# Transforming the Greek Island of Samothraki into a UNESCO Biosphere Reserve

## An Experience in Transdisciplinarity

*The natural and cultural beauty of the Greek island of Samothraki is threatened by soil erosion due to overgrazing, and by overfishing and waste accumulation. Scientists therefore developed a vision to transform the island into a UNESCO biosphere reserve. In a participatory process, the initiative was gradually transferred to local stakeholders.*

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**Abstract**

This research explored the feasibility of transforming the island of Samothraki, Greece, into a UNESCO biosphere reserve. The goal was to assess whether this would help to foster a sustainable socio-economic development and to preserve the unique natural and cultural heritage of the island. In recent years the number of seasonal residents and tourists on the island has been growing substantially, and so, too, have the demands upon facilities and infrastructures. The number of livestock, primarily goats and sheep, has increased exponentially, enhanced by the agricultural policies of the EU. Overgrazing, in combination with the steepness of terrain, has led to severe soil erosion, even within the existing *Natura 2000* conservation area. Such conditions made it apparent that a new development model was needed, and an initiative was started to create a biosphere reserve. In a transdisciplinary process, the scientists gradually transferred ownership of this vision to local stakeholders. A biophysical and socio-economic assessment showed that a biosphere reserve would be appropriate and be welcomed by the majority of stakeholders. The community council recently endorsed an application to UNESCO.

**Keywords**

biosphere reserve, Greece, island tourism, Man and the Biosphere (MAB) Programme, Samothraki, stakeholder analysis, sustainable pathways, transdisciplinary research, UNESCO

Samothraki, a Greek island in the northeastern corner of the Aegean Archipelago, is a place of great archaic, natural, and cultural beauty. In 2001, the Greek government established a *Natura 2000* conservation area covering about two thirds of the island, recently extended by a large marine area. Nevertheless, the most precious features of the island appear severely threatened. The EU's agricultural policies have stimulated a sharp increase in the number of goats and sheep, resulting in severe erosion; overfishing, growing amounts of waste, and inadequate infrastructures are additional problems. Local non-governmental organizations (NGOs) criticized the authorities' policies and demanded effective strategies to conserve the island's ecosystems.

How could visitors to the island – visitors who happened to be scientists with experience in nature conservation and sustainable development – contribute to address this situation? First, we identified the key challenge as how to preserve biodiversity and the special archaic character of the island, given the fact that the top-down legal measure of establishing a protected *Natura 2000* area did not seem to have been effective (figure 1, p. 182). We then generated a preliminary idea of a solution, namely, a shared vision for the community to develop their island as a valuable heritage and asset in a sustainable way. Such a vision can only be successful if supported by the local population who needs to anticipate benefits that outweigh negative trade-offs. The concept that seemed best attuned to pursuing a pathway of both nature conservation and socio-economic benefits was the biosphere reserve concept of the United Nations Educational, Scientific and Cultural Organization (UNESCO). It originated from UNESCO's *Man and the Biosphere (MAB) Programme* in 1974; the *World Network of Biosphere Reserves* was launched in 1976.

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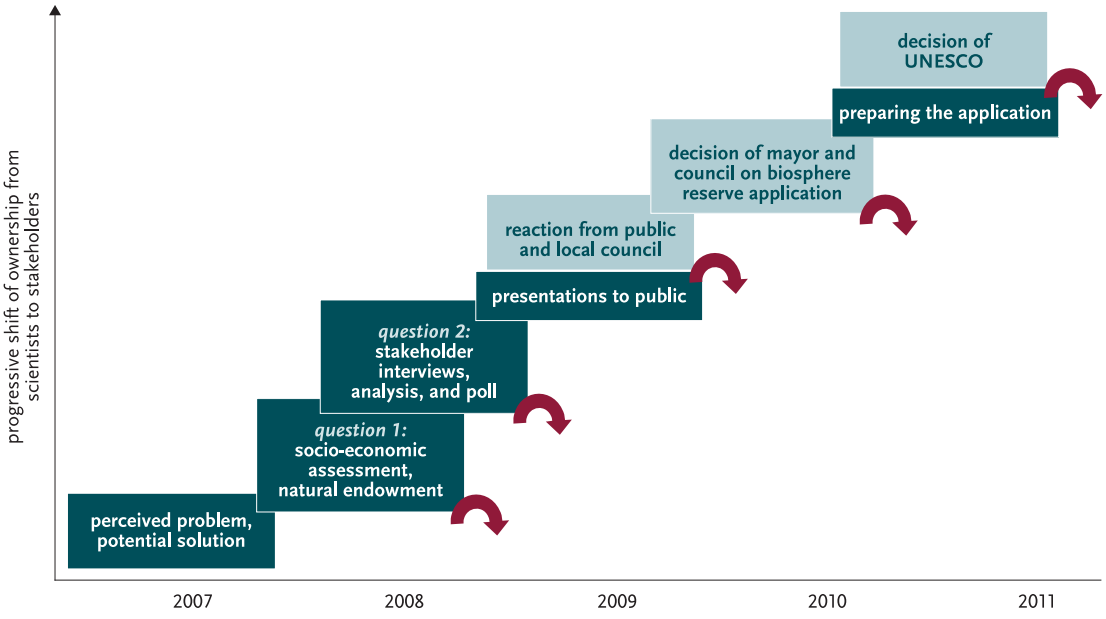


**FIGURE 1:** Progressive stages and uncertainties in a transdisciplinary process, shifting ownership from scientists to stakeholders. This shift is seen as an important condition for the success of the Samothraki Biosphere Reserve initiative. Dark green boxes represent science-dominated activities, light green boxes represent stakeholder-dominated ones; red arrows represent potential "collapse-in" situations where the process could end.

