ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

RISKS AND COASTAL PROTECTION

Protecting our coasts requires accurate assessment of vulnerabilities and risk (i.e. erosion, flood risk and long-term habitat deterioration threatening also the environmental heritage) and methods to select and design the best combination of adaptation solutions.

Coastal areas are vital economic hubs in terms of settlement, industry, agriculture, trade and tourism to mention some key sectors. The University of Bologna research develops a systematic approach to deliver both a low-risk coast for human use and preserved healthy habitats for evolving coastal zones, subject to multiple natural and anthropogenic factors.

Research at the University of Bologna covers a wide range of issues:

- Modelling and forecasting of meteo-marine climate and extreme events, and of processes promoting the coastal vulnerability (subsidence, sea-level rise). Mitigation of related effects such as coastal erosion, flooding, tsunamis and salinization of coastal aquifers
- Design of coastal structures, eco-compatible interventions, multi-functional mitigation measures and non-technological solutions
- Assessment of marine pollution, focusing on synthetic plastics, chlorinated/ non chlorinated xenobiotics and oil spills; and bioremediation measures
- Integrated risk assessment and development of tools for prioritisation of intervention and sustainable decision making useful for relevant authorities
- Contribution to the implementation of national and European directives and laws

HIGHLIGHTS

Design of technological and non-technological innovative adaptation solutions to coastal floods:

FP7 Project **THESEUS** - *Innovative technologies for safer European coasts in a changing climate.*

Development of decision support systems for decision makers to assess impacts and risk:

H2020 Project **BRIGAID** - *Bridging the gap for innovations in disaster resilience*.

Biotechnological **solutions to remediate marine pollution** by means of enrichment/isolation of marine aerobic and anaerobic mixed consortia/pure bacterial strains able to degrade conventional petroleum-based synthetic **plastics, hydrocarbons** and **chlorinated xenobiotics**:

H2020 **INMARE** - *Industrial Applications of Marine Enzymes: Innovative screening and expression platforms to discover and use the functional protein diversity from the sea*. JPI **Plastox** - *Direct and indirect ecotoxicological impacts of microplastics on marine organisms*. FP7 **BIOCLEAN** - *New biotechnological approaches for biodegrading and promoting the environmental biotransformation of synthetic polymeric materials*; **KILL SPILL** - *Integrated Biotechnological Solutions for Combating Marine Oil Spills*; **ULIXES** - *Unravelling and exploiting Mediterranean Sea microbial diversity and ecology for xenobiotics' and pollutants' clean up2*.

Interdepartmental Centres for Industrial Research (CIRI) "Building and Construction" and "Energy and Environment" develop and transfer respectively innovative technologies and methods for the design of innovative infrastructures in the sea and control of environmental quality and for the management of natural resources.