



**Land care in desertification affected
areas:
from science towards application**

LUCINDA Project

**Coordinated by:
The Universidade Nova de Lisboa
(UNL-FCSH) Portugal**

**Project coordinator:
Prof. Maria José Roxo**

Desertification processes

Booklet B6

LITTORALISATION

By

Dr. Pandi Zdruli

Table of Contents

Introduction	3
Fragile coastal ecosystems merged with enriched cultural heritage.....	3
Natural processes and human pressures on coastal areas.....	6
Desertification and littoralisation: where is the link?.....	7
On-site effects of littoralisation	7
Urbanisation, soil sealing and population pressure including tourism.....	7
Agriculture.....	11
Flooding.....	13
Off-site effects of littoralisation	14
Future perspectives and recommendations	14
Policy and institutional framework.....	15
Further reading and resources.....	16
Contact details.....	17

Introduction

The word “littoral” derives from the Italian “*litorale*” and could often have ambiguous meanings. Most common definitions however relate to “*waterfront*”, “*waterside*”, “*intertidal zone*” or “*littoral zone*” and are related to the activities that are occurring on a rather narrow strip of land and water otherwise known as the *coastal zone*. In French the process of “littoralisation” means “*coastal over-development*”. Generally the process could be described as the internal population migration towards the coast and the “*maritimisation*” of the economy linked with economic activities such as tourism, harbour, naval and storage facilities and services, oil industry, fishing, and infrastructure development all resulting in a tremendous expansion of artificial land cover over rather short time periods. There is no doubt that chances for a better life and more employment opportunities are largely increased for both national and international migrants due to robust economic development in these areas. Rarely these processes are elsewhere more accentuated than in the Mediterranean.

Official definitions of the coastal zone

Official coastal boundaries in many riparian countries are even lacking or imprecise. On land, they are often measured by physical distances (few kilometres or few hundred meters from the sea) that do not necessarily coincide with the territory inhabited by the coastal societies. If they exist in the sea, they usually include all the territorial waters, which extend beyond the boundaries of the coastal zone as such. In **Spain**, the law on coastal areas uses the term 19 times without defining it; in **France** the legal definition includes seaside municipalities (and in some cases estuaries and deltas located outside the salty limit of water); in **Algeria** it includes all islands and isles, the continental shelf and a strip of land along the coastline with a minimum width of 800 metres, while in **Egypt** this width could reach as much as 30 km in the desert regions.

Source: Blue Plan 2005

Fragile coastal ecosystems merged with enriched cultural heritage

The Mediterranean coastline is roughly 46,000 km long and is almost equally divided into rocky and sedimentary coasts. The northern coast of the basin is especially jagged and includes numerous big and small islands covering almost 73 per cent of the whole coastline. Additionally there are nearly 1 million hectares of wetlands and paralic ecosystems (deltas, mud flats, lagoons, ponds, and coastal marshes) occupying just about half of the wetlands.

Despite covering only 0.8 per cent of the global water bodies, the Mediterranean Sea is home of 7 per cent of all marine species recognised worldwide. Its rich biodiversity includes rare species under threat of extinction like the sea monk, *Monachus monachus*, and two species of marine turtles (*Caretta caretta* and *Chelonia mydas*). The coastal wetlands play a crucial role in maintaining and enhancing environmental quality and providing valuable economic benefits. Through their many functions, they purify water, sequester carbon, help maintain the equilibrium of the water cycle, host millions of migratory birds, and provide excellent environments for leisure. There are 81 Ramsar and numerous NATURA 2000 sites as such throughout the Basin.



Wetlands of Torre Guaceto, Brindisi, Italy

Photo: P. Zdruli

The richness of Mediterranean Sea's biodiversity includes a total of 694 species of marine vertebrates and 1,289 marine plants. Despite the area covered by the sublittoral zone is limited at only 5 per cent of the total water surface it has an enormous ecological importance due to the presence of marine sea grasses like *Posidonia oceanica* that provide both environmental and productivity functions for the stability of the ecosystems. European studies value ecosystem's ecological services of wetlands in some 2.4 million euros per km² per year.



