Romania, creating optimal strategies for a sustainable development and increasing the degree of awareness of the population regarding the danger represented by the degradation of the environment.

2. METHODOLOGY

2.1. Study area

Corbu Commune is situated along the coast of the Black Sea, being a part of the Constanta County, representing the central part of the Romanian touristic littoral area, at a distance of 23 kilometres north from Constanta Municipality (Corbu Commune Municipality, 2024). The Commune is formed out of 3 villages, Corbu, Vadu and Luminița, but only the first two of them have an opening to the sea. The coastal area (Figure 1) is full of natural habitats specific to the geomorphology of the region. Due to this fact it is integrated in the widely known Danube Delta Biosphere Reserve, thus making it a SCI Nature 2000 site (Ministry of the Environment, Waters and Forests, 2016). The Reservation's Management has identified in this area many dunes that are home to diverse floristic and faunistic species, such as "2110 embryonic mobile dunes which provide a first stage of fixation of marine sands and which harbour rarer species such as the perished sea urchin, and 2130 coastal dunes with herbaceous vegetation ("grey dunes") populated mainly with perennial herbaceous species harbouring numerous floristic rarities" (Ministry of the Environment, Waters and Forests, 2016: 2).

From a physical-geographic point of view, the region is part of the eastern compartment of the Dobrogea's tableland (Ielenicz et al., 2005). This south-eastern extremity of Romania has, at a general level, a climate dominated by continentalism, especially in its northern half, close to the Danube Delta, to which we can also add the Pontic marine influences (active up to a maximum distance of 30 kilometers from the coastline towards west) and, last but not least, the sub-Mediterranean influences, which bring mild and rainy winters most of the time, while summers are hot and often dominated by low rainfall (Velcea, 2001). Thus, the south of the mentioned region is the only point in Romania where the average temperature in January is positive (in the city of Mangalia, where we have +1°C in the first month of the year), and the area of the Corbu commune is also notable for its mild cold season, with brisk winter but not much snow, very hot summers warm, and a rainfall level of approximately 300-400 mm/year (Ielenicz, 2007).

Economically, the commune favours from the position it is situated in and the vast fields that surround it, so agriculture and farming are one of the main factors that stabilize the economy, also due to the geology of the area, a limestone mining site is contributing to it (Figure 2). Fishing is also a method for the local population to earn money for a living, as well as tourism due to the existence of the many accommodations in the area such as guest houses and small huts (Safta, 2012).

