

A NEW APPROACH FOR MONITORING AND EVALUATING ENVIRONMENTAL ISSUES IN PORT AREAS: TEN ECOPORT EXPERIENCE

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Abstract

The ports are, today, the hub-point of the Core Regional Transport Networks. Port authorities have a great responsibility: they are appointed for the Control and the real application of the Environmental Management System, being the nodes that ensure the environmental sustainability of the intermodal transport networks. TEN ECOPORT is a new approach for the management of the public area in which a lot of external enterprises operate, ensuring the economic development and their environmental quality of the cities.

Key words: port, management, eco-sustainability, empowerment

1. INTRODUCTION

In Europe, coastal regions represent strategic areas for production and trade. These areas produce 40% of the European GDP and trade 75% of the incoming and outgoing production, so that ports are consequently considered strategic hub point for sea transport.

Because of the large volume of shipping generated by different activities, some aspects related to this volume of traffic may affect the surrounding environment and the population. In this complex context, where economic, social and environmental aspects interact, different entities are appointed for the Control and the real application of the Environmental Manage System. Even if a responsible entity has been found, the analyzed laws systems (including Italy) do not have effective tools to enforce an environmental policy to all stakeholders, which often operate port services in total autonomy. For this reason, the project included the Benchmarking seminar, through which all the parts involved may share environmental policies. Environmental and social issues seem to increase quickly when port areas are settled next to urban or natural sites. For these reasons the ESPO Green Guide underlines the Top 10 environmental priorities to preserve the environment of the concerned areas (2009):

- 1) Noise;
- 2) Air quality;
- 3) Garbage/Port Waste;
- 4) Dredging: Operation;
- 5) Dredging: Disposal;
- 6) Relationship with Local community;
- 7) Energy consumption;
- 8) Dust;
- 9) Port development (water);
- 10) Port development (land).

TEN ECOPORT, as a new approach for monitoring and evaluating environmental issues in port areas, born as an initiative of Politecnico di Bari that is the project leader, under the guidance of the professor Leonardo Damiani. The project, involving 7 member countries: Italy, Greece, Romania, Bulgaria, Montenegro, Croatia and Albany, is supervised by Universus, institution of which I am the president and which figures as a privileged observer of this new approach, being the European Regional Development Fund partner in association with Politecnico di Bari. TEN ECOPORT is widely inspired by the priorities listed above and also by a great number of initiatives undertaken at EU level: initiatives that aim at improving sustainable mobility of people and shipping along the sea-network. Obviously, TEN ECOPORT has been created to capitalize the results of the previous

ECOPORT 8 experience: a project that deals with the problem of environmental impact affecting port areas and its surrounding areas, taking into account that all the port areas examined have a high population density.

The implementation of ECOPORT 8 resulted in a Context Analysis report which described in an explicit way the lack of specific rules concerning the environmental quality of the 8 ports involved in ECOPORT 8, summarizing the European and national laws, the environmental indexes to be surveyed, as well as SWOT analyses of the ports that participated in the project.

As said before, TEN ECOPORT aims at capitalizing the gained experience and take it a step further by updating the analysis collected under ECOPORT 8 to realize a deeper examination of new ports involved in TEN ECOPORT. This will produce an updated context analysis, which will be used in all TEN ECOPORT Platform activities, including the Benchmarking Seminar, that has been already organized. Benchmarking seminar has to be considered an important instrument because it allows to focus the attention to the "close chain" analysis implemented during the ECOPORT 8, offering the opportunity to define the possible internal or external constraints that prevent the achievement of the sustainability of the results.

Another source of inspiration of TEN ECOPORT project is the extensive review process of the Trans-European Transport Network (TEN-T) policy during the last years. The main innovation put forward in the new policy of Trans-European Networks (TEN) was the concept of a "core network" as part of a dual-layer planning approach. This approach, broadly supported by the stakeholders, has established the importance of the regional networks for the future TEN-T development that are set in order to enable further economic growth, economic and social cohesion. At the moment, the ports constitute the greatest opportunity for increasing the relationship among SEE countries; as a matter of fact, the ports experiences an increasing trend in passenger mobility. Therefore, the enhancement of the Core Regional SEA-Network as precursor of Trans-European Networks (TEN) has led the ECOPORT 8 partnership to update its goals with this new vision. For historical reasons, most of the Mediterranean ports are embedded in the densely urbanized contexts, often consisting of territories of great social and economic importance (originally all major ports stood in the peripheral areas of large urban centers and then degraded because of the presence of ports). This makes environmental issue even more urgent, since the critical points of the urban context increase, overlapping to those of the port environment. In addition, urban development around ports made it impossible the adaptation of port infrastructure to the remarkable evolution of maritime traffic: that's to say, for example, containers or cruise transport. For these reasons, where possible, it was decided to relocate part or all of the ports (eg, Genoa, Marseille, Barcelona, London, New York, etc.), improving the environmental quality of the urban environment and promoting the recovery of historic settlements / art.

