



INTERREG EUROPE

“Sustainability of the Land-sea System for Ecotourism Strategies”

2ND SEMESTER

FOLLOW-UP PAPER



Land-Sea focuses on regional policies for sustainable management of coastal ecosystems and stimulates implementation of territorial strategies for ecotourism development.

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Table of content:

1.	Abstract	3
2.	INTRODUCTION	4
3.	THE CRITICAL LANDSLIDES IN THE VARNA REGION	5
4.	INTERREGIONAL COOPERATION - SHARING EXPERIENCE IN TOPIC LANDSLIDE PREVENTION, ECOTOURISM AND NATURAL	9
4.1.	<i>Urban Ecology Agency of Barcelona</i>	<i>10</i>
4.2.	<i>Catalonia Regional Government</i>	<i>11</i>
4.3.	<i>Free and Hanseatic City of Hamburg</i>	<i>12</i>
4.4.	<i>Molise Region</i>	<i>13</i>
5.	DISCUSSION AND CONCLUSION	14



1. ABSTRACT

This Follow-up paper presents a summary of the findings from the Second Project Steering Committee meeting in Varna (Bulgaria) 13-15 December 2017, the Expert panel meeting, the Interregional conference and the International thematic seminar, as well as the Study visit).

During the events, the Land-Sea Project partners engaged with a range of stakeholders, users, academics and experts from public institutions.

At the “Interregional conference: Public-private partnership for preventing and solving neuralgic threats for the eco-tourism development” following presenters from the Bulgarian side were available:

Best and worst practices in the field of shoreline protection, marine hydrotechnical construction and the consolidation of landslides along the Black Sea coast” by engineer Krasimir Marinov, Project Troy Ltd.;

“Identifying all indicators related to erosion and landslides threats to balance and protect environmental components to develop sustainable ecotourism” - presentation from Regional Inspectorate of Environment and Water –Varna;

“Flood Risk Management in the Black Sea region for water basin management” presentation from Black Sea Basin Directorate;

“Coastal strategies for risk assessment and disaster management” presentation from Institute of Oceanology – Bulgarian Academy of Science.

The Land-Sea project uses a holistic approach by analysing the ecotourism strategies. Some specific cross-thematic objectives between Partner Regions have been highlighted. The idea is to focus on a limited number of selected fields because according to our ideas this Will increas the project potential to make a substantial impact on regional policies.

For the conduct and development of tourism, respectively ecotourism, as well as for the preservation of the natural landmarks, which are an attractive place for many tourists, it is necessary to implement activities on coastal protection. Interregional cooperation through shared knowledge and experience will contribute to enhancing regional and local capacity for sustainable coastal ecosystem management.



2. INTRODUCTION

Within the forum, hosted by the Regional Administration Varna, the experience was exchanged with partners on topics related to the development and promotion of sustainable ecotourism, the conservation, restoration and sustainable management of coastal marine areas.

The Land-Sea project illustrates the joint efforts of the six partners from four European regions to promote an integrated approach towards improving the policies for sustainable management of the land-sea ecosystems.

Concerning the ecotourism, Varna region has some of the most attractive natural and anthropogenic tourist resources in the country with a unique combination of natural resources (beaches, mineral waters) on the one hand and cultural heritage and traditions on the other. This led to a rash development of the tourism as a whole, but also to a tremendous urban pressure. The eco-tourism is used as a tool for promoting disadvantaged municipalities in Varna region and their social and economic development. However a considerable potential of the region's territory remains unused or poorly used, and businesses and the population there cannot benefit from the benefits of tourism.

During the official opening of the international conference in Varna the Regional Governor of Varna Stoyan Pasev presented the main expected benefits by the Regional Administration Varna for the region – elaborating of prevention the sea from continuing to conquer territories from the coast, and the intentions of the Administration to on the contrary win territories from the Black Sea and thus create additional good conditions for tourism and investments.

The specific objectives are to link the protection and promotion of natural and cultural heritage with coastal protection plans, risk assessment - mapping and development of tools for monitoring cultural and natural heritage, early warning and conservation measures, green jobs in tourism, the realization of the unexplored potential of cultural and eco-tourism.