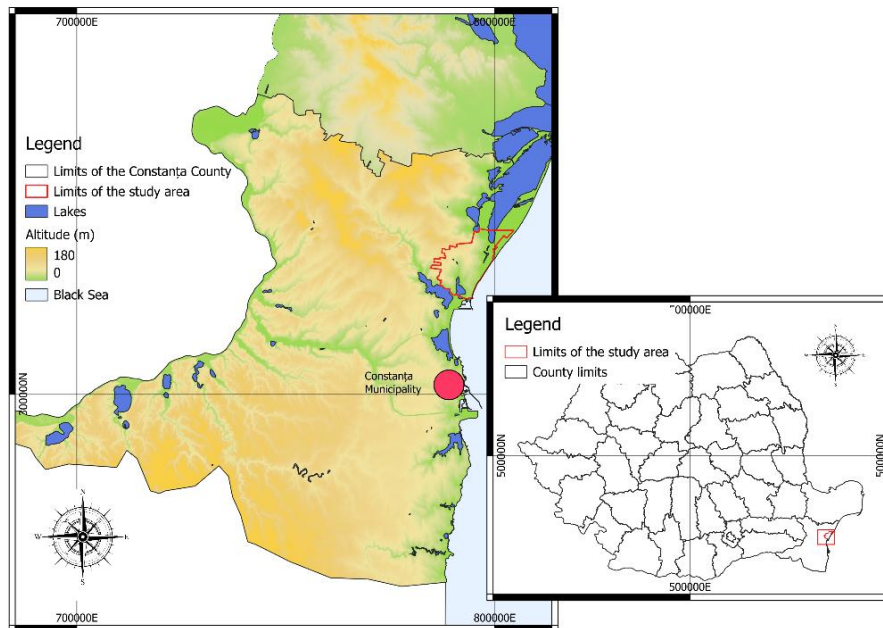


Figure 1. The location of the study area area on a regional and national level

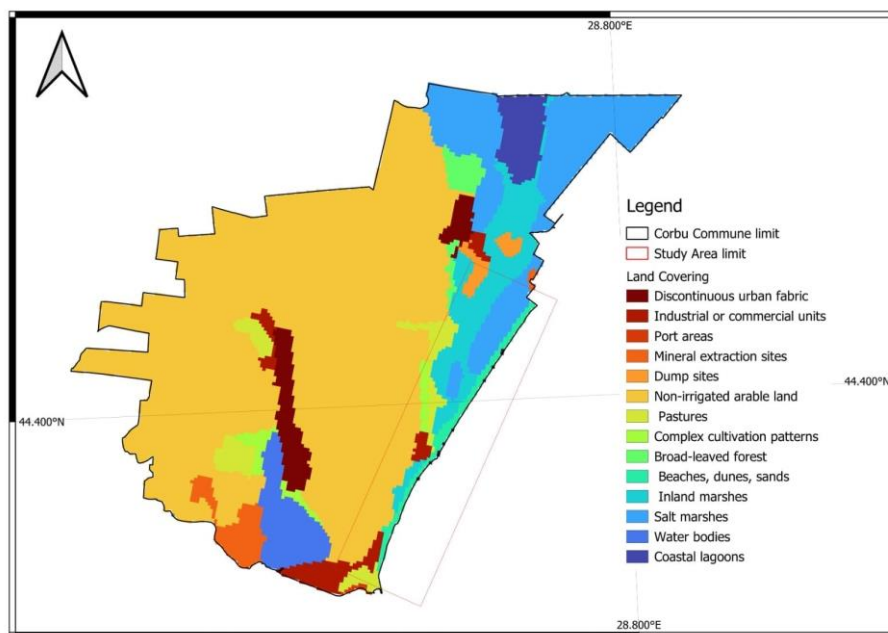


Figure 2. Land Covering of Corbu
Source: Corine Land Cover, 2018

2.2. Tourism impact assessment

In order to complete the analysis of the impact of tourism in the protected coastal area of Corbu, we made a series of field observations in November of last year, as well as in June 2024, keeping in mind our most important goal, which was to identify the most affected areas due to uncontrolled tourism, and what the irresponsible human activities

have done to the natural habitats and vegetation. Also, we did not hesitate to immortalize the scenery through some photos, helping us to compare the area between the two completely different dates we have practiced the field observations.

To connect deeply with the matter, we consulted many bibliographic resources regarding the area, such as scientific articles and official publications containing the strategies for a sustainable development in the Corbu Commune. The consultation of the bibliographic materials was also accompanied by a series of tourism indicators (the number of overnight stays and tourist arrivals, as well as the accommodation capacity of the resorts in the study area), based on the processing of data taken from the National Institute of Statistics.

Table 1. Questionnaire regarding tourist opinion about the impact of tourism in the area

Question	Answer Possibilities
<i>Visiting the Corbu area by tourists</i>	<ul style="list-style-type: none"> • Yes • No
<i>Respondents visit period in the study area.</i>	<ul style="list-style-type: none"> • Winter • Spring • Summer • Autumn
<i>The first impressions that the respondents had about the zone.</i>	<ul style="list-style-type: none"> • "Open Answer"
<i>The purpose of their visit.</i>	<ul style="list-style-type: none"> • "Open Answer"
<i>Respondent's satisfaction about the general appearance of the area.</i>	<ul style="list-style-type: none"> • Yes • No
<i>Evaluation of the tourist infrastructure in the area.</i>	<ul style="list-style-type: none"> • Excellent • Good • Satisfying • Unsatisfactory
<i>The main problems of the area from the touristic point of view.</i>	<ul style="list-style-type: none"> • "Open Answer"
<i>The differences between Vadu and Corbu beaches, according to the respondents.</i>	<ul style="list-style-type: none"> • "Open Answer"
<i>Ranking the quality of the natural environment in the area.</i>	<ul style="list-style-type: none"> • 1= Very poor • 2= Poor • 3= Decent • 4= Good • 5= Excellent
<i>Thoughts about revisiting the area, according to the respondents.</i>	<ul style="list-style-type: none"> • Yes • No
<i>If the study area is worth recommending to others.</i>	<ul style="list-style-type: none"> • Yes • No

