

LAND-SEA PROJECT

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

THEMATIC PAPER I

The Land-Sea project has been funded with support from the Interreg Europe programme. This publication reflects the views only of the authors, the Interreg Europe programme authorities are not liable for any use that may be made of the information contained therein.

ECOTOURISM INTEGRATED APPROACH FOR COASTAL ZONE MANAGEMENT

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1. Introduction (<i>led by F. Roscioni</i>):	3
Urban vs Natural coastal zones	3
a. User Expectations	7
b. Management framework	8
c. SWOT analysis	8
2. Legal aspect (<i>led by H. Markus-Michalczyk</i>)	9
3. Ecotourism best practices (<i>led by X. Cazorla i Clarisó and G. Mas</i>)	11
4. Ecotourism governance to produce an actual integrated approach (<i>led by X. Cazorla i Clarisó and G. Mas</i>)	13
5. Skills involved and developed (<i>led by M. Greco, P. Contestabile and F. Roscioni</i>)	16
6. Staff exchange preparation (<i>all the experts</i>)	23
7. Socio-Economical aspect (<i>led by P. Contestabile and M. Greco</i>)	28
8. References	30

1. Introduction

Urban vs Natural coastal zones

In Europe in the last decades the expansions of invasive building construction and artificial planting actually modified the landscape of coastal zones, especially in the Mediterranean area [1]. It is very rare to find locations in which nature conserves its peculiarity and that can be considered residual places of wilderness (Fig.1).



Fig.1 Semi-natural environment in the Molise coast. These dunes have a good level of wilderness however they had been managed planting native species to recover a wild fire that destroyed the area during 2007 summer.

The anthropic effect is so evident especially in the coastal area. Actions devoted to promote tourism did not take into account during the economic boom of the '60s the great importance that such vulnerable ecosystems represent (Fig.2).



Fig.2. Massive building and planted pine in a Mediterranean coastal area

Coastal areas are wonderful landscapes that also have important roles for the maintenance of the equilibrium in such perturbed ecosystems. The role of coastal area is important even in relation of geomorphological events. Erosion is a big and continuous process, natural since the '60s and completely altered by the human activities that now is actually difficult to manage and be controlled.

Nowadays, different fields of scientific research need adequate tools and applications in order to obtain high quality outputs for realistic and accurate representation of the coastal environment. This is a fundamental requirement when knowledge, managing and planning territorial issues are concerned. Coastal areas are very valuable environments where various habitats are each other linked by complex interaction rules within a status of dynamic equilibrium. Moreover, coastal areas are often occupied by infrastructures and urban settlements implying important commercial and economic activities. Hence, in order to ensure the adequate management and to contribute to set up a permanent monitoring system of so complex areas, an accurate environmental characterisation of these areas is necessary. Integrated River Basin Management (IRBM) (2000/60/EC) and Marine Strategy Framework Directive (MSFD) (2008/56/EC) identify several keys descriptor to assess the environmental status of coastal area and marine waters.

The impact of human activities involves the loss of coastal area resources, i.e. the building of dams along rivers and their discharge control, the construction of jetties at sea and other engineering works, altering the natural equilibrium of coastal areas and consequently affect the distribution sediments and beaches [2]. Over the past 50 to 60 years, rapid expansion of economic activities, settlements and tourist activities have increased the demand for littoral areas and it has also led to hydrogeological and environmental stresses along the coast. Erosion is caused by a large number of factors such as changes of winds pattern

and wave climate, increase of wave energy and reduction of rivers solid discharge and compromises the delicate equilibrium governing coastal environment creating a sensitive impacts on all habitats associated with this complex ecosystem. Understanding of conservation status, and coastal dynamics and evolution is essential not only for the protection of habitats, but also for proper management of all components of the band coast. Submerged beach, backshore and dune area are three separate interdependent elements mutually strong interact. For that, it is plausibly expect that changes affecting one of these three components induce direct or indirect influences on the state of the other two.

The assessment of the direct impacts due to interaction between coastal structures and shoreline represents one of the crucial issues to be taken into account in the coastal management plan both in terms of littoral morphodynamics and marine ecosystem maintenance. In fact, the widespread presence of permanent and seasonal structures built on the longshore sand dune close to the foreshore, amplified the wave action increasing the local erosion rates with an appreciable reduction in beach width and sensitive impoverishment in local economy mainly based on tourism activities.

Timing is of the utmost importance, also considering as in the Mediterranean Area, more than 40% of 48.000 km of shoreline has been artificialized. In any case, the anthropization caused by coastal structures may easily affect the visual impact causing a loss of aesthetics and naturalness. The result is a negative trend about touristic activities. Natural Engineering may be a fine solution to avoid erosion, granting a less anthropic impact (Fig. 3). However, the long term effectiveness should be accurately estimated.

Stretching from the North-East Atlantic and the Baltic to the Mediterranean and Black Sea, more 200 million European citizens live near coastlines. Biodiversity loss, habitats destruction, pollution, as well as conflicts between potential uses, and space congestion problems have become daily occurrence questions. Coastal zones are also among the most vulnerable areas to climate change and natural hazards. Risks include flooding, erosion, sea level rise as well as extreme weather events. These impacts have the potential to change the lifestyle and livelihoods of coastal communities. From the environmental status of the coastal area, therefore, depends the well-being of populations and the economic viability of many businesses. The promotion of ecotourism, included in a broader strategy of integrated coastal management, is essential to enhance the protection of coastal resources whilst increasing the efficiency of their uses. Ecotourism, in fact, could represent the key factor to balance urban and natural aspect in coastal zone.



Fig. 3. A) Natural engineering structure to avoid erosion effect. B) Artificial engineering structure to avoid erosion effect

Coastal zones need to be managed in order to assure its functionality (ecological and touristic) in the long term. In order to achieve this objective is fundamental to promote a land-sea management that take into account the coastal heritage that need to be preserved but also to be valorised to make people change attitude towards the use of these vulnerable areas. It is of urgent importance to promote a sustainable management to avoid the great accumulation of waste and marine litter (Fig. 4 and 5)



Fig. 4. Waste in a retrodunal habitat



Fig. 5. Marine litter

a) Users Expectations

Beaches are systems where plainly physical, ecological, social and economic dimensions interact. Although these systems can provide several protective, recreational and natural functions, only recreation has been traditionally prioritized by managers. This situation has led to the homogenization of beach management culture and practices. Major flexibility and adaptation capability are required in order to set management strategies to beach setting and beach users. In two antagonistic beaches (natural protected vs. urban) travellers have different motivations and expectations which should be satisfied during holidays, in order to get their satisfaction and hence their future returns. A recent study [3] suggest that users' motivations, priorities, and expectations in these two antagonistic beaches are not notably different. Therefore, the usual expectations of the Mediterranean "sun, sand and beach" tourism model is confirmed [4; 5; 6]. Often, users expectations blend with perceptions. In fact, in urban intensive tourist coastal areas, beach services are generally poorly evaluated, albeit their quality was awarded with a Blue Flag.

