

DESIGNING FOR SUSTAINABLE TOURISM DEVELOPMENTS

CASE STUDIES OF GREEK ISLANDS

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Abstract

Tourism has been rapidly growing sector and a wide-sweeping socioeconomic phenomenon with broad economic, social, cultural and environmental consequences. It is likely that tourism will continue to dominate the international scene for many years to come. Environmental protection has become a major issue in the recent years. As a result of environmental consciousness, a great number of alternative forms of tourism have been developed in the last decade. Various names are utilized to demonstrate the typologies of the environmentally tourist. ‘Green’, ‘soft’, ‘eco’, ‘sustainable’, ‘responsible’, or ‘alternative’ tourism are some of the terms for to describe the new tourist. This new trend, prefer the places which are not destroyed by the “mass of tourists”. Sustainable environment requires sustainable design. Sustainable design solutions for the continuity of the traditional architectural environment can be seen in the Greek Islands. One of the examples is Mykonos; designing the minimum space for the maximum comfort conditions is the main idea of the sustainable design. As a second, Santorini (Thira), it can be seen a house consist of one small room. The main idea of this paper will contain “the design of the architectural touristic environment -in minimum space usage with the maximum comfort conditions- for a sustainable environment”.

1.INTRODUCTION

Tourism has been one of the economic success stories of the last 40 years. It has grown into a major component of the world economy and one of the most highly developed and dynamic industries with an important contribution to incomes and employment. Part of it being in less developed regions it helps to an extent-etceteris paribus- to spread economic development and reduce inequalities in the geographical distribution of income (Özgen, 2003).

Tourism at the same time is increasingly becoming an important subject in environmental and social sciences as the result of many socioeconomic and environmental factors influencing the movements of people (Nijkamp, 1974). The major factors, which have contributed to the rapid growth of this activity are the rise in incomes, increase in the time available for leisure, the advent of declining costs of travel, etc. Tourism grew at such a scale that, within a short period of time it almost tripled from 160 million international arrivals in 1970 to 430 million in 1990 (WTO, 1991)- a rapid increase unquestionably.

Tourism has been rapidly growing sector and a wide-sweeping socioeconomic phenomenon with broad economic, social, cultural and environmental consequences. It is likely that tourism will continue to dominate the international scene for many years to come. Environmental protection has become a major issue in the recent years. In general, most people realize that the planet has quite limited resources and therefore attempt to identify various methods, which will enable its preservation. "Despite the recognition of the long history of the environmental problem, it should be noted that until the beginning of the twentieth century, in general only relatively modest environmental changes were taking place, as the prevailing technological and economic was unable to alter environmental condition on earth dramatically" (Nijkamp, 1992, p.1).

The environment is probably one of the most important contributors to the desirability and attractiveness of a destination. Scenic site, amenable climates and unique landscape features have an important influence in tourism development and the spatial distribution of tourist movements. Consequently, sustainable development, can be defined as designing for a development that meets the needs of the present without compromising the ability of future generations to meet their own needs, required in order to preserve the environment as an asset for the tourism industry. However tourism has been responsible for a great number of environmental problems. The major problems arise because the environment (at least in the short term) is a zero priced public good and as with any zero-priced good, is subject to excess demand and over-utilization. This over-utilization of the natural resources, especially during the peak periods of tourist activity as well as often ill planned tourism development, have provided a number of examples where tourism is in conflict with the environment (Coccosis, Parpairis, 1995).

As a result of environmental consciousness, a great number of alternative forms of tourism have been developed in the last decade. Various names are utilized to demonstrate the typologies of the environmentally tourist. Green, soft, eco, sustainable, responsible, or alternative tourism is some of the terms for to describe the new tourist. This new trend, prefer the places which are not destroyed by the mass of tourists. Sustainable environment requires sustainable design. Sustainable design solutions for the continuity of the traditional architectural environment can be seen in the Greek Islands (Özgen, 2003).