Caretta caretta sea turtles

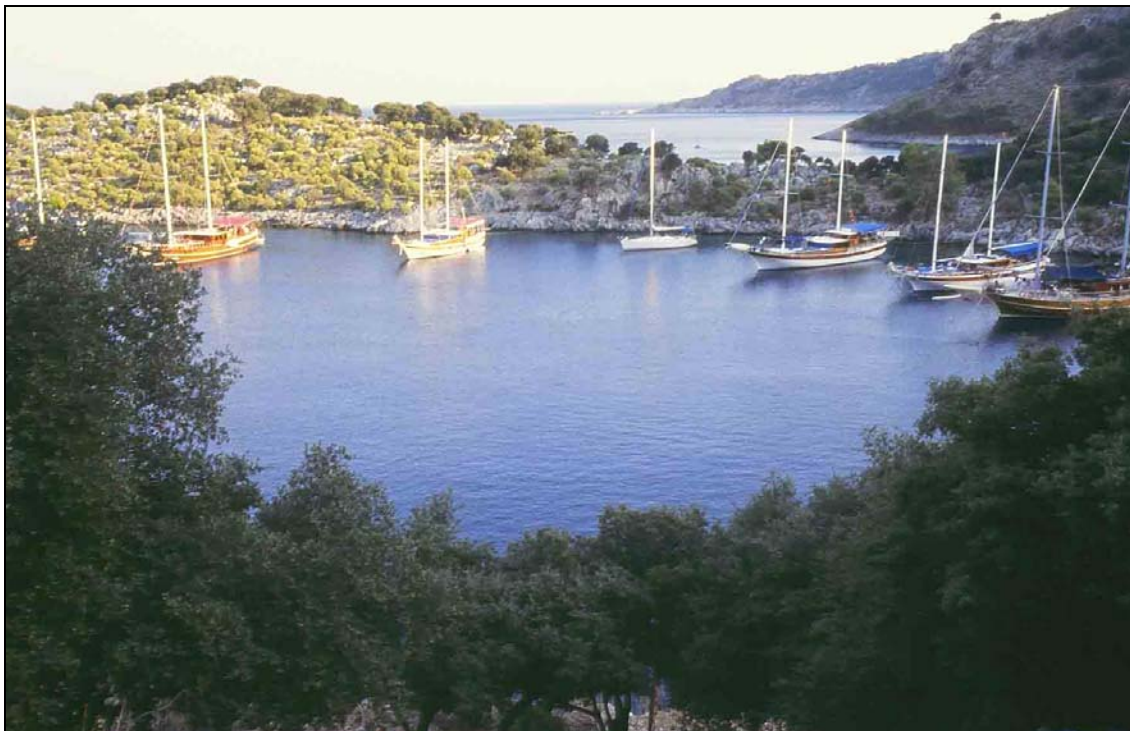
Source: MEDCOAST project

In addition, the Mediterranean coasts swarm 48 UNESCO cultural heritage sites of exceptional beauty like the millenary terraces of Cinque Terre in the Tyrrhenian coast of Italy or the stunning Venice on the Adriatic side. The coasts enjoy breathtaking beauty. Thanks to their exceptionally rich fauna and flora, marvellous beaches and extremely rich cultural heritage, they have always been the preferred tourist destination for millions of people from around the world.



Dolphins swimming in the Mediterranean Sea

Source: MEDCOAST project



The famous Blue Lagoon of Oludeniz in western Mediterranean coast of Turkey

Source: MEDCOAST project

It is impossible to describe the Mediterranean without its people and their millenary history. The *Mare Nostrum* was the bridge and not the division between Africa, Asia and Europe. The Mediterranean people shared often common goals and left their signs of civilisation on both shores of the basin as could be seen in Portugal, Spain, France, Italy, Croatia, Albania, Greece, Turkey, Cyprus, Malta and throughout North Africa and the Middle East. The Roman temples from Fés in Morocco all the way to Baalbek in the Bekaa Valley in Lebanon are yet living witnesses of a glorious past that paved the way to the future modern European civilisations, not to mention that were the *Mediterraneans* those who discovered the New World. Rarely anywhere else in the world there is a mixture of Phoenician, Greek, Roman, Byzantine, and Arab culture as here and most importantly much of this worldwide famous cultural heritage is concentrated on the coast.

The famous French historian Fernand Braudel (1902-1985) describes the Mediterranean as “*a thousands things at the same time. Not just a landscape, but countless landscapes. Not just one sea, but a string of seas. Not just a civilisation but many civilisations. The Mediterranean is an old age crossroads. For thousands of years, everything has converged on this sea, disturbing and enriching its history*”.

Where is Ogygia, the island where the nymph Calypso held Ulysses in captivity? Where is Scylla, the fearsome monster with twelve feet and six heads? Where is the land of the Phoenicians, where the lovely Nausicaa welcomed the shipwrecked hero? The answer to many of the questions posed by the Homeric mythology is to be found in the coasts of Calabria: the isle of Ogygia is offshore the Lacinian Promotory, today's Cape Colonna; Scylla is on the southern point of the Violet Coast; the kingdom of Alcinoüs is near the Gulf of Squillace. Ancient history too has much to tell along Calabria's shores: it was here that Magna Grecia's most famous colonies were founded and prospered: Sibaris (Sibari) at the mouth of the Crati river, Kroton (Crotone) slightly south of the mouth of the Neto, Locri Epizephiri to the north of Cape Bruzzano. This extraordinary past has left traces scattered just about everywhere, only a few metres from the shoreline, buried in the sand, standing on the cliffs, safeguarded on the sea-bed.

Source: Franco Bevilacqua, ©1999 Abramo. Regione Calabria with the contribution of the European Union



The Venetian harbour in Chania, Crete, Greece

Photo: P. Zdruli

It is obvious that protection and conservation of the Mediterranean coastal ecosystems and their cultural heritage are and will be important issues on the political agendas of all national Governments of the region and of the European Union. Is yet to be seen however, if they will succeed to resist the pressures of globalisation and economic competition. One thing is sure: pressures on coastal areas will increase, as we will try to analyse them in the following sections.

Natural processes and human pressures on coastal areas

When dealing with the Mediterranean coastal ecosystem becomes clear that there is a strong correlation between natural inland processes like erosion for instance and its off-site effects linked to flooding, sedimentation, coastal erosion, all of them interfering with the littoral drift and coastal changes. It is well documented for instance the evolution of the Gulf of Valencia in Spain since historical times. It shows that from the Ebro valley to the city of Valencia the coast has a recessive tendency while from Valencia to the Cape of Sant Antonio the tendency is to prograde. Similar



processes are evident throughout the basin particularly in the big deltas of Rhone, Nile and Po.

These processes inevitably incite expansion of coastal erosion, which causes extensive damages. The EU funded EUROSION project reports in 2004 that the area lost or at high risk of being lost in Europe is estimated to be 15 km² per year. Only for the period 1999-2002 some 300 houses have to be abandoned in Europe and another 3,000 homes lost their market value due to high coastal erosion risks. The risks are highly increased if the coastal dunes and artificial defences would be damaged provoking thus coastal flooding in very large areas that could expand to several square kilometres. The process reflects both natural conditions and human-induced effects. These last include coastal engineering, land claim, dam construction, dredging, vegetation clearing, gas mining and water extraction. In particular the urbanisation of the coast has aggravated the intensity of the problem by gradually disappearing the undeveloped coastal landscapes.

