

# Sustainable Development and Environmental Education in Natura 2000 areas. A Vision of the Mountain of Pantokratoras for Corfu and the Local Community

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**Abstract**— Sustainable development is a key tool for the management of areas with natural and cultural wealth. Particularly in protected areas, the sustainable use of natural resources enables the rational use of environmental resources and environmental awareness, both for the protection from increased tourism and for mild development of downgraded areas. Land planning in such areas is a tool for controlling the intensive use of resources and for creating appropriate infrastructure. This paper explores the perceptions and attitudes of the local community of the region of Pantokratoras, in north Corfu, Greece, on the development of ecotourism and on environmental education, as well as the residents' general attitude towards sustainable development in an area, part of which is included in the Natura 2000 and is ideal for alternative tourism and environmental education. The strong development of tourism in Corfu and coastal areas will inevitably lead to an uncontrolled growth of the Pantokratoras mountain. Using questionnaires, this study investigates: a) the degree of awareness of the local community in protecting and preserving the environment, b) the knowledge of the local population on sustainable development, and c) the willingness of the local community to be active in sustainable tourism development plans. The analysis of the questionnaires shows the local community is interested in the protection and conservation of natural and cultural resources, while it also believes that sustainable tourism development is the ideal model for economic revitalizing and retaining local population.

**Index Terms**—Environmental Education, Local community, Natural and Cultural Resources, Sustainable Development, Sustainable Tourism.

## I. INTRODUCTION

**T**OURISM in areas with natural and cultural wealth is a key tool for the economic development of local communities, providing a destination for many visitors. The social, economic and environmental impact may be a major cause of degradation and gradual marginalization of these areas, while the viability of the chosen developmental model

plays a key role in protecting and preserving the environment and providing for continuous development [1]. Touristic development is based primarily on the use of sensitive resources from both the natural and the cultural environment. In many cases, human activities and reckless exploitation can cause irreversible damage on ecosystems and biodiversity. [2, 3]. The degradation of natural and cultural resources has led to the direct or indirect economic decline of areas, the destruction or change of use of forest ecosystems, the drainage of wetlands, the destruction of natural habitats and the extinction of rare or endemic fauna and flora [4]. Ecosystems and the environment in general are under pressure from human activities to meet growing tourist demand [5]. Human behavior begins to change, once societies perceive that their future depends on the physical, chemical and biological processes of the world [6, 7]. In any case, it should be clear that ecosystems and ecosystem services play a crucial role in humanity, ensuring goods, raw materials, and the basic ingredients of life, along with recreation, relaxation, cultural inspiration and natural beauty [8, 9].

Sustainable development is directly linked to the natural and cultural environment. It creates opportunities for touristic development, environmental protection, high living standards for the local community, and recreation [10], as well as enabling the sustainable economic development of local communities. All this is achieved through the land planning and organization of areas, where activities should be consistent with the protection of the environment [11]. For each area there is an appropriate activity, and for each activity there is the appropriate space. According to Buckley [12], any future research should be focused on nature-based tourism, especially in protected areas.

Protected areas are the predominantly suitable areas for alternative forms of tourism, such as hiking, interpreting the environment, biking, environmental education, etc., always in connection with history, religion, culture, local customs and the production of goods, so that the visitor can enjoy nature and also learn about the area and local communities. For the above to be effective, adequate infrastructure is necessary [13]. All the above affect the attractiveness of the visitors' preferred choice. Visitors choose their destination based on sustainability characteristics, mobility potential, landscape, services offered, information provided, safety, and infrastructure. All these criteria should be taken into account

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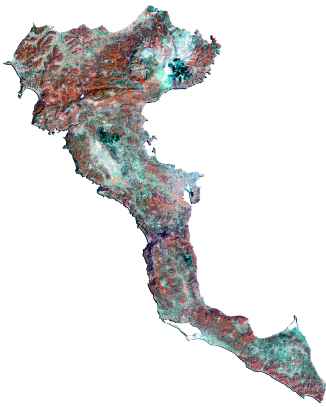


