

CASE STUDY: ROMANIA

ICZM PROGRAMME

I. INTRODUCTION

The Romanian coast is 244 km long and situated in the south-eastern part of the country, stretches from Ukraine in the north to Bulgaria in the south. The Romanian coastal zone, bordering the Black Sea, is entirely located in the Dobrogea region, the latter covering an area of 15,485 sq km, corresponding to almost 6.5 % of the entire Romanian territory.

The main river crossing the Romanian coastal zone is Danube. It is the major freshwater contributor to the Black Sea (80% of the annual river discharge into the north-western Black Sea). The Danube Delta Biosphere Reserve, a labyrinth of channels, small lakes and the lagoon complex Razim Sinoe makes part of the coastal zone. Furthermore, in the southern part of the coast there are salty and brackish lakes (e.g. Techirghiol Lake) which are supplied by underground springs. These lakes were marine lagoons in the past which over the years became simple lakes fronted by large sandy beaches.



Photo 1 Mamaia Beach Resort - 2010

The coastal zone of Romania is experiencing increasing pressures mainly due to population increase, urbanization, and growth in agriculture, fisheries and industry. As it is essential for the national economy, competition for its resources is growing, threatening to destruct the functional integrity of the resource system. The coast is already subject to erosion, water pollution, decline of renewable resources, loss of biological diversity, wetlands losses and destruction of landscape. The need to deal in the future with the impacts of climate change in combination with finding adaptive responses is also an issue. This is why in addition to

Romania's policy to adopt and implement the EU Water Framework Directive (WFD - 2000/60/EC), Romania strives to comply with the "European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe", issued on 30 May 2002.

II. INTEGRATED MONITORING PROGRAMME OF COASTAL WATERS

An integrated monitoring programme (IMP) is carried out along the Romanian coastal waters. The central governmental authority on environment protection, Ministry of Environment and Forests is responsible for the implementation of the Integrated Monitoring Programme which follows WFD and the European Environment Agency requirements and the recommendations of Black Sea Commission Action Plan.

The activities carried out within IMP are the following:

- Pollution monitoring and assessment by means of physical, chemical, biological and bacteriological indicators;
- Assessment of pollutant loads discharged into marine waters by land based sources, Danube included;
- Monitoring of biological diversity, marine dolphins included;
- State of marine living resources;
- Monitoring of designated areas of molluscs;
- Monitoring of the quality of bathing waters and beaches;
- Monitoring of incidental pollution.

Main objectives of an Integrated Monitoring Programme

❖ To assist the taken decision levels on management of marine ecosystem with the necessary informational support for:

- 1) Preserving the biological diversity and integrity of marine communities;
- 2) Diminishing the negative influences of human activity on marine living resources;
- 3) Protection of critical habitats;
- 4) Protection of human health;
- 5) Assessing the effects of implemented measures on coastal zone protection;
- 6) Assessing the evolution trends and environmental risks;

❖ To identify the root causes and solutions for preventing the further deterioration and rehabilitation of the ecosystem;

❖ To fulfil the requirements of the EU directives, as well as global or regional conventions;

❖ To increase the knowledge on physical, chemical and biological conditions of marine coastal and transitional waters

Participant institutions

In performing the IMP will take part institutions designated by Ministry of Environment and Forests and Ministry of Health and other institutions that occasionally develop some projects that can contribute to the general database.

The Integrated Monitoring Programme components:

Pollution monitoring and assessment		
<i>Water</i>	<i>physical indicators</i>	<i>temperature, pH, suspended matters, conductivity, Secchi disk</i>
	<i>chemical parameters</i>	<i>salinity, dissolved oxygen, BOD₅, P-PO₄, P-total, N-NO₃, N-NH₄, Si-SiO₄, TOC, trace metals, total hydrocarbons, POPs (pesticides, PAHs), radio nuclides.</i>
	<i>biological indicators</i>	<i>Phytoplankton, zooplankton;</i>
	<i>bacteriological indicators</i>	<i>total coli forms, faecal coli form, faecal streptococci.</i>
<i>Sediments</i>		<i>trace metals, total hydrocarbons, POPs (pesticides, PAHs), radio nuclides, zoobenthos</i>
<i>Biota</i>		<i>trace metals, total hydrocarbons, POPs (pesticides, PAHs), radio nuclides.</i>
Monitoring of biological diversity		
		<ul style="list-style-type: none">- <i>presence and density of important species;</i>- <i>biomass of present species;</i>- <i>total biomass in a specific location;</i>- <i>ratio between principal groups;</i>- <i>chlorophyll-a;</i>- <i>state of dolphin populations</i>

Pollution indicators are monitored in a network of sampling stations and observation points. The state of most important populations (phytoplankton, zooplankton and zoobenthos) is monitored in the same time with pollution monitoring in order to assess the effects of eutrophication.