Biosphere reserves are areas encompassing valuable ecosystems and social communities that wish to combine the conservation of ecosystems with their sustainable use. They are nominated by national governments and remain under their jurisdiction but are internationally recognized and protected by UNESCO, based on the *Seville Strategy* and the *Statutory Framework* (UNESCO 1996). In the *World Network of Biosphere Reserves,* exchange of information, experience, and personnel is facilitated. There are about 580 biosphere reserves in 114 countries (UNESCO 2011), combining nature conservation, environmental monitoring, training, demonstration, local participation, and sustainable development. Biosphere reserves contain a core area that strictly conserves minimally disturbed ecosystems, a buffer zone surrounding the core, and a transition zone that allows limited socio-economic activities such as sustainable tourism or agriculture.

On the basis of this problem definition and vision, an open, thorough, and critical process was designed to systematically explore whether a development pathway as outlined in the biosphere reserve concept would be feasible for the island of Samothraki and whether it would be welcomed by local stakeholders.[1] As a first step, answers were sought to the following questions (figure 1):

- ***Question 1:*** Does the island of Samothraki provide adequate natural, social, and economic opportunities for a pathway of nature conservation and sustainable development as envisioned in the UNESCO biosphere reserve concept?
- ***Question 2:*** If yes: Is the vision of becoming a biosphere reserve in accordance with UNESCO standards attractive to local (and regional) stakeholders? Does it offer containment and an identity that is welcome and promising?

Through systemic methodological exploration (see methods described below) both questions could be answered positively. An iterative feedback process between the research team, stakeholders, and local decision makers was initiated (figure 1). This feedback was designed to 1. inform the stakeholders of the research findings, 2. reveal to the researchers the plausibility of their interpretations, 3. bring to light discrepancies between views and interests, 4. provide guidance to decision makers about promises and risks of the options being considered.

As described below, this process led to a unanimous decision of the community council in favor of a biosphere reserve application, and the application, formally signed by the mayor and supported by the Greek MAB Committee, was submitted to UNESCO, where a decision is awaited. The last stage of the process was in the hands of the decision makers, with the role of scientists restricted to advising how to prepare the application.

## Does Samothraki Provide Potential to Qualify as a Biosphere Reserve?

### Historical, Cultural, and Natural Endowment

Samothraki is among the rare remaining examples of natural island beauty among the Greek Aegean Archipelago. It is situated in the northeastern part of the Aegean Sea, close to the border with Turkey (figure 2). It has been inhabited since prehistoric times, with numerous prehistoric sites dating back to 6000 BC. From about 2600 BC until 400 AD, Samothraki was famed as a spiritual centre, with its "Sanctuary of the Great Gods" devoted to the cult of Kaveiria mysteries. The remains of this sanctuary have been unearthed during the last two centuries (the famous statue of Nike in the Louvre Museum originates from Samothraki), and together with the local archaeological museum it constitutes a major tourist attraction. During Byzantine and Ottoman