2. TOURISM DEVELOPMENT IN GREECE

The Tourism for Greece plays an important role in the maintenance of financial stability. In Greece, the Tourism development started after the end of the Second World War, the tourism arrivals from 210.000 in 1956 were increased to 5.557.109 in 1981 and 8.351.000 in 1988. According to the predictions of the international tourism arrivals in Greece, the arrivals will present augmentative tendencies during 1997-2005 and will be increased per 36,3 times in relation to 1969 (Varvaressos, 1998). The 85% of the tourism movement takes place on May-October while the full months, when the 50% of the tourists visits Greece, are July, August and September (Drettakis, 1996), which demonstrates intensively the seasonal characteristic of tourism in Greece. The specific data concern mainly coast areas, islands, which either are specialized in foreign tourism and possess big hotel units, either are specialized in local tourism, mainly under the form of summer residence. The visitors in Greece come mainly from Europe and especially, from countries of the European Union (Germans and British) and, in a smaller percentage, from North America. Thus, noticed the dependence on the international tourism in Greece. The main tourism destinations are: Rhodes, Corfou, Creta, Calchidica, Mykonos and Santorini as well as Attiki - however lately there is a series of other smaller destinations (Voultsaki, 2000).

2.1. CASE STUDIES: TWO AEGEAN ISLANDS FROM GREECE

There is no doubt that tourism has already attracted considerable attention in issues related to an island environment and particularly the development of small islands. The growing demand for tourism opens up new opportunities even for small and isolated places, contributing to income and employment for islands inhabitants, but at the same time it has direct effects on their sensitive and unique environmental resources (Coccosis, 1987). This situation has already influenced local awareness of environmental issues especially in some cases where the expansion of tourism was rapid and intensive.

The development of tourism is basically attracted by the area's natural features-landscape, plant, and animal life-complemented by cultural and social attractions. Although these features and attractions should be protected, tourist development unfortunately is often in sharp conflict with the protection of uniqueness since it is associated with modernization, change in culture, urbanization and extensive exploitation of resources, (from boom-bust agricultural and fishery activity to the monopoly of tourism where landscapes and coastlines are being visibly affected by widespread urbanization and the intrusive impacts of hotel, marina, airport and road construction (Towle, 1985).

The potential effects of environmental degradation due to uncontrolled and intensive tourist development, inevitably affects tourism itself and the sensitive island ecosystem on which tourism is based. However there seems to be wide agreement to place emphasis on the management of at least some key island resources (coasts, freshwater, agricultural land, marine resources) in an attempt to highlight the interdependence of socioeconomic phenomena and environmental processes. In this respect the carrying capacity is becoming a critical tool in creating an efficient management (static component) and allocation (dynamic) of environmental resources (Coccosis, Parpairis, 1995).

The villages of Mykonos and Santorini still retain much of their old visual character today, in spite of greedy development. The fear of pirates was a compelling motive to select sites far from the shore (Figure 1), on steep cliffs or hidden valleys in Santorini. In Mykonos a narrow and complicated street structure like a labyrinth preferred because the same reason. Several factors have led to high density with narrow streets and small buildings: shortage of available safe space, mutual protection from the wind and the solar heat, defence, family growth, construction materials saving, as well as the highly communal spirit of the old societies. In Mykonos densities of up to one person per square meter have been reported, so one can imagine similar crowded conditions in Santorini villages. In our era, when the sea is the main attraction and sunburns are more frequent than pirate assaults, more and more settlements appear near the shore assisted by new roads (Özgen, 2003).