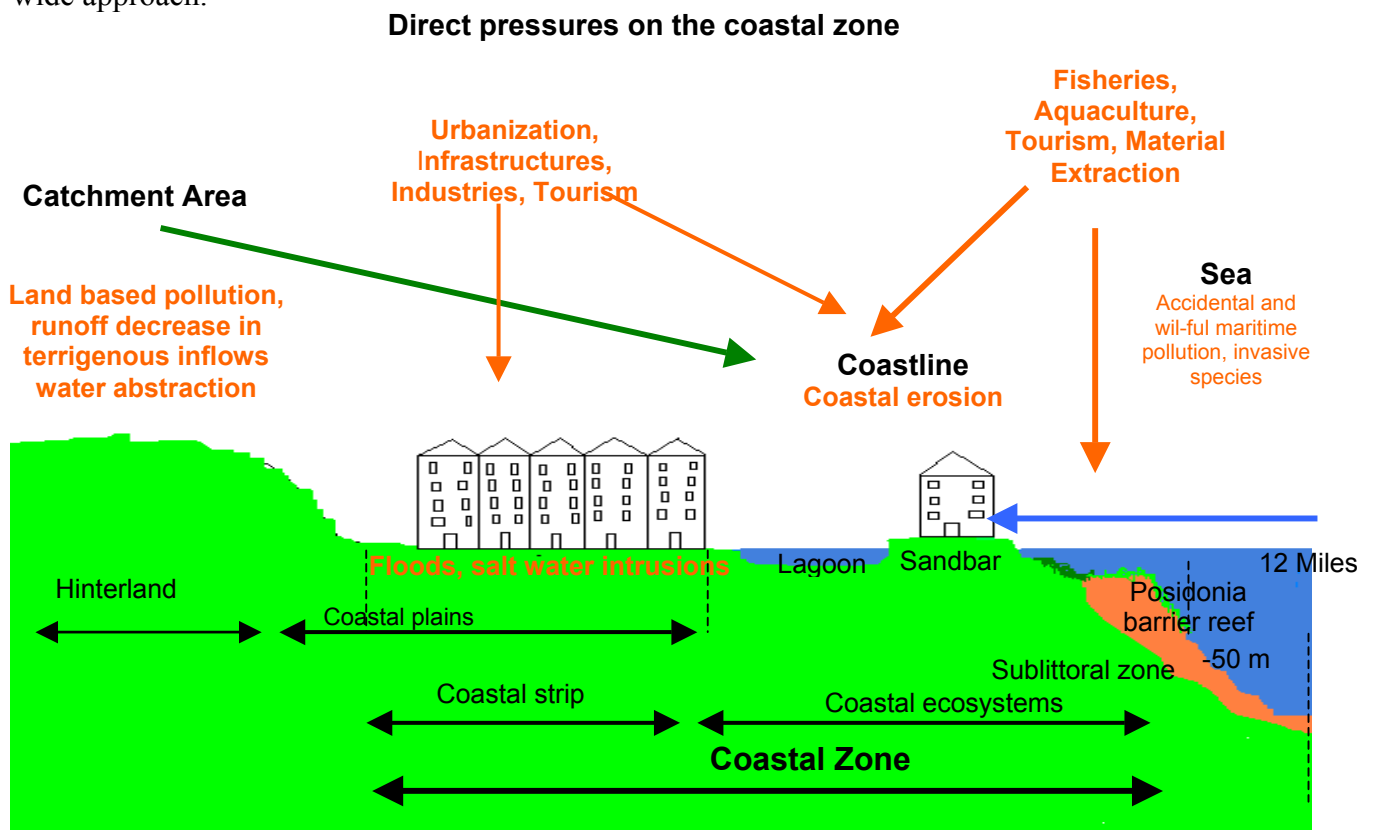
The coast of Barcelona

Photo: P. Zdruli

Assuming that climate change scenarios would be proven right, the economic damaged due to sea level rise and other factors could be devastating. Italy alone may loose 6 per cent of its territory while half of Europe's coastal wetlands may disappear. A study for the Intergovernmental Panel on Climate Change (IPCC) estimates the worldwide risk of coastal erosion at 5,400 million euros per year for the period 1990 – 2020. The situation might be quite noticeable especially in the Mediterranean due to its closed nature.

Desertification and littoralisation: where is the link?

If one should look at the narrow definition of desertification it may become evident that at least from the climatic point of view littoralisation stands a bit on the edge of what today is known to be desertification. However, desertification is *land degradation* (no matter in what climatic domains occurs) thus its link with littoralisation is real. To address this issue it is necessary to analyse a set of pressures and drivers that directly affect the coastal zones. The figure below summarises interactions between land-based processes on the upper inlands of the watershed and the pressures on the coastal shores. It is clear that anthropic pressures play a crucial role in the overall process. Desertification has no borders and does not follow even the political ones, thus the analyses and conclusions of this booklet address not only the countries included in the Annex IV and V of the United Nations Convention to Combat Desertification (UNCCD); instead follows a Mediterranean wide approach.



Source: Blue Plan 2005

On-site effects of littoralisation

A set of drivers and pressures are considered in these analyses with the goal to investigate the causes behind them and estimate their extend. While stressing that these analyses rely on published data they should be taken with caution and carefully confronted with national and local conditions. They could be used also as a methodological approach to supplement the DPSIR framework while dealing with risk and environmental impact assessment of coastal zones.

Urbanisation, soil sealing and population pressure including tourism

The EU Thematic Strategy for Soil Protection identifies soil sealing as one of the eight recognised threats to Europe's soil resources. While the economic damage of some other threats like erosion or contamination for instance are estimated at several million euros per year, no financial estimates are possible on the economic damage of soil sealing. This is a main issue that requires further studies.

Some may argue: “What is wrong in using the land for infrastructure development instead of cultivating tomatoes?” The answer is clear: the artificial cover of land largely disrupts the ecosystem functions and the natural exchange cycles of nutrients, water and gas fluxes with direct consequences on biodiversity, ground water equilibrium and ecosystem stability to name a few.

- Built-up areas now cover nearly 40% of the Mediterranean coastline.
- 80% of the total pollution affecting the Mediterranean Sea is from land-based sources.
- Half of the cities with over 100,000 inhabitants do not have water treatment plants and 60% of urban wastewater is discharged into the sea without being treated. Yet the quality of bathing water has improved in the EU.
- The accumulation of persistent toxic substances (PTS) in food chains is cause for concern. Locally measurements have shown levels above WHO standards.
- The in-put of nitrates has doubled in 20 years.
- Plastics account for 75% of the waste found on the sea floor or surface.
- Over the past 50 years, the amounts of sediments reaching the sea have fallen by 90%, and a large coastal surface is subjected to erosion.
- Despite the reduction of operational pollution by hydrocarbons resulting from regulations, it still accounts for 100,000 to 150,000 tonnes a year.
- Data reveals the introduction in the Mediterranean ecosystem of 500 foreign invasive species.
- Coastlines are being cemented over by harbours and marinas to accommodate the expansion of pleasure yachting, which also contribute to solid-waste pollution, to untreated discharges into the marine environment and to degradation of marine plant life due to anchorages.
- Several tourist destinations have suffered considerable loss of income due to decreasing environmental quality.

Source: www.planblue.org/coastal

How long it will take to cement the Maltese islands?