Where relocation is not possible, and most of the TEN Ecoport ports is under these conditions it is necessary to act with more attention, planning structural and managing interventions to mitigate the environmental hardships and conflicts between the different needs.

2. TEN ECOPORT MISSION: TARGET GROUP AND STAKEHOLDERS

As Known, when an international partnership is created, the different legal situation in the involved countries create difficulties for the unification of procedures, which can guarantee a good environmental quality, without affecting the competition rules: that's to say that different norms and rules can lead to disparities in terms of competition between ports. One of the most important target of TEN ECOPORT project aims is to become a driving force of competition and cooperation among all ports involved, trying to equalize environmental effectiveness of the sea-networks. To accomplish this mission TEN ECOPORT ensures the tight collaboration of the following target groups and stakeholders:

- The First target group is composed by Port Authorities of the SEE area. A group that is considered fundamental to create an extended and eco-cooperating network among them. Port Authorities are, in fact, considered as the key-target: they will be the direct responsible and the direct beneficiaries of the sustainable model to be performed by the project.
- The Second target group is composed by All policy and decision-makers coming, till now, from the 7 countries involved (4 coming from EU countries and 3 from IPA countries).
- The Third target group is composed by Those that are affected by the environmental port policies and engaged in port activities, such as port operators, SMEs, several related authorities.
- The Fourth target group is composed by Port end-users. They play an important role in enhancing port-networks therefore they will be involved in a wide dissemination phase.
- The Fifth target group is composed by Experts and technicians working with EMS (Environmental Management Systems).
- The Sixth target group is composed by Research and educational institutes. These institutions will support and guarantee the scientific quality of the outputs and results. Furthermore, through this target group the project will reach an open variety of beneficiaries and stakeholders, allowing a productive dialogue with the view to create a shared strategy in designing environmental solutions.

Starting from this point, what are the important goals of the TEN ECOPORT Project? First of all the project aims at improving the capacity of Port Authorities to develop and implement effective policies for environmental management of the port areas, giving to Port Authorities the instruments to define specific critical issues to implement Specific Action Plan useful for a shared, efficient and sustainable Operational Environmental Plan. To reach this main goal, the promotion of peer discussion among all individuals and institutions involved in port activities is considered fundamental: because thanks to this integrated approach is possible to exploit education, training, consulting and reviewing coming from on the best experiences and lessons learnt by all ports involved. Further to the accomplishment of this step it is necessary to create regional/local platforms involving all local stakeholders connected, directly or indirectly, with the port areas and the cities hosting them, in order to guarantee information about the peculiarities of each area involved and to provide timely solution plans. At least TEN ECOPORT aims to promote transnational enhancement of a permanent TEN ECOPORT network with a view to develop, strengthen and transfer coordinated initiatives useful for a transnational strategy for port ECO-management in SEE sea basins.

3. MATERIALS AND METHODS: HOW TEN ECOPORT WANTS TO REACH HIS GOALS

In order to reach the previous mentioned goals, it is necessary to adopt a “closed chain” approach to validate the initial estimates or to correct management actions planned. The different phases of the closed-chain cycle can be summarized as follows:



- Identification of the key-actors within the partnership;
- Identification of the key-activities for the achievement of the forecasted aims;
- Application of environmental protocol;
- Monitoring of the obtained results;
- Identification of the obstacles which prevent the achievement of the objectives;
- Identification of the possible solutions and review of initial hypothesis.

This activity aims at providing the mapping of all the specific critical issues within each port area and the surrounding cities involved. The critical issues data collection can be a time-consuming task. Therefore, in order to get a realistic approach on the required data collection, it is necessary to get an

overview over the input data requirements and availability. So, in this phase, all the material obtained during the implementation of ECOPORT 8 will be capitalized. Twelve scientific map-reports, one for each port involved in TEN ECOPORT, will be implemented with the joint work of the local working groups developed during the activity TEN ECOPORT Community.