Figure 1. Santorini, Fira Town From The Sea (Özgen, 2002)

Climatic conditions are typical for the Cyclades region, with long sunshine duration and little rainfall. Humidity is not very high in fact it is the main water source for vegetation. Temperature fluctuations are rather limited throughout the year and snow is a rare event. Winds usually come from the North quite strongly (especially the meltemi in August), but sometimes the south ones can be nasty (Stasinopoulos, 2002). The natural environment of the islands, typical of the Cyclades, is characterized by low vegetation due to the dry climate, lack of fresh water and poor soil conditions. Rural activities have adapted over the centuries to the low capacity of the terrestrial ecosystem to provide few agricultural products. The marine environment is of unique beauty and still largely undisturbed. The stronger attraction of the islands, though are their unique architectural heritage in the built environment. However, the rapid tourist development and its expansion to a scale which can be considered large in relation to the size and population of the islands, threatens not only their rich built environment heritage and the natural environment but also their socioeconomic structure and local culture.

This situation –common to many other island in Greece as well as in other parts of the world, where tourism is rapidly developing- leads to the question of whether the present development in these islands is sustainable. Mykonos and Santorini, because of their size and their traditional activities, these small islands never became a commercial, administrative or political centre nor reached a state of economic influence as happened to Syros, Rhodes, Samos, Lesbos, and Chios, but they became a universal cultural centre mainly because their historical/cultural and natural resources. For this reason Santorini and Mykonos are strongly dependent on its indigenous natural and manmade resources (Coccosis, Parpairis, 1995).

2.1.1.MYKONOS

Mykonos is a Greek Island known for its natural beauty and its unusual traditional architecture (Figure 2). It has an area of a little over 100 square kilometres and has seen a dramatic growth in tourism over the past 25 years. Between 1971 and 1991 a quarter of a third of the island was taken up with the building of new tourism developments. The accommodation stock has risen dramatically.



Figure 2. Mikonos, Hora Town (Özgen, 2002)

For example, in 1961 there were 98 beds in hotels while in 1991 there were 4724. Tourist numbers also rose, growing from around 5150 arrivals at hotels in 1965 to 60,000 in 1995. Likewise hotel bednights have also increased considerably from 34,350 in 1965 to 922,000 in 1995. The island welcomes up to 4000 1-day transfer visitors per day, many of whom are using Mykonos as an intermediate stop on ferry routes or as a day trip destination. The island's population rose too between 1961 and 1991 from 3718 to around 8500, but the rate of growth has been much slower than the rate of growth of tourism on the island (Priestley and others, 1996).

2.1.2.SANTORINI

The spectacular and unique landscape, the distinctive vernacular architecture and the long runaway have caused a rapid increase of mass tourism during the recent years, with all the related side effects on the environment and the attitude of the locals. The port of Fira (Figure 3) is a routine stop for every East Mediterranean cruise. There are quite a few sandy shores easily accessible by car or motorcycle; Kamari and Perissa beaches are crowded in summer, though there are spots with better sand and fewer people at short distance. The sea in Caldera is deep (down to 400 meters at a spot west of Imerovigli) and clean, but accessible only at a few points -and by few people. Special attractions include the excavation site in Akrotiri, the islets of New and Old Kameni (with black lava rocks and sulphur water warm all year), and local religious events.

Le Corbusier was greatly impressed by the visual virtues of Santorini vernacular buildings when he visited the island during the CIAM conference in the 1920's. The basic building features, like in the near-by islands, are solid volumes, thick masonry walls with small openings, the whitewashed plaster skin covering almost everything with an integrative power, the creation of composition through continuous repetition. All these elements have produced a kind of organic urban and building forms, evolving through a long response to the climatic

conditions skillfully using the locally available resources, and at the same time imprinting the social evolution through time (Stasinopoulos, 2002).



Figure 3. Santorini, Fira Town (Özgen, 2002)

One can say that Nature is the chief designer of that architectural style, dictating its whims on the local builders, i.e. the dwellers themselves in most cases. Climate, earthquakes, materials, and topography had been the primary design parameters, and were respected with admirable honesty and ingenuity. Tradition, resulting from long experience, was regulating the building specifications from layout to decoration, leaving little ground for experiments or deviations from the established norms. The introduction of Neo-classical elements at the end of the 19th century must have been a radical act, adopted by rich captains who could afford showing off that they can follow the new architectural fashion, which was flourishing in Europe at that time.