Source: University of Malta, 2004



Extensive urbanisation on the Maltese coasts

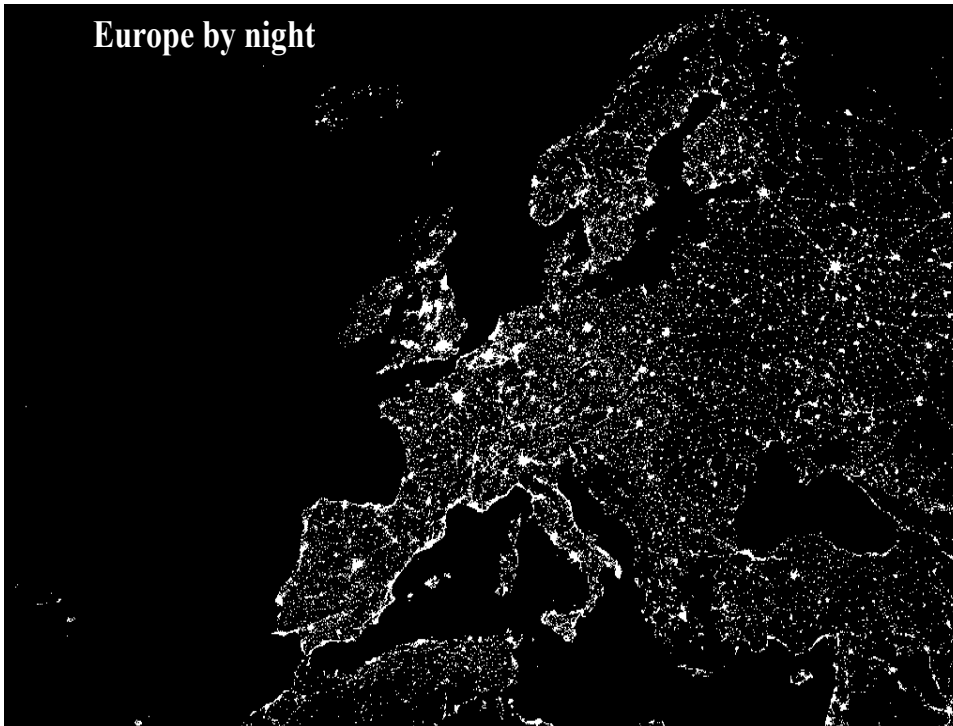
Photo: Ch. Morini

European people have transformed more than 65 percent of the continent’s territory but the situation is much more accentuated in the coastal areas. Studies show that around 50 to 70 percent of the Mediterranean Europeans live within 60 km

distance from the coast. In some rare cases as in southern Spain and France, Portugal, Monaco, Greece, Italy, Malta, Cyprus, Turkey etc, the figure is much higher. (An extreme example of littoralisation is the capital city of Beirut in Lebanon, where practically there is no freer land left in the coast and soil sealing is rapidly expanding in the surrounding hills). Unfortunately often urbanisation has expanded on illegal basis. Whether the decision makers could or could not stop such a process is often an open question accompanied with much controversy.

The concentration of activities in such narrow strips of land is accompanied with loss of fertile agriculture soils and valuable coastal habitats as well as pollution and increased environmental damage. It is estimated that Greece only may have lost more than one third of its wetlands. On the other side, the high concentration of population over small areas makes it more vulnerable to natural disasters such as floods, earthquakes, volcanoes (Vesuvio that destroyed Pompey two thousand years ago is not far from the coast either but the present situation of Naples expansion is tremendous). Finally who knows if tsunamis could ever happen in the Mediterranean?

The process of population concentration on the coastal zones of Europe was mainly initiated after



the industrial revolution but expanded rapidly only in the mid the 20th Century. It was promoted by a number of public incentives that where in favour of rapid economic development following the end of the World War II. Once the economic boom produced unprecedented wealth (especially in Western Europe), tourism became a main driving force of coastal transformation.

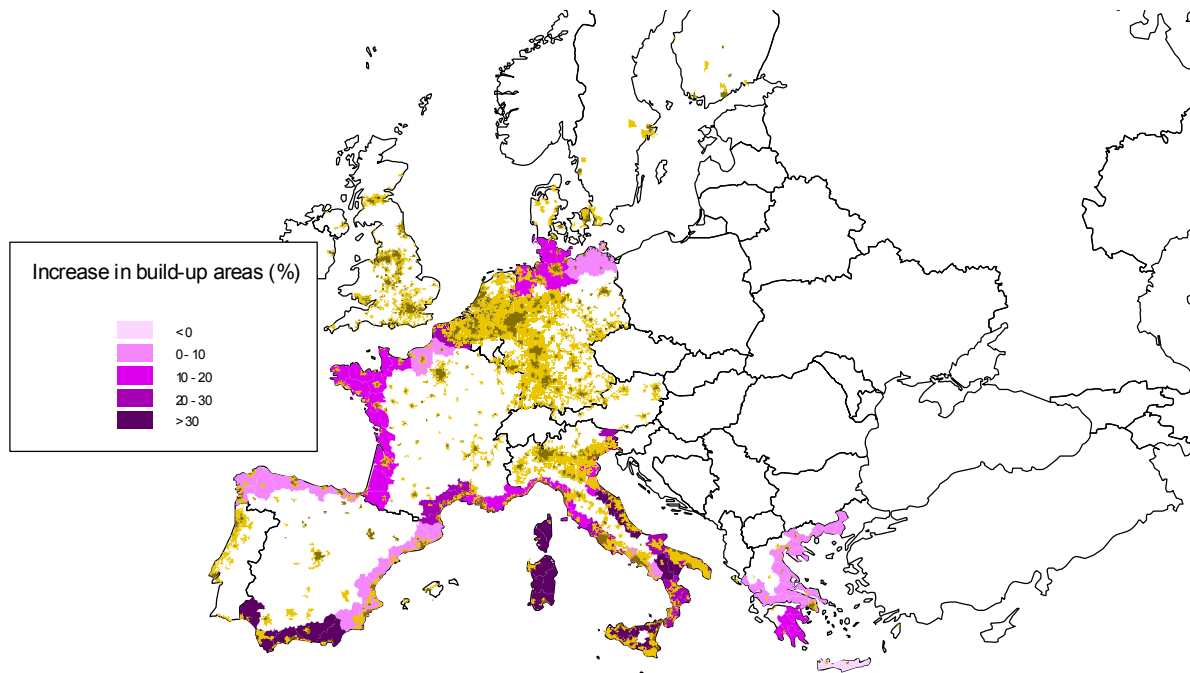
Note the intensity of lights throughout coastal zones of Europe

Source: NOAA (www.nqdc.noaa.gov)

A study released in 2000 by the Joint Research Centre of the European Commission, named LACOAST project (LAnd cover changes in COASTal zones) quantified land cover changes of the European coastal zones for the period 1975-1990 over a standard length of 10 km from the coast. The study concluded that changes occurred during this period include both transformation within the same category (irrigated agriculture against rain fed agriculture), conversion of pastures to arable land or loss of wetlands for harbour development. Most relevant changes were revealed for the build-up areas in the coasts of south-eastern Portugal, southern Spain, and the three major islands of Corsica, Sardinia, and Sicily where the figures stand for 30 per cent increase (see also the map produced by the LACOAST project). Since then coastal littoralisation continued at high pace.