We have also included in our work a SWOT analysis, that includes the strengths, weaknesses, opportunities and threats of the studied region, which helped us determine the best strategies to develop the area in the most sustainable way as well as a DPSIR analysis, in order to more easily synthesize the existing environmental problems through a multidisciplinary approach designed to include the pressures exerted by a whole series of stakeholders on the study area and solving the problems by drawing a plan of sustainable development. This analysis allowed us to better illustrate the impact that external pressure exerts on the study area, at the same time outlining its possible response scenarios for the near future, so that the solution for sustainable development can be identified more easily.

Finally, we have also conducted a questionnaire (Table 1), which was applied online to a number of 23 respondents, between the period of April to June 2024, when we intended to find out some more information about tourist perception of the study area and what they consider to be the main problems that affect the nature. Of all the people who answered, the majority were women (65 %), and the main age group was between 19 to 22 (68 %) years old, living in towns that are close to Constanța and Corbu. Speaking about their studies, the majority were students (56 %) that graduated high school as their last educational programme, or freshly graduated university students (39.1 %).

3. RESULTS

The first set of results can be outlined around field observations made in late 2023 and also in the first half of 2024. During the first period, the main things we have noticed were the amount of waste that was scattered around the beach, and this fact has been confirmed even at our second field observations in June. The multitude of waste observed includes, in general, remains of plastic packaging, as well as cigarette butts carelessly thrown away by tourists or locals who went to the beach in the protected area. We also mention wet or dry napkins which, although some of them are partially biodegradable, can still represent a form of visual pollution. Accompanied to the waste were the cars parked on the beach, at a distance of approximately 10 meters from the seashore. We noticed that the sea dunes and the natural vegetation suffer from the penetration of vehicles on the sand-covered surface (Figure 3). Of course, the situation is enforced by the continuous degradation of the informative panels, positioned right at the limit of entrance in the protected area (Figure 5).

These phenomena are more and more common, as tourists' interest in the area of Corbu commune has gradually increased over the years. If we look carefully at the level of tourist occupation represented at the entire southern half of the Romanian coast in

the period 2009-2023, we will notice that our study area ends up being at least as appreciated by tourists as other resorts known for the relatively high degree of attractiveness (Figure 4).

Driving from one beach to another, from Corbu to Vadu, we also struggled to access the second location, as the communal road (DC83), which connects the two villages, is currently in a very precarious condition (Figure 6).

Upon exiting Vadu, driving towards the beach, we stumbled upon a massive, deserted construction site that very much looks like a factory. The place, although it worked during the communist period, is completely abandoned and disused today, and the property around it is made up of degraded lands (Figure 7).



Figure 3. Unauthorized access on Vadu Beach (Corbu)

As for the SWOT analysis, we identified the various points that include the strengths, weaknesses, opportunities and threats which are shown in the following table. The main strong points are represented by the location and its unique features, such as its major part in the Danube Delta Biosphere Reserve, therefore these are balanced by the weaknesses such as the lack of administrative laws that are needed to manage the area even if it has a high national interest in tourism which causes pollution. As for the opportunities, the main point is the chance of attracting European funds for creating a balance between tourism and environment, bringing a stable value to the area, but yet, the threatening actions are on the rise as we see the number of tourists slowly increasing, as well as the lack of education of the population in the area regarding the protected wild beach.