Fig. 1. Map of Corfu

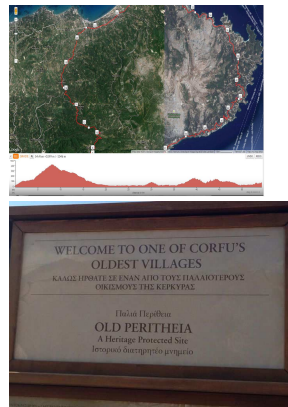


Fig. 2. Area of study

in the design and management strategy of areas [14]. According to Van der Zee [15], recreation in nature and in natural resources is based on the uniqueness of the landscape and the accessibility to the area. As mentioned indicatively by Bennett et al. [16], tourism plays a key role in shaping and supporting local communities, employment, economic growth, and cultural emergence. Directly associated activities also include improving infrastructure, and increasing and improving services provided; these parameters contribute to rural development at local level and improve competitiveness [18].

The human dimension and impact on society, and its connection with tourism has three dimensions: social, environmental and economic level. It can be either positive or negative [19]. The environmental impact that may arise from the pressure of tourism and affect tourism resources and the attractiveness of a region, can also have a negative impact in terms of the region's sustainability [20].

Sustainability and the sustainable development and management of areas has recently become a priority for the evaluation of sustainable development models.

The definition of "sustainable development" prevailed internationally in 1992, after the United Nations World Summit on the Environment in Rio de Janeiro, Brazil. As defined by the World Commission on Environment and Development, of the United Nations (WCED), the term refers to "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". One decade later, at 2002, the European Union and the World Summit for the Environment of the United Nations in Johannesburg established the three pillars of sustainable development (economy-society-environment), and determined the rational management of natural and cultural resources as essential to achieving sustainable development.

Therefore, sustainable tourism can be defined as tourism that takes into account current and future economic, environmental, and social impact, also considering the needs of visitors, and the current economic and environmental identity of each region.

Sustainable tourism refers to the environmental, economic, and social aspects of tourism development, and could stabilize

these three dimensions to guarantee long-term sustainability.

For the development of sustainable tourism, a necessary condition is the cooperation of all stakeholders, as well as strong political will, so as to ensure broad participation and social consensus. Visitor satisfaction and gaining experience are characteristics of sustainable tourism, leading to sustainability of alternative development models.

Sustainable touristic development is defined as the touristic development that takes place in balance with the local, social, economic, cultural and environmental structure of each tourist area, with the necessary conditions (services, infrastructure, expertise) for its continuous feedback [21].

## II. PURPOSE OF RESEARCH

This research was designed and implemented in order to investigate local community views and perceptions regarding natural and cultural environment, and the prospect for the sustainable development on Mount Pantokratoras of Corfu.

Its main objectives were:

- 1) *to identify the natural and cultural wealth and its emergence as a pillar of sustainable development,*
- 2) *to investigate the knowledge and understanding of the local community regarding natural environment, cultural heritage and the role they could play in the sustainable development of the region, and*
- 3) *to create material of environmental education and awareness, both for the promotion of the area, and for the informal education of visitors and local community.*

## III. AREA OF STUDY

The study area is located in the northern part of the island of Corfu, which also constitutes the wider part of the island. It is a mostly mountainous area, with two distinct geographical entities: the mountain of Pantokratoras in the east, i.e. the "Mount" and the hilly terrain in the west, i.e. the "Round". The predominant geomorphological landscape is represented by mountain and hilly masses and, to a lesser extent, hilly areas, plateaus and plains. The highest peak is Pantokratoras, with an altitude of 911m. The area is characterized by the lesser development of the hydrographic network and higher rainfall rates than other areas of the island. It ranks in the wet bioclimatic stage, with mild winters and an average minimum temperature of the coldest month  $3^{\circ}\text{C} < M < 7^{\circ}\text{C}$ , while its rich vegetation, favored by the wet and mild climate, belongs to the Eumediterranean vegetation zone (*Quercetalia ilicis*).

On mount Pantokratoras, there are 10 villages under the Municipal Sections of Thinalio, Cassiopeia and the Phaeacians, in the Municipality of Corfu. The largest population in the study area is the Community of Spartilas, with 721 inhabitants, while the smallest Community is Zygos, with 207 inhabitants.