Land-sea project with its guidelines and action plans encounters the exigencies of people who already have a particular attention towards a correct use of naturalistic coastal habitat. In addition it promotes activities directed to change the attitude of the general users of coastal habitat. To the users will be offered the opportunity of living these habitats in a full comfort but in complete respect of nature assuring facilities that can be sustainable ecologically also promoting slow mobility in order to reduce the use of cars and every type of motor vehicles.

b) Management framework

Coastal habitat will be managed considering the following focal aspects: dune restoration, delta requalification, erosion control, natural ponds restoration, slow mobility, flood control, scattered hotel to promote a tourism in contact with local people.

c) SWOT Analysis

Strengths	Weakness
<ul style="list-style-type: none"> - Natural value of coastal habitat - Economic value of coastal habitat - Socio economic benefit deriving from ecotourism 	<ul style="list-style-type: none"> - Difficulty in dealing with too altered coastal zones
Opportunities	Threats
<ul style="list-style-type: none"> - halt human impact - increase people awareness - reduction of waste 	<ul style="list-style-type: none"> - human impact - socio political pressures to an unsustainable development

Chapter 2 Legal aspect

“The achievement of integrated coastal zone management (ICZM) in the European Union inevitably raises questions of law revealed considerable diversity within the national legal systems governing the European Union (EU) coastal zone” [7]. Actions have to be assessed by legal frameworks and evaluated regarding the compatibility of sectoral legislative instruments within the Member States. On the international level, European Directives are legally binding on Member States, and offer the benefit of legal enforceability. Still, any directive needs to allow the principle of subsidiarity to guide its implementation [8]. Five key European Directives driving the management at the national and local level were identified by the Institute of Estuarine and Coastal Studies (IECS) [9] which are crucial for ICZM.

Key International and European Directives related to Integrated Coastal Zone Management:

1. Birds Directive (2009/147/EC): The BD [10] is one of the most important nature legislation pieces, creating a comprehensive scheme of protection for wild bird species naturally occurring in the EU.
2. Habitats Directive (92/43/EEC: Member states are legally bound to promote the maintenance of biodiversity by requiring measures to maintain or restore habitats and species listed on the Annexes at a favourable conservation status and introducing robust protection for those while taking in account economic, social and cultural requirements. Designated Natura 2000 sites serve for conservation and restoration of habitats in a good conservation status. The HD [11] together with the BD [10] are the “cornerstones” of the EU’s nature conservation policy.
3. Water Framework Directive (2000/60/EC): The WFD [12] defines quality by using biological elements together with physical-chemical elements to access good ecological status at the ecosystem level. The achievement of “Good Chemical and Good Ecological Status” or in case of Heavily Modified Water bodies “Good Chemical Status” and “Good Ecological Potential” of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater is intended.
4. Marine Strategy Framework Directive (2008/56/EC): The MSFD [13] is an integrated framework for the management of marine spaces. The MSFD aims at achieving or maintaining a good environmental status for community waters by 2020 at the latest and contains the explicit regulatory objective that “biodiversity is maintained by 2020” as the cornerstone for achieving Good Environmental Status.
5. Flood Risk Management Directive (2007/60/EC): The FRMD [14] aims to reduce and manage the risks that flooding poses to human, environment, cultural heritage and economics. All inland and coastal waters must be assessed regarding the flooding risk and adequate measures to reduce

this flood risk have to be taken. The FRMD needs to be implemented in coordination with the WFD.

Furthermore, environmental assessment aims to integrate environmental considerations into the preparation of plans and the implementation of projects which are likely to have significant environmental effects in the EU member states [15]. The Environmental Impact Assessment and Strategic Environmental Impact Assessment Directives [16; 17] are the assessment framework, which sets out principles for an environmental assessment regime that is also relevant to the coastal, estuarine and related riverine environment.

The base for each directive's implementation are the general principles in the field of environmental policy. The "prevention principle" is a strategy for decisions on uncertainties that can be expressed in terms of known probabilities based on the notion of a maximum acceptable risk level to be chosen by society. The "polluter pays principle" is based on the concept that the party responsible for producing pollution is responsible for paying for the damage done. Regarding pre-damage control, the "precautionary principle" emerged e.g. for anticipatory measures associated with climate change. Based on the "Aarhus Convention" the public "participation principle" was implemented in order to provide access to information, public participation in decision making and access to justice in environmental matters. The "participation principle" is applied e.g. in the Environmental Impact Assessment directive (EIA Directive). The overall guiding principle is "sustainable development" as an approach to foster economic growth while preserving the quality of the environment for today and future generations at the local and global level. This is also a important principle in the adoption of both the Birds and Habitats Directives because protecting and conserving species and habitats are also the base for their sustainable utilization.

Chapter 3. Ecotourism best practices

Exists lots of ecotourism good practices in Europe but here we highlight some of the best that occurs in Catalonia.

Delta Birding Festival

Delta Birding Festival (www.deltabirdingfestival.com) is the most important ornithological trade fair in the Mediterranean region, jointly promoted by two NGOs and a shop for birders and naturalists. The DBF takes place annually in the Ebro Delta, one of the most important natural places in the Western Mediterranean, and hosts a wide and attractive program of activities with lectures, courses, workshops, contests and others coupled with a large fair of products and services for the birder and people who enjoy nature as a whole.

In addition, the DBF sets aside the profit of ticket selling to a project related to the study and conservation of birds and nature. In 2018, for instance, the financial contribution will be dedicated in a research project to study the migration routes of European Turtle Dove.

The festival has reached a renowned prestige among birders as a result of the category of its invited lecturers and the large number of scheduled activities and the quality of exhibitors, highlighting the wide participation of all major brands of optics and photography and numerous stands of products and services.