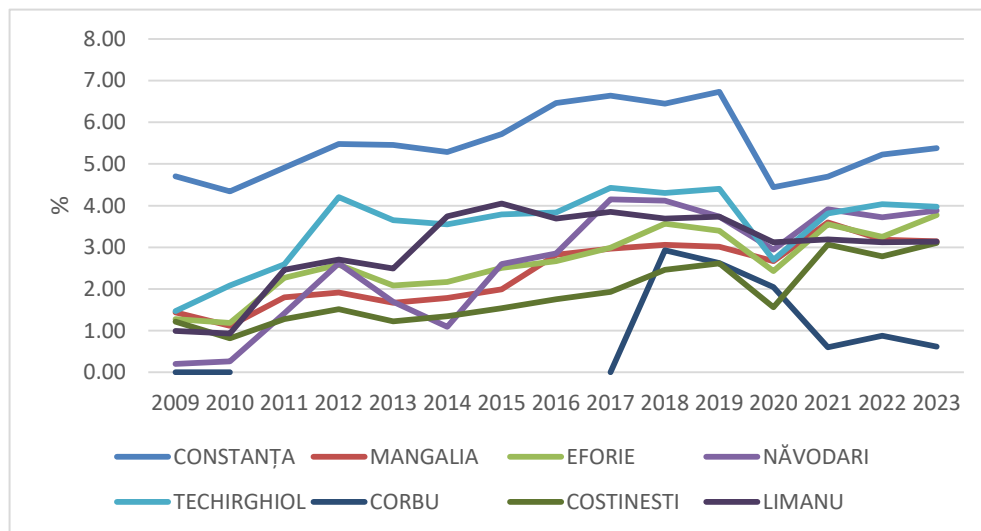


Figure 4. The level of tourist occupation of the Romanian coast in the period 2009-2023
Source: National Institute of Statistics (2023)



Figure 5. Information panels in Vadu (Corbu)

Furthermore, we found it necessary to create another form of analysis, such as the DPSIR analysis, in which we found out that the climate crisis represents a major pressure to the area through erosion and irregularities in climate phenomena (Figure 8). Not only that, but the tourist impact is also major, as we stated in the SWOT analysis as well, bringing the area in a state where regulations are overlooked, with a major lack of green-blue infrastructure which can only be resolved by implementing a sustainable development strategy.



Figure 6. Damaged road connecting Vadu to Corbu



Figure 7. The deserted communist factory of rare metals in Vadu (Corbu)

Drivers - Among the natural and artificial conditions which create pressure on the Corbu-Vadu protected area, we note that the main negative influence is generated by the climate crisis, which represents a global problem that, unfortunately, does not bypass any area on the planet. To this, we can also add the deficient legislation at a national level, especially in the sphere of environmental protection, and later, we remember essential factors such as tourism, agriculture and industry.

Pressures - Of course, all these factors mentioned above put pressure on the study area. The climate crisis brings with it the intensification of coastal erosion and the rise of the sea level, not to mention the thermal anomalies and irregular rainfall levels. The deficient environmental legislation makes possible the existence of poaching,

uncontrolled real estate development, but also the removal of local flora and fauna, the last two representing a pressure also caused by expanding agriculture, along with the growth of uncontrolled tourism. Also, the industry at the Petromidia oil refinery (located very close to our study area) brings and creates alteration of the quality of sea water and also of the air we breathe.

State - Regarding the state of the study area, it is important to specify that the environmental legislation specific to a protected region like this has generated the restriction of many economic activities, which, before the establishment of the current natural reserve, were not prohibited. But the non-regulation of tourism in the area, as well as the non-application of an effective development strategy, have led to the decrease in the standard of living for the local population, and, ironically, to an annual increase in the number of visitors to the area, despite the difficult accessibility at present. At the same time, the area is facing the increasing intensification of risky climatic phenomena, manifested by periods of prolonged drought, followed by abundant precipitation in the form of very powerful storms.