A special ergonomic scale is all too obvious, very similar to the one found in ships: low doors, narrow and steep stairs, tiny inner/outer spaces. These are products of necessity rather than choice, since the dominant design rule is economy in every respect (Small Is Necessary). Certain additional features differentiate the architecture of Santorini from that of the surrounding islands: excavated buildings in a stepped-back layout and cylindrical vaults (Stasinopoulos, 2002).

2.2.SUSTAINABLE ARCHITECTURAL DESIGN OF THE ISLANDS

In view of present global crises, population expansion, natural resource depletion and ecological disasters, there is an urgent need to align development and the practice of architecture with the concept of sustainability. This idea of sustainability is not only creating a place which is self-sustaining but also includes being sensitive to local community needs and concerns; involving affected, and recognizing the importance of all the peoples in the decision-making processes. Like all well studied design, sustainability also takes into account the sensitivity of local history and culture. This means the respecting of local materials, vernacular designs as well as being sensitive to the existing built environment of the given location, and giving priority to the conservation and preservation of old buildings as cultural beacons in the history of a place. This is important in order to compete with other well studied design.

In Santorini topography, materials, building methods, and -above all- time have contributed to a complex uniformity in the built space. The geometric typology of the structural solids is quite simple, consisting of prisms, cylinders and domes, all being covered by a continuous plaster membrane. However, it is the combination and transformation of these few geometric primitives in many and random fashions that generate a unified totality with a strong sculptural atmosphere, amplified by light and shadow contrasts -strong or soft- according to the hour and season. Thus, the forms acquire a varying personality, enriching a walk through them with a series of visual surprises. The plasticity of the bold surfaces is enhanced by the rectangular or semi-circular openings, as by the numerous bell-towers and chimneys of many styles and sizes. In Mikonos Hora Town, topography is very flat in confrontation with Santorini. Mykonos buildings details are very simple like their shapes. White colour, which is dominant like in Santorini, gives a feeling of simplicity (Figure 4).



Figure 4. The Simplicity of Mikonos (Özgen, 2002)

The colours still embedded in the plaster of old ruins remind the era before the widespread white washed surfaces of today, an attribute that originated as a cheap method for disinfecting and sun protection, imposed later as a common Greek vernacular trademark. Some villages in Santorini and Mykonos still remain far from the contemporary artificial 'white and blue' idea of Cycladic architecture, thus presenting several original examples of the vernacular use of colour. Sustainable design for architecture is useful decision for protecting the future of the Greek Islands. A list (Anon., 2003) can be shown for the islands sustainable design:

***Smaller is better:** This is the main design principle of the islands. It means optimize use of interior space through careful design so that the overall building size -and resource use in constructing and operating it- are kept to a minimum. Some of the buildings consist of one small room. This is a current design principle for both islands. In Figure 5, it can be seen an example of building geometry from Santorini, Oia Town.

***Designed for durability:** To spread the environmental impacts of building over as long a period as possible, the structure must be durable. A building with a durable style ("timeless architecture") will be more likely to realize a long life. In the islands, it can be seen a sort of timeless architecture, they have their own style. At every season start (generally in May) with a white paint, all of the buildings rescued from the impacts of the time (Figure 5).



Figure 5. Santorini, Oia Town, Small Houses (Özgen, 2002)

***Optimized material use:** Minimize waste by designing for standard ceiling heights and building dimensions. Avoid waste from structural over-design (use optimum-value engineering/advanced framing). Simplify building geometry. Minimize the luxury of the spaces. Minimize the use of the furniture. A room from the islands can be given as a simplicity example (Figure 6).



Figure 6. Santorini, Simplicity of A Room (Özgen, 2002)

***Design buildings to use renewable energy:** Passive solar heating, daylighting, and natural cooling can be incorporated cost-effectively into most buildings. Also consider solar water heating and photovoltaics—or design buildings for future solar installations. On the islands there is no need an energy-efficient building design because of the use mostly in summer period.