WildSea Europe

Different coastal areas in Catalonia (including the Ebro Delta) are destinations of WildSea Europe (www.wildsea.eu), a network of tourism destinations and operators working together to give market visibility to a rich choice of ecotourism experiences in Europe. They do it while building a pan-European network of tourism operators who actively nurture love and respect for the Ocean through sustainable, responsible tourism. Diving, snorkeling, trekking, birding, kayaking... marine wildlife can be experienced in so many different ways.

Other key elements of WildSea Europe mission include empowering small, local businesses of coastal communities, supporting sustainable livelihoods, enhancing ocean literacy through citizen science and preserving our marine ecosystems.

The Government of Catalonia (Catalan Tourism Agency) and the NGO Submon are the catalan partners of the WildSea Europe project.

Eco-briefings

A briefing is a short talk (5-10 minutes) given by the diving instructor just before divers jump into the water. A regular briefing includes crucial aspects of the dive site to make the experience both safer and

more enjoyable: sea bottom topography, maximum depth, recommended itinerary, points of interest, hazards (currents, caves, poisonous animals...), entry and exit procedures, hand signals and instructions in case of emergency.

In Catalonia diving centers operating in the Medes Islands Natural Park are obligated to add some aspects regarding marine conservation in the briefings, so is called eco-briefing. Instructors strongly reminds to divers they are in a protected area and they cannot touch or take anything, not feed animals and pay attention to the buoyancy near walls with gorgonians.

In addition, every instructor working in these diving centers must be certified by the Park, so it means they must to complete a course to complement and enrich his training in order to transfer to people the best practices in relation to the needs of preservation of the environment.

Fishing tourism

Fishing tourism activity could be described as the one that other people, different from the crew, participate on a professional fishing activity with a recreational and touristic purpose, to know the methods and fishing practices *in situ*.

Catalonia's government established a legal framework for fishing tourism in order to regulate the activities related totally or partially to sea fishing and aquaculture that allow to improve or complement the incomes of the people that integrate the professional fishing sector, in order to achieve the economic diversification of the sector and the promotion of its products.

There are several designed activities for the fishing tourism activity in Catalonia: from accompanying the fishermen on a fishing journey (on the fishing boat or on another boat that is sailing alongside), to visit a floating structure for the production of mussels or join a seafood fisherman to collect seafood from sandy shores. Most of the activities includes a gastronomic complement.

Chapter 4. Ecotourism governance to produce an integrated approach

Good governance is a key factor to implement ecotourism strategies and to have an integrated approach for coastal zone management, usually identified as a complex context. Implementing good governance schemes allow stakeholders to participate in the development of tourism strategy, communicate and achieve their goals and interests, and successfully implement tourism programs. In Catalonia, one of the top reference Mediterranean tourism destinations, ecotourism governance has a cross-sector and multilevel approach.

REGIONAL LEVEL: A common strategy (NaturCAT2020) and a public-private partnership (PPP)

It is essential to define a common strategy on ecotourism, a cross-cutting sector by definition, establishing a roadmap with specific goals and milestones. In 2015 was approved in Catalonia the *NaturCAT2020 Strategy* [18], a common plan to boost ecotourism sector in natural areas engaging tourism, natural areas and local development. The first action was to issue the *Catalan Ecotourism Board (CEB)*, a stakeholder partnership integrated by 30 representative professionals and experts from public and private sectors, which help for the implementation and evaluation of actions related to NaturCAT2020. The plenary of the board meet every 3 months, and usually it works with a Secretariat and Working Groups in different topics such as the definition of resources with ecotouristic potential, the principles that defines ecotourism practices, etc. So, the interventions of CEB include to improve the tourism product offered (e.g., clustering businesses together and developing touring routes, developing packages), marketing strategies (collaborative destination promotion), funding (e.g., obtaining donor funding), human resources (e.g., offer training), and infrastructure (e.g., new buildings).



Meeting of the Catalan Ecotourism Board in the Ebro Delta

The EPPBC also promotes every two years the celebration of a 3 day- meeting of ecotourism professionals: *Forum ENS: Ecotourism, Nature and Sustainability*.

LOCAL LEVEL: European Charter for Sustainable Tourism in Natural Protected Areas

The *European Charter for Sustainable Tourism (ECST)* [19] in Protected Areas is a practical management tool that enables Protected Areas to develop tourism sustainably. It was set up in 1995 by EUROPARC Federation. In Catalonia 7 Natural Protected Areas are granted by ECST, in Europe 164 NPA. The core element of the Charter is working in partnership with all relevant stakeholders to develop a common sustainable tourism strategy and an action plan on the basis of a thorough situation analysis. The aim of all Charter projects and activities is the protection of the natural and cultural heritage and the continuous improvement of tourism in the Protected Area in terms of the environment, local population and businesses as well as visitors.

The European Charter for Sustainable Tourism in Protected Areas is awarded by the EUROPARC Federation through an independent verification process. The award recognises not just a commitment to sustainable tourism but also the implementation of practical sustainable actions by public and private partners. Such actions;

- bring measureable economic, social and environmental benefits from well-managed sustainable tourism,
- strengthen relations with local tourism stakeholders and the wider tourism industry,
- provide access and membership of an extensive and dynamic European network.

The Charter provides a model of governance that delivers Protected Areas as sustainable tourism destinations. Further, all actors through the application of sustainable tourism practice in their region ensure the natural habitat and landscapes upon which they all depend are conserved for future generations.

The process of pursuing and achieving the award enables all involved to receive expert advice, maintain motivation and incentive, and obtain international recognition.

The Ebro Delta Natural Park is one of the NPA granted by ECST with extensive experience (over 10 years). A very useful governance tool is the Sustainable Tourism Forum. It is a permanent participative platform established between the protected area authority, local municipalities, conservation and community organizations and representatives of the tourism businesses. The constitution and numbers involved in the Forum and any associated Executive Committees or other structures, and the regularity of their meetings, should be sufficient to enable effective discourse and decision making. In the Ebro Delta, the ST Forum is set up by 132 members, divided in 6 work commissions [20].



Sustainable Tourism Forum of the Ebro Delta: signature of commitment

Chapter 5 skills involved and developed

In this thematic paper we show what skills are involved to properly manage the coastal habitat and develop the ecotourism in a very sustainable manner.

Ecology. Some best practices will be exchanged with the other partners in order to manage coastal habitat in terms of dune conservation, as well as prevention of erosion and flood.