Table 2. Swot Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> • Unique natural area • Specific coastal flora and fauna • Protected region of national interest • Integrated part of the Danube Delta Biosphere Natural Reserve • The possibility of supporting some ecotourism activities • Reduced accessibility to the wild Corbu and Vadu beaches 	<ul style="list-style-type: none"> • Area of high interest for tourism • Non-compliance with the regulations for constructions in the protected area • Insufficient personnel for beach monitoring and compliance with environmental legislation • Lack of participatory governance • The existence of carelessly thrown waste • Degradation of information boards
Opportunities	Threats
<ul style="list-style-type: none"> • Attracting European funds for biodiversity conservation • Attracting some marine creatures whose effect is in decline • The existence of a sustainable development, from which both the population and the environment can thrive • Decreasing tourist interest in wild beaches and preventing overcrowding 	<ul style="list-style-type: none"> • Attracting more and more tourist flows, which gradually lead to the decline of biodiversity • Attracting European sanctions for non-compliance with environmental legislation • The accentuation of the climate crisis through the loss of wild areas • Lack of effective education of the population regarding the value of the natural ecosystem

Impacts - The impact of the reported aspects is, more than likely, easy to understand. We are talking about the lack of green-blue infrastructure, promoted at the European level, the fragmentation and degradation of most of the natural habitats, through illegal constructions, the reduction of marine and coastal biodiversity, through pollution and acidification of sea water, all culminating in the decrease in the standard of living for the entire area at a general level.

Response - Because of the cause, the study area can respond to these pressures through the immediate implementation of a sustainable development strategy, which includes, implicitly, the development of eco-friendly activities, the education of local communities and their involvement in promotion of sustainability. Also, other possible answers are surveillance of the protected area with the help of drones and rangers, stopping the expansion of real estate development, the transition to ecological construction materials and the careful control of the tourist flows.

When asked about the main problems which the area is currently facing, they had, most of the time, the option of an open answer, so the majority of them had the same opinions. From this particular questionnaire, we can highlight an important series of ideas, mainly that tourism is the main problem in this area, by the simple fact that after a mob of people, comes a wave of garbage, being able to also add here the problem of the non-modernized infrastructure (Figure 9). We have also included the graphic about tourist's opinion on the quality of the natural environment (Figure 10). The answer with the highest percentage is "Good" (52.2 %), followed closely by "Decent" (26.1 %).