***Design water-efficient, low-maintenance landscaping:** Conventional lawns have a high impact because of water use, pesticide use, and pollution generated from mowing. Landscape with drought-resistant native plants and perennial groundcovers.

***Look into the feasibility of graywater:** Water from sinks, showers, or clothes washers (graywater) can be recycled for irrigation in some areas. If current codes prevent graywater recycling, consider designing the plumbing for easy future adaptation.

***Renovate older buildings:** Conscientiously renovating existing buildings is the most sustainable construction.

***Create community:** Development patterns can either inhibit or contribute to the establishment of strong communities and neighborhoods. Creation of cohesive communities should be a high priority.



Figure 7. Mykonos, Hora Town, Adaptable Using of Buildings, Home and Room For Rent (Özgen, 2002)

***Design for future re-use and adaptability:** Make the structure adaptable to other uses, and choose materials and components that can be reused or recycled (Figure 7).

***Value site resources:** Early in the siting process carry out a careful site evaluation: solar access, soils, vegetation, water resources, important natural areas, etc., and let this information guide the design.



Figure 8. Santorini, An In-fill Development, Houses and Hotel Rooms (Özgen, 2002)

***Encourage in-fill and mixed-use development:** In-fill development that increases density is inherently better than building on undeveloped (greenfield) sites. Mixed-use development, in which residential and commercial uses are intermingled, can reduce automobile use and help to create healthy communities. Figure 8 shows an in-fill development from Santorini.



Figure 9. Mikonos, Motorcycle Parking Outside of The Hora Town (Özgen, 2002)

***Minimize automobile dependence:** Locate buildings to provide access to public transportation, bicycle paths, and walking access to basic services. The road system on the islands doesn't need a high density of automobile because of their limited interval. The tourists groups prefer mostly lower capacity scooters, which have inexpensive prices for rent. For Mykonos Hora Town, it is forbidden to enter to city center by vehicle (Figure 9). Santorini's narrow streets aren't suitable for the vehicles, because of its topographic features.

2.3.IMITATION OF THE VERNACULAR: SUSTAINABILITY?

There are some opposite ideas about the sustainable architectural design. Sustainable design means the repetition of the old existing architecture? Two examples from Santorini can be given for discussing this subject:

One of them is the idea of an architect. According to Agnes Couvelas-Panayotatou, architect of a new house in Akrotiri/Santorini; the devotion to pseudo-traditional morphology must be the outcome of tendencies, which begin from the need to preserve the cultural past and end in a nostalgic copying of styles. This imitating, this aping has nothing in common with respect for tradition; it belies a deeper desire to return to another age, an illogical bent for reviving an idealized past. Architect turn our back on the future and create a hybrid present, incapable of expressing the meaning of our age. Traditional buildings, constructed locally of materials available and built by the inhabitants themselves, constituted an extension of the natural environment. In sharp contrast, designed architecture initiates a nonstop opposition to nature, as principal perceived representation. An endless series of applications, the one succeeding the other in different forms, are associated with 'the house', just as a whole range of interpretations are attached to an ancient tragedy. What is bequeathed by the preceding generations is transmuted, so giving birth to the new (Couvelas-Panayotatou, 2002).

Today human being spent her/his life in cities built with industrial materials, in a man-made environment. They have access to an enormous range of information, images and materials. New representations are created on computer screens. Designers are more and more dependent on the mass media of communications that create an artificial environment. They

are bombarded with images of virtual reality, immaterial simulations of the real world. And, naturally, they are unable to assimilate so many new perceptions. Perhaps the preservation of the traditional vocabulary is related also to this human inability. Perhaps it functions as a secure legacy of collective assurance. The main role of the architectural avant-garde can be sought here, that can be seen today in the expression and interpretation of developments, in the exercise of polemic and in submitting proposals. In recent years designed architecture has been regarded as an isolated, autonomous aesthetic phenomenon, as a spatial scheme. Perhaps the emphasis on the opposite viewpoint, that is its appraisal as something rooted in the intellect and the human, might open up new roads in architectural creation. Couvelas believe that one of the main aims of architecture today should be to re-link man with nature. Architecture should reflect man's concern with the depletion of natural resources and his distancing from nature. The second example is a complex of apartments revitalises the form of the traditional residence by reconstructing a set of ruined houses and adding new sections. It is an in-fill project and the architect prefer a vernacular design vision and the 17 apartments fits easily into the more general masses and morphology of the island. According to the architect the new parts of the complex blend into the old ones as if they had always been there.