Dune habitats conservation can be obtained managing invasive alien species, planting native species, controlling the trampling posing boardwalks and access bars, managing fires [21]. All these activities preserves the foredune habitats and permits the formation of the sand and a natural requalification of these vulnerable areas. However, in order to achieve these objectives is fundamental to control erosion.

Shoreline erosion can be caused by both natural (storms, subsidence, eustatism, bradyseism) or anthropic (bad designed harbors or defensive coastal structures) phenomena and can be defined as the disproportionate removal of sediments along the coast despite the one naturally deposited.

Erosion can be distinguished in *short-term erosion* (which usually is a reversible process, due to cross-shore currents) and *long-term erosion* (which usually is a non-reversible process, due to longshore currents).

Dunes represent the natural structural defense concerning erosion. They are a natural reservoir of sediments formed by wind transportation, able to give a contribution during the extreme storms and, at the same time, are the upper limit of the shore. Typically, erosion can be avoided by using several kinds of structures which can be classified as “hard” or “soft”.

Traditional solutions are typically seawalls, groins, breakwaters, artificial beaches and nourishments. These are very useful solutions but take in account several disadvantages, mainly linked to heavy visual impact, high costs or periodical maintenance, limiting circulation of nearshore currents.

In order to preserve against erosion and to safe ecosystems, a number of non-conventional “hard” systems exist. An example is the submerged structures which, during the calm conditions are able to maintain the equilibrium of the protected environment and during the storm events grants the breaking wave and the wave dumping to reduce the hydraulic loading. They also offer a lower cost of realization and a smaller intrusion in the landscape. In some cases, it could be useful to employ alternatives elements such as EcoReef (snowflake-like ceramic modules crated in a 3D hexagonal shape, with a microporous surface texture for improved coral adhesion) and Reef Balls (which are porous modules that combine the ability to protect the shore and the opportunity to act as a habitat for marine organisms).

As non-conventional “soft” solution, it may be taken in account the employment of sand bypassing systems. It is an efficient technique which uses the sediments accumulated along the part exposed to the current, relocating them where erosion occurs. In this way it is possible to partially restore the sediments’ budget avoiding a high environmental impact. Beach nourishment and beach drainage are other example

of “environmental friendly” solution. However, their application must be carefully considered, in order to prevent physical and ecological impacts, ongoing maintenance cost and potentially short lifespan.

Furthermore, the assessment of the direct impacts due to interaction between coastal structures and shoreline represents one of the crucial issues to be taken into account in the coastal management plan both in terms of littoral morphodynamics and marine ecosystem maintenance. In fact, the widespread presence of permanent and seasonal structures built on the longshore sand dune close to the foreshore, amplified the wave action increasing the local erosion rates with an appreciable reduction in beach width and sensitive impoverishment in local economy mainly based on tourism activities.

Renewable energy from the sea. Some schemes on how optimise the sea energy are shown. The idea to harvest energy from oceans has always fascinated scientists and engineers. Waves are generated in large part when the wind blows over the ocean’s surface, which itself is a function of temperature and pressure differences across the globe caused by the distribution of solar energy. Wave energy carries both kinetic and gravitational potential energy, the level of which is a function of both the height and the period of the wave.

Oceanic Tides are the function of the motion of the moon and sun relative to the earth. These gravitational forces in combination with earth rotation on its axis cause periodic movements of the oceans and seas. The vertical rise and fall of water - known as tides – is accompanied by incoming and outgoing currents from the bays, harbors and estuaries. These currents are called *tidal streams* it is possible to exploit energy from them using turbines. It is something really similar to the concept of harnessing wind to create energy. The energy potential of the tidal currents is typically located in areas with the greatest range. Anyway, this potential increases in areas where the flow of water is constrained or funneled by local topography such as narrow straits and headlands. The gravitational forces from the sun and moon generate oceanic tides and the difference in sea level between high and low tide is known as the *tidal range*. At most coastal sites, high and low tides occur twice a day. Even so, these tides have been studied for centuries and can be easily forecast the tidal range energy.

Devices able to convert *wave* energy in electricity are called Wave Energy Converters and they can be mainly distinguished considering the different methods of operation: Oscillating Water Columns, Wave Activated Bodies and Overtopping.

Tidal *stream* devices convert the kinetic energy of free-flowing water into electricity. A number of devices exist and these typically fall into following categories: Horizontal-Axis Turbine, Vertical-Axis Turbine, Oscillating Hydrofoil, Ducted Turbine Tidal Kite and Archimedes’ Screw.

Tidal *range* technology shares a range of similarities with hydropower, capitalizing on the artificial height differential of two bodies of water created by a dam or a barrier, and so the gravitational potential energy to generate electricity via turbines.

Ecology – Flood prevention

Floodplain vegetation controls sedimentation and erosion processes and is a key function to prevent floods within fluvial corridors. Poplars and willows show a strong mechanical resistance to physical disturbance. These floodplain forest species explain the synergy between vegetation succession and the construction of landforms identified as an ‘ecosystem functions’ that additionally act as diversity reservoirs [22]. However, dams and dykes reduce water level fluctuations and lead to substantial changes in the floodplain plant species composition [23] and thus wetland restoration and dyke relocations are required.

The European Habitats Directive [24] protects biodiversity on species and habitats level and alluvial forests are listed as priority habitats (e.g. Alluvial Forests; 91E0* HD annex I) that have to be maintained or restored. Thus, White Willow Softwood Floodplain Forest restoration along the tidal freshwater section of the Elbe estuary in Hamburg is recently implemented [25].

Willow floodplains reduced the overtopping of dykes in a scheme that combines lowered dyke height and construction costs with landscape conservation. Willow plantations in locations where the soil is not constantly saturated are proposed for coastal flood protection on the macro-scale, whereas oyster and mussel beds should be used lower in the intertidal and dunes and coastal wetlands like salt marshes intermediate on the landscape scale [26].

A further “building with nature” approach is managed realignment what is increasingly considered as an option with ‘no-regret’ [27], bringing together improved flood risk management, reduced costs for flood protection and habitat restoration [28]. Kreetzand serves as one example located along the Elbe estuary in Hamburg. The Hamburg Port Authority (HPA) created an extended new shallow water area in the foreland where dyke realignment had been carried out in 1999 but due to high elevated foreland it was not influenced by the tidal action. HPA set up this Kreetzand pilot project to reduce the upstream sediment transport and decrease tidal energy of the Elbe estuary. This example of sustainable river engineering shall also be used to improve the public understanding of the function of tidal systems and estuaries [29].