Evaluation of pollutant loads direct from discharges of waste waters together with the load transported by Danube are done by the institutions responsible for managing the coastal and marine waters.

Monitoring the state of marine living resources:

- seasonal diversity of fish population ;
- seasonal monitoring of stock reproduction;
- demographic structure on size classes, length and/or age, sex ratio etc
- annual assessment of fishery resources reserves, evolution trends.

Monitoring of coastal erosion

- Monitoring of the shoreline changes;
- Erosion trends assessment
- Identifying causes of coastal erosion
- Risks assessment

Quality of bathing water and beaches

- Microbiology - Total coliforms, faecal coliforms, faecal streptococci, Salmonella
- Physico-chemicals – PH, Colours, etc

Two institutions working under the central authorities (Ministry of Health, Ministry of Environment and Forests) are responsible for monitoring the quality of bathing waters. The parameters are those mentioned in the Bathing Water Directive, sampling stations and frequency being established by each institution involved.

Monitoring of designated area of molluscs

Parameters included in the Council Directive with this subject are assessed in the pollution monitoring and assessment section of IMP, this one being developed in such a manner to cover this request also.

III. INTEGRATED WATER MANAGEMENT SYSTEM

Romania harmonized its national legislation to EU's specific directives, including those related to water. The Water Framework Directive (WFD) mandates integrated river basin planning and management for EU Member States and Candidate Countries from the date of their accession to the EU. Since 2007, Romania was in the process of designing and implementing an integrated water management system. Apart from the requirements of the WFD, development of the capacity for integrated water management is viewed by Romania as an important step in managing water resources more effectively.

Historically, Romania has experienced significant economic losses from floods, accidental spills and droughts – costs that could be substantially reduced through improved capacity in monitoring, use of effective decision support system tools in managing water allocation and quality and implementation of a comprehensive communication network to ensure timely responses by water users and the public to forecasts and warnings.

Romania has already made major investments to upgrade meteorological monitoring and forecasting (SIMIN) institutional capacity and infrastructure and has made a second investment (DESWAT) in automated hydrological monitoring that provides real time data for improved forecasting of floods and accidental spills.

Integration

- **Integration of physical aspects of all water categories:** surface waters, ground waters, transitional waters, coastal waters and also of quantitative, qualitative and biological aspects of water.
- **Integration of water uses at river basin level** – solving the equation resources-water demand and water resources protection requires the analysis of water use at river basin level.
- **Upstream-downstream integration** – upstream water uses must recognize the rights of downstream water uses on using good quality and sufficient water resources.
- **Integration of water resources in planning policies** – water is one of the key elements of life and also a factor which influences economic and social development, being often a limitative factor.

Water Framework Directive

The core piece of EU water legislation is the Water Framework Directive. To comply with the WFD requirements, Romania develop an integrated water resources management which needed to take into account social problems, economic development and protection of the environment at the river basin level. The WFD establishes a 'Framework', providing a common approach and common objectives, principles, definitions and basic measures for water management. However, the specific actions required to achieve the mandated "good status" in river basins are in the responsibility of competent authorities in the country. Thus, WFD required implementing the necessary measures to prevent deterioration of the status of all surface and groundwater bodies and to achieve good surface and ground water status within 15 years from the date of implementing the Directive.

River Basin Management

In the last years, Romania has established a framework for implementing the WFD. This included adapting Romania's legal framework to provisions of the WFD and identifying River Basin Districts (RBDs) and competent authorities for each RBD. Since 2002, National Administration "Apele Romane" subordinated to the Ministry of Environment and Forests was appointed to be the water management authority. The National Administration includes central offices in Bucharest, eleven river basin (regional) offices, forty-two county-level offices and 57 hydrological offices.

Romania fulfilled several key and supplementary tasks for WFD implementation requirements including:

- setting up **11 River Basin Districts (RBDs)**
- setting up **River Basin Committees**
- identifying and agreeing on key water management issues;
- establishing and maintaining monitoring networks;
- developing River Basin Management Plans (RBMPs) and Programs of Measures (PMs)

Integrated management of water resources is based on *Master Plans on River Basin Management and Planning*. Romania is one of the first countries which introduced water management on river basin level, since 1959. Between 1959 and 1962, Romania carried out first *River Basin Management Plan*.

