

PROPOSAL OF TOPICS TO BE CONSIDERED AS *Specific International Cooperation Activities* (SICA) FOR THE PROGRAM ENVIRONMENT OF THE 7th FP.

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The topics proposed in this report have been suggested by the experts participating in the Workshop on Common EU-MPC Priorities Identification in the Environment Workshop organized by Project MIRA in Cairo (Egypt) the 26-27 January 2009, following a preparatory work of synthesis on the national MPC priorities in this area, and the content of the Work Program of the Priority Environment of the 7th Framework Programme.

The criteria for topics selection on the Mediterranean region were thus:

- strategic dimension
- regional dimension
- of mutual interest for southern and northern countries
- new topics (regarding recent calls and current projects)

Topics proposed in preferential order

1 - Response of coastal Mediterranean ecosystems to anthropogenic pressures

Aims

Assess the response of coastal ecosystems to the pressures induced by anthropogenic activities which are increasing in the Mediterranean region. Contribute to knowledge about complex coastal ecosystem functioning under multiple stresses. Study land-sea interactions especially in urban, peri-urban areas and in coastal wetlands. Better understand the specific sensitivity of the Mediterranean Sea to chemical contamination, the pathways and the fate of contaminants in the marine environment in relation to geochemical cycles, their bioaccumulation and biomagnifications in marine food webs and their impact on ecosystems.

Rationale

According to the Blue Plan 2005 prospective study, more than 50 % of the Mediterranean coast could be artificialized by 2025. Permanent and seasonal populations living in coastal areas are growing. Diffuse and small scale interactions between land and coastal sea are difficult to study.

Mediterranean top predator fishes bioaccumulate much more (5 to 10 times) chemical contaminants than those in the Atlantic. Bioconcentration factors (the ratio between the concentration in water and in fish flesh) can reach 10^6 in the Mediterranean. This difference appears to be controlled by the specificities of the Mediterranean Sea biogeochemistry (poor in nutrients, seasonal-stressors) and food webs which all need to be better known. Knowledge of the food webs is especially necessary to develop an ecosystem approach in fishery management, to tackle with biodiversity issues, and to support the implementation of the Marine Strategy Framework Directive and Horizon 2020 initiative. An improved knowledge of the processes inducing the contamination of marine ecosystems by micro pollutants will help to take appropriate management measures (including source control and waste management), to preserve the quality of marine resources and to protect the ability of ecosystems to provide services to coastal populations.

2 – Responses and adaptation of freshwater ecosystems/systems in the Mediterranean region in response to climate change

Aims

Identify impacts of climate changes on freshwater systems and to distinguish these from those caused by human practices and pressures. Improve knowledge about changing climate threats to the quality, quantity and sustainability of freshwater systems. Identify environmental change thresholds, critical points, and the most vulnerable areas. Assess the impacts of the extreme climatic events frequencies on modifying freshwater systems. Develop new policies and schemes for improved management of freshwater resources in the region. Construct and assess scenarios about fresh water resources and their sustainability that take account of population evolution and repartition in response to changes in fresh water resources availability.

Rationale

Water scarcity is already a major problem in many Mediterranean countries. Pressures on freshwater resources are strong and increasing (due to population growth and increased consumption per capita). Climatic models agree in predicting increased temperatures and reduced precipitation in the Mediterranean region. Maintaining high quality freshwater systems is essential for both people and biodiversity yet management systems for the 21th century are underdeveloped. As an area of high risks (dense and growing population, rich biodiversity, and a dry climate predicted to intensify and increase, active desertification), the Mediterranean region can be taken as a model for studying impact and adaptations to climate change.

[A new FP7 on climate change in the Mediterranean region must be complementary to CIRCE project which carries out extensive modelling work]

3- Integrated assessment of hydro-ecological functioning at catchment basin scale for sustainable management of natural resources

Aims

Better understanding of processes involved in the hydro-ecological system functioning at the catchment basin scale. These processes concern: ground water (including aquifer compaction and salinization), surface water, evapotranspiration, ecological processes, land degradation (including soil and vegetation systems), socio-economic aspects e.g. water and land use, and policy strategies. They impact the quantity and quality of water resources. An integrated approach requires improvement and standardization of data collection and management systems (including GIS, DSS) and development of modeling and scenario assessment tools.

Rationale

Interactions between different processes involved in the water cycle at the catchment basin scale are complex and require an integrated approach. A better knowledge of the consequences of environmental change processes that include agricultural and land use practices on water resources is expected. Results will provide decision-makers with the information needed to improve water resources management and land use policy in a sustainable way.

4 - Sustainable technologies and alternative management options for agricultural and agro-industrial activities in the Mediterranean region

Aims

Develop and assess innovative technologies and methodologies aiming to improve the sustainability of agricultural and agro-industrial practices in the Mediterranean region. Research results should contribute to the development of recycling and reuse practices, to better waste management, to improved water-use efficiency (including harvesting, conservation, and leakage control) and to reduce pollution. Relevant fields include biomass exploitation (energy, biochar, etc.), olive oil mills waste, and wastewater management. Attention will be paid to the preservation and sustainable management of cultural and natural heritage when developing new practices.

Rationale

Agriculture is a traditional activity in the Mediterranean and is a key point for the socio-economic development of several countries by providing goods, shaping the landscape, impacting water resource quality and quantity. New models for agriculture and agro-industries development in the Mediterranean region can lead to a better integration with other activities like tourism (agro-tourism) while preserving natural resources (biodiversity, water, soils...) and cultural heritage. A better exploitation of rural areas should help to limit urban encroachment (in so called "rurban" areas).

5. Natural hazards analysis and construction of scenarios for natural risks

Aims

Better understanding of the natural hazards and the vulnerabilities of the Mediterranean countries to contribute effectively in the reduction of disaster risks. Hazard analysis (earthquake, storms, floods, desertification, drought, fires, etc.) and vulnerability (social, physical, economic, etc.) evaluation and the construction of scenarios are needed to develop a new strategy for disaster risk reduction in the Mediterranean countries. A Mediterranean natural hazards observatory should be set up. Its main task is to ensure coordination of scientific investigations in the Mediterranean. A database on the characteristics of the extreme nature phenomena is needed to face the consequences of events like earthquakes, tsunamis, floods, heat waves or cold, advance of sand, locust, lush flood and heavy snow cover, etc. A particular interest should be devoted to the threats to the soils of the southern Mediterranean, as these soils are in a stage of advanced degradation.

Rationale

It is well known that all the Mediterranean countries have been affected by so many natural hazards (e.g. earthquakes, storms, floods, drought, desertification, fires, etc...). As in many recent disasters had their main impact in urban areas where there is a large concentration of people with a heavy dependency on infrastructure and services. The rapid urbanization, population increase, development of critical engineering works, industrialization of cities with modern types of buildings and the concentration of population living in hazardous areas are matters of growing concern, as they are likely to contribute to heavier loss of life and seriously increasing the economic losses in future disaster damage.