According to the Regional Governor, the Region and the country do not have the potential to cope with these issues without the support of EU expertise and funding



support. Serious funding is needed for designing and efficient shoreline strengthening – this task is unbearable for the budgets of both the Black Sea municipalities and the state. At present, there are **153 active landslides on the territory of the Varna Region. Their territory is 37 166 000 square meters.**

The sustainable development aims at creating a system that, while preserving the environment, will ensure economic development, human well-being, a high standard of living, and the right of future generations to enjoy natural resources and the environment that are maximally protected by reversible quantitative and qualitative changes.

3. THE CRITICAL LANDSLIDES IN THE VARNA REGION

Varna region is one the twenty-eight regions in Bulgaria. There are 12 municipalities in it. Its territory occupies 3 822.2 sq. km. or 3.5% of the country's territory. Varna regional coastline includes the territory from Golden Sands resort to the north and to the city of Byala to the south. The Bay of Varna within it includes the territory from St. George ridge to the north to the Galata ridge to the south.

Bulgarian Black sea coastline main characteristics:

- Coastline – 394.1 km;
- Sediment accumulation – 173.7 km (44%);
- Total beach area – 6 317 000 m²;
- Sandy beaches (D50 = 0.2-0.5 mm);
- Foreshore slope – 0.018-0.033 (0-5 m depth); 0.02 average;
- Erosion;
- Landslides;
- Hard coastal structures – 339 (including harbors).

The Bay of Varna main characteristics:

- Coastline length: 15 km; Eastward orientation;
- Wave direction: NE, E & SE; predominantly NE & E;
- Segmentation coefficient: 1.67;

Coastline characteristics:

- Eroding; comprises marl, limestone, clay & sandstone;
- Landslides (both past and present);
- Source of beach grade sediment: updrift erosion & riverine input;

Foreshore characteristics:

- Average foreshore slope ratio: 0.02;
- Sand & rock covered cliff (up to a depth of 17 m); silt & mud (beyond 17 m depth).



On the territory of the Varna region are registered some of the biggest ancient and modern landslide processes. They cover almost the entire coastal zone: to the north of Varna to Kranevo (Frangen landslide complex, including the cirque "Long Yar", "Golden Sands", "Aladzha Monastery", Vinnitsa and Varna), in Varna city (Vazrazhdane residential area and Botev residential area), south of Varna (Galata, Fichoza, Sakamata dere, Pasha dere, Rodni balkani, Kamchia - camping Romantika, Byala), as well as in the town of Provadiya (Provadiyska river), Staro Oryahovo, Novo Oryahovo. The coastline has well-pronounced old and modern abrasive, landslide-abrasive, landslide and accumulation forms. The shore is terraced by landslides. The morphology of the Frangen Plateau is closely related to the most extensive landslide complex on the Bulgarian coast. Between Galata Cape and the Kamchiya River Valley, the shoreline is hilly- terraced on the slope, which is cut from the gullies and saturated with numerous small landslides. Modern abrasive and accumulating processes are occurring on the shore - with the accumulation of mobile sea and river beds.

One of the main reasons for the activation of landslides is the intensified urbanization along the coastline, consisting of: additional loading with static and dynamic loads on the slopes; felling slopes; increasing water infiltration; obstruction of surface and underground runoff; construction of buildings and facilities not in accordance with the engineering-geological and hydro-geological conditions; lack of sewerage network; leakages in the water supply network, poor exploitation and poor maintenance of the drainage, anti-shrinkage, water-suppression and anti-abrasion facilities and others. The experts say, up to now the facilities are 339 built hydrotechnical facilities at the sea shore. The types of coastguard facilities are Sea walls are:

- ✓ Revetments;
- ✓ Groynes;
- ✓ Breakwaters;
- ✓ Artificial beaches (protected).

The Types of landslide measures applied in Bulgaria:

- ✓ Retaining walls;
- ✓ Piles, ground anchors, or anchored piles;
- ✓ Slope adjustment;
- ✓ Groundwater drainage wells (vertical or horizontal).



Coastal protection:

- Coastal protection measures construction starting 1980s (north of Varna beach);
- Includes: 2900 m revetment; 3 T-shaped groynes; additional groyne; 3 artificial beaches;

Groynes:

- Approx. 180 m long & 650 to 800 m apart; until 4-5 m depth;
- Contain the artificially nourished sand in place;
- Artificial beaches – sediment from dredging works on #1 waterway channel;
- Two additional groynes designed, but never built.