River Basin Management Plans for 11 hydrographical basins have been set up including Danube Delta and Danube floodplain, covering the entire territory of the country. The management plans were developed considering several studies and researches on hydrological, hydro-geological, climatic, geodetically, demographically evolution, urban and territorial development, drinking water and industrial supplies, land reclamation, navigation, hydro energetically and fishing domains. According to the Law no. 310/2004 that updates Water Law no. 107/1996, Master Plans on River Basin Management and Planning has been updated according to the Water Framework Directive 2000/60/EC requirements.

River Basin Management Plans - the elements:

1. General description of the characteristics of the River Basin District:

1.1. For surface waters:

- mapping of the location and boundaries of water bodies,
- mapping of the eco regions and surface water body types within the river basin,
- identification of reference conditions for the surface water body types;

1.2. For ground waters:

- mapping of the location and boundaries of groundwater bodies;

2. Summary of significant pressures and impact of human activity on the status of surface water and groundwater, including:

- estimation of point pollution source,
- estimation of diffuse pollution source, including land use information,
- estimation of pressures on the quantitative status of water,
- analysis of other impacts of human activity on the water;

3. Identification and mapping of protected areas

4. Networks monitoring;

5. Environmental objectives for surface waters, ground waters and protected areas;

6. Summary of the economic analysis of water use;

7. Summary of the programmes of measures adopted in order to reach “good water status”;

8. Register of any more detailed programmes and management plans for the River Basin

District dealing with particular sub-basins, sectors, issues or water types, together with a summary of their contents;

9. Summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence;

10. List of competent authorities;

11. The contact points and procedures for obtaining the background documentation and information and in particular, details of the control measures and the actual monitoring data.

IV. INSTITUTIONAL SETTINGS FOR WATERS MANAGEMENT

In Romania the **Ministry of Environment and Forests (MEF)** is the central authority for water management and environmental protection. Its responsibilities include policy making at national level, drawing up strategies and regulations that integrate with general government policy, including the transposition of the EU regulations into Romanian legislations and coordinating the implementation of the strategies.

The **Water Resources Department** of the Ministry is responsible for policy development and legislation related to the implementation of the WFD and ICZM Recommendations.

National Administration ‘Apele Române’ (NAAR) under the Ministry of Environment and Forests is responsible for the implementation of policies and legislation related to water management. This includes the management and provision of raw, and in some cases treated, water to municipal water companies, industry and agriculture. **NAAR is responsible for both water quality and quantity**, which in other countries is often not the case. As part of its active responsibilities for water quantity management, it is involved in the operation and maintenance of water related structures such as dams, dikes and reservoirs. It is as mentioned

further, in charge of monitoring the water quality of the surface waters of rivers, lakes transitional and coastal waters and operates the measuring and sampling stations. Also NAAR is in charge for implementing the legislation in compliance with WFD regarding the water resource management, the preservation of the aquatic ecosystems and the water areas. In this respect, it is in charge and responsible for the ways the surface and underground waters on the Romanian territory are used and for the water management operations as well as collaborating with all the owners of other operations regarding the waters.

The National Environmental Protection Agency is also responsible for water quality, but more related to providing licenses for extraction and discharging. At regional level the Regional Environmental Protection Agency is amongst others, bearing responsibility for surveying economic activities, granting permits for actual and future economic activities and evaluating EIAs related to regional and local plans.

Romania has already included a number of issues that are prescribed by the Water Framework Directive. A good basis for implementation of the Directive is, for instance, the long-standing division of Romania into eleven **River Basin Districts**, (fig. 1) and the more recent obligation to establish **River Basin Committees**. The eleven water basin authorities report to the NAAR. The Apele Romane **Directorate of Water Dobrogea Littoral (DADL)** is of importance in relation to this project as it is responsible for the implementation of the WFD and ICZM Recommendation in the Romanian Black Sea area. Another positive aspect is that one single ministry is responsible for working out the national strategy and policy for water management, ensuring the coordination and control of the application of national and international regulations.



Fig 1. Romanian River basin districts

Through the Governmental Decision 1115/2002, River Basin Committees have been created for each Water Directorates and consist of representatives of:

- governmental and local authorities
- Local communities;
- Users from river basin district;

- Beneficiaries of water management services;
- NGOs.

With the main functions:

- To approve water rationing during drought periods;
- To approve the plans to prevent and fight against accidental pollution;
- To approve the integrated watershed management plans.