Sustainable planning and Sustainable tourism. In different coastal areas different methodologies to develop tourism in a very sustainable way will consider the characteristics of the area historically and ecologically.

With a surface of 300.000 km² and a total shoreline of over 7.500 Km, Italy has in coastal tourism one of the most important economic features, thanks also to a fine geographical collocation. At the same time, the diversity along the coast may encourage ecotourism. In Italian coastal areas, the number of sustainable beaches and restoration project “working with nature” are increasing. They combine the touristic offer

with the environmental protection and making unspoilt nature the measure of all things. In particular, with an emphasis on enriching personal experiences and environmental awareness through interpretation, ecotourism promotes greater understanding and appreciation for nature, local society, and culture. Several technological (e.g. improvement of green power technologies, cycle waste and wastewater management) and non-technological (i.e. sustainable territory maintenance and integrated coastal zone management) approach should be combined in order to obtain effectiveness conversion from tourism to ecotourism. Initiatives like these are sponsored by important authorities and associations. Economic operators benefit from their own quality offer and are conscious that it is thanks to the environmental protection if they could keep having their business, aiming to an equilibrium between ecosystem and anthropic impact.

Sustainable planning and sustainable tourism example by Hamburg

The city of Hamburg is located along the tidal freshwater section of the Elbe estuary that extends 140 km from an upstream barrier near Geesthacht up to the North Sea including the island Neuwerk and the Nationalpark “Hamburgisches Wattenmeer” beside the city. Thus, sustainable planning and tourism covers the estuarine and coastal environment and the related river basins with a focus on the Elbe estuary.

The Hamburg Port Authority (HPA) together with the Waterways and Shipping Directorates (WSA) developed firstly a concept for the sustainable development of the tidal Elbe in 2006. Based on the hydrodynamic changes during the last decades, the concept focusses on (i) damping the tidal energy in particular in the estuary mouth, (ii) creating room for retention in the tidal freshwater and brackish section and (iii) optimising the sediment management in the whole system. A shallow water area created in a 42ha former flushing field in the foreland “Kreetsand” served as pilot project. The project aims to reduce tidal pumping and tidal amplitude, and sediment load. The concept was developed in accordance to the HD and WFD in cooperation with the administration and NGO’s. Communication is important part of the project, e.g. via the dyke booth what is being frequently visited by tourists.

The whole Elbe estuarine stretch except the Hamburg harbour and other industrial sites are protected via the Natura-2000 network. Impact assessments are required regarding planning’s which may affect a Natura 2000 site and for each Natura 2000 site management plans must be set up. The Integrated Management Plan Elbe Estuary (2012) was established as a joint state plan by voluntary commitment of all stakeholders to sustainably develop the Elbe estuary as part of the Natura-2000 network. Two hundred measures are proposed, many of them have been implemented by the Elbe Habitat Foundation including “Wilderness-Camps” for both locals and tourists.

The Tidal-Elbe concept and the IMP Elbe Estuary were created by regional administration and stakeholders. Within the Interreg IVb TIDE project, international representatives of four North Sea Region estuaries including the Elbe estuary worked together to improve management of estuaries by developing concrete tools which enable stakeholders to take the whole estuary into account (ecology, economy,

society). Ecosystem function, governance and measures were selected as focus areas in the transnational cooperation that delivered the Tide Tool Box based on an ecosystem service approach comprising tools for effective governance and communication. Moreover, the Forum Tideelbe, a cooperation among the *Länder* Hamburg, Lower, Saxony and Schleswig-Holstein, the federation, municipalities and NGO's aiming to sustainably develop the tidal Elbe was initiated in 2016.

Estuary-Management is also part of the long-term research project KLIMZUG-NORD that targets to develop adaptation strategies to climate changes concerning the metropolitan area of Hamburg up to the North Sea. Moreover, the Hamburg Climate Plan aims bringing together climate change mitigation and adaptation to climate change. While (eco-)tourism is not explicitly mentioned, most of the action areas (e.g. urban development, buildings, education, mobility, human health, nature conservation) aim to promote a climate friendly tourism. However, the most recent development to promote sustainable tourism is the set-up of the Destination Management section in the leading Hamburg Tourismus GmbH.

Sustainable planning and sustainable tourism example by Varna

Coastal zone representing the boundary between sea and land is a highly dynamical and sensitive area that comprises a large variety of natural resources. Population growth in the littoral causes rapid urbanization of the coast, development of infrastructures, transport system and so on. Therefore, coastal ecosystems experience pressure and become vulnerable to pollution, habitat degradation, and loss, overfishing, and increased coastal hazards. Accelerated tourism development during recent years is an extra risk factor for the Bulgarian Black Sea coastal zone. Considering that the coastal zone is a limited and very vulnerable land area, the high population increase due to tourism is one of the most hazardous factors for coastal zone sustainability. Although tourism growth and coastal development give rise to a number of economic benefits, they also could lead to loss of habitat, green space, and biodiversity. Introduction Coastal zone is a highly dynamical and sensitive area that comprises a large variety of natural resources. This predetermines the attractiveness of the littoral for settlement and other human activities, like tourism, recreation etc. Population growth causes rapid urbanization of the littoral, development of infrastructures, transport system etc. Therefore, coastal ecosystems experience pressure and become vulnerable to pollution, habitat degradation and loss, overfishing and increased coastal hazards. Vast sandy beaches along the Bulgarian Black Sea coast, in combination with favorable climate and clean seawater, are valued preconditions for tourist industry development. Speeded tourism development during recent years is an extra risk factor for the coastal zone. Both local residents and tourists cause pressure to the ecosystem, therefore population in the coastal regions is used as pressure indicator for ICZM.