2.3.1. Vacation House, Akrotiri, Santorini Island, 1993-97, Agnes Couvelas-Panayotatou/ Architect.

This holiday house stands on the hill of Akrotiri (Figure 10), above the village of the same name, and has superb view of the volcano, the caldera and the rocky spine of the island. The ground floor has two residential units, with separate entrances. On the upper floor, the empty open-air space breaks the continuity between the smaller mass of the kitchen and a third, spacious bedroom doubling as a winter sitting - room. The materials and construction methods are purely local for creating a sustainable design: light, easily - moulded bricks, providing excellent heat insulation, thick - grained peach – coloured local sand for the external plaster, pozzolana for the insulation, and concrete slabs made with local sand to cover the floors.



Figure 10. Vacation House in Santorini, Akrotiri Town (Couvelas-Panayotatou, 2002)

The objective of adapting the house to local climatic conditions led to the adoption of an ingenious system of protection from the strong northerly winds. The thick shell of the building has the appearance of being perforated at its apertures by appropriately - designed internal funnels which absorb the wind, changing its direction and strength and creating what might be described as invisible protective wind – panels. These air ducts allow the skin of the

building mass to breathe and provide it with unobstructed contact with the environment and the view towards the caldera, making the use of glass panes superfluous.

There are many points of interest in this sophisticated essay, located in a landscape full of dramatic contrasts: the 'erosion' of the interior, hewn out of the ground; the monolithic yet plastically dynamic mass; the ruggedness of its character as a solitary fortress; its geological and almost masculine intensity. It is a journey through time, an exceptionally thoughtful process of reduction, the transcription of memories from the Akrotiri archaeological site and the anonymous local architecture into a structure which, ignoring any of the current conventions, has invested itself with the poetry of a ruin charged with the definitive traces of its natural environment (Giacumatos, 1999).

2.3.2.Colours Apartment Complex-Hotel Chromata, Imerovigli, Santorini Island, 1991-94, Kostas Nikolaidis/ Caroline Edwards/Architects.

This complex of apartments revitalises the form of the traditional residence by reconstructing a set of ruined houses and adding new sections. The old buildings, half-sunk into the ground on the side of the cliff looking out over the caldera, have a striking, unrestricted view out of sea. The customary local way of building houses was retained, and the 17 apartments fits easily into the more general masses and morphology of the island. All the apartments differ from one another (like all the houses of the island), and the complex is deployed on six stepped levels in response to the quirks of the terrain and the position of each. The paths, verandas, flat roofs and successive levels go with the apartments to make up a continuous entity consisting of interior and exterior spaces (Figure11). As a result, the new parts of the building group blend into the old ones as if they had always been there (Figure 12).



Figure 11. Santorini, Hotel Chromata Verandas (Constantopoulos, 1999)



Figure 12. Santorini, Imerovigli Town, Vernacular Architecture Hotel Chromata
(Constantopoulos, 1999)

Only when one walks around the complex does one become aware of the delicate but significant distortions to which the architects have subjected the traditional forms. Although the colours, the forms and the materials are all familiar, the morphology is not entirely conventional. The manner in which the materials have been used, the wooden beams, the brush - strokes of bright colour, the occasional twists and curves in the forms-all these features have a dual interest: on the one hand, they revitalise the vocabulary of the island townships, complying with it but not imitating it, and on the other they introduce a new and contemporary aesthetics, discovering new ways of linking familiar materials and forms. As a result, the outcome is doubly gratifying (Constantopoulos, 1999).