3.1 Mapping System: the Port of Varna an example.¹

To facilitate a quick identification of the kind of pollution in each port, TENECOPORT has adopted a geographical reference system of critical points to insert in the maps. Each point is characterized by a round composed by two colours:

-  The first (on the circle upper part) indicates the source of pollution: red  to indicate pollution from the ground and light blue for pollution from the water;
- The second (on the circle lower part) indicates issues: Blue for WATER; Brown for SOIL AND STORAGE; Grey for AIR, ODOURS, DUST AND NOISE; Yellow for ENERGY/CONSUMPTIONS; Green for WASTE

The port of Varna is a Port situated in north-east of Bulgaria (43°11'38.82"N, 27°54'53.57"E), the Authority involved in managing activities are Executive Agency Maritime Administration, Bulgarian Ports Infrastructure Company and Port Varna PLC - Port operator. After an analysis of the impact of travel and transport activities, the main issues discovered, analysed and investigated in this port are: water and air pollution. Contaminated waste and surface waters discharged into the sea water is generated by two different process, these issues affect two different locations in the Port of Varna (as shown in the layout below).

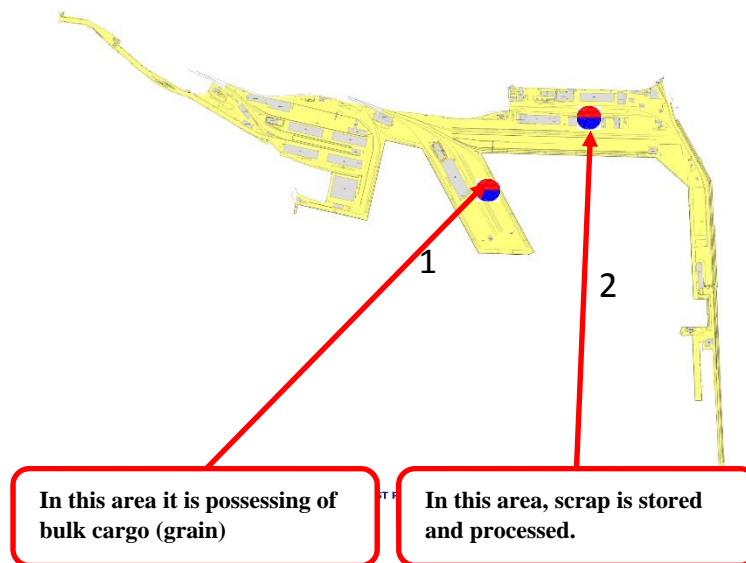


Fig. 1 On the port's layout are shown the areas with the sources of the environmental water problems

In the first area [1], pollution is caused by inflow of surface and rain water to berths where it is processed bulk cargo (grain), in the second location [2] inflow of surface and rain waters to berths where it is stored and processed metal scraps. Air pollution by emissions from ships (stay of container vessels) affect three different areas in Port of Varna (as shown in the layout below), two of them came from the same activity that generate water pollution and the third one came from staying of container vassels, but the impacts are different: [1] for stays of container vessels emit harmful emissions from ship engines; [2] processing of bulk cargo causes excessive dust; [3] processing of scrap dust deposits.

¹All the data regarding mapping activities on the Port of Varna were kindly provided by TEN ECOPORT reserved databases.