## IV. RESEARCH METHODOLOGY

In order to meet its objectives, this paper included both bibliographic and field research to record the natural and cultural environment. The qualitative evaluation of the data

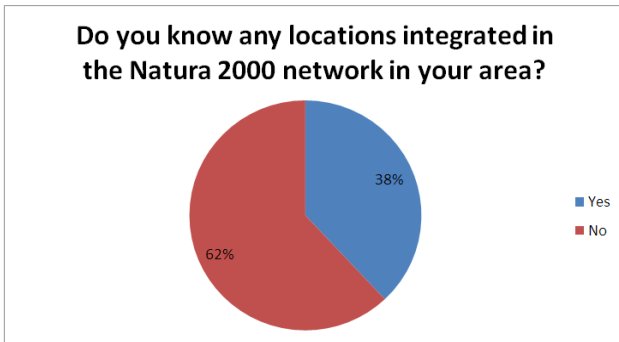


Fig. 4. Answers given by local residents regarding their knowledge of locations integrated in the Natura 2000 network in their area.

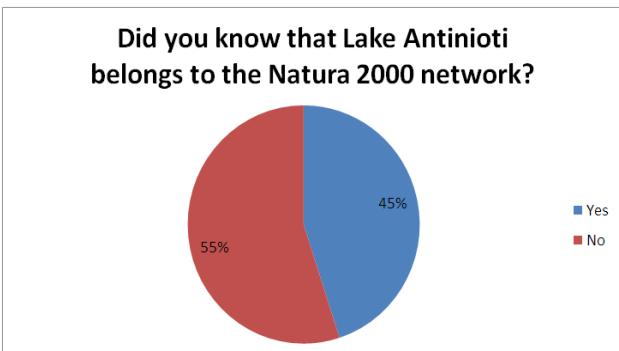


Fig. 5. Answers given by local residents regarding whether they know that Lake Antinioti belongs to the Natura 2000 network.

was performed using SWOT analysis [22]. This type of analysis, which has applications in various sciences, was established in the 50s, as a method that investigates the strategies of organizations in relation to their environment [23].

Questionnaires were used in order to record the knowledge of the local community regarding the current state of the natural and cultural environment of Mount Pantokratoras and the potential for its exploitation, in accordance with the principles of sustainability. The sample consisted of 200 residents. The survey was conducted in all villages of the Mount for the period 08.08.2013 to 15.07.2014.

The questionnaires were designed and composed based on extensive relevant literature [24, 25, 26, 27, 28, 29]. Specifically, the questionnaire consisted of general questions regarding demographics (gender, educational level, age and occupation) and specific open and closed questions.

The main research instrument was the questionnaire, orally completed by the local community of Mount Pantokratoras. In particular, the research was conducted at shops, homes and public places (cafes, streets). The selection of residents was random, and participants were generally cooperative.

Data collection was followed by data analysis, with the following steps [30]:

- a) **Control:** *The main control related to the proper completion of the questionnaires and the observation of sampling rules.*

- b) **Coding:** *This stage involved the conversion of responses to numbers or symbols, i.e. of qualitative data (complete phrases, a name, an affirmation or negation, etc.) to quantitative.*

- c) **Computer processing:** *Data entry into the computer and statistical processing. The processing of the questionnaires and the coded data conducted using specialized statistical programs, including the creation of graphs (pies and bar charts).*

Moreover, a virtual map of the area was designed, with the main purpose of audiovisual recording. The main mapping criteria were: a) the main villages or other important landmarks of Mount Pantokratoras, b) specific significant environmental areas, c) the main occupations, d) cultural monuments [31, 32].

## V. RESEARCH FINDINGS

Regarding participant demographics, it was observed that approximately half of the participants (51%) belong to the productive age of 19-45, meaning they have the ability to engage in business activities in the context of sustainable tourism. The education level of participants was relatively low, since about 10% are university graduates, and only 2% have attended postgraduate studies. A large percentage corresponds to primary school graduates, whereas 41% have completed secondary education. The residents' low educational level, which does not differ from the other tourist islands of the Ionian Sea, is mainly due to touristic development and their involvement in tourism. A conclusion and suggestion of this study is that seminars should be organized, with topics related to sustainable tourism development.

The majority of participants (about 90%) have a monthly income of less than 900 €, which reflects the difficult economic situation in Greece in general. Unemployed and part-time participants reach 28%, with the majority employed in the private sector (41%) Part-time employment, especially in the islands, concerns a significant category of workers, who can only work during the summer months, particularly in activities directly or indirectly related to tourism.