Objective overviews of the development of these structures:

- Efficient cooperation between water management territorial structures and the local public administration;
- Balance between conservation and sustainable development of water resources;

Tasks of River Basin Committees:

- Collaborate with Water Directorates in the implementation of national water management policies and strategies;
- Agree on River Basin Management Plan;
- Approve the list of protected areas and establish measures for ecological reconstruction;
- Recommend priorities for the financing of sustainable development programs;
- Propose the revision of the water management norms and standards and, if necessary, develop quality norms for effluent waters, specific to river basins;
- Inform the public about the organized actions within at least 30 days before the planned action;
- Public debates on all the problems concerning water management;
- Public access to documents and to official meetings;

In the case of river basins shared by two or more Member States, the WFD requires that International RBDs be established. If a river basin extends beyond Community territory as in the case of Danube River, the relevant Member State(s) must seek to establish appropriate coordination with the non-Member State(s) concerned.

A Romanian inter-ministerial Water Council has been formed by the representatives of the ministries and central authorities and Apele Romane for the implementation of the WFD. The president of this Council is Romania's representative on the International Commission for the Danube River Protection. Water management functions in Romania are organized on a river basin model, with a decision making role reserved for the National Authorities in the cases of large floods with transboundary or inter-basin implications (e.g., if water needs to be diverted to other basins through the network of canals) or serious drought seasons. There are three other important functions carried out by national authorities. Monitoring and infrastructure investments related to floods is funded by the State Budget, owing to the "public good" nature of flooding problems.

Water Policy and Strategies

The draft of a *National Strategy for an Integrated Coastal Zone Management* been developed in 2007 and involved all relevant stakeholders. Also a short-term *Flood Risk Management Strategy* was put in place being in line with the WFD requirements.

Romania's flood control strategy is taken into account the sustainability principle and adopts the new European approach "more space for water" (living with the water). In order to improve the legislative framework and tackle the problems resulting from the flood events of 2005, efforts are currently undertaken to amend Law no. 107/1996. The amended version envisages improving monitoring and inspection activities, management of waters in case of floods and developing a public information strategy during the flood event.

It is stressed out that an successful integrated water resources management programme significantly depends on the fruitful cooperation of stakeholders at all levels. This can only be achieved by fostering public awareness of the necessity of sustainable water resources management. In accordance with the provisions of the WFD, Romanian Ministry of Environment has issued two ministerial orders for approval:

- 1) Order no. 1044/2005 envisages procedures for public consultation in decision-making processes;
- 2) Order no. 1012/2005 grants the public access to information regarding water management.

By participating in various international conventions – such as the Convention for the Protection of the Danube River and Black Sea Convention, Romania undertakes consistent efforts to implement the provisions of these documents at a national as well as international level.

V. MEASURES TO REDUCE THE SEA WATER POLLUTION FROM LAND BASED SOURCES IN THE ROMANIAN COASTAL ZONE

Through EU's ISPA grant program, measures to rehabilitate the infrastructure of environment and transport were targeted and were planned for implementation in 2000-2006. However, deadlines have been extended until 2011. For Romania, the EU funds have been allocated for projects in environmental and transport infrastructure.

The general, the objectives of ISPA program for the Environmental Protection have sought the provision of technical assistance to Romania in order to align to the requirements of EU environmental legislation relating to preserve, protect and improve the environment, protecting human health, prudent and rational utilization of natural resources;

The action principles are the following:

- The precautionary principle;
- Damage prevention;
- Rectification of damage at source;
- The 'polluter pays' principle

ISPA Program Implementation in Constanta

Constanta, a major international seaport and second largest city in Romania, with a developed tourist activity, has experienced serious environmental problems in terms of coastal marine water quality. Effective treatment of wastewater is a priority measure in the National Action Plan for Environmental Protection, which is why Constanta received almost a third of the funds allocated during the period (€ 250 million) and respectively, € 86,877,177 nationally.

The share of EU assistance was set at 75% of eligible expenditure, the difference of 25% being provided by national co-financing.

"Rehabilitation of the sewerage and sewage treatment facilities in Constanta, Romania" was done by the Instrument for Structural Policies for Pre-Accession (ISPA). Rehabilitation of sewerage network and wastewater treatment facilities in Constanta, Romania was a priority measure in order to improve water quality in coastal areas of the Black Sea. After 2007, ISPA measures have become ex-ISPA measures, following the EC Regulation 1164/1994 for the establishment of the Cohesion Fund.

Therefore, during 2002-2010, in compliance with European agreements under ISPA sign 2000/RO/16/P/PE/003 priority measures were implemented in the Romanian coastal zone which contributed to the implementation of Community policies and especially those concerning the protection and improvement of coastal environmental quality.