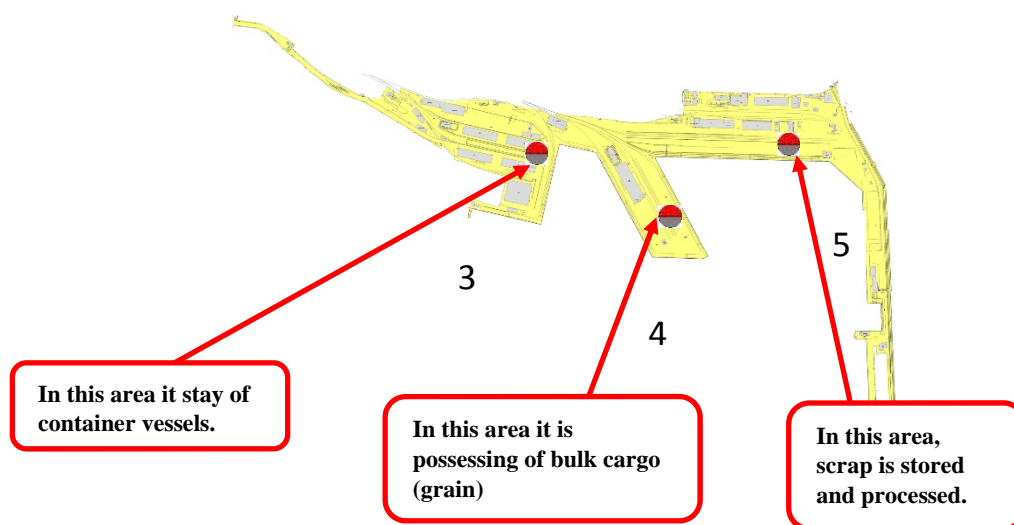


Fig. 2 On the port’s layout are shown the areas with the sources of the environmental air problems

In all activities that generate water and air problem, the operating Organization are Port Operator and Ship Owners. According to TENECOPORT approach, in order to guarantee an effective operation to reduce water an air pollution, rise the need to entirely involve all the stakeholder that are directly, or not, bounded up with these locations (Bulgarian Ports Infrastructure Company; Port Operator and Ship Owners).Any environmental problem founded in the Port of Varna has a source and has some actors involved (directly or indirectly). The aim of this project is to represent the current situation and find out the best and effective way to manage it. Concerning the Port of Varna objectives to reach and the actions to reach them have been found out (as shown in the table below):

Issue	Area	Objective	Action
Water pollution	1	Reduce pollution by discharge of surface water and rainwater.	-To install automatic monitoring system. -Improving the technology of cargo handling.
	2	Reduce pollution by discharge of surface water and rainwater.	-To install automatic monitoring system. -Improving the technology of cargo handling.
Air pollution	3	Reducing air pollution from the bulk cargo processing.	- To install an automatic monitoring system. - Improving the technology of cargo handling.
	4	Reducing air pollution from the ships emissions.	- To install automatic monitoring system. - Use of higher quality fuels.
	5	Reducing air pollution from the processing of scrap metal	-To install automatic monitoring system. -Improving the technology of cargo handling.

The approach illustrated above has allowed ECOPORT 8 to reach the goals. TEN ECOPORT will help to individuate and to provide proper innovative methodologies and instruments for mapping the critical issues for each port involved and highlighting the common key-elements, as the basis of the Common Action Plan aimed at protecting port areas and at sustaining ecosystems. ICT instruments seem to be the ideal instruments for updating the EMS systems starting by the assessment of the vulnerabilities and risks. An accomplishment that will be strengthened by the establishment of a multidisciplinary Task Force that will gather all knowledge and experience to be gained providing support and services to SEE ports. The tool identified to allow constant monitoring of the port areas that are part of TEN ECOPORT is WEBGIS. This tool guarantees a great number of advantages. First of all, WEBGIS provide important “hot spots” for eco-mapping, consenting also to spatially allocate the historical buildings and monuments that are closely related to the ports of the Project. WEBGIS provide also to monitor the long-term variations (annual and inter-annual) of marine parameters in the whole eastern part of Mediterranean and Black Sea: highlighting their rates of changes in sub-areas and sea corridors that connect commercially the participating ports. In the Pictures below there is an example of how WEBGIS works.