One major driver of littoralisation is **population pressure**. Over the last three decades the Mediterranean countries experienced a tremendous growth of population increase. In 2000 the whole 22 riparian countries had 428 million people compared to 285 million in 1970. Data are quite different between northern and southern countries with the latest having an annual growth rate of 2.35 per cent per year or adding 3.9 million people per year for all the countries from Morocco to Turkey. These data are five times higher than the northern Mediterranean countries. At coastal level (N3) the population increased from 90 million in 1970 to 143 million in 2000. The major increase happened in the southern and eastern countries (80 per cent of a total of 48 million people increase in 30 years). The forecasts for the coastal regions show that the population increase in these areas

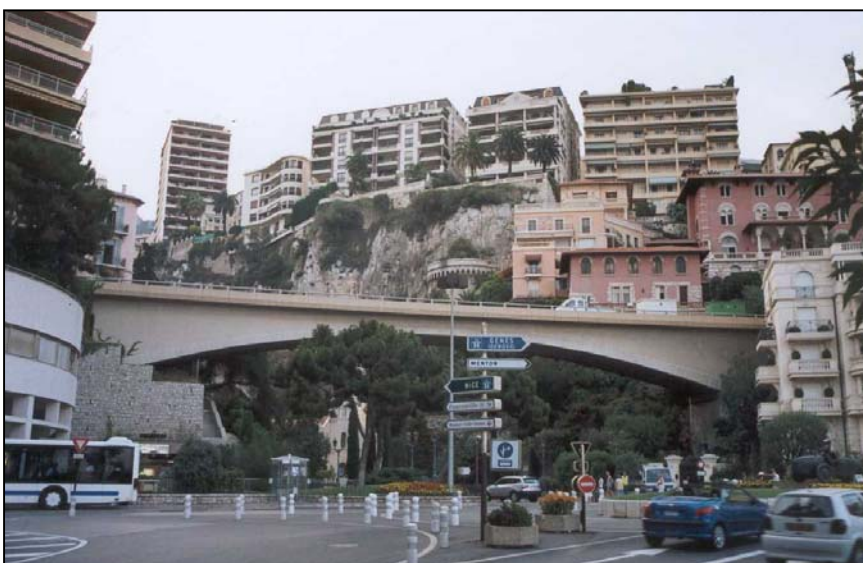
could reach as high as 174 million by 2025 or an average increase of 0.8 per cent per year, and yet the major share will be in the south-eastern parts of the basin.



Increase in built-up areas for the period 1975-1990. LACOAST Project

Source: EEA 2002

Population pressure is exacerbated also by the *tourism* industry. The Mediterranean is the third most preferred international tourist destination and the first for European tourists, accommodating around 218 million visitors every year. According to the World Tourism Organisation tourists' flows in the Mediterranean would increase. By 2025 the region would receive 396 million international and 273 million domestic tourists. France, Italy and Spain alone would accommodate more than 75 per cent of the international tourists while Turkey would become the fourth destination in the Mediterranean with about 34 million international visitors per year. To these figures should be added many more million domestic tourists who will spend their holidays or weekends on the coast. A typical example is Malta, an EU country with less than half a million inhabitants receiving on average 1.2 million tourists per year.



The tourism industry plays an important role in the Mediterranean economy and its share is predicted to increase. However, the industry has created a number of environmental problems ranging from loss of agriculture lands, pollution, coastal erosion, and increased water consumption.

The need for housing and infrastructure has pushed developers to construct almost everywhere as it could be seen in this picture from Monaco

Photo: P. Zdruli

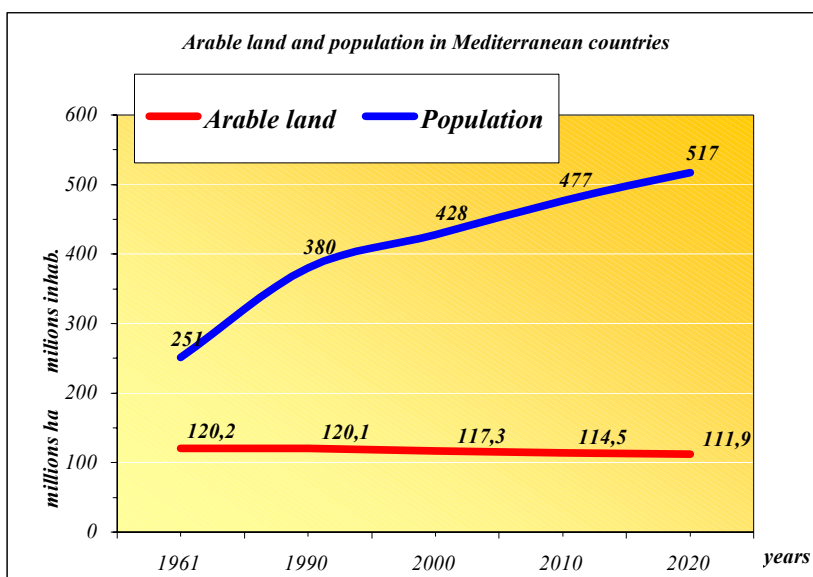
Agriculture

The present land-use patterns in the Mediterranean coastal zones no longer reflect the long established practices of a traditional rural agriculture. Instead, they result more and more from the multiple decisions of land users concerned for the expected financial returns of different crops, fruit trees and livestock and of decision makers dealing with industrial and commercial companies, as well as with urban development and infrastructure expansion expressed in construction of motorways and tourist holiday centres. There are several competing interests for land and it appears that agriculture is the main loser in the equation.

