Addressing coastal erosion in Marche region, Italy

European Environment Agency

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Case studies

Addressing coastal erosion in Marche region, Italy (2014)

A series of actions were taken to address erosion in the section of coast between the municipalities of Sirolo and Numana, in the region of Le Marche (Italy), in particular for beach nourishment, principally with gravel and small stones. Cliff stabilisation was another part of the actions, as well as the removal of a portion of artificial reef. The approach for this work was established in the region's Integrated Coastal Area Managed Plan (released in February 2005). Its broader goals included protecting local settlements and tourism. Climate change impacts were recognised but were not a major element of the actions undertaken so far; however, the region intends to make climate change a key focus for future works.

Case Study Description

Challenges

The actions undertaken so far have sought to restore the coastline, which has retreated due to erosion, and to strengthen the coastline against the risk of storms and flooding, in particular related to storm surges, which have been a major concern in recent years. Works also seek to reduce the risks of landslides along coastal cliffs.

The actions in this case study were undertaken in two municipalities. Here, three main types of shoreline are found: a beach in front of cliff; a cliff face on the water line; and a relatively broad coastal beach, however with few dunes in the backshore, which rises towards hills. In the municipality of Sirolo, where the first two types of shoreline are found, the erosion of San Michele beach has been accompanied by afforestation which reduced the beach area and the cut off sediment. In addition, waves hitting the base of the sea-cliff of Mount Conero risk creating landslides which could endanger part of the town. In the municipality of Numana, erosion has reduced the width of a relatively long and broad beachfront, bringing a coastal road closer to the shoreline. This area extends to the Musone River; works on this river have reduced the transport of sediment to the shoreline, increasing erosion.

To an important extent, the challenges addressed arose due to previous human interventions. For example, modifications of rivers in the region, including the Musone River, at the south of the beach area in Numana, have reduced their transport of sediment to the sea and to the beaches. Another example is work to place large blocks at the base of the sea cliff of Mount Conero: while the intention was to protect the cliff, it appears that these accentuate wave energy. The work has helped to adapt against the impacts of climate change. Beach nourishment will need to be continued in the near future, with the goal also of addressing sea-level rise (actions to address sea-level rise of about 25 cm for 2050 and 60 cm for 2100 are being considered in planning).

Objectives

The main objectives are to protect beach areas (in particular, lower sections of the beach), as well as cliffs, against erosion. In doing so, these actions seek to protect settlements and the tourism-based economy of this coastal area. Moreover, the overall strategic approach set out in the region's Integrated Coastal Area Managed (ICAM) Plan is to focus on actions that address the imbalance between sediment erosion and accretion along the coast and to reduce the environmental and landscape impacts of coastal defences.

In addition to this objective focused on protection, the work also sought to strengthen the recreational opportunities of the shoreline (and hence tourism) and improve nature protection.

Adaptation Options Implemented In This Case

Beach and shoreface nourishment Cliff stabilisation Retreat from high-risk areas

Solutions

In the municipality of Sirolo, about 156,000 mc of gravel was used for beach nourishment along a 1200 m shoreline in the San Michele Bay. In the municipality of Numana, about 172,000 mc of gravel were used along 1500 m of beach front. The work also included actions to stabilise a cliff base for Mount Cornero. This mountain is designated as a Natura 2000 site, and the works incorporated the need to maintain site conditions. In the long term, several actions involving retreat from the shoreline are under consideration, including: relocation of shoreline tourism installations and coastal infrastructure and settlements. Other long-term actions under consideration include the

maintenance of rivers in order to increase their transport of sediment and thus provide natural beach nourishment, the removal of fixed coastal defences (grey infrastructure) and the protection of a sufficiently wide coastal strip. As of late 2014, however, budget resources had not been allocated for follow-up.

Relevance

Case mainly developed and implemented because of other policy objectives, but with significant consideration of CCA aspects

Additional Details

Stakeholder Participation

The regional administration of Le Marche provided information to local citizens via flyers and newsletters. Moreover, interviews were held with tourism operators in the two municipalities, along with meetings with key stakeholders including the fishing and tourism sectors. The regional administration emphasised three objectives of the work: strengthening protection against storms and other risks, improving recreational opportunities and strengthening nature protection.

Success and Limiting Factors

Main success factors include:

- Use of cost/benefit analysis (and EIA) to strengthen project planning;
- Strong public information, stakeholder consultation and cooperation with local communities.

Main limiting factors are:

- Beach nourishment will have to be repeated due to ongoing erosion (proposed works to re-establish river sediment transport could reduce future erosion);
- Budget uncertainties for follow-up work due to economic crisis.

Costs and Benefits

The cost of the works in Sirolo and Numana was 8.6 million Euros. These costs were partially financed by Italy's national Ministry of the Environment, Land and Sea and by the Central Institute for Scientific and Technological Research Applied to the Sea (ICRAM, now part of ISPRA, the national Institute for Environmental Protection and Research). The benefits include strengthened protection against storm surge and other risks, as well as benefits for local tourism and thus the local economy. In 2013, following completion of the project, the work at Sirolo and Numana were included in a cost-benefit analysis prepared under the EU Shape-IPA project; the analysis, focused, mainly on tourism revenue as a benefit.

Legal Aspects

The works were based on the objectives and approaches set out in the Marche region's 2005 Integrated Coastal Area Managed Plan. A formal agreement with the national Ministry of the Environment, Land and Sea and ICRAM was a necessary step for financing. An EIA and appropriate assessment were made for the project, incorporating public consultation.

Implementation Time

The actual work took two years, from April 2009 to April 2011. Preceding activities included the

agreement on financing with the national Ministry of Environment and ICRAM, in December 2007, and project preparation.

Life Time

The foreseen lifetime of the work is five years; consequently, new interventions may be undertaken in 2016.

Reference Information

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http://www.autoritabacino.marche.it/costa/costa.asp

http://www.slideshare.net/oettam971/regione-marche-pf-difesa-della-costa

Source

EC DG ENV Study "Sharing of Best Practices on Integrated Coastal Management (ICM) in a Context of Adaptation to Climate Change in Coastal Areas"

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Case Study Illustrations (4)

Keywords

Numana, Sirolo, beach nourishment, nature restoration, stakeholder consultation, tourism

Sectors

Coastal areas, Disaster Risk Reduction

Climate impacts

Flooding, Sea Level Rise, Storms

Governance level

Local (e.g. city or municipal level)

Geographic characterization

Europe

Macro-Transnational region:

Adriatic-Ionian, Mediterranean

Biographical regions:

Mediterranean

Countries:

Italy

City:

Sirolo, Numana