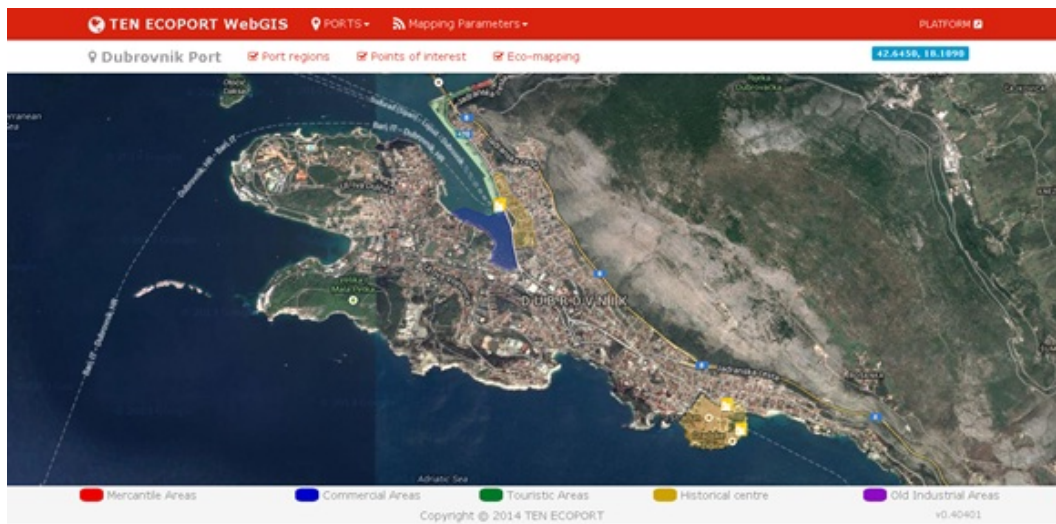


Fig. 3 The Port of Dubrovnik monitored by TEN ECOPORT WEBGIS. Source: <http://www.tenecoport.eu/webgis/port/Dubrovnik>



Fig. 4 WEBGIS 2003-2013 SEE Temperature monitoring. Source: <http://www.tenecoport.eu/webgis/map/1>

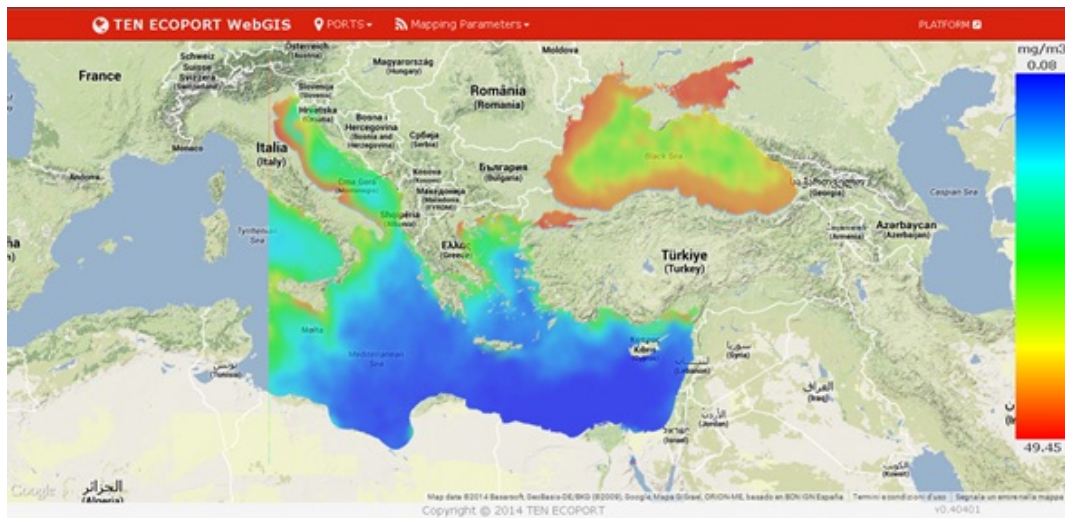


Fig. 5 WEBGIS 2003-2013 monitoring presence of Chlorophyll-a (mg/m^3) Source: <http://www.tenecoport.eu/webgis/map/3>

4. RESULTS

TEN ECOPORT is a project with notable expected impacts, in part already accomplished. Maybe the impact that is of most importance for a social innovation is the cultural impact carried on with the raise of awareness on the themes of environmental and economic advantages of the sustainable management of port networks. This is a relevant goal of the project, in fact methodological process for the peer education and training among ports involved will be developed and improved where already existent. Starting by this social-cultural empowerment all the monitoring technologies described will have a crucial role in improving the present management of the involved port areas: the realized maps for the specific critical issues and vulnerability risks, surely will improve the integration of ports and hosting cities. When the starting scenario will be fully understood and analyzed, the expertise of groups linked in TEN ECOPORTS will be enhanced to give authorities instruments and acknowledgement for the creation of shared and sustainable operative action plan for a timely solution of critical issues of the ports involved. This way of acting and programming will produce an intelligent environmental port management, enriched by a real time information systems sustained by the relative integrated technologies for environmental risk protection. From this integrated approach and from the definition of the Managing Action Plan and the Set of Common Critical Issues, a “Common Model of Environmental and Sustainability Development and Sustainable Accessibility of the sea-networks” will result. This Common Model will be lever to draw up the common guidelines that should be followed by the involved ports in order to meet the needs and lacks that will be depicted during the mapping procedure and will be defined in the Set of Common Critical Issues by the direct and indirect key-stakeholders. So a transnational task force will come to life during this project: a task force that will link the local platforms and will serve as a supporting tool for the SEE port network and its empowerment in the future.

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