Facilities which are good functioning engineering interventions, i.e.:

- Protecting the coastline from wave attack and wave-induced erosion;
- Retention (blocking) of natural sediment pathways & beach formation;
- Artificial beach – prevents washing out of nourished sediment;
- Creation of seasonal ports/marinas for fishing and recreation (as a secondary function).

For the last years, the anti-erosion strengthening of the slope on the promenade in Varna is one of the most important consolidation events in the municipality of Varna and in the region. Emergency reinforcement of the slope consists of:

- Reinforcing wall, consisting of a highly reinforced rectangular reinforced concrete section 80 cm wide and 7.5 meters high, laid on reinforced concrete piles with a diameter of 80 cm and a depth of 7.5 meters, axially spaced 1 meter apart;
- Subsequently, the wall is clamped to the skeleton with steel anchors, injected with cement solution with 24 meters' length and a diameter of about 8.5 cm;
- The open slope from the front of the wall to the top edge of the bay is wearing special bridging steel grids and reinforced concrete grids that are grassed with hydropower, and separate sections and wooded with special erosion-strengthening plants for the landscaping task. The grids are intercepted for reinforced concrete piles with a length of 3 to 8 meters and a cross section of 35 to 60 cm drifting along the top edge of the slope to the panoramic alley.

Future development northern shoreline:

- Expansion of the revetment (additional 1675 m);
- Artificial beaches;
- Construction of groynes or submerged breakwaters (to contain the artificial Beaches).



Future development southern shoreline:

- Revetment construction (2700 m):
- From Karantinata to Galata headland;
- Possibility for beach formation w/o artificial nourishment (groynes required).

Cliff reinforcement:

- Cliff reinforcement total length: 1105 m;

Includes:

- Complete water drainage (surface & groundwater);
- Pipeline transports drainage water into the sea;
- Cliff reinforcement.

Water drainage:

- Comprises:
 - Vertical drainage wells (d=60 cm) 32-35 m high;
 - Horizontal (HDD) wells (d=12 cm) approx. 30 m long – drains the verticals wells;
 - Combined drainage trench (drains both surface and groundwater).

Cliff reinforcement:

- Cliff reinforcement comprises:
 - Retaining wall (7.5 m high, 0.8 m thick); placed on 7.5 m long piles;
 - Anchored using steel-concrete injected anchoring units (24 m long, d approx. 8.5 cm);
 - A combination of an anti-erosion steel mesh & reinforced concrete grid units;
 - Attached to reinforced concrete piles (3 to 8 m long, 35 to 60 cm in diameter);
 - Anchored using soil nailing.



The landslide area “Trifon Zarezan Lanslide”, resort Golden Sands

4. INTERREGIONAL COOPERATION - SHARING EXPERIENCE IN TOPIC LANDSLIDE PREVENTION, ECOTOURISM AND NATURAL CONSERVATION

Extremely useful practices were exchanged within the forum, hosted by the Regional Administration Varna - on topics related to the development and promotion of sustainable ecotourism, the conservation, restoration and sustainable management of coastal marine areas, for developing of eco-tourism plans and strategies and their management through sustainable institutions. All participants agreed that a crucial issue for the Bulgarian partner in the Land-Sea project was the critical landslides. For the development of ecotourism, as well as for the preservation of the natural landmarks and cultural heritage places, which are a tourist attraction, it is necessary to implement activities for a coastal protection.

Through the Interregional cooperation were shared knowledge and experience. Similar solutions already implemented by the partners and shared with the Bulgarian partner will contribute to enhancing regional and local capacity for sustainable coastal ecosystem management. Recommendations from partner experts focus on the following:



4.1. Urban Ecology Agency of Barcelona

In the preparation paper it was already indicated that one of the causes of landslides is the intensified urbanization along the coastline, consisting of: additional loading on the slopes; felling slopes; increasing water infiltration; obstruction of surface and underground runoff; construction not in accordance with the hydro-geological conditions; lack of sewerage network; leakages in the water supply network, poor exploitation and poor maintenance of the drainage, anti-shrinkage, water-suppression and anti-abrasion facilities and others. Therefore, all actions aimed at reversing these processes should be a priority to reduce the risk and not worsen the situation.