Interestingly, 47% of participants consider environmental protection a top priority, with 23% in slight and only 1% in complete disagreement.

However, the ignorance of the local community regarding protected areas, Natura 2000 areas and the existing current delimitation of such areas in the region of Mount Pantokratoras, is disappointing, reaching percentages of 60%, 60% and 62% respectively.

Another disappointing point is the percentage of participants who gave a positive answer to the question whether environmental protection is more important than economic growth (11%), a finding also confirmed by the next question, whether environmental protection always collides with economic development (60% of participants answered positively). It is also important that 80% of participants has observed a marked abandonment of the area by the local population, who seek employment in urban centers, especially

in the capital of Corfu.

A particularly encouraging element is the participants' view that the development of alternative forms of tourism will bring positive changes in the economy, everyday life and local environment. Despite the low level of education, 80% of the sample declares this perspective to be positive, also hoping for income growth (89%). Nevertheless, they are concerned about the deterioration of morals and customs of the region, in case of tourism development, with 35% agreeing, 26% disagreeing, and 39% having no clear picture.

A particularly important fact is that 82% of participants believe it is important to take measures for the protection of the Pantokratoras, while a small percentage (14%) did not have an opinion. Roughly the same percentage (85%) think they can create sustainable development activities in the region. Nearly eight in ten participants answered that the sustainable touristic development of Pantokratoras is the only hope for development and protection of the Mount.

The majority of participants (80%) believes that alternative forms of tourism may generate major benefits for the region, while only very small percentage believes the benefits will be small (2%).

Despite positive attitudes on the protection and sustainable development of Mount Pantokratoras, the majority of the sample (57%) say they do not intend to contribute as volunteers to possible efforts for protection and sustainable development of the region.

#### VI. EVALUATION OF RESEARCH FINDINGS

The key findings from this research are summarized as follows:

Despite the lack of knowledge of the local community regarding the institution of protected areas, participants showed a high awareness of issues of environmental protection and developmental models. It is necessary to fully inform the residents about environmental protection and sustainable development.

An important finding is the local community's positive attitude towards the institution of protected areas and its impact on development. Sustainable development, revolving around natural and cultural wealth, is regarded as the only hope for the economic revitalization of the currently degraded area of Pantokratoras. They believe that the unique combination of the natural environment with its rich cultural heritage should be highlighted.

The residents appear very concerned about the possible deterioration of morals and customs of the region by the potential development of tourism. This is probably due to examples of neighboring areas (Acharavi, Kassiopi, Sidari), where mass tourism has altered the traditions and daily life of local residents. Yet they also entertain the view that they will come into contact with different cultures, opening new horizons and developing new ideas for innovations and actions related to the promotion of the environment and the improvement of living standards. They are also positive towards the idea of highlighting, promoting, and reinforcing their cultural and culinary tradition.

A general conclusion from the data processing is that the protection and conservation of the natural and cultural environment, along with its interpretation and promotion with modern and innovative approaches, is a challenge, which tends to show stronger positive effects in protected areas, given their specific, differentiated and substantial character [33].

Furthermore, it is estimated that the benefits from the protection of environmental and cultural wealth and sustainable development are much greater and more important than those resulting from an unregulated tourism development. The local community seems to believe in the coexistence of economic growth and environmental protection.

#### VII. DISCUSSION AND PROPOSALS FOR SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL AWARENESS AT PANTOKRATORAS

In general, environmental education and the interpretation of natural and cultural heritage, enhance the understanding and knowledge of both local residents and tourists, in terms of the area's natural features and way of life of the visited area [34]. The dynamic combination of science and local knowledge has the potential to enhance the sustainable development of communities and the environment [35]. As a result, appropriately trained local population can manage the interpretation of their area to visitors, reaping economic benefits and promoting respect and appreciation for the natural and cultural environment of the region through their interaction with tourists. Tourists for their part, are sensitized through Informal Environmental Education action, and become active in preserving and promoting the elements of the environment and local population [36]. The implementation of modern technologies and innovative methods, the recording, promotion and protection of landscape and soundscape, can endow the area with a special character, highlighting its uniqueness in space and time [33, 37].

