

Artificial nourishment protected by a submerged breakwater to maintain a high-value tourist beach, Sicily - IT

1. Policy Objective & Theme

- ADAPTATION TO RISK: Integrating coherent strategies covering the risk-dimension (prevention to response) into planning and investment
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space

2. Key Approaches

- Knowledge-based
- Technical

3. Experiences that can be exchanged

To remove the causes of coastal erosion and to restore natural conditions. The project, beyond the merely engineering (structural and functional) aspects, has taken into consideration the respect of coastal ecosystems (especially safeguarding of marine life), the compliance of engineering design with the public uses of the coast (tourism, recreation and hygiene requirements) and the respect (or the improvement if possible) of environmental and landscape aspects.

4. Overview of the case

The first stage of shoreline protection intervention has been completed with the creation of an artificial reef breakwater, associated with beach nourishment in the same protected area. The second (and final) stage is planned to include an advanced monitoring program and the enlargement of the nourished beach, protected by an artificial reef barrier. An assessment study of the environmental and social impact of the artificial reef has been carried out.

5. Context and Objectives

a) Context

The bay of Giardini-Naxos is located in the Northern sector of the Ionian coast of Sicily, between the towns of Messina and Catania. The town of Giardini-Naxos has about 10,000 inhabitants and it is characterised by an intense tourism exploitation. The town of Taormina is also located in the Bay of Giardini Naxos. More than 1 million tourists per year spend at least two nights there. From Capo Taormina in the North to Capo Schisò in the South, this part of the Ionian coast represents a closed system of coastal waters, isolated from the contiguous physiographic units. The isolation, due to the geological nature of the area, has been boosted by the deployment and the subsequent extension of the pier of the port of Schisò which has completely enclosed the bay system to the south. In fact, at the southern edge of the bay, an artificial extension of the volcanic promontory of Capo Schisò was realized in the late 60s, in order to start the construction of a port which was never completed. These structures allowed the formation of a protected area which has been exploited, over the past forty years, as a "natural" seasonal harbour for small boats. However, they have established also a coastal sediment imbalance which has caused the progressive erosion of the coastline.

The morphological dynamics of the seabed and the evolution of the shoreline is conditioned by the influence of the winds coming from the first and second quadrant and the transport of sediments along the shoreline is prevalently from north to south, causing a violent erosion of the central sector of the bay. Thus the beach enclosed by the bay of Giardini-Naxos may be

considered a “relic” beach. In recent decades, this stretch of coastline has been affected by an intense erosive activity favoured also by a general reduction in transported river sediments and aggravated by the construction of the pier of the port of Schisò which has prevented the access of Alcantara river sediments into the bay. The previous interventions (groynes and breakwaters barriers), were decided as responses to emergency situations, but have fostered an irregular evolution of the shoreline: in fact, they have prevented erosion phenomena in a limited area while causing further erosion problems in areas immediately adjacent.

b) Objectives

The Regional Authority recently became aware that the previous erosion management practices in the Bay of Giardini-Naxos were not sustainable: a new shore protection scheme has been decided. The measures adopted by the Municipality of Giardini Naxos aim to remove the causes of coastal erosion and to restore the natural conditions, which should lead to the protection of the shoreline. New actions also include inland considerations, with a particular attention to building activities, protection of the ecosystem, recovery of the natural condition of the wet and dry river courses, and restoration of solid littoral transport. Furthermore, the initiative intends to shelter small boats in safe port structures.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The activities have been carried out by the Municipality of Giardini Naxos and have been organised along two different lines: the coastal defence measures and the achievement of the structure of the port.

b) ICZM tools

The Municipality has initiated a comprehensive study on the causes of coastal erosion and, in 2002, has decided on interventions for the protection of the shoreline through “mixed” structures: a beach nourishment with sand extracted from the sea-bed, and a long sub-merged reef barrier of about 850m.

The intervention was provided in order to improve the aesthetics of the local coastline, to reduce wave actions inside the protected area and to limit the dispersion of sediments into the same bay, both eastward and towards the south. It has been necessary to carry out a monitoring plan and maintenance of the protection works. The intervention was monitored seasonally, considering the bathymetric and sedimentological aspects, to provide an in situ modelling, which was essential for the prosecution of the works. The monitoring of building activities provided indispensable elements for verifying the overall stability of the intervention. During the execution of the project, changes were introduced, in order to improve the original draft.

7. Cost and resources

The coastal protection intervention has been funded within the Regional Operational Plan (POR) 2000-2006, for €3.15 million (the first stage of a €11 million project).

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

The project gave the opportunity to collect a great amount of data and information related to the interested coastal area. These data have been indispensable elements to deploy an efficient protection system of the Bay. Due to the difficulty of acquiring a single funding, the project has been divided into three functional stages: two were made with a good results, both in terms of extension and protection of shoreline, and in terms of landscape reconstruction. Concerning the third and final stage, its financing procedure is in progress. For the achievement of the Schisò harbour, the Municipality adopted the Project Financing procedure (i.e. with the intervention of private capital). Currently, the project has been slowed down, due both to bureaucratic problems, and to the conflict with the town of Taormina which would also like to realise a marina, using the instrument of Project Financing, in the small part of the territory falling under its jurisdiction, in the Northern sector of the Bay.

9. Success and Fail factors

At a local level there are no ICZM instruments and the only reference at the regional level is the Hydrogeological Asset Plan (Piano di assetto Idrogeologico PAI). The Plan does not present any scientific and technical foundation and doesn't present any planning scheme based on clearly defined guidelines. The Plan has been implemented on the logic of "risk" not supported by scientific data on the erosion trends and values of assets exposed. The Municipality of Giardini Naxos has always been involved in European programmes allowing the person responsible for defence systems to interact during the years with specialists from different nations and to achieve the knowledge of experiences elsewhere realised.

10. Unforeseen outcomes

None.

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13. Sources

<http://www.euroSION.org/>