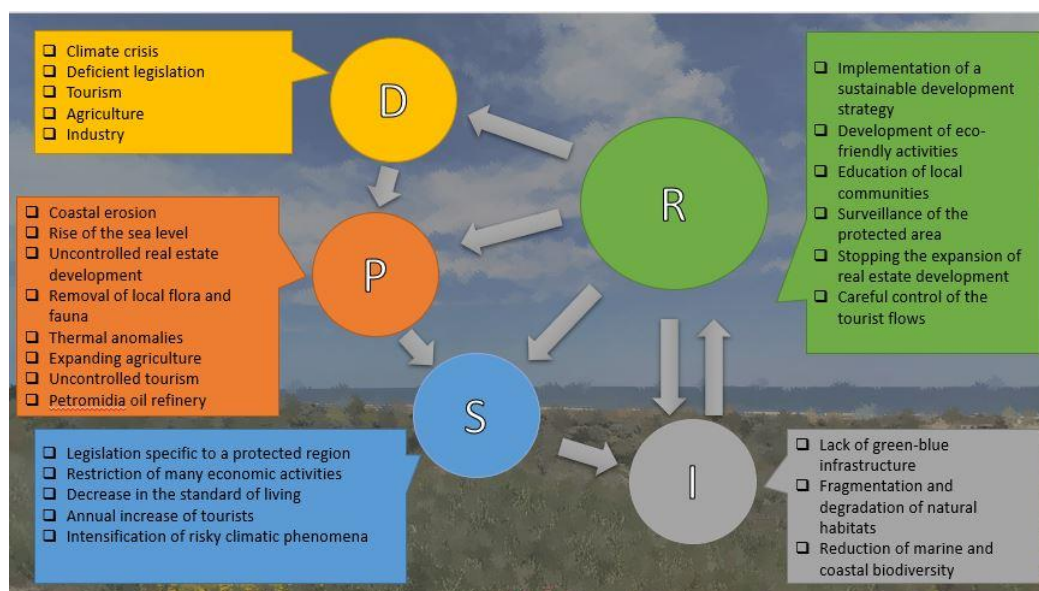


Figure 8. The DPSIR analyses of the Corbu Commune

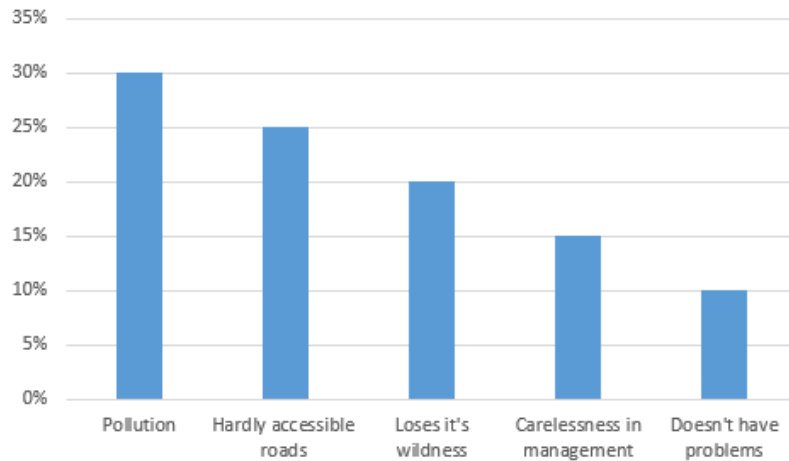


Figure 9. The main problems of the area in the view of tourists

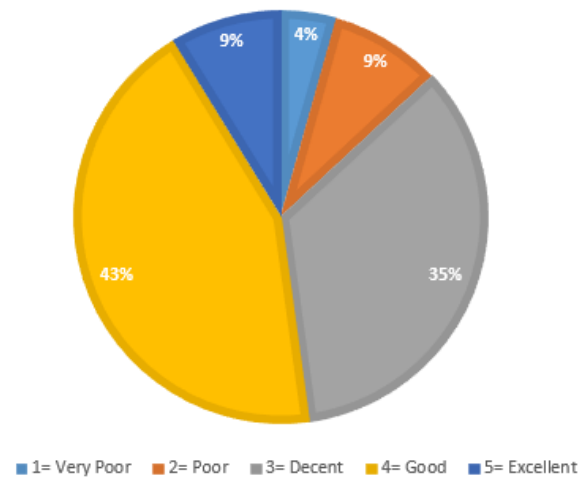


Figure 10. Ranking the quality of the natural environment in the area

4. DISCUSSION

The main problem starts from the deficient environmental legislation, often easy to interpret and not always applied correctly in Romania (Braşoveanu, 2023). On this favourable foundation, private investors and real estate developers often manage to find legislative loopholes through which they can obtain the greatest possible profit from illegal businesses, often without respecting the principles of sustainability, so important for a balanced development (Văidianu et al., 2020). Non-compliance with the regulations regarding the height and location of buildings, the cleanliness of public space, the inefficiency of public services and the specific overcrowding generated by the mass tourism, all are problems often encountered on the Romanian coast, and these represent

the very cause which determines more and more people to search the quiet of the wild areas of Corbu and Vadu, which still preserves a piece from the nature unmodified by the human factor. Also, another criterion that significantly contributes to the increase in the number of tourists in the area is precisely its geographical position. As we stated before, Corbu commune is located near the city of Năvodari and also very close to Mamaia, the latter being a very popular destination among tourists looking for leisure during their holidays at the seaside (Nica, 2022).

Beyond these aspects, it should also be mentioned that to all this anthropic pressure there is also the problem of non-existent participatory governance, extremely important for a good sustainable development (Văidianu et al., 2015). If we take, as an example, other countries from the western half of the European Union, we will see that the current trend of environmental policies aims to transform the coastal area, at a conceptual level, from a simple region delimiting two living environments, into a sector regarded as a distinct area, having a special functionality, on whose good development depends on both the health of the marine ecosystems and also that of the continental environment (Assche et al., 2020). In Romania, the main problem is given by the fact that the protected areas from the seaside are administered by the Ministry of the Environment, Waters and Forests, while the Romanian territorial waters, framed in a longitudinal strip that extends up to a distance of 12 nautical miles in front of the shore, it is under the jurisdiction of the Ministry of Energy. Having a shared governance between several state institutions, each with different interests, the management of environmental problems and sustainable development end up as goals which become more and more difficult to achieve (Văidianu et al., 2015).