In the EU-15 countries agriculture in 2001 accounted only for 2 per cent of the GDP and only for 4 per cent of the job employment. After the EU enlargement reaching at 27 member states in 2007 the GDP share of agriculture has increased. Despite its small portion in the national GDPs, agriculture still remains the major water consumer with almost half of the water consumption. In the European Mediterranean countries the figure in water consumption by agriculture is above 50 per cent but increases drastically in North Africa and the Middle East with values as high as 80 per cent. The EU Water Framework Directive is particularly sensitive to water use efficiency and places major emphasis on sustainable use of water in the coastal zones.

On the other side it is important to better define the role of agriculture as yet an *important driving force* in economic development, job employment and source of income for the remaining rural population of the coastal zones. Agriculture should not be seen only as a culprit in causing environmental degradation. Loss of fertile lands to urbanisation and sealing especially in the southern Mediterranean countries could create severe problems of food insecurity and social unrest in these countries that could affect northern countries like Spain and Italy for example. Due to increased population pressure and continued pace of land degradation it is expected that the available arable land per capita in the whole Mediterranean would decrease from 0,48 ha per person in 1961 to 0,22 ha in the year 2020. (The figure is quite stable though for Mediterranean Europe). At present Southern countries spent considerable amounts of their financial revenues deriving from the oil or tourism industries to meet their food needs that otherwise could be spent for social or public health related programmes.

Two different agrarian scenarios appear in the agriculture sector on both shores of the



Mediterranean. The southern ones yet remain largely typical rural societies once the real meaning of “rural area” in the Mediterranean EU has drastically changed, even almost disappeared to be replaced by the so called “urban rural”. The EU has been and still is particularly attentive to its rural development policies.

Source: MEDCOASTLAND Project based on FAO data

The EU policies for rural development have tackled a large array of problems and have tried to develop scenarios for the future. One important aspect (typically Mediterranean) deals with the so-called **marginalisation of agriculture** that in other words mean a process that combine social, economic, political and environmental factors by which in certain areas farming ceases to be viable under existing land use and socio economic structure and no other agriculture options are available, thus the process ends with *land abandonment*. This last effect is particularly directly linked with littoralisation.

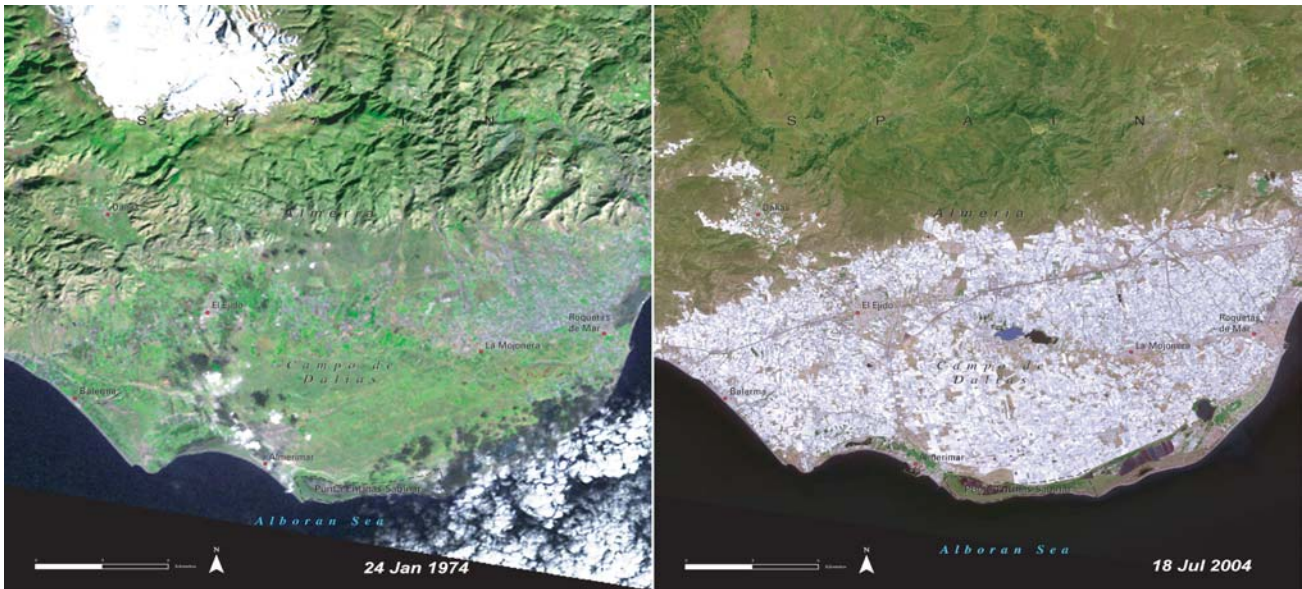
The LEADER projects (*Liason Entre Actions de Développements de l'Economie Rurale*) are good examples. In the Mediterranean European countries they point out at the need of *diversification* meaning that farmers should not be dealing only with crop, fruit, olive, horticulture or livestock production but also engage in other activities such as agro and ecological tourism, restoration/preservation of cultural heritage. They could also be rewarded for implementing agri-environmental measures.



Picturesque landscape of the area of Murge di Alberobello near the Adriatic coast of Bari, Italy. In the centre could be seen the famous conic farmhouses or the “trulli” of Apulia.