The overall objective of the project was to improve the environmental infrastructure in the county of Constanta, in order to fulfil the obligations outlined by the EU Accession Partnership. Specifically, by implementing the project's measures, it was aimed to protect coastal marine waters against pollution from uncontrolled dumping of untreated sewage and industrial wastewater. Due to the rehabilitation of wastewater treatment plants in the coastal area, treated wastewater is within the currently accepted standards of effluent quality. The taken measures have led to improved sewerage infrastructure by optimizing the acquisition and control capacity of wastewater flow and by reducing losses from sewers and uncontrolled discharges in order not to damage groundwater and surface water sources.

The benefits of implementing the measures have contributed to the promotion of tourism by providing a better quality of bathing waters in the coastal zone.

Components of rehabilitation measures:

1. Constanta North - Waste Water Treatment Plant (WWTP)

Currently Constanta North WWTP has a capacity of 1920 l / second, sized for 255,000 EP (equivalent population) that provides wastewater treatment for the northern area of Constanta and Mamaia. The plant is equipped with the latest technology in the field, with extended aeration, including biological nitrogen and phosphorus removal, aerobic stabilization and sludge dewatering. The existing wastewater treatment plant was demolished and then an area (land reclamation) of Lake Tabacarie was filled in order to obtain necessary area for expansion, construction and finish have been completed, after which the plant was equipped with necessary equipment. Moreover, uncontrolled discharges into the Black Sea of untreated wastewater were solved and now their effective treatment is carried out under EU standards.



Photos 2 - Rehabilitation of the Waste Water Treatment Plan - Constanta Nord -2005

2. Sea discharge pipelines for Constanta North WWTP and Eforie Sud WWTP

Through this contract, it was intended to mount large discharge pipelines for treated waters at Constanta North and Eforie Sud. At Constanta North WWTP two pipelines were mounted that discharge treated water at 3886 m offshore and meteoric waters at about 490 m offshore. For Eforie Sud WWTP, the discharge is achieved through a single pipe at 1480 m from shore.

This work was implemented for the first time in Romania and compared to neighbouring countries which discharge treated water into the Black Sea basin, S.C. RAJA S.A. Constanta is the only company that applies this technology to comply with European Community Directives. Necessary funds were provided by the European Commission and the County Council of Constanta.

- Constanta North WWTP: the long pipeline with DN 1500 discharges into the sea at 3886 m, maximum depth of -15 m;
- Constanta North WWTP: the short pipeline with DN 1500 discharges into the sea at 490 m, maximum depth of -3.5 m;
- Eforie Sud WWTP: the long pipeline with DN 700 w discharges into the sea at 1480m, maximum depth of -10m.

3. Pumping stations, sewerage network and the controlled over flows in the southern Constanta area.

S.C. RAJA S.A. Constanta has rehabilitated 36 sewage pumping stations in Constanta and from the shoreline by installing new electrical pumping equipment and performed the automation and monitoring of the parameters through SCADA system.

- Rehabilitation of 35 pumping stations in Mamaia, northern Constanta, southern Constanta, Eforie and Mangalia;

- Collection of wastewater discharged into Lake Tabacarie and directing of the flows to Constanta North WWTP;
- Rehabilitation of sewerage network in Peninsula Area in Constanta;
- Rehabilitation of the over flow and discharge pipelines of southern Constanta and Eforie area.



Photo 3 – Water discharge pipeline on Constanta Nord beach - 2006

4. Eforie Sud WWTP Expansion

The rehabilitation of Eforie Sud WWTP was designed to have a maximum capacity of 745 l / second. The sizing of the technical capacity of wastewater collection and treatment was made for 140,000 EP (equivalent population) in summer and EP 69,000 in winter, in another seaside resort, namely Eforie Sud. According to the project, the following works have been made:

- Partial demolition of existing wastewater treatment plant;
- Expansion of the treatment plant to a capacity of 140,000 EP with long-term ventilation, including biological removal of nitrogen and phosphorus, aerobic stabilization and sludge dewatering.

A large contribution to these projects had the EU through program grants of, 75% which led to: human health insurance benefits, improvement of environmental quality, international recognition of the Romanian Black Sea seaside beaches and obtaining the "Blue Flag" classification.

VI. REFERENCES

1. C. Coman, Plancoast, ICZM National Report, 2007
2. NIMRD Annual Report on the state of marine environment, 2009
3. Ministry of environment and Forest reports on implementation of WFD ,<http://www.mappm.ro>
4. Ana Lucia Varga, Overview of Romanian's Water management
5. RAJA Annual Report, Constanta 2010