Thus, knowing all these details, we can outline a set of intermediate objectives, which will help us to achieve the general one, formulated in the first section of this study. First of all, the digitization of school units and other state institutions represents an important process which must be achieved over a period of 1-5 years, contributing significantly to the improvement of the education system and reducing the unnecessary consumption of resources. Respecting environmental legislation in protected areas, improving the quality and efficiency of public services, as well as developing partnerships with other public and private entities could lead to the elimination of pollution, but also to the attraction of sustainable investments, promoting the environmental characteristics of the Corbu commune as a set of unique values at a national level and even in the whole Europe (Corbu Local Council, 2023).

Afterwards, we also have some objectives which can be achieved in a medium term, between 5 and 10 years. They involve the development of the infrastructure for practicing sports and spending free time, thus promoting the European concept of creating green-blue infrastructure, which connects parks and promenades with aquatic

ecosystems. For example, the degraded lands occupied by former disused industries could be reused for the construction of an amusement park, which would offer tourists the possibility of recreation by spending time outdoors on its trails. Last, but not least, the expansion and modernization of the natural gas network, potable water, sewerage and public lighting can also contribute to increasing the level of security in the village and preventing uncontrolled discharges of household water into lakes or even in the sea (European Commission, 2020).

Finally, we can suggest one last objective, which can be implemented only on a long term. By accessing some European funds and supplemented with national ones, an urban train highway could be built, connecting Năvodari and Mangalia with Constanța, thus serving the entire metropolitan area of the most important city in the county. Of course, at this railway, the inhabitants of the Corbu commune should also have access, to benefit as well from an easy trip between their village, located in the protected area, and the economically developed urban space, where many carry out their daily activities (Constanța Municipality, 2019).

As in the case of other similar studies, the attention is focused on common threats, of which, perhaps the most important, is the refusal of the population to cooperate in order to obtain a sustainable development. This happens when the local residents are either not sufficiently well informed about the advantages that environmental protection brings including to their own community, or when the initiatives are approached exclusively through the top-down technique, following the imposition of strict rules from a superior level to the citizens, without coming into direct contact with their needs and preferences. The studies carried out in the marine protected area of Nha Trang Bay in Vietnam, have already revealed that the balance between the primary activities of the locals and the tourist activities is very fragile, and the communication between the authorities and the population is of vital importance, if we want to obtain a future based on cooperation and mutual trust (Navarro, 2019).

Moreover, if we take a brief look at the Development Strategy of the entire Danube Delta Biosphere Natural Reserve, we will see that the area of the Corbu commune is intended, on a general level, for fishing activities, especially in the southern half of the mentioned space, while the north of the commune, overlapping the village of Vadu, is considered to be a marine buffer zone (Ministry of the Environment, Waters and Forests, 2016).

Looking now at other coastal areas in the world, we can also take some ideas from the sustainable development strategy of Seychelles as an example of good coastal management. Although we are talking here about an island state with a direct opening to the Indian Ocean, what is worth noting is the way in which this country tries to reduce the negative impact generated by the rise of the ocean level. Here, especially in the area

of the volcanic islands of Mahé and Praslin, the traditional "bulkhead" system, which aims strengthening the shores in the inhabited areas by concreting the promenades, is gradually being replaced by modern techniques designed to reduce coastal erosion. Thus, the rehabilitation of "pocket beaches" is preferred, made up by a series of small bays, where the power of the rip currents is much reduced. Also, although Romania does not benefit from the possibility of regenerating coral reefs as natural dikes, an idea put into practice in the Seychelles can still be taken as an example, namely the restoration of beach sectors with natural dunes, which are meant to slow down the advance of the sea towards the shore, especially during storms (Ministry of Environment, Energy and Climate Change, 2019).