1 The Austrian UNESCO-MAB Committee financially supported such an exploratory study.

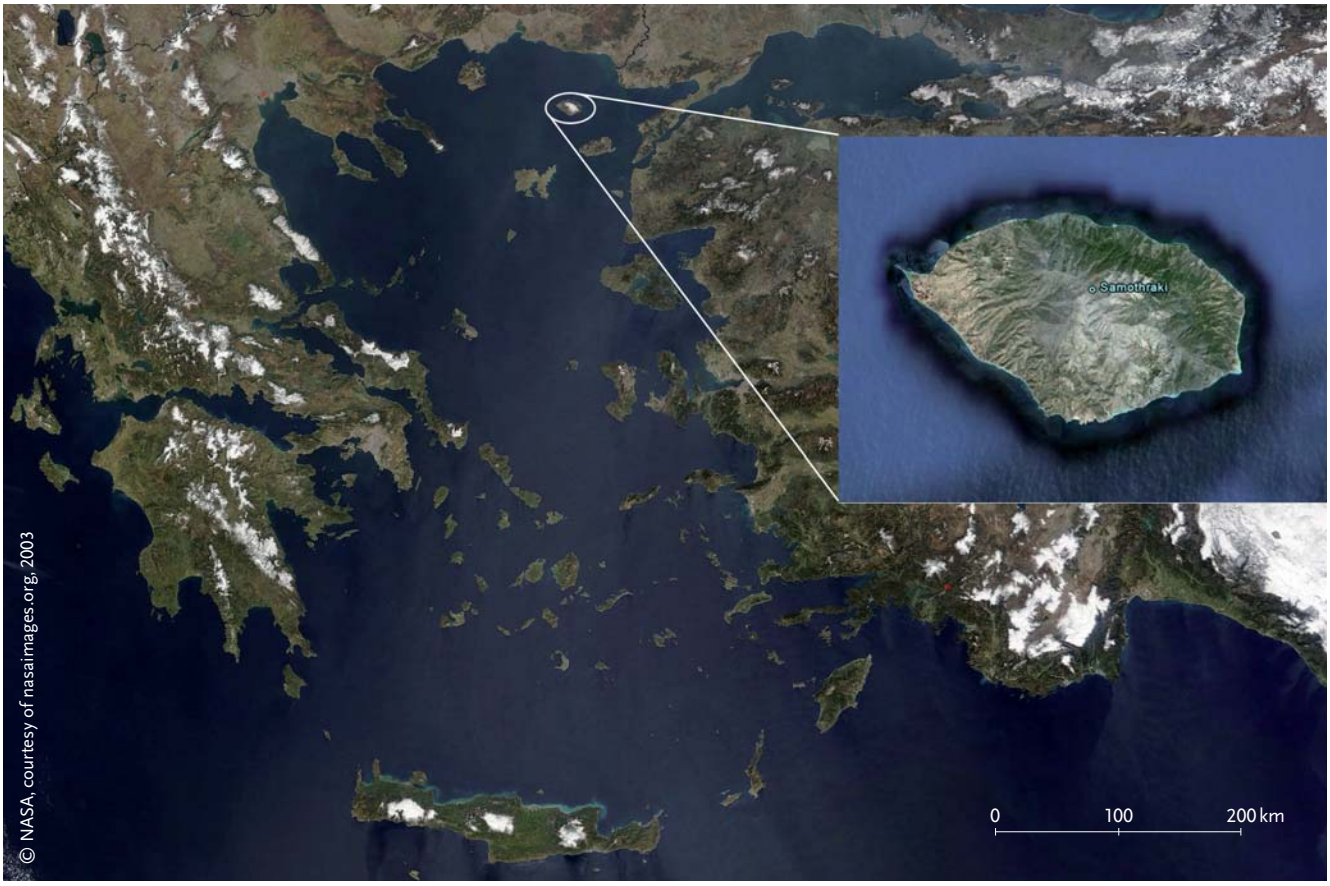


**FIGURE 2:** The Greek island of Samothraki and its location within the Aegean Sea.

times the island played an important role in maritime trade, the evidence of which can still be found in the picturesque remains of towers and fortifications. In the 19th century, Samothraki was forcefully depopulated by the Ottoman army and in 1912, it became part of the modern Greek state.

A large part of Samothraki's total surface area of about 178 square kilometers is mountainous, owing to the volcanic origin of the island, the highest peak rising up to 1,611 meters. Most of this mountain territory is currently protected as a *Natura 2000* conservation area that was extended in 2009 by a marine protection area (figure 3, p. 184). A wet microclimate exists on the north side, with numerous streams – most of which carry water year-round – forming hundreds of waterfalls and scenic freshwater ponds. Lush vegetation shaded by century-old oriental plane trees reaches down to the beaches.The southern and western sides are typically Mediterranean in terms of climate and vegetation, and agriculture – goat and sheep herding, olive groves, wheat fields, and some vineyards and vegetable gardens – dominates the landscape.

The geology is dominated by granite, ophiolites, schist, and other rock of volcanic origin, while the plains are formed by eroded sediments (Christofides 2000). The hydrographic network is extensive. Due to tectonic trenches, there are thermal springs that have been renowned for their health benefits since antiquity.

The flora of Samothraki comprises a great variety of species and habitats.[2] This variety is due to isolation from the mainland and the wide range of habitats the island presents. There are 962 plant species, including 62 tree and bush species, many of them rare and endangered (Alkimos 1988, IUCN TPC 1982, Strid and Tan 1991, Strid and Tan 1998). Eight plant species are endemic. On the north side of the island, one of the last remaining old-growth oak forests *(Quercus frainneto)* can be found in high altitudes, a remnant of lush oak forests that used to cover large parts of the territory but were degraded by illegal logging and forest fires. Another unique characteristic is the extensive riverine-alluvial forest of oriental plane *(Platanus orientalis)*, one of the largest in Greece. A recent inventory by the World Wide Fund For Nature (WWF) Greece on wetlands of the Aegean Islands (Catsadorakis and Paragamian 2007) lists eleven wetlands on Samothraki. >

2 Ecosystem information was derived from various older reports since no recent survey exists on the island's ecosystems and surrounding marine areas. No funds were available to undertake a new ecosystem survey. Data on the *Natura 2000* area included a mapping of habitat types and a comprehensive record of threatened natural assets. A great amount of data concerning the ecosystem qualities of Samothraki were provided by the local authorities, the municipality of Samothraki, the Greek Biotope/Wetland Centre and the Hellenic Ornithological Society.

