Hard versus soft coastal protection measures in the southern Black Sea coast - RO

1. Policy Objective & Theme

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

2. Key Approaches

- Integration
- Knowledge-based
- Ecosystems based approach

3. Experiences that can be exchanged

Throughout a period of international co-operation with the Japanese government, Romania set up the foundation for a coastal protection management system of the southern coastline which is based primarily upon hard techniques based upon existing tools with the involvement of stakeholders. Pilot projects, however, are now needed to determine whether soft techniques may be a better option.

4. Overview of the case

The Romanian Black Sea coast is facing long term shoreline erosion problems. Since the 1980s, the southern part of the Romanian coast, where the most economic and social activities are located, is threatened by a steady increase of erosion phenomena which has caused severe damage in terms of beach losses, tourism and recreation facilities and public safety. Since 2005, coastal protection became a priority for the Romanian government. Taking into account the serious threat of coastal erosion, the government requested support from the Japanese Government. Through its Agency JICA (Japan International Cooperation Agency), Romania received international technical assistance and financial support to develop a comprehensive study for coastal protection and rehabilitation of the southern part of the Romanian Black Sea coastal area. The main outcome of the study was the Master Plan for coastal protection delivered at the end of 2007.

5. Context and Objectives

a) Context

The total length of the Romanian coastline is about 244 km. The Black Sea coast has distinct geographical features divided into two management areas. The northern area of the Romanian coast is a deltaic coast of the Danube; part of the Danube Delta Biosphere Reserve, a World Heritage Site, with a particular management regime. The southern area with a length of about 70 km consists of cliffs interrupted by small beaches with sand dunes backed by lakes which formed, in the past, coastal lagoons. The latter area is more socio-economically developed (e.g. harbours , tourism, coastal cities) and more densely populated than the northern area. Since the 1970’s, the southern coastal area has been significantly damaged by erosion produced by natural and human-induced causes (climate change and sea level rise, dramatic changes of sediment loads from the Danube, alteration of the longshore drift supplying the beaches, intensity of storm and wave attack, jetty construction, sand extraction, etc). To prevent and stop the erosion in the southern part of the Romanian coast, coastal protection measures were carried out between 1970 - 80 by the government consisting of a combination of hard and soft coastal protection measures (groynes, breakwaters and artificial beach nourishment). During the last two decades, the existing monitoring programme for coastal erosion has revealed that the coastal erosion processes have increased again and provided evidence that the protection measures of coastal erosion mitigation have had only positive effects for a short time and space perspective.

Furthermore, the coastal protection measures implemented in the southern area, vulnerable to erosion, were also generating other environmental problems along the Romanian Black Sea Coast. As a consequence, Romania has started to make considerable efforts to protect the coastal zones particularly the southern part of the coast.

b) Objectives

The study undertook by JICA on the rehabilitation and protection of the southern part of the Romanian coast had the objective to formulate a coastal protection Master Plan for the southern coastal area and to propose priority projects to stop and prevent the coastal erosion process along the Romanian Black sea Coast.

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

a) Project Management

In Romania, according to the ICZM law put in place in 2003, beaches and coastal cliffs are acknowledged as a public domain for which the Ministry of Environment is the responsible government authority as well as for coastal protection. At the local level, the management for beaches and cliffs are not carried out by the coastal municipalities but by the Environmental ministry's executive agency the National Administration of Romanian Waters (NARW), Coastal Water Directorate named Water Directorate Dobrogea Litoral. This is responsible for implementing the water strategy and policy, quantitative and qualitative water management as well as for the operation of water infrastructure. Consequently, the Ministry of Environment has been playing an important role as a beneficiary of the coastal studies and together with the local authority responsible for beach management arrangements for developing the legal framework.

b) ICZM tools

In 2005, a baseline survey study for coastal protection in the southern part of the Romanian coast against erosion was initially developed by the JICA. The study comprised socio-, economic- and environmental aspects. Later on, in the second phase, it was focused on the assessment of the Mamaia and Eforie barrier beaches and the pocket beaches, southward, identification of the main causes of beach erosion, division of the coastal areas into vulnerable sub-areas, shoreline changes under the local hydrological conditions (waves, sea level, currents) as well as short and long term shoreline predictions. The main study aim was to develop a Master Plan for coastal protection of the southern part of the Romanian coast which a preliminary design of the coastal protection measures necessary to be implemented within the time scale of 2015. By the end of 2007, the Master plan and feasibility studies for two priority areas (Mamaia Beach and Eforie Nord) were developed by JICA using their own funds. For the other priority projects identified in the Master Plan, the funds will be allocated by the Romanian government although the technical assistance may still be provided by JICA. The protection coastal measures identified in the Master Plan for the two priority areas were mainly directed towards hard protection such as breakwaters and groynes and to a lesser degree by soft protection such as artificial reefs and artificial sand nourishments. In addition, maintenance of the existing hard structure or removal of the inadequate and non-effective old structures were also considered as necessary coastal works.

An assessment of the coastal protection measures in terms of estimated costs for operation, maintenance and a management plan, legal and institutional framework, was carried out by the Romanian institutions. A Strategic Environmental Assessmenthas been applied for the Master Plan and its outcomes paving the way for a Strategic Plan for coastal protection. Also an EIA and public debate of the two priority projects were conducted.

7. Cost and resources

For 2007-2010, the estimation of the total costs was about €44 million for the implementation of the protection coastal works for the two priority projects. Over the period 1998-2015, the estimated total cost for the implementation of the Master Plan for coastal protection was €316 million.

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

The costs of the coastal measures estimated by the Japanese study and to be paid by the Romanian government have to be weighed against the socio-economic damages incurred in the event that no protection measures will be executed. The main causes of erosion along the Romanian shores are identified as: sediment withdrawal up stream of the Danube river, on-going global sea level rise (since mid 19th Cent: 15 cm/century), and locally by protruding constructions like harbour jetties. Coastal erosion caused by deficiency of sediment supply to the coast is most effectively combated not so much by hard but by soft coastal measures such as large scale sand nourishment filling up the sand budget deficit along the coast. Modelling three dimensional sand movements along the Romanian coast is a preliminary way to estimate the duration that nourished sand will stay in its sediment circulation cell. As a result, the 2007 – 2010 plans have not been executed and are still pending to be put into practice .

9. Success and Fail factors

The success of combating coastal erosion depends very much on the type of measures which will be chosen and the way they will be prepared, executed, monitored and evaluated. Starting with well prepared, executed and monitored sand nourishment pilots along the Romanian coast will provide a growing knowledge on how beneficial this way of combating coastal erosion will be both economically and ecologically. These anticipated pilots accompanied by frequent and detailed monitoring will provide more knowledge on how long the nourished sand will be acting as sand buffer. This will increase the confidence in the cost and benefit analyses.

10. Unforeseen outcomes

None.

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13. Sources

- JICA, 2006, A short presentation of coastal protection plan for the southern Romanian Black Sea shore and coastal protection and rehabilitation projects at Mamaia Sud and Eforie Nord
- JICA, 2007, The study on protection and rehabilitation of the southern Romanian Black Sea shore in Romania - executive summary
- www.mmediu.ro/departament_ape/zona_costiera/proiect_jica.htm

Coastal Protection Plan - S Romanian Black Sea Shore (518.69 KB)

JICA Study on Southern Romanian Black Sea Shore (490.19 KB)

assesment romania_ coastal erosion (206.24 KB)