If we try to outline some possible future scenarios for the Corbu commune area, we could divide them into three stages: the negative, the neutral and the positive stage.

The first scenario is, certainly, the one in which the future of the commune fails to achieve the proposed goals. Unsustainable development can bring with it the more intensive use of agricultural land, thus offering the community a higher production on a short term but exposed more and more to the extreme climatic phenomena on the longer period of time, reaching the loss of biodiversity that can represent a brand for the entire region, on which we can also add the degradation of the surrounding lands and waters. Also, if tourism will continue to be practiced without being well controlled, then, again, the local economy will be revitalized on a short term, but gradually, as the number of visitors will continue to grow in the area, the natural habitats will be destroyed, and the coast will be occupied by real estate constructions that do not comply with legal standards, leading to a general chaos marked by a large series of dysfunctions (Ministry of the Environment, Waters and Forests, 2016).

The neutral scenario assumes that the situation of Corbu commune remains unchanged, without necessarily implementing a sustainable development strategy. This will also lead to the gradual degradation of the ecosystem, but the process will be slowed down compared to the first scenario, because the few environmental protection rules will contribute to a partial conservation of the geo-ecological factors, maintaining an average to poor standard of living for the population, but without significantly contributing to the general fight against the climate crisis (Constanța Municipality, 2019).

The last scenario is also the preferred one, the achievement of which is desired. In this situation, the Corbu commune, implementing a sustainable development strategy, will end up benefiting from the protection of local biodiversity, which can attract a controlled number of visitors annually, who will be able to practice environmentally friendly ecotourism activities here, thanks to the uniqueness of the studied area. The local population will thus increase their standard of living through the efficient

management of environmental resources, in the same time, having at their disposal a good connection with the nearby urban areas, which bring with them the possibility of having stable jobs (Corbu Local Council, 2019).

Finally, we also included some aspects related to a series of limitations of our study. These concerned, first of all, the difficulties faced by the slightly smaller bibliography that was available in terms of books published on the subject addressed, so our documentation was exclusively concerned with scientific articles on similar subjects. Also, at the moment, we did not have the necessary equipment to be able to officially measure the pollution level of sea water, respectively of the soil, this information being approached only from the perspective of simple field observations. In the future, however, we aim to improve our study, so that the results obtained will be even more conclusive.

As future research directions, we are of the opinion that it should be studied how the nearby industrial activity (the Petromidia oil refinery) negatively affects the ecosystem in the Corbu commune, in order to understand how the economic activity there should be regulated for nature conservation and sustainable development. Last but not least, it would also be worth analysing how climate changes and, in particular, extreme phenomena and sea level rise, could affect the wild beaches of Corbu, thus being able to take a series of more effective measures knowing the gravity of the situation to be expected.

5. CONCLUSIONS

Thus, we can draw a series of conclusions from our entire study. The protected area of the Corbu commune possesses some unique environmental characteristics whose future can only be bright if the rules for the protection of biodiversity are respected. Included in the area of the Danube Delta National Biosphere Reserve, this coastal sector also has two villages, which need relative economic development in order to survive. This aspect creates a rather delicate situation, putting, at first glance, the local population to choose between two different management scenarios: the one focused on the development of the local economy, or the one focused more on environmental protection.

But if we look carefully into the depth of the problem, we will find that sustainability does not draw any limit between the two development options, but rather takes positive aspects from both of them, based on balance in each situation. The local economy must be developed, but not by any means and not in an uncontrolled way. Tourism can replace the disappearance of the former disused local industries for sure, but in order to also preserve the area's main asset, the wilderness, it is extremely

important that visitors must be directed towards the practice of ecotourism, being effectively informed about the reason why environmental protection is so important after all. Educating the population and including it in taking important decisions can bring more advantages on a long term than ignoring the problem or simply applying sanctions.

Therefore, our study revealed the importance of all these aspects, coming with a set of intermediate objectives which can contribute to the sustainable development of the area, while also pursuing the identification of appropriate solutions to combat the threats.

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