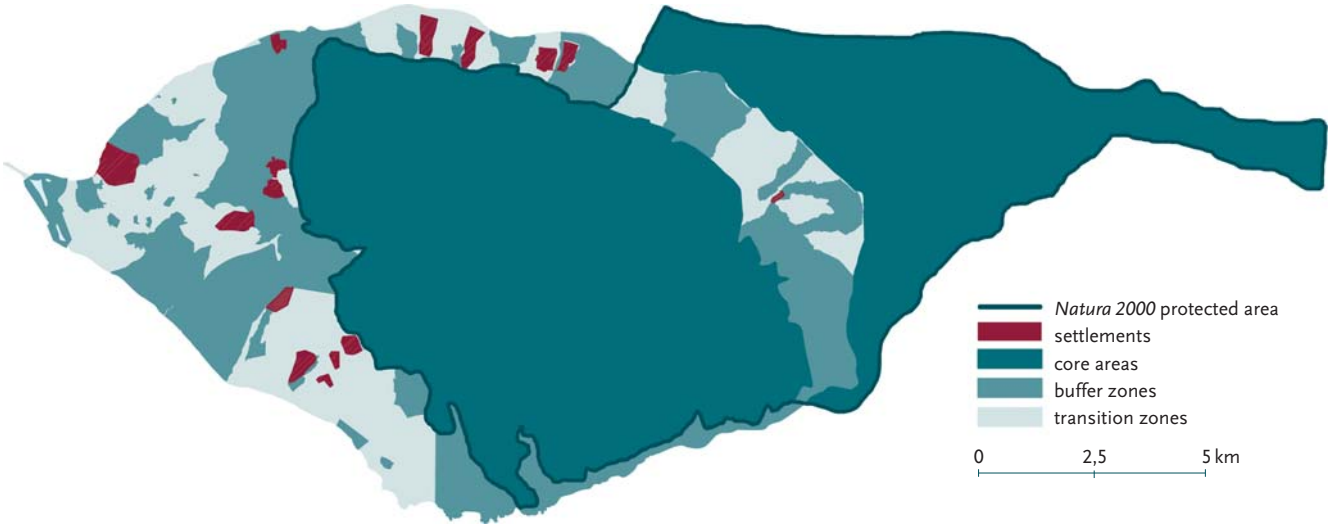


**FIGURE 3:** Zones of the planned Samothraki UNESCO Biosphere Reserve, including the marine extension of the *Natura 2000* protected area. The initiators are confident that the project will contribute to conserve the island's valuable natural assets while maintaining or increasing the livelihood of the residents. Source: Chanos and Scoullos (2011).

Samothraki's rich fauna includes 15 mammal species, 27 reptile and amphibian species – e. g., snakes, lizards, and rare fresh water turtles endemic to Greece (Broggi 1988, Buttle 1989, Clark 1991, Cattaneo 2001) –, and 156 bird species. Most of these are observed during migration stops on the island. The Greek Ornithological Society is active in implementing annual observations and monitoring of bird populations (Hellenic Ornithological Society 2007). The seas surrounding the island feature high biodiversity. Deep sea trenches up to 1,000 meters deep are considered highly important for populations of rare and endangered marine mammals such as dolphins and whales. Also the Mediterranean monk seal *(Monachus monachus)* and the Mediterranean sea turtle *(Caretta caretta)* are frequent visitors to the area even if they do not breed there (Frantzis et al. 2003).

Samothraki has so far escaped mass tourist development.[3] The reasons for this are its remote location (it can only be reached by a two-hour ferry trip from Alexandroupoli, the easternmost city on the Greek mainland), the pebbly nature of most of its beaches, and the fact that much of the land ownership on the island is legally contested (buying large areas for tourism development projects has proven difficult and fraught with legal problems).

All this explains why almost two-thirds of the island's terrestrial area have been protected under the EU's *92/43 EEC Habitats Directive* (Greek Biotope/Wetland Centre 2001, Dimopoulos et al. 2005). In 2009, the *Natura 2000* area was extended by 50 square kilometers of territorial waters (figure 3), which has ushered in a new era of marine research and protection.

However, there are substantial threats to ecosystems mainly from overgrazing by goats and sheep, the number of which exceeds the estimated carrying capacity by a factor of four to five (Skapetas et al. 2004, Greek Ministry of Agriculture 2008). Large areas, including the area protected under *Natura 2000,* have suffered erosion. Increasing, largely unregulated freshwater extraction is depleting the rivers and draining the estuary areas that are particularly important for biodiversity. Finally, trawling and drift net fishing threaten marine species and habitats that are already in decline in the Mediterranean. Although conservation efforts have led to legal protection measures, the degree of enforcement seems to be rather low, and environmental pressures mount.

Nevertheless, the *Natura 2000* area may constitute the core area of a biosphere reserve (figure 3) without requiring additional legal measures. However, zoning of conservation areas is not enough to prevent degradation. Key to actually preserving pristine areas is – in this case – the effective control of grazing and the number of livestock. Thus our conclusion from this assessment was positive: Samothraki's ecosystems are valuable and worth preserving. The historical aura and the spiritual heritage of the island provide an additional argument in favor of seeking special status.

## Socio-Economic Conditions and Tourism

### *Methods*

For assessing socio-economic conditions, it was necessary to clarify who would be the "users" of a potential biosphere reserve, how they could potentially benefit from it, and how they would perceive their interests. The methods applied pertain both to socio-economic structures (question 1) and to the interests and potentialities as stakeholders perceive them (question 2).

For information on the size and composition of the permanent residential population and their economic activities, we could rely on public statistics, mainly the 2001 census.[4]

3 With only 0.5 tourist beds per inhabitant, Samothraki is in the lower range of Greek islands (Spilanis and Vayanni 2004).

4 Census data provided by local authorities.

Among the resident population, beyond extensive networking activities, we conducted 24 semi-structured interviews with partners from various relevant stakeholder groups such as the communal government, local entrepreneurs, NGOs, land owners, and the local Orthodox Church. The interviews were to explore the ways in which each stakeholder group relates to the environment, its interests and preferences, resources and competencies (Fischer-Kowalski et al. 2008), key problems perceived, and the general attitude towards Samothraki possibly becoming a biosphere reserve.

For other users and potentially interested groups – such as second home owners, seasonal workers, and tourists – no reliable statistical sources were available. For an estimate of the size and composition of these groups, we assessed the flow of visitors to and from the island, which is recorded on a monthly basis by the port authorities. This information is highly reliable and comprehensive: ferries are practically the only way to travel to the island (beside rare private yachts or emergency helicopter flights). Since 2002 the flow of visitors has remained roughly constant, with 20,000 to 30,000 arrivals per month in the peak season (July/August), about 6,000 per month in the low season (April to June, September/October), and about 2,500 per month in the off-season (November to March).