Analysis The Bulgarian Black Sea coast, situated in the Western part of the Black Sea, has a 378 km long coastal line, 140 km of which occupied by 78 beaches. 14 of 262 state municipalities are located in the coastal zone. The Bulgarian Black Sea coastal zone is 5.21% of the country territory and hosts 8.85% of the national population. Official census results show that during 1934-2001 the total coastal population growth is almost six times higher than in the entire country. Thus, the Bulgarian Black Sea coastal zone is one of

the most rapidly growing and developing areas on a national scale. Tourism and in particular coastal tourism is one of the fastest developing world industry sectors, and Bulgaria follows this tendency. Tourist spate towards Bulgarian Black Sea coast dramatically increased during the last years and will continue to grow at least for few more years. Tourist spate towards Bulgarian Black Sea coast dramatically increased during the last years and will continue to grow at least for few more years. The existing facilities in some municipalities are not able to meet this additional pressure and to reduce the adequately anthropogenic impact on the marine ecosystems. Considering that the coastal zone is a limited and very vulnerable land area, the population increase due to tourism is one of the most hazardous factors for coastal zone sustainability. Although tourism growth and coastal development give rise to a number of economic benefits, they also could lead to loss of habitat, green space, and biodiversity, especially in case of newly constructed tourist sites, some of which are in very low populated coastal regions or neighboring protected territories. Public policymakers and coastal managers are now facing the challenging task of finding a balance between benefits of tourist growth and mitigation of its effects on the coastal environment. Data for tourist international arrivals in Bulgaria during the period 20014 -2018 show that the number of tourists has been continuously increasing: from 9 408 821 in 2014 to 12 368 363 in 2018, so there is a rapid development of coastal tourism. On the north coast of the Black Sea, sustainable projects have been implemented for sustainable planning land – sea system:

The Institute of Oceanology - at the Bulgarian Academy of Sciences is implementing a research project "Dynamics of the sea level in the western part of the Black Sea. Estimates and impacts on ecosystem characteristics." [30] The following activities were carried out:

- Creating a single set of historical data on sea level fluctuations in the western part of the Black Sea;
- A pilot system for operational observation and reporting of adverse natural events caused by extreme sea level increase in a scientific research base at Shkorpilovtzi village, Varna region;
- identifying risk floodplains with regard to extreme hydro-climatic events during a storm and river floods;
- a methodology for the determination of the morphological vulnerability of a coastal area by modeling the morpho-dynamical processes under conditions of extreme hydro-climatic events has been established.

A project MICORE [31] (Morphological and Coastal Risks Caused by Extreme Events) was carried out by the EC. The main objective is to develop and demonstrate tools for reliable prognosis of morphological impact and damage caused by storm events. The results of the project are fully orientated to help strategies for the protection of the population from disasters, the development of the probability mapping of the morphological impact of the sea storms and the creation of an early warning system and information system for long-term disaster reduction.

The SPICOSA[32] project is implemented by the Bulgarian Academy of Sciences with the main goal of creating and developing an innovative, interdisciplinary research approach to help develop criteria for assessing sustainable coastal ecosystem management policies through environmental, social and economic equality. The coastal ecosystem of the Varna District is part of the scientific experimental Black Sea-Danube delta, one of the 18 projects envisaged within SPICOSA. The main focus in implementing the Environmental Approach (SER) will be the growing tourism industry, identified as one of the current threats to the ecological balance of the Northwest Black Sea coastal zone, and the challenge of formulating and implementing an adequate science-based strategy for sustainable coastal management.

The National project BG161PO001 / 3.2-02 / 2011 "Support for the development of regional tourist product and destination marketing", operation 3.2. "Development of the regional tourist product and destination marketing", priority axis 3 "Sustainable development of tourism". The main objective is developing and promoting a regional tourism product and increasing the effectiveness of regional marketing on the basis of an integrated approach to sustainable tourism development at regional level. The specific project objective is promoting the natural, cultural and historical heritage of the tourist region, including the municipalities of Varna, Avren, Aksakovo, Beloslav, Devnya in Varna which have significant tourism potential [33]. The Interactive Cities is a cutting-edge project aimed at exploring how digital, social media and user generated content can improve today's urban management in European cities, whatever size. Interactive Cities is a network of URBACT, the European Territorial Cooperation programme aiming to foster sustainable integrated urban development in cities across Europe. Interactive Cities focused not only on the technological side but also on how this kind of innovation can be concretely useful for local authorities and urban residents, promoting better urban governance, citizen participation and economic growth.

Chapter 6 Staff exchange preparation

FROM	TO						
		Italy		Bulgaria	Germany	Spain	
		RBD	Molise Region	Varna	Hamburg	Catalonia Region	BCN
		8-9/04/19	10-12/04/2019	10-20/06/2019	18-22/02/2019	20-24/05/2019	27-31/05/2019
Italy	RBD				2	2	
	Molise Region				1	1	
Bulgaria	Varna		2				2
Germany	Hamburg	1	1	1			
Spain	Catalonia Region		2				
	BCN				1		

The partners are going to concentrate in the concrete transfer of experience into the local policies through the elaboration of 4 local action plans, that have to be finalized at the end of the year.

For this activity they ask the active cooperation of other partners (a period of staff exchange will facilitate this "physical" transfer and exchange), so that the transfer can entail a consistent adaptation of a good practice in a new context.

Regarding the Lead Partner (RDB) two modules will be activated, as described in the following.

- Module A: Management and valorization of coastal geoarcheological sites. The module aims to transfer and develop competences in the field of coastal geoarcheological sites, building new strategy to promote these sites. Through the integration of geologic concepts and information, geoarchaeology offers an effective means of finding early sites in the modern coastal landscape and in the now-submerged paleocoastal landscape. Particular attention will be paid to the fundraising activities and operative planning. Four days are planned, covering office visit and technical meeting with the manager of the natural sites, technical visits to a pair of natural sites, participation at the local stakeholder meeting.
- Module B: Management and valorization of coastal habitats, aimed to boost competencies on the integrated management of transitional small wetlands and coastal forests. These areas are among the most degraded and threatened ecosystems in the EU. This has resulted in many habitats and species in Mediterranean coastal areas having 'unfavourable', 'vulnerable' or 'near threatened' conservation status according to the Habitats Directive. The program focus on three main themes:

planning of marine and coastal areas; protection, preservation and restoration of coastal and marine habitats; sustainability of socio-economic stress on the coastal zone.

First day visit at the Offices of Regione Molise in Termoli-Demanio Marittimo. Suvery in the portual and Natura 2000 sites in the coastal areas. Visit at the Offices of ARPA Molise.

Second day visit at the ARPA Molise of Campobasso laboratories where will be illustrated the procedure for the analyses of sea water samples both for touristic (“Balneability”) and environmental purposes (“Ecological state of coastal and marine water” and Ecological state for the Marine Strategy” according to the Directive 2000/60/EC and 2008/56/EC. The procedure for the elaboration and classification for dissemination will be also showed. At the end visit to the technical infrastructure of Molise Region.