In the Catalan coast, many mistakes were made in the past, due to a lack of territorial planning and the erroneous conception that building on the coast was the best strategy for tourism. Over time it has been proven that the mistakes of the past are irreversible and that the most important tourist values were destroyed, precisely, by building tourist infrastructure. Unfortunately, there are still cases today, but they are already negatively valued by the administration and by society. In Varna they should take good note of this experience, since they are in the situation where Catalonia was in the 70s, still with many natural and ecotourism values to preserve and protect from tourism "development".

Three locations were visited where the interest was the problem of geological risks (landslides and floods) and where the solutions applied were shown. However, no space was visited with natural (or ecotouristic) interest, nor was information provided on aspects such as the degree of environmental protection, its natural values or the ecotourism potential of the area.

The solutions applied in the three case studies were of the engineering type, with hard artificial structures, irreversible, and with a very significant impact on the landscape. At the ecotourism level, the landscape is a very important value, and work should be done to improve it, and not the other way around.

Given that the field of experience of the region of Catalonia is not the prevention of risks, but the evaluation of environmental impacts and the conservation of habitats and species, the following recommendations are provided:

- ✓ The raw material of ecotourism is nature and therefore it is necessary to plan and act to conserve and improve it. This should be a strategic objective in territorial planning. This planning should take into account not only the stabilization of the coast to continue developing tourism and transport infrastructure, but also from an



- ✓ environmental point of view and conservation of natural resources, which are the basis of ecotourism.
- ✓ In planning, the Varna coastline should be zoned according to two main axes: geological risks and natural value. In this way, areas of natural interest should be defined without geological risk (some high legal protection figure should be applied to avoid their loss), areas of natural interest with geological risk (common sense grants them natural protection, but it would be necessary to apply figures of low legal protection), areas without natural interest with geological risk (hard measures that are considered necessary can be applied, as long as they do not have effects in areas of natural interest nearby), and areas without natural interest and without geological risk (it could be authorized urban development, housing and road infrastructure).
- ✓ Hard infrastructures on the coast are not always the best solution, since they are very expensive, complex and with uncertain results. In this sense, it is not advisable to act according to the trial and error principle, because the consequences for the coast are often irreversible.
- ✓ The new infrastructures should be planned on the second coast line, at a distance where they would not be affected by geological risks. In the same way, it would be necessary to assess the relocation of current uses and infrastructures from first to second coast line.
- ✓ Soft, adaptive solutions based on the plasticity of the geological and biological elements of the coast would be the most appropriate for an important part of the coastline of the Varna region.

4.2. *Catalonia Regional Government*

The problem of landslides is considered complex and covers a very extensive coastline. It seems that is being solved with a series of “rigid” structures, that propose adapting the dynamics of the subsoil to the needs of the territory.

Without questioning that in some cases these types of solutions are the most appropriate ones (especially in those places where the urban pressure is bigger and is already located in the territory), they should be able to look for solutions where what is adapted are occupations and needs for use in the dynamics of the soil.



In order to exchange experiences, an analogy must be made with floodable soils. Since this is the case in which we have expertise in our country of natural dynamics that generate us needs of intervention to be able to order the territory. So for the intervention on floodable soils, they are no longer used hard structures (rigid) and, on the other hand, it seeks to find a balance that leaves room for the needs of nature.

These types of solutions are those that are to be applied in the case of the Ebro delta. It is a delta that in the coming years will suffer big changes caused by two independent reasons: on the one hand the existence of dams upstream significantly diminishes the contribution of sediments and, on the other hand, the effects of Climate Change will increase the sea level, and consequently, there will be a strong regression in the coming years.

It is necessary to find a "soft" solution that allows the maintenance of current conditions and morphology to the maximum possible and, also, its compatibility with the maintenance of both habitats and ecosystems of high value and human activity, which in this place should have a lower intensity.

Without having expertise in solutions for landslides, it would be possible to think of solutions that seek lower inclinations of slopes (greater land occupation), in a way that could leave room for soil dynamics and also prioritize another type of occupation of the territory, allowing the maintenance of the biodiversity and the natural state of the spaces and looking for uses of the ground that allow the implantation of ecotourism strategies.

An efficient alliance could be global planning of the territory, which would allow to tackle the problems in an orderly manner instead of doing it reatively once the problem has been generated.