The creation of educational meetings and workshops to reinforce the residents' environmental knowledge and awareness on environmental issues related to the area under study is a necessity. Indicatively, a first step could be the reopening of the Environmental Education Centre (EEC) of the Municipality of Thinalio, which could implement diverse actions. EECs play a particularly important role in the activation of local communities, as they promote knowledge as a tool for communities to become familiar with the environment and realize its importance. Awareness raising through modern educational tools and methods can strengthen the local population, providing incentives for the creation of the sustainable development paradigm and reinforcing the role of younger generations in shaping alternative development policies [38, 39].

In the context of developing alternative forms of tourism at Mount Pantokratoras, we suggest the creation of a network of traditional villages in the area, aiming at familiarizing visitors with the villages and their natural and cultural heritage. An important role will be played by the cooperation and the promotion of routes by local tourist operators, with emphasis

on alternative forms of tourism. Additionally, central coastal tourist areas (e.g. Acharavi, Kassiopi) could connect with the natural and cultural heritage of nearby villages in Pantokratoras. These routes would be designed based on common cultural or environmental characteristics, would be depicted in digital maps (both in printed form and in electronic material online), and would form part of the relevant website. Audiovisual material for broader and specific groups should be designed, and material for the tour routes should be produced. Moreover, special themed events would strengthen the local community, highlighting the landscape, local products, and gastronomy [40].

Linking environmental priorities to economic development consists a challenge for the creation of inventive and dynamic design, taking into account both protection and development. Modern developmental models include sustainability and its different priorities in the term 'viability'. As a country with significant revenue from tourism, Greece should account for any possible effects, while also trying to mitigate them, proposing alternative models of touristic development, which will ensure the protection of Greek nature and cultural heritage. The economic benefits of tourism is the result of a development process that relies primarily on the natural and cultural capital of any tourist area which consists a tourist destination. Corfu has already developed and followed the model of mass tourism. Through this study, we suggest that the model of tourism be redefined and complemented by new and innovative implementation proposals, which would provide environmentally significant areas with support, alternative development, and network creation. A basic prerequisite for the implementation of the proposed model is the education and awareness of all involved stakeholders, the interpretation and promotion of the Pantokratoras area with contemporary design, the promotion and implementation of modern approaches of touristic development and the inclusion and accessibility of wider and special groups. In particular education is a key factor in promoting sustainable tourism development, the strategy of which should be part of an overall plan for the sustainable development of tourist areas. This proposed network could form the basis for developing environmental programs in schools of both Primary and Secondary Education in Corfu. In general, the acquisition of lived experience and experiential knowledge facilitates learning and helps the assimilation of knowledge in classrooms [41, 42]. According to Broda [43] and Quay and Seaman [44], outdoor education is defined as a combination of outdoor activities, environmental education and personal and social development. Awareness should targeted visitors of the area, enabling them to simply observe or even participate in planned activities. This experiential process contributes to the acquisition of knowledge and experience, nurturing environmental awareness and attitudes, and promoting the adoption of environmental ethics [45].

In the context of the present paper, we mapped and recorded environmental and educational routes on Mount Pantokratoras, through which visitors can get acquainted with natural and cultural wealth, history, traditions and local products of the

region. We also propose that educational activities be organized in representative areas, in terms of interpretation, information and participation in activities of the local community, which would be addressed to all, including the disabled, and would relate to interpreting the area and connecting characteristics and priorities so as to gain understanding of the natural and cultural wealth.

This research, in addition to its planned objectives regarding the sustainable development of Mount Pantokratoras, could constitute a guide for educational action in the context of environmental programs and awareness raising.

## VIII. CONCLUSION

From the current research it can be concluded that the lack of environmental knowledge and awareness is one of the most important parameters that could potentially be improved and contribute to the sustainable development of Pantokratoras. The upcoming proposals from this research could serve as the basis for planning the 'restoration' of the area, drawing on environmental, social and economic criteria. Local society and local government, such as the Municipality and the Region, have to embrace a modern consciousness, including environmentally friendly processes and long-term planning, for the successful sustainable development of Pantokratoras and Corfu Island. The financing of development programs in the period 2014-2020 constitutes a challenge for planning and for their successful implementation.

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