To estimate the number and composition of the visitors, we carried out a survey among the travellers leaving the island by ferry.[5] On randomly selected dates between July and September 2008, the project team went to the port two hours before boat departure and handed a questionnaire (alternatively in Greek or English) to all waiting passengers. The response rate was close to 100 percent. On average, respondents needed about four minutes to complete the questionnaire. 1,511 questionnaires were filled out and collected: 200 by permanent residents, 182 by seasonal workers, 50 by second home owners, 74 by family visitors, and 980 by tourists. In 25 cases, the stakeholder status could not be identified.

With information on the length of stay from our interviewees, we could generate reasonably good estimates of the absolute size and composition of all visitor groups (table 1). This information had so far not been available for the island and will be valuable for future planning and managing of infrastructures and socio-metabolic requirements (e. g., food and water supply, and waste disposal).

Estimates in table 1 are based on port statistics[6] for all months of the year; survey data have been mainly collected in the high season. Therefore, main season data may be considered highly reliable, while data for the other seasons are more uncertain. Every visitor shows up in port statistics, but the stocks of permanent residents cannot be estimated from travel flows. Census data give an indication – but how many residents remain on the island in >

5 While surveys are a common method used in socio-environmental research for protected areas (Udaya Sekhar 2003, Hughes and Morrison-Saunders 2003, Hovardas and Stamou 2006, Bentrupperbaumer et al. 2006), an island with only one entry/exit point offers unique conditions for random sampling.

6 Port statistics provided by port authorities.

**TABLE 1:** Estimated presence of residents and visitors on Samothraki. These hitherto unavailable data allow to estimate the number of people staying on the island at different seasons of the year, for example, and the visitor's average duration of stay. Source: own calculations from port statistics 2008 and survey data (N = 1,511).

| | number of departures | | average duration of stay (days) | number of overnight stays[a] | number of people present on Samothraki on an average day[b] | |
|---|---|---|---|---|---|---|
| | absolute | percent | | | absolute | percent |
| **high season (July/August)** | | | | | | |
| **permanent residents** | **4,716** | **13** | – | **156,600** | **2,526** | **30** |
| **visitors** | **30,742** | **87** | **11.8** | **361,636** | **5,833** | **70** |
| ■ seasonal workers | 4,326 | 12 | 23.3 | 100,790 | 1,626 | 19 |
| ■ second home owners | 1,240 | 4 | 20.2 | 25,030 | 404 | 5 |
| ■ family visitors | 1,666 | 5 | 18.8 | 31,296 | 505 | 6 |
| ■ tourists | 23,508 | 66 | 8.7 | 204,520 | 3,299 | 39 |
| **total** | **35,458** | **100** | | **518,236** | **8,359** | **100** |
| **all year** | | | | | | |
| **permanent residents** | **38,706** | **49** | – | **858,600** | **2,352** | **66** |
| **visitors** | **40,421** | **51** | **10.9** | **438,722** | **1,209** | **34** |
| ■ seasonal workers | 7,490 | 9 | 16.7 | 124,764 | 342 | 10 |
| ■ second home owners | 2,699 | 3 | 16.3 | 44,105 | 121 | 3 |
| ■ family visitors | 3,560 | 4 | 11.3 | 40,384 | 111 | 3 |
| ■ tourists | 26,671 | 34 | 8.7 | 232,039 | 636 | 18 |
| **total** | **79,127** | **100** | | **1,299,892** | **3,561** | **100** |

a Equals number of departures multiplied by duration of stay (in days); for the high season this is known from the visitor survey, for the other seasons it was estimated on the basis of interviews. | b Equals number of overnight stays divided by number of days in the respective period.

the low and off-season (and do not go to their second homes on the mainland) is hard to estimate. Our assumptions reflect themselves in the estimates for every group's average duration of stay (table 1), which for residents is uncertain. Another source of uncertainty is the classification into groups. Survey responses left us with ambiguities: between residents and second home owners (Which is the second home: the one on the island or the one on the mainland?), and between seasonal workers, family visitors, and tourists (seasonal workers staying with their families of origin on the island, for example, or tourists working part-time in odd jobs). The lines we had to draw were sometimes arbitrary, hence table 1 has to be interpreted with care.

### *Resident Population*

The island's resident population has dropped from a peak of 4,200 people in 1951 to 2,700 in 2001 (census data). A first wave of decline had been due to labor migration in search of income and a better future in the 1960s, in particular to Germany (Kolodny 1982). Even nowadays, there is a vibrant Samothrakian community in Stuttgart who visit their relatives on the island during the summer months, and often still have voting rights on the island. As a result, many people speak German and have acquired a certain ecological awareness that in their view contrasts to Greek traditions. This is particularly relevant given that more than 60 percent of the resident population have received no more than primary education (2001 census), while nine percent have a university background.

The primary sector – consisting of agriculture, animal husbandry, and fishery – still employs 45 percent of the about 1,000 permanent residents that are economically active. Agricultural land occupies around 16 percent of the total island territory and the main products are grains, olives, grapes, and horticultural products. Agricultural production strongly depends on subsidies according to the *European Common Agricultural Policy (CAP),* most of which are expended on the livestock sector (mainly sheep and goats, representing 1.7 million Euro of subsidies annually). These subsidies have contributed to a sharp rise in the number of livestock in the past decade. The *CAP* policy is due to change substantially by 2013 with major cuts to be expected. At present, the goats and sheep on the island number 60,000 to 80,000, mostly freely grazing, and are used for milk and meat production. In addition, there are around 1,000 pigs, 9,000 poultry, and 1,550 beehives. Local fisheries recorded a catch of 2,186 tonnes (in 2007), estimated to be worth 9.27 million Euro (National Statistical Service of Greece 2005, Greek Ministry of Agriculture 2008).