Staff Exchange preparation; Hamburg, Gemany (Heike)

The Hamburg Staff Exchange Programme will consider the wishes of our guests regarding the topic, method, timetable and participating people as much as possible. The selected topics are “Multipurpose flood protection infrastructure” and “Managing ecotourism in protected areas”. The staff exchange programme will start at the upstream city border and follow the river through the districts (Bergedorf, Hamburg Mitte, Harburg, Altona) that cover the Elbe estuary up to the downstream city border. The programme will comprise both study visits and discussions with the persons in charge regarding the selected topics.

Proposal with a selection of activities for the Hamburg staff exchange programme:

Day 1 - Study visit district Bergedorf

- Weir Geesthacht that limits the tidal influence of the Elbe estuary and ensures sufficient water level for shipping in the upstream river Elbe; European largest Fish Pass that was admitted an “Outstanding project in fishery and ecohydrology” (Vattenfall Europe)
- Restoration of the tidal influence in the protected area “Borghorster Elblandschaft” via sluices to allow a controlled tide (retention room and beaver habitat) (Ministry for Environment and Energy; Nature protection agency BUE); viewing platform for public information
- Large compensation measure “Zollenspieker” with restoration of protected habitats in the Elbe foreland (BUE); neighbouring and highly frequented Tourist Infrastructure (ferry, hotel, ...) • Nature protection measure “Wrauster Bogen” with lowering of revetments to allow limited tidal influence for habitat restoration (Elbe Habitat Foundation); Willow Plantations along the dyke for flood protection (Waterways and shipping administration)

Discussion: Destination Management Hamburg Tourismus GmbH; Nature Conservation Authority

Day 2 – Study visit district Mitte

- Nature protection area with Tidal softwood forest relict; Elbe-Tidal-Wetland Information Centre NGO GÖP (Society for Ecological Planning/GÖP); Tourist destination at former

Stackmeisterei

- Pilot project “Kreetsand” – large shallow water area for flood water retention and habitat restoration (Hamburg Port Authority HPA); Dyke booth Information location for tourists
- Insight into the recent Hamburg Flood Prevention Program on the Elbe island Wilhelmsburg

Discussion: Hamburg Port Authority; Ministry for environment and energy; Institute for River and Coastal Engineering TUHH

Day 3 – Study visit district Altona

- Multipurpose flood protection infrastructure in the HafenCity and Hamburger Hafen (HPA)
- Experiences in Elbe-Tourism by ferry
- Museum harbour Hamburg. Elbe Beach as Tourism destination and Flood protection measures connected to the Elbe Beach
- Overview Elbe estuary (protected areas Elbe islands, shallow water area “Mühlenberger Loch” and planned fairway adjustment measures, cruise vessel traffic) Final

Discussion, conclusions, steps to be taken

Staff Exchange Programme – BCN Ecology

From 27th to 31st May, 2019, it will take place in Barcelona, organized by Urban Ecology Agency of Barcelona (BCN Ecology), the Staff Exchange Programme, in which Regional Administration Varna (from Bulgaria) will participate.

The training plan is going to focus on Ecosystemic urbanism and is aimed to learn keys and tools to generate a new model at a more sustainable city, based on efficiency and habitability. It intends to develop competences on the following fields: Urban fabrics analysis and keys of their unsustainability reflection; Rethinking of the city model from flows and cycles (urban metabolism); Identification of the factors that determine the city (efficiency and habitability); Learning the instruments for ecosystemic urbanism design and planning, and Dissemination of existing good practices to get at a sustainable city model.

The Staff Exchange Programme is divided also in three thematic sections: 1) Conceptual framework and instruments of Ecosystemic Urbanism; 2) Ecosystemic's Urbanism Tools, and 3) Charter for the Ecosystemic Planning of Cities and Metropolises. The first section consists in two sections training: General presentation of Ecosystemic Urbanism and Organizational instruments of the Ecosystemic Urban Planning. The superblocks and the three-level urbanism. On the second one, 4 sessions are included: Presentation and practical application of the SIMEU program, of the

Habitability index in public space, of SIMUR program, and of GHG emission calculator (greenhouse Gas). And the third section, it will be target on the Charter's presentation and application.

This programme is also comprised of 4 hour-visit and technical meeting with the manager of Urban Ecology Agency of Barcelona, Mr. Salvador Rueda; 23 hour-technical meeting different Agency's areas responsible; 8 hour-technical visit to three of superblocs (Poblenou, Sant Antoni and El Born), and 4 hour-participation at local stakeholders' meetings.

Staff Exchange Programme – DG Tourism (Catalonia)

Ebro Delta & Barcelona, 20th- 22nd May, 2019

The Staff Exchange Programme of Land-Sea Interreg Europe to Catalonia will take place in the Ebro Delta and Barcelona, from 20th to 22nd May, 2019 organized by DG Tourism (Catalan Government). There will attend representatives from River Basin Authority of the rivers Liri – Garigliano and Volturno / Southern Apennines River Basin District and Molise Region (from Italy).

The training plan will be focused on how is implemented eco-tourism and sustainable tourism in coastal and wetland areas. It intends to develop competences on the following fields: Integrated Coastal Zone Management; Climate Change; Ecotourism facilities; Governance; Land planning, and Strategic planning on tourism.

The Staff Exchange Programme is divided also in three thematic parts: 1) Conservation and Ecotourism 2) Integrated Coastal Zone Management & Land planning; 3) Strategic planning, governance and tourism marketing. The first part consists in visiting the Ebro Delta Natural Park and their most relevant facilities (observatories, hides, interpretation centers, cycling paths, etc.) combining ecotourism promotion and natural heritage conservation. We will also learn how small companies and public institutions are working together (under the European Charter of Sustainable Tourism –ECST- and other collaborative structures such as a Water Sports & Tourism Center) to consolidate a top-level land-sea destination on ecotourism. The second part, also in the Ebro Delta aims to share knowledge and experience regarding Integrated Coastal Zone Management & Land planning facing current and future challenges such as invasive species (and the loss of native ones), the subsidence and salinization of deltaic areas, and climate change (increase of extreme weather episodes, rise of sea level, etc.). In this sense we will become acquainted about several ongoing and/or recently finished European projects (LIFE Delta Lagoon, LIFE Migratoebre, etc.), on habitats restoration and integrated coastal management, and migratory fish recovery through rivers ecological connectivity. Finally, the third part, centered in Barcelona will be focus on the strategic planning on tourism (DG Tourism – 2018-2022 Strategic Tourism Plan for Catalonia) and ecotourism (NaturCAT2020); how to establish a good-governance scheme based on the Catalan Ecotourism Board, and the marketing strategy and actions to promote ecotourism (Catalan Tourism Board – 2018-2022 Strategic Tourism Marketing Plan)

Staff Exchange Varna – Bulgaria 5th

semester

FIRST DAY – 20TH OF MAY

Official visit at Regional administration Varna, located on 26 Preslav str. Followed by an official meeting with Regional Governor to present the international participant /participants in the staff exchange in Varna. Followed by a discussion with experts dealing with spatial planning, inspection of the beaches and regarding landslide coastal area landslide prevention.