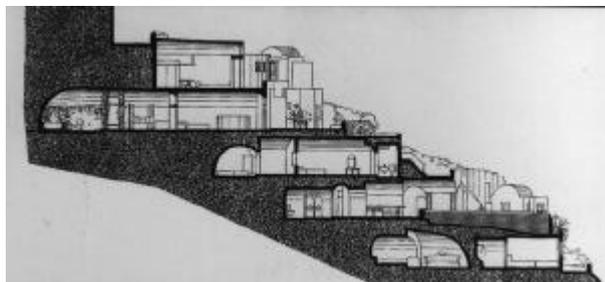
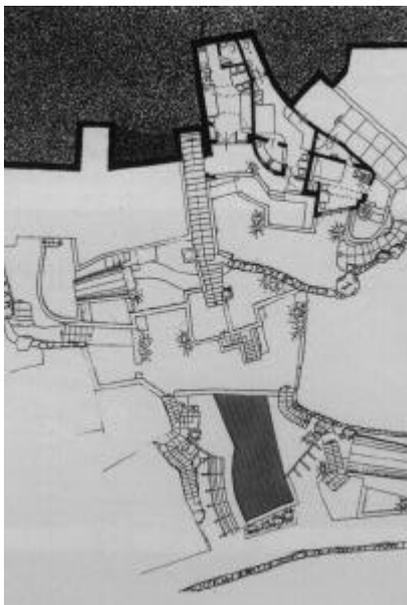


Figure 13-14. Plan and Section of Hotel Chromata (Constantopoulos, 1999)

Apart from the ever-present white, the colours used are the brown of the scorched island soil for the perpendicular curved surfaces, ochre for the flat surfaces and cobalt blue for the flat roofs. At its extremity, the swimming pool on farthest edge see in Figure 13-14 the complex fades into the water of the sea. Today it is used as a hotel complex, named Hotel Chromata.

3.CONCLUSION

Tourism is not only a rapidly rising economic activity, on all continents, in countries and regions, but it is also increasingly recognized that this new growth sector has many adverse effects on environmental quality conditions. In the context of the worldwide debate on sustainable development there is also an increasing need for a thorough reflection on sustainable tourism, where the socioeconomic interests of the tourist sector are brought into harmony with environmental constraints, now and in the future. Tourism is intricately involved with environmental quality, as it affects directly the natural and human resources and at the same time is conditioned by the quality of the environment. Such a relationship has important implications from the point of view of policies, management, planning and designing.

Santorini and Mykonos already presents some symptoms of saturation, and undesirable effects on the islands' sensitive environments are emerging. These include congestion, lack of parking space, insecurity and water and soil pollution, especially during the peak summer season. Evidence shows that the limited natural resources of the islands are insufficient to cope with the competing demands placed on these resources as a result of uncontrolled tourism development. A large proportion of the islands are extremely limited land surface have either been absorbed by intensive housing construction, tourism development and its accompanying infrastructure, or left unused for future speculation, thus causing widespread loss of agriculture land. Furthermore, surveys have indicated that the satisfaction levels for both tourists and residents have fallen as the scale of tourism on Mykonos and Santorini have grown. Especially in Mykonos as a result of the "cosmopolitan" type of tourism prevalent in the main town Hora of the island tourists want to seek the traditional hospitality, spontaneity, honesty of relationships, and the authenticity of the experience in rural areas.

In the case of Mykonos and Santorini there is the evidence that it has approached a crucial stage of tourism development. Local authorities and designers should carefully formulate more detailed policies, carefull designs oriented to development control through planning and management with the aim of achieving the optimum capacity. Finally in order to protect the islands' heritage and natural environment in the interests of their tourist long term success, future research should adress the need for a more holistic and systematic approach to the identification of the critical areas and the assesment of potential environmental impacts from the restructuring of the tourist product and from the expansion of summer holiday houses, a trend which in the long run will cause unforeseen and unacceptable environmental degradation.

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