The secondary sector, employing twelve percent of the active population, is relatively small. There is one olive press, a municipal wheat mill, a small winery, and some construction and mining activity. There are also several bakeries as well as one cheese factory.

The tertiary sector, mainly trade, services, and tourism, has grown substantially during the last decades and now amounts to 40 percent of the island's workforce. Beyond direct tourism-related services, there are a number of young, well-educated people successfully making a modest living on the island from artistic and performance activities. A substantial number of young people having acquired higher or university education abroad would like to return home if they could find some income opportunity on the island.

According to the socio-economic data, the resident population is fairly polarized: on the one hand, there is a large group of predominantly middle-aged male[7] farmers and herders with low education leading a traditional life with little contact to outsiders and highly dependent on subsidies and state welfare programs. Their income is rather low and often based upon directly utilizing ecosystem services. On the other hand, there are educated persons working mostly in the tertiary sector, with more contact to the outside world – they have often travelled to or lived in other countries –, who sometimes perceive the "specialness" of the island as backwardness and an obstacle to better income, but for the most part as a precious feature that has to be preserved and improved upon.

### *Visitors*

As shown in table 1, the about 40,000 visitors annually make up half of all ferry passengers. Of these, about 27,000 are in fact tourists. The remaining are family visitors (3,500), second home owners (2,700), and seasonal workers (7,500). Almost 40 percent of all visits to the island happen in the months July and August. In relation to 2,700 permanent inhabitants, visitors appear to be a large number, but on average they stay only for about ten days. On an average day across the year, there are twice as many residents present than visitors, while in the high season, there are twice as many visitors than residents. Still, even in the high season, tourists in the narrow sense amount to a daily average of no more than 3,300. The population density remains very moderate at an estimated 13 persons per square kilometer in the off-season and 45 persons per square kilometer in the high season.[8]

***Owners of second homes:*** According to our estimates, during the summer season about 1,200 owners of second homes and their families spend an average of 20 days on Samothraki.[9] The survey shows that they are usually well-educated, with two-thirds of them having university degrees. Almost a quarter of them come from abroad.[10] They have chosen Samothraki as a secluded location close to nature, away from mass tourism. This group might have most to gain from an efficient biosphere reserve management, as this would probably result in improving infrastructures for energy, water supply, waste removal, and sewage.

7 There is a 56 percent male majority on the island, even among the 0-to-14 age group; it seems that females of all ages tend to leave the island.

8 Austria, for example, a similarly mountainous region, has a population density of 100 persons per square kilometer.

9 The annual flow data (table 1) are higher because persons travel to the island more than once per year.

10 A further 25 percent live for most of the year in Alexandroupoli, the closest mainland city.

**TABLE 2:** Annual spending on Samothraki by visitors. Tourism makes a significant contribution to the island's income. Source: own calculations based upon port statistics and own survey (2008).

| | number of visitors per year | number of overnight stays per year | consumption (EUR/day) low estimate | consumption (EUR/day) high estimate | consumption (EUR/visitor) low estimate | consumption (EUR/visitor) high estimate | income for island (EUR) low estimate | income for island (EUR) high estimate | percent |
|---|---|---|---|---|---|---|---|---|---|
| seasonal workers | 7,490 | 123,990 | 16.5 | 22.2 | 274.8 | 369.3 | 2,058,603 | 2,766,193 | 13 |
| second home owners | 2,699 | 43,489 | 33.7 | 41.2 | 549.9 | 673.6 | 1,484,380 | 1,818,229 | 9 |
| tourists and family visitors | 30,231 | 272,423 | | | | | | | |
| ■ lodging with family | 3,560 | 40,384 | 29.8 | 37.8 | 337.7 | 429.1 | 1,202,151 | 1,527,766 | 7 |
| ■ lodging in hotel/rooms | 11,548 | 81,650 | 72.4 | 86.9 | 516.4 | 619.3 | 5,913,760 | 7,091,752 | 36 |
| ■ camping | 15,327 | 150,388 | 38.0 | 45.5 | 375.6 | 449.7 | 5,715,930 | 6,843,174 | 35 |
| **total (resp. average)** | **40,421** | **438,722** | **37.3** | **45.7** | **405.1** | **496.0** | **16,374,824** | **20,047,113** | **100** |

***Seasonal workers:*** During the summer months, there are some 4,000 seasonal workers in tourist establishments. They are mainly young males, of whom more than half have university degrees. About a quarter comes from the neighboring town of Alexandroupoli and the rest from other locations in Greece. A large number of these workers are students and teachers earning an extra income during the summer break while enjoying cheap holidays as food and accommodation usually is provided by their employers. They spend an average of 23 days for each continuous stay[11] on the island.

***Family visitors:*** About 3,500 visits across the year were classified as "family visits". A third of them occur in the high season, lasting for about three weeks. During the rest of the year, we assume the family visits to be much shorter (mainly participation in weddings, birthday ceremonies, and funerals).

***Tourists:*** Tourists, estimated at about 27,000 people annually, are predominantly Greek (87 percent), well-educated (two-thirds having university education), relatively young (three-quarters are below the age of 40), and more than half of them camp (table 2). Half of them have travelled to Samothraki repeatedly[12], and more than 90 percent declared an intention to come back in the future. Such an attached tourist population is an important asset for the island. However, almost half of the tourists come in the peak season (July/August), staying there for little more than a week (8.7 days on average). According to port statistics, there has been no tendency to extend tourism into spring or autumn, and the overall number of tourists has remained fairly stable in the last decade.