As previously mentioned agriculture is a “looser” by the changes provoked by littoralisation. For what yet remain land used for agricultural production, the links with desertification are mainly reflected in increased **soil and water pollution** due to overuse of pesticides

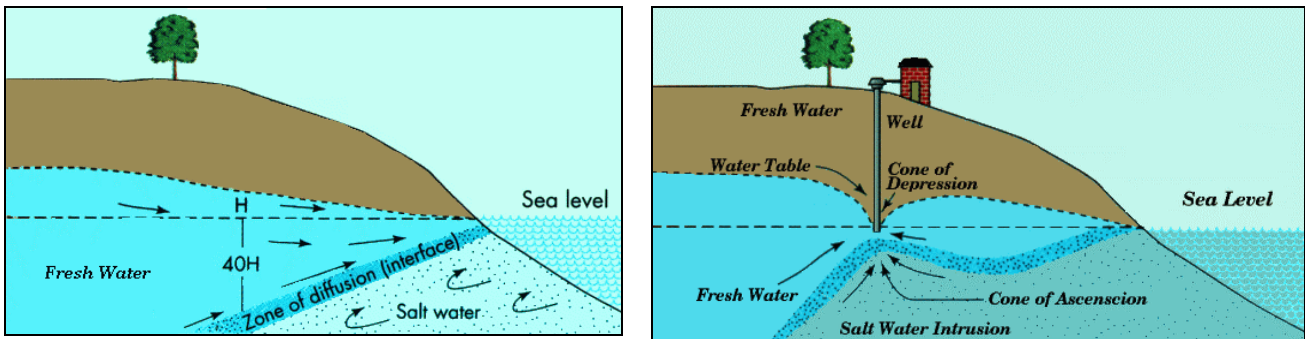
and fertilisers and **salinity build-up** due to poor irrigation water quality. This last problem is particularly evident, in Italy, Spain, Greece, Albania, Egypt and Turkey.



In 2004 UNEP released these remote sensing images of the coastal areas of Almeria in Spain. In thirty years (1974-2004) the whole area of Campo de Dalias has been transformed from grazing and rainfed agriculture to greenhouses. The process has been followed by extensive groundwater pumping to meet irrigation water needs. These drastic land use changes show the determining factor of markets in establishing land use patterns. Spain is the largest exporter in the EU for fresh fruits and vegetables.

Source: United Nations Environmental Programme 2004

The figure below shows *seawater intrusion* into the ground freshwater aquifer due to drilling and water pumping, mainly for irrigation. The process has widely expanded in the coasts of southern Italy and elsewhere in the region and has accelerated salinity expansion in several low lying agricultural fields with severe consequences in crop production.



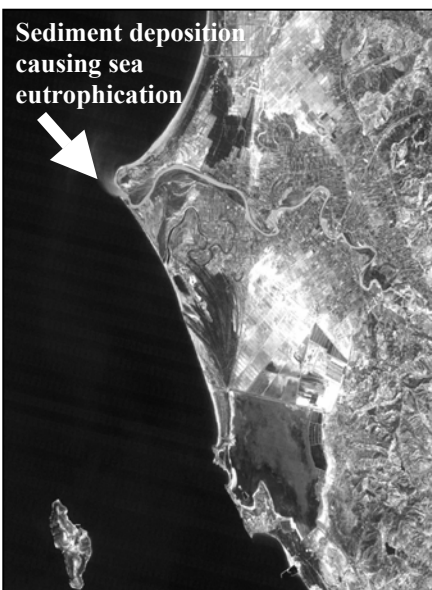
Seawater intrusion and salinity built up through ground water pumping

Source: www.lentech.com

Flooding

Floods are a function of climate variability especially rainfall patterns, hydrology including river bed shape, intensity of drainage and debit flow as well as soil characteristics particularly water holding capacity of soils. In strict sense flooding is the last result of deforestation, forest fires, overgrazing, collapse of terraces and anti erosion conservation measures that accelerate soil erosion and surface water runoff increasing hence flooding intensity in the lower plains. Coastal zones are particularly prone to such devastating process. Littoralisation inhibits the process mainly through the artificial cover that reduces water infiltration into the soil and provokes disturbances of the natural ecosystem. Littoralisation is thus both cause and sufferer of flooding.

According to a press release (2005) of the EU for the period 1980-2002 the greatest number of floods occurred in France (22 %), Italy (17 %), ...and the highest number of fatalities was registered in Italy (38 %), followed by Spain (20%) and France (17%). The greatest economic damages occurred in Germany and Italy (both 11 billion euro) followed by Spain and the UK (around 6 billion euro). The floods of Mondego River in Portugal in January 2001 despite property damage caused an economical loss of about 12.5 million euro due dyke breakdown on the left side of the river.



Floods are present in southern Mediterranean too. An extreme event of flood and mudflows was recorded in Algiers, a city with more than 3 million inhabitants on 10 November 2001. This natural disaster caused the loss of 712 human lives, injured 350 more while 116 people went missing, some 1,800 houses and 56 schools were damaged as well as scores of bridges, roads, public works were destroyed. Almost 1,000,000 m³ (up to 10 m thick) of mud accumulated in the street of Bab el Oued, were more than 350 vehicles (cars, trucks and buses) with passengers were buried alive by mud.

The final result of flooding is sea *eutrification* that some scientists paragon as the *desertification* of the sea. This last outcome only reinforces the need for an ecosystem-based approach when dealing with the management of the sea-land interface.

Off-site effects of littoralisation

In erosion studies off-site effects are related with the final consequences of the process. In the case of littoralisation its off-site effects are the opposite of erosion. In this context littoralisation creates extreme disparities of development between the coastal zones and the hinterlands. These last are being abandoned leaving behind neglected forests, eroded lands, collapse of terraces, overgrazing, forest fires and in general backwardness. Over the last few decades' internal migration towards the Mediterranean coasts has accentuated rapidly all these processes.

Future perspectives and recommendations

The stakes are high for the Mediterranean coastal zones. The population of enlarged EU living in coastal areas more than doubled over the last fifty years and the total value of economic assets located within 500 metres from the seacoast multiplied to an estimated 500-1,000 billion euros in 2000. It is expected thus that economic considerations would continue to be the major driver in the development of coastal areas and the national and EU policy makers will continue to be concerned about economic dynamics and growth. This will continue to dominate political agendas and most likely would accelerate littoralisation and all its related positive and negative consequences described above. Chances are that more *Promenade d'Angles* and *Las Ramblas* would appear throughout the Mediterranean coasts.

The responses to ensure a sustainable coastal zone development however have been so far inadequate. Time has come to call for action and stop or reverse coastal zone degradation. However, without a clear definition of where the coastal zone starts and ends it is difficult to compare and monitor various indicators and the status of environmental degradation.

The best way forward thus to deal with littoralisation is to apply the principles of Intergrated Coastal Zone Management (ICZM).

