

Landscape and environmental improvement through beach nourishment using dredged material of the Roja river, Liguria - IT

1. Policy Objective & Theme

- ADAPTATION TO RISK: Managing impacts of climate change and safeguarding resilience of coasts/coastal systems
- 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

Implementation of measures to defend the shoreline against coastal erosion. The approach adopted has the objective to improve the landscape and environment through beach nourishment using river dredged material.

4. Overview of the case

The project concerns the coastal area situated in the Western part of the Liguria Region. The study area stretches for about 1.5 km of littoral. The area is subject to erosion. The erosive process is favoured by the increasing urbanisation and by a general reduction of transported sediments, due to a series of causes such as the removal of material from the river bed. In the past, local administrations adopted measures of a rigid nature consisting of building emerged structures. The initiative aims to introduce soft interventions (beach nourishment and submerged groynes) as an alternative to the previous structures. The beach nourishment has been done using the dredged material from the Roja River, according with the provisions of the basin plan. The result was an environmental and landscape improvement of the coastal area.

5. Context and Objectives

a) Context

The project involved the 4 municipalities located in the Western part of Liguria Region: Ventimiglia, Camporosso, Vallecrosia and Bordighera. The study area stretches for about 1.5 km of littoral. This coastal area, exposed to waves generated by south-west winds, was originally nourished by the Roja River sediments. The Roja River basin (872 km²) lies in the Liguria Region and in the French Maritime Alps. At the turn of the 20th century, the construction of flood control for the generation of electric energy in the French territory caused a general reduction in transported river sediments to the beaches. The erosive process has been also favoured by different reasons such as: the deployment of the railway along the coastline, the removal of material from the river bed and increasing urbanisation. In this stretch of coast, since the first decades of the 20th century, and in particular after the second World War, different protective measures were taken. Almost all the interventions on the coast were realised with hard measures, in particular parallel breakwaters.

The municipality of Bordighera, to protect its tourist industry mainly based on bathing establishments, proposed measures to combat coastal erosion. The project, which was enlarged to the whole littoral, used a series of submerged, parallel breakwaters but because of landscape safeguarding reasons was not approved. Finally, in 1998, the Liguria Region enhanced a programme agreement between the interested local administrations (the region itself, the province of Imperia and the 4 municipalities) in order to jointly face the erosion problem.

b) Objectives

The main objective was to create a more efficient and durable form of coastal defence, able to face coastal erosion as well as to ameliorate the natural landscape. The approach aimed to replace the hard structures built in the past by soft interventions (beach nourishment and submerged groynes).

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

a) Project Management

Regional and local public authorities are the primary players. In 1998, the Liguria Region enhanced a programme agreement between the interested local administrations (the Region itself, the Province of Imperia and the following municipalities: Ventimiglia, Camporosso, Vallecrosia and Bordighera). At the same time, the Liguria Region allocated 400 million Lire (about €200,000) that, in addition to the co-financing of other local administrations (600 million Lire- €300,000), had to finance the cost of the overall project:

- bathymetry measurements, mapping biotic communities and sediments;
- a preliminary project including an Environmental Impact Assessment covering the whole physiographic unit of interest
- the final project of a first round of interventions .

The realisation of the project has been entrusted with a tender to the Studio Sirito di Savona (Civil Engineering). The realisation of the final project has been possible thanks to the financing by the Structural Funds, Objective 2. The final project was organised in different rounds of interventions (2 for Ventimiglia, 2 for Camporosso, 2 for Vallecrosia, 3 for Bordighera and an additional 1 still in progress for Bordighera)

b) ICZM tools

The preliminary project consists in two different types of protection measures:

- the removal of existing hard structures (parallel breakwaters and other artificial reef structures) through the construction of 13 large semi-submerged groynes using rocks of the previous structures. The distance between the groynes varies between 180-250 m and each groyne is placed side by side to two artificial submerged reefs (-1 m below the sea level). The intervention also included the extension of the final groyne of Campo S.Ampelio for about 40 m. the beach nourishment 2,100,000 m³ of dredged material from the Roja River.
- The initiative has given the opportunity to link the protection measures of the coastline with the requirements of the Roja River Basin Plan that foresees the need to dredge the river bed, in order to restore the hydrological regime in different sectors of the basin. The dredged material of the Roja River has been used to nourish the beaches within the physiographic unit allowing a significant cost reduction of works. Because of that, a study concerning the river bed has been provided. Furthermore, since the dredging area is an EU Site of Community Importance, the Province of Imperia conducted an Environmental Impact Assessment of the interventions. After fluvial material dredging activities, re-naturalisation works of the river bed have been proposed and carried out in order to restore natural conditions.

The final project, funded by the Structural Funds, Objective 2, has been articulated in a different batch of interventions (2 for Ventimiglia, 2 for Camporosso, 2 for Vallecrosia, 3 for Bordighera and an additional 1 still in progress for Bordighera). These interventions, starting from the most critical areas covered, at the end, the whole stretch of littoral.

7. Cost and resources

The total cost of the project is €11 million.

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

The structures done have been extremely important for the environmental and landscape improvement of this coastal area, giving the opportunity to have again a quality beach and allowing local people to re-use this area. Moreover, the beach has been able to sustain the high energy storm events occurred over the past few years. On the other hand, the beach alone is not enough to give back a quality waterfront, characterised today by low profile architectural housing and abandoned agricultural areas.

9. Success and Fail factors

The complexity of the project is due in particular to the necessity to organise and co-ordinate the activities carried out along the coastline with those undertaken in the river. The involvement of local authorities and their capacity to co-operate has been a successful element for the whole project. Two of the major problems encountered during the project have been the traffic caused by truck transport of materials from the river to the beach and fishermen's protests due to some fluvial interventions.

10. Unforeseen outcomes

Some groynes had to be reinforced in order to avoid an excessive sediment transport from one cell to another

11. Prepared by

CORILA


12. Verified by

Corinna Artom, Regione Liguria (Ufficio Aree Demaniali Marittime), Italy


13. Sources

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- R.Bobbio (a cura di) Progettare nuovi paesaggi costieri, Venezia 2008
- Regione Liguria Piano Territoriale di Coordinamento della Costa (2000)
- www.beachmed.it




Bordighera (3.22 MB) 



Camporosso (2.28 MB) 



Vallecrosia (2.49 MB) 



Ventimiglia (2.3 MB) 