The financial turnover from tourism is significant. Based on our visitor survey and interviews (data on daily spending habits with respect to food, accommodation, vehicle rent/parking fees, and shopping), we estimate the average daily expenditures per visitor at 37 to 46 Euro (table 2). Annually, visitors spend 16 to 20 million Euro on the island. Although the campers spend half as much per day as those who stay in hotels, the overall contribution of both groups is nearly the same, mainly because campers on average stay longer. In this sense, campers are highly relevant for the local economy while exerting the least environmental pressure in terms of infrastructure demands. Annual spending by those who stay with their relatives, as well as seasonal workers and second home owners, also amounts to 30 percent of the income the island acquires from its visitors.

## Is a Biosphere Reserve Attractive to Local Stakeholders?

We examined the attractiveness of a biosphere reserve perspective in three ways:

1. The richest information came from interviews with local stakeholders. The only stakeholder group that appeared to be sceptical about the benefits of the proposal were the owners of agricultural land and livestock, the most traditional group on the island with the lowest level of education. They see increased nature conservation as a potential threat to their income that derives mainly from subsidies per head of livestock. In contrast, local tourism entrepreneurs expect image gains and better marketing for the island's tourism, as well as potential employment opportunities for their children. Similarly, NGOs, decision makers, and civil servants expressed support, the latter ones focusing on the potential for more highly qualified employment opportunities. The interviews also provided a range of ideas for an eventual future biosphere reserve.
2. Another important source was our survey. We asked: "How would you prefer the future of Samothraki to look like?". Interviewees could choose between a "modernist" scenario ("Samothraki as a modern tourist destination with high-class infrastructure and accessibility by air"), and a "conservationist" scenario ("Samothraki as a place rich in nature and cultural traditions, a place for escape by city dwellers to find recreation in a calm environment that is well preserved"). >

11 Our stakeholder interviews show that seasonal workers often travel to and from the island during a longer stay. Thus the annual flow number for seasonal workers in table 1 exceeds the number of persons actually doing seasonal work on the island.

12 Among the visitors of the National Marine Park of Zakynthos, Togridou et al. (2006) also found 50 percent of the Greek visitors to have been there before.

The visitors expressed an overwhelming preference for the "conservationist" scenario (figure 4). The permanent residents' opinion is divided[13], with 57 percent opting in favor of the "conservationist" scenario. It seems that the accessibility by air suggested in the "modernist" scenario constituted a major attraction of this alternative for the permanent residents.

The attitudes were even more pronounced when the interviewees were asked whether they found the island of Samothraki "very special, indeed" or whether they chose the alternative "all islands are special and alike at the same time". Even among the often sceptical permanent residents, 84 percent found Samothraki "very special, indeed", while second home owners and tourists agreed to this statement by an even higher margin of 90 percent.

3. The third source were audience responses at our public presentations of the project. The two major public presentations we undertook attracted much attention: Audiences of up to 80 people included community council members, local NGOs, local tourism entrepreneurs, and longtime tourists. The people who spoke up welcomed the idea of a biosphere reserve.

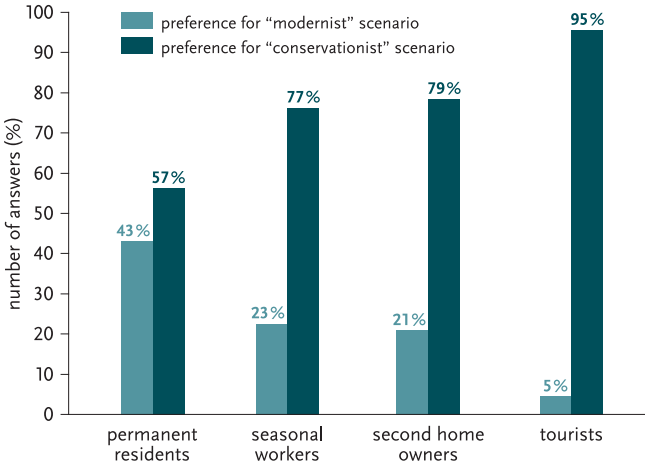


**FIGURE 4:** Preferred visions for Samothraki's future, by stakeholder group. Interviewees could choose between a "modernist" scenario (light green: modern high-class tourist infrastructure) and a "conservationist" scenario (dark green: preservation of nature, culture, and calmness). Visitors overwhelmingly prefer the "conservationist" scenario, while the permanent residents' opinion is divided. Source: visitor survey (N = 1,511).

Thus, according to all three methodological approaches, each with its own bias and distortions, the people on Samothraki welcome the perspective of a biosphere reserve. This was confirmed by an unanimously positive decision of the community council in December 2010, in the middle of a severe economic crisis in Greece. The mayor and the council as well as the chairman of the Greek National MAB Committee signed and submitted an application to UNESCO in April 2011 for Samothraki to become part of the *World Network of Biosphere Reserves*.