SECOND DAY -21TH OF MAY

Office inspection and technical meeting with the commission implemented with an order of Regional Governor of coastal infrastructures in Varna, based on the north and south of Varna region. Visit of the site and monitoring of Alley first, Trifon Zairean landslide and small-scale landslides allocated in the municipalities of Varna region .

THIRD DAY -22 TH OF MAY

Technical visit for monitoring of coastal beaches, provision of water-rescue infrastructures and warning signs, monitoring of the cleaning procedure of the beach and maintenance of unprotected beaches from the Black Sea in the region of Varna. Followed meeting regarding the features of the modern landslide. Discussion regarding the operational planning procedure and the procedure for requesting allocation of funds from the Interdepartmental Commission for Accidents and Emergencies.

Inspection of the beaches in the Black Sea coast area. Allocation of the area occupied by umbrellas and deck chairs, the cleanliness, the designation of the free zones and the lounges occupied by the lounges, the medical provision, the availability of equipment necessary for water saving and the connection of the provision of medical services - first aid.

FOURTH DAY -23 TH OF MAY

Participation at the local stakeholder meeting. Inspection of the beaches in the Black Sea coast area. Allocation of the area occupied by umbrellas and deck chairs, the cleanliness, the designation of the free zones and the lounges occupied by the lounges, the medical provision, the availability of equipment necessary for water saving and the connection of the provision of medical services - first aid.

Chapter 7 Socio-economical aspect

Coastal habitats provide lots of ecosystem services. The study of the ecosystem services allows to make the people aware on the importance of the ecosystems even for their health and welfare. In an ideal world consider for the benefits derived from a well conserved ecosystems should be normal.

Coasts are highly dynamic and geo-morphologically complex systems, exposed to the continuous action of several factors such as waves, tides, relative sea level change, as well as extreme meteorological and climate events, including storms surges and direct and indirect human activities and pressures (ETC-CCA, 2011). They are considered key climate change hotspots worldwide (IPCC a, 2007; Voice et al., 2006; EEA, 2010) and the ecological functionality of the coastal environment is a crucial index to assess the degree of integrity as well as the resilience of the ecological system. Coastal floods are regarded as among the most dangerous and harmful of natural disasters (Douben 2006), while coastal erosion is one of the most important socio-economical problems that challenge the capabilities of states and local authorities even related to the carry capacity planning and control and ecosystem resilience. Whether it is due to natural or anthropogenic factors, coastal erosion is the mainly cause of significant economical losses, social problems, and ecological damages. Furthermore a study of the World Bank indicates that more than half of the world's population lives in areas subject to at least one hazard at a significant level and, about 13% of the world's population live in area characterized by a high exposure to two or more different criticalities.

As a consequence, the increased risks of natural hazards associated to the growing concentration of people and activities on the coastal zone, like in the Mediterranean coastal zones, requires updated information and a better understanding on coastal zones vulnerabilities. Furthermore, the selection of appropriate vulnerability and risk evaluation approaches as well as protection and enhancing activities depend on the decision-making context and ranges from global and national quantitative assessments to local-scale qualitative participatory approaches. Further, the analysis of the scenarios related to coastal hazards and over-exploitation of coastal environment involves the evaluation of two main components: vulnerability and resilience. In such a frame the vulnerability represents the propensity or predisposition of a community, environmental system, or asset to be adversely affected by a certain external and inner pressures and in a broad sense it should include economic, social, geographic, demographic, cultural, institutional, governance and environmental factors. In this context, vulnerability is often expressed in a number of quantitative indices and is a key step toward criticalities assessment and management.

However, years and years of anthropic activities without taking into account of the environment led to the phenomenon already discussed in the introduction of the problems derived from the alteration of ecosystems and the heavy consequences on health and welfare. Ecotourism can provide lots of money to be used for the conservation of coastal ecosystems, as well as conservation of these ecosystems can develop a sustainable tourism that can be fundamental for the sustainable develop of a coastal area creating a virtuous positive feedback.

In natural area, while many benefits from the development of ecotourism are possible, it should also be recognized that not all proposed ecotourism projects are likely to be profitable. that they can result in little or no economic benefit to local communities, may become a drain on finance that could otherwise be used for nature conservation [34] and can distort the range of species conserved. In fact, when over-emphasis on the commercial value occurs, the holistic picture of economic value is lost. For instance, a project of ecotourism may be non-consumptive (as in the case of viewing or watching wildlife, photographing it and so on) or it may be consumptive (as in the case of hunting and fishing). In general, ecotourism has been associated with the non-consumptive passive form of wildlife-based tourism. It needs, however, to be recognized that either form of tourism can be a negative or positive force for nature conservation. Even consumptive wildlife-based tourism can be sustainable if catch is appropriately controlled and it can also be supportive of wildlife conservation [35].

In rural/urban areas, in contrast, the socio-economic impacts of ecotourism are more evident. In fact, a range of opportunities for positive interactions with a new natural Park's management/ staff include job opportunities, good working relations and joint problem solving [36]. Key tourism related benefits include interaction with the tourists, sale of crafts and opportunities to profile cultural activities. However, there remains the need to improve beneficiation given the high poverty and unemployment rates in certain rural coastal area in several part of European countries. The organisation of more attractions (such as traditional dancing and singing, storytelling, traditional healing and other related activities) as well as tours to persuade tourists to stay longer than they had originally planned are recommended [37]. Since in most cases the lack of alternatives forces rural people to use natural resources in an unsustainable manner, the major focus should be to reduce pressure on the environment and this can be best achieved through activities that generate benefits to the adjacent rural communities. Several studies [38; 39; 40] reveals that ecotourism community perceptions are changing positively. This provides an ideal platform to strengthen positive socio-economic impacts and benefits.

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