Thus, the places where there are risks of landslides can be identified and distinguish within those areas where the use of the land by the population must be limited to allow soft solutions and ecotourism experiences based on the conservation of environmental values and also identify the places where the population's occupation needs are greater and, therefore, another type of solution must be found.

4.3. *Free and Hanseatic City of Hamburg*

The delegation from Hamburg was impressed to see what problems the Varna region has to tackle. The city of Hamburg does not have to cope with the same



problems the region and city of Varna is facing. Landslides are no issue or a minor issue within the Hamburg city administration. Hamburg does not have a corresponding slope or cliff line along its coast.

Hamburg is currently engaged to enforce its flooding protection in order to prepare and adapt to the rising of the ocean level and the intensity of the flooding of the river Elb. This project involves a fortification of the protective walls against high tide in the city center. Parts of this project have been finished already. Hamburg is also raising its dykes along the Elb in parts.

The city of Hamburg has also faced problems concerning planning and construction processes along the river Elb. The European standards have caused delays and rework for example in relation to the city's plan to deepen and widen the river. Explicit planning and an early and thorough involvement of the public and especially the environmental organizations prove useful.

The delegation from Hamburg included with Barbara Makowka as a stakeholder a good best practice example of ecotourism. She presented the WÄLDERHAUS in Hamburg – a multi-functional building in Hamburg. It includes a hotel as well as exhibition and meeting spaces.

4.4. MOLISE REGION

Varna Region from the geological and geomorphological point of view is similar to the coastal areas of Molise Region. In particular the geological formations present in the area are established essentially from sandstones or carbonatic sandstones intercalated by layers or conglomerated levels. From the geomorphological point of view, the coastal area is characterized by a sea terrace immediately close to the sandy beach. The action of the exogenous agents on the geological and geomorphological context of the coastline causes diffused gravitative phenomena – landslides - that can evolve in events of a catastrophic nature. This problem is faced through measures of structural interventions both “PASSIVE” as friction barriers in order to mitigate the action of coastal erosion and “ACTIVE” such as the containment and consolidation of landslides. In the site visited during the study visit, “Alley First”, Molise Region considers that the combined actions of the applied types of intervention is effective and that this is one of the better possible actions.



Molise Region identifies in the “Alley First” a good practice which can be exchanged for its combined action of different types of interventions, for example in the sea by the presence of the cliffs, and on the ground by the consolidation of the landslide site. The combination of these actions allowed to gather the tourist fruition of the area through the creation of a parking and beach clubs.

With regards to the landslide area “Trifon Zarezan Lanslide”, from the inspection made during the study visit in Varna, it has been able to discover that landslide movements of different nature and extension diffusely interest the site, involving road infrastructure and housing. From the geological point of view the interested site is constituted by "in flysch facies" formations and sedimentary series and, in this context, the unstable movements are set. Molise Region believes that the interventions of consolidation put in place are not fully functional as they are only represented by underground poles and containment walls, and interventions of channelling of the stream waters are implemented only in the alternative. For our experience it would be useful to assess the delocalization of the main roads and, in the same time, to consider a planning of the areas where it is possible to build.

5. DISCUSSION AND CONCLUSIONS

The second partnership meeting of the Land-Sea project in Varna showed that the project covers a wide spectrum of issues. The crucial issue for the Bulgarian partner in the Land-Sea project were the critical landslides.

The experts from the Varna Region and the Regional administration Varna find the conception , that **preservation of natural and cultural heritage is on of the appropriate strategy for tourism for the Bulgarian conditions.** It is considered to be a possible solution not to make mistakes which will be irreversible and would destroy the most important tourist objects such as the le of environmental sustainability - the nature, the habitats and species. Fortunately there are still many natural and ecotourism objects to be preserve and protected from tourism "development".

The Barcelona Urban Ecology Agency of Barcelona’s proposition has been found as a solution is to obtain resources for the protection of the coast is the establishment of legal protection figures at an environmental level, especially at



European level (Nature 2000 Network). To achieve this, the possible natural spaces of interest at European level must be described and cataloged.

The Catalanian Regional government's proposition has been found as a solution that allows the maintenance of current conditions and morphology to the maximum possible.

Moreover it is compatible with the maintenance of both habitats and ecosystems of high value and human activity, which in this place should have a lower intensity.