## The Initiative and the Role of Science

In their analysis of the evolution of Greek policies in creating protected areas, Papageorgiou and Vogiatzakis (2006) describe a development away from top-down approaches directed at nature conservation only and administered by the national Forest Service towards more holistic frameworks of integrated environmental management that take local stakeholder interests and participation into account. This change, they claim, builds on lessons learnt 1. from experiences with national parks, 2. in the course of the broad initiative to create *Natura 2000* areas in the 1990s and thereafter that had often suffered from an exclusive focus on regulating land use, and 3. from the pursuit of conservation objectives that often "remained rhetorical" (Papageorgiou and Vogiatzakis 2006, p. 481). The policy innovation lies in the emphasis placed on "sustainability" and integration of conservation policy objectives into other policy areas by a holistic framework. The latter has the potential to incorporate natural resource management as well as socio-economic and cultural concerns and aspirations. This requires mobilization of additional decentralized societal capacities in a new governance pattern beyond the traditional direct management by a forest agency.[14]

The initiative of establishing a biosphere reserve on Samothraki (see box) follows this new policy orientation in both respects: in opening a more holistic, sustainability-oriented perspective on nature conservation, co-processing conservation with issues of natural resource management and regional development, and in pursuing a participatory bottom-up approach.

Within the Samothraki Biosphere Reserve initiative, the role of science was to provide

1. a new perspective on the island, linking nature conservation to socio-economic concerns, and different from the prevailing discourse on bad accessibility and backwardness;
2. new and interesting information on stakeholder numbers and attitudes, and on tourists' expectations and expenditures;
3. credibility and legitimacy to the researchers, raising their profile in the communication network of the island, but leaving the authority of decision making and action with the local stakeholders.

13 The survey sampled only permanent residents that travel. Among those, the island's agricultural population – who, according to the stakeholder interviews, was sceptical about the prospects of a biosphere reserve – is underrepresented: in our sample, only eight percent of the persons economically active on the island were working in agriculture or fishing, the sector in which 45 percent of the island's economically active population is engaged in.

14 According to Papageorgiou and Vogiatzakis (2006), the implementation of the *Habitat Directive* (Directive 92/43/EEC) signified a turning point in national nature conservation policy followed by a number of changes in park administration. Among other things, it provided for the establishment of managing authorities as conservation bodies, legally entitled to administer and manage the *Natura 2000* sites as autonomous and non-departmental boards.

This transdisciplinary process, spanning over almost five years, continuously had to cope with two different systemic logics: the logic of a scientific project and accountability towards the donor of the research funds, with predefined goals, methods, and products in a given period of time, and the logic of action in a real-life situation with differential interests and power relations. The key goal of transferring ownership of this process gradually from scientific researchers to local actors appears to have so far been achieved.

To be successful, it is important that the initiative maintains its broad public support and momentum, and that an appropriate management is installed that is able to effectively pursue the sustainable use of ecosystems, including the required changes in the island's water, waste, land, and energy management. Otherwise, Samothraki might share the rhetoric of many protected areas without substantial practical impact. It is known from other cases (see, for example, Oikonomou and Dikou 2008 for Alonissos National Park, or Trakolis 2001 for Prespes Lakes, and more examples cited by Dimitrakopoulos et al. 2010) that the positive attitude of stakeholders towards protected areas may gradually wane with too little public communication efforts, weak monitoring, and conflicts of interest. We argue that in Samothraki one of the key preconditions for a different pathway has been created: the solution was not imposed upon the local stakeholders, but was a matter of their participation and choice.

**BOX: The Samothraki Biosphere Reserve Initiative**

The initiative started bottom-up, from a long-term regular visitor and lover of the island, but with hardly any knowledge of the Greek language. She proposes a project for developing the island into a biosphere reserve to local NGOs, and finally to the mayor. In the next year, she returns with a research design and a small team including a Greek PhD student able to bridge the language barrier. They start with a feasibility study involving stakeholder interviews and a broad visitor survey, and thus become fairly visible on this small island and raise people's curiosity. The resources for this research were provided completely from outside[a] and the process was designed in an open-ended fashion to come up with a positive or a negative answer. In the following year, the team returns and is invited by the mayor to publicly present its results. Many people (some of them influential in local politics) participate and almost unanimously express their support for a biosphere reserve initiative. The offer from the research team to prepare the required application to the UNESCO is gratefully accepted. Finally, after some delay due to a major economic crisis, an election campaign on the island leading to a new mayor, and severe cuts in public spending, the application is signed and submitted in 2011.

a Thanks to the Austrian UNESCO-MAB Committee that decided to spend some of its research funds on initiatives abroad.

## Conclusions

The island of Samothraki is attractive as a hotspot of culture and nature and deserves becoming a UNESCO biosphere reserve. A majority of local stakeholders and tourists regard Samothraki's natural and cultural heritage as unique and worth preserving and see a biosphere reserve perspective as adequate.

Currently, the existing protected areas on Samothraki are overexploited agriculturally (Skapetas et al. 2004) and marked by loss of biodiversity and significant erosion. Tourism generates waste unmanageable by the present infrastructure, the rich freshwater resources are used lavishly, renewable energy opportunities remain underutilized, and employment opportunities for young, well-educated people are rare. On the other hand, there are a number of strong assets, such as a continuous flow of many highly educated tourists faithful to the island, and a motivated local administrative management.

As scientists, we see our role in continuing to support and advise the local authorities and the future biosphere reserve management by developing ideas and projects. We believe a well-managed biosphere reserve holds large potential for Samothraki to conserve natural resources while improving local income and quality of life, draw a broader variety of tourists across a longer season, and make island life attractive in terms of meaningful engagement and employment for present and future generations. There are some concrete ideas how this could work, specifying for each economic sector and each stakeholder group how to maintain or increase their benefits at a lower resource and environmental cost. But these ideas are part of a next stage of further developing a biosphere reserve on Samothraki. The most critical immediate need is to establish a potent and creative management with some basic resources that can mobilize and maintain people's trust.

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