The European Commission defines the ICZM as follows: *"ICZM is a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning (in its broadest sense), decision-making, management and monitoring of implementation. ICZM uses the informed participation and cooperation of all stakeholders to assess the societal goals in a given coastal area, and to take actions towards meeting these objectives. ICZM seeks, over the long-term, to balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics. 'Integrated' in ICZM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space."*

The Mediterranean baseline scenario forecasts significant increase in pressures with:

- Coastal city populations rising from 70 million in 2000 to 90 million in 2025.
- 312 million tourists in 2025 in the coastal areas versus 175 million in 2000, a density per km of coast, which could triple in the South and East.
- 360 coastal power plants by 2025 versus 200 in 2000.
- Several dozen refineries and additional industrial complexes in the South and East, perhaps the equivalent of 175 new desalinization plants with a capacity of 6,000 m³ per day and new harbours, roads and airports.
- The most significant risk is the saturation of coastal areas and the additional artificialization of 4,000 more km of coastline (reaching 50% of total in 2025).
- The trend scenario also projects accrued risks of major accidental pollution incidents given the average age of the fleet, the number of ships with open-shipping registrations, the number of accidents recorded (311 in 23 years) and the potential quadrupling of maritime traffic.

Source: www.planblue.org/coastal

In addition the ICZM intend to address the following key points:

- Develop a unifying framework to provide equitable solutions for conflict solving between the competing interests
- Should allow for restoration of aquatic ecosystems
- Valorisation and enhancement of ecosystem products and services
- Allow for policy analyses, cross cutting issues and implementation through participatory management and involvement of all stakeholders

Policy and institutional framework

Chapter 17 of Agenda 21 sets out policies regarding ICZM. All the Mediterranean countries have signed such document.

Additionally the EU has been always active in its Mediterranean policy. In 1976 in Barcelona was held the first Intergovernmental Conference on the Protection of the Mediterranean that approved the **Mediterranean Action Plan**, which was followed by series of conferences and treaties. One important event was again held in Spain known as the **Barcelona Convention for the Protection of the Mediterranean** that was signed in 1995. The initial Barcelona Convention of 1976 which entered into force in 1978 and amended in 1995, and the Protocols drawn up in line with this Convention aim to reduce pollution in the Mediterranean Sea and protect and improve the

EU plans to clean marine environment in 15 years

The European Commission has proposed a new strategy to ensure that all EU marine waters are environmentally healthy within 15 years. Loss of marine biodiversity due to contamination by dangerous substances, excess nutrients, the impact of commercial fishing, and effects of climate change are the major problems out lined by the Commission that the strategy is supposed to address.

Environment Commissioner Stavros Dimas says *“Europe’s seas and oceans make a huge contribution to our quality of life and our economic prosperity, but they are deteriorating because of over exploitation, pollution, climate change and a range of other factors. This is an area where there is a strong need for a European overarching and an integrated approach”*. The Commission has developed an integrated policy framework to help deal with the pressures and negative impacts on the marine environment. The strategy lays down clear operational guidelines on how to achieve good environmental status for all of the EU’s marine areas by 2021.

Member states who share marine areas with countries that are not members of the EU will be encouraged to cooperate closely with these third countries, within the framework of existing regional seas conventions. Impact assessments, including detailed cost-benefit analyses of the measures proposed, will be required prior to the introduction of any new measure. The national programs will have to be approved by the Commission.

Source: January 2005, Europa News

marine environment in the area, thereby contributing to its sustainable development. In 1996 the governments of the region and the European Community put in place the **Mediterranean Commission on Sustainable Development (MCS D)** with a very broad and ambitious mandate in terms of sustainable development strategy. The EU strongly endorses recently the **European Neighbourhood Policy** with all the countries of the region.

Finally this booklet propose the following main issues that require special attention for the future:

- Capacity and institutional building at central, regional and local levels
- Strengthening regulatory policy implementation and governance of the coastal zones
- Enhance cultural resources and encourage community support for sustainable coastal zone management
- Establish a reasonable balance between economic growth and environmental protection
- Ensure continuous monitoring

Further reading and resources

“A sustainable Future for the Mediterranean: The Blue Plan’s Environment & Development Outlook” edited by Guillaume Benoit & Aline Comeau. EARTHSCAN 2005. ISBN-13 1-84407-259-0

“The LACOAST Atlas: Land Cover Changes in European Coastal Zones”, edited by Vanda Perdigão and Susan Christensen. European Commission, Joint Research Centre, Space Applications Institute, Ispra, Italy. 2000.

Related web sites

Barcelona Convention

http://www.unep.ch/regionalseas/regions/med/t_barcel.htm

European Commission policy in Integrated Coastal Zone Management

<http://europa.eu.int/comm/environment/iczm/home.htm>

EU Water Framework Directive

http://ec.europa.eu/environment/water/water-framework/index_en.htm

CIESM Mediterranean Science Commission

<http://www.ciesm.org/index.htm>

MEDCOASTLAND Thematic network funded by the European Commission (EC), within the 5th framework program for the international cooperation with Mediterranean countries, aiming at the *Mediterranean coordination and dissemination of land conservation management to combat land degradation for the sustainable use of natural resources in the Mediterranean coastal zones.*

<http://medcoastland.iamb.it/index.php>

MEDCOAST project: Contribute to coastal and marine conservation in the Mediterranean and the Black Sea, through improved coastal management practices

<http://www.medcoast.org.tr>

EUROSION Project: European Commission, Directorate General Environment: A European initiative for sustainable coastal erosion management

<http://www.euroasion.org/>

The Blue Flag is an exclusive eco-label awarded to over 3200 beaches and marinas in 36 countries across Europe, South Africa, Morocco, New Zealand, Canada and the Caribbean in 2006

<http://www.blueflag.org>

EU Thematic Strategy for Soil Protection COM (2006) 232 of 22.9.2006

<http://ec.europa.eu/environment/soil/index.htm>

Coastal Management for the Mediterranean: Post Graduate Programme (Master of Science)

<http://www.educom-med.org/course/CourseWeb.htm>

PlanCoast (2006–2008) is an INTERREG IIIB NP CADSES Project with the aim to develop the tools and capacities for an effective integrated planning in coastal zones and maritime areas in the Baltic, Adriatic and Black Sea regions

<http://www.plancoast.e>

Contact details:

Dr. Pandi Zdruli
CIHEAM-Mediterranean Agronomic Institute of Bari
Via Ceglie 9
70010 Valenzano (BA)
Italy

Tel: 39 080 4606 253
Fax: 39 080 4606 274
E-mail: pandi@iamb.it

Cover page: NASA picture of the Western Mediterranean from space. In the north is the Iberian Peninsula and in the south the Moroccan coast.