Given that the field of experience of the region of Catalonia is not the prevention of risks, but the evaluation of environmental impacts and the conservation of habitats and species, the following recommendations are provided:

- ✓ The raw material of ecotourism is nature and therefore it is necessary to plan and act to conserve and improve it. This should be a strategic objective in territorial planning.
- ✓ In planning, the Varna coastline should be zoned according to two main axes: geological risks and natural value
- ✓ Hard infrastructures on the coast are not always the best solution, since they are very expensive, complex and with uncertain results. In this sense, it is not advisable to act according to the trial and error principle, because the consequences for the coast are often irreversible.
- ✓ The new infrastructures should be planned on the second coast line, at a distance where they would not be affected by geological risks.
- ✓ Soft, adaptive solutions based on the plasticity of the geological and biological elements of the coast would be the most appropriate for an important part of the coastline of the Varna region.

Molise Region considers that administrative tools which can lead to policy change in the field of the management of the territory may be:

- a management plan of the coastline;
- a plan of the management of the landslide and floods risks.

In the framework of these 2 plans it could be indicated the areas where building should be prohibited and the places and type of interventions to be taken into action.

The planning and management of the coastal and marine environment (especially from the point of view of conservation or environmental sustainability), are



the main strategies for mapping of emergencies, realize effective control/monitoring systems, coordinate the environmental restoration of sites, improve infrastructures and services for the eco-tourism sector.

Ecological concerns and environmental impacts of port development and harbour operations represent very important issues for the regions Molise region, Hamburg and Varna. Furthermore, these areas should go forward with the exchange of good practices related to strategies for preserving cultures through ecotourism.

Molise, Catalonia and Varna regions experience a very large tourist overcrowding in certain areas and/or at some times of the year, especially on the coast in the summer. Therefore, the study of tourism dynamics and its evolution in the course of the years represent an important interconnection point between the partners. The population distribution in coastal zones over the regions could be analysed in the perspective of the life styles and significant comparison could be assessed. Alteration of coastal dynamics by the construction of breakwaters, ports and other structures in the sea can be considered as another important connection point and the exchange of good practices here is strongly recommended.

The partners agreed that major emphasis should be devoted to the development of tourism by ensuring the integration of different types of tourism specific to the area.

In Bulgaria, the Tourism Act regulates the social relations associated with the implementation of governance and control in tourism, the interaction of the State and municipalities in the implementation of activities related to tourism, as well as the participation of not-for-profit legal entities and natural persons in the said activities.

That act gave us precisely definition of sustainable tourism is any form of development, device or tourism that preserves and protects natural, cultural and social resources in the long term and contributes in a positive and balanced way to the economic development and prosperity of people who live, work or residing in these territories.

To date, the state policy for the sustainable development of tourism in Bulgaria is integrated into the sectoral policies and is implemented by the Minister of Economy and Energy with the participation of the other bodies of the central and territorial executive power within their competence. The implementation of cooperation and



coordination in the field of tourism is carried out by the National Tourism Council as an advisory body to the Minister of Economy and Energy. As the stakeholders of planning and implementing the regulatory impacts on the development of tourism at national, regional or local level have a decisive role in shaping and implementing tourism policy, we believe that, as a continuation of the National Strategy, a strategic document at regional level, which specifies the policy for the sustainable development of tourism in the different areas. This is also the main tool for impacting on problematic issues concerning environmental pollution and overcoming them with the active support of state policy at all levels.

The final conclusions, as Bulgarian partner by the Project "Land-Sea" in the Second project meeting in Varna (Bulgaria) 13-15 December 2017, we define the following two issues:

1. Impact tools to promote sustainable development through responsible management of natural resources and adequate environmental care can be summarized as following institutional measure - preparation of a proposal to the Regional Development Council of Varna region through the Regional Development Council of Varna region for the establishment of a Regional Strategy for Tourism;
2. Will be formed in a formal proposal by the Regional Governor of Varna region to the Managing Authority of the Operational Program "Regions in Growth" or to the Council of Ministers, so that they can be subsequently extended with construction and construction activities. That is why the policy instrument is the Operational programme "Regions in Growth" because the fight against the landslide processes requires activities in its sphere of design / construction /. The need for funding at first is possible under the Operational programme "Regions in Growth".