

Land-Ocean Interactions in the Coastal Zone (LOICZ)

Global change and the coastal zone: current LOICZ science activities

A. Newton

Winston Churchill said “*All men make mistakes, but only wise men learn from their mistakes*” ...and maybe wise men should learn from the mistakes of others? It is a grave concern that the same mistakes are repeated time and time again at different locations and times around the coast of the world. There are many examples and case studies of problems in the coastal zone and LOICZ – the Land-Ocean Interactions in the Coastal Zone core project – is now synthesizing these and organizing them into categories. The categories include erosion, from damming of rivers and physical disruption of the coastal dynamics by coastal engineering; eutrophication and hypoxia from agriculture, animal rearing, processing of organic matter and sewage; changes in land use leading to the destruction of mangroves, salt-marshes and wetlands; urban development in a flood prone low-lying coastal zone; as well as overexploitation of biotic and abiotic resources. In extreme cases, these problems result in massive loss of life and property, as well as translocation of populations.

Case studies

LOICZ has invited coastal scientists from around the world to submit well-documented case studies of such problems and are now analyzing the case studies using a similar method-

ology. The project has developed a series of simple questions that are based on the DPSIR (driver-pressure-state-impact-response) framework (OECD, 1993)[1]. This framework links economic drivers through to the impacts on the environment, on the ecology, on the economy, on society and health. Societal responses are also being categorized as governance, policy, management, technological and engineering, educational and scientific responses.

Solutions

But LOICZ scientists are interested in solving, not just studying coastal environmental problems. LOICZ is seeking to provide innovative solutions to these common coastal problems rather than yet more studies. One of the major challenges is the different scales of the systems, but also the degree of development. Although several mega-cities are coastal, many of them still lack adequate infrastructure, such as urban wastewater treatment. The intent of LOICZ scientists is to inspire, manage and produce timely syntheses and assessments on key coastal issues and the watershed. We are developing a user-friendly toolbox to help coastal scientists and managers. These include well-established tools such as the biogeochemi-

cal budgets as well as new tools such as conceptual diagrams and report cards. LOICZ is at present researching how to link the biogeochemical model with the LOICZ typology and ASSETS, an assessment of estuarine eutrophication methodology.

LOICZ is using cross-cutting workshops to test these tools in the global coastal context and thus achieve regional syntheses. The current theme of the cross-cutting workshops and research is coastal lagoons. LOICZ has carried out a study of Indian lagoons (see the LOICZ newsletter *INPRINT* 3 (2008)). The next study will be of the lagoons of the Middle East and North Africa region, and a workshop will be held in Rabat 11-16 May 2009.

LOICZ scientists are also working with scientists from other projects to bridge and link their initiatives together. For example, LOICZ and IGBP's Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) project have been working together to develop an implementation strategy for continental margins research.

Climate tourism in coastal zones

LOICZ and the International Human Dimensions Programme (IHDP) have also been investigating water consumption by the tourism sector in Southern Europe. The Mediterranean climate with warm, wet winters and hot, dry summers makes this region an attractive tourist destination for North Europeans and also the site of many second homes. Whole coastal stretches are devoted to the socio-economic activity of tourism, such as the Algarve (Portugal), the Costa del Sol (Spain), the Côte d'Azur (France) and the Amalfi coast (Italy). The peak tourist season during

July-September, when excessive water extraction supports the consumption by tourists and their activities (eg. golf courses and swimming pools), also coincides with the driest season of the year. A pilot study of the use of water by tourists was made in the coastal area of the Algarve, Portugal. The results of the study will be used for a larger-scale study of water use by tourism in the Mediterranean region, including seasonal migration, environmental change, water scarcity, governance and human security. The report will be communicated to stakeholders and decision makers such as the regional tourist office, the regional water provider, the regional environment agency and the National Water Institute.

LOICZ hopes to replicate this pilot study in the coming years throughout the Mediterranean and in other regions of the world that experience “climate” tourism.

Scientists are increasingly aware that many coastal zones are experiencing regime changes. Management measures are often insufficient to reverse the damage done to coastal ecosystem structure and function. The effect of global change on the coastal zone is difficult to quantify, but in many cases the degradation of coastal systems seems to have passed a threshold. We are walking along a cliff-top in thick fog, not knowing where the edge is. Although we are navigating through a “perfect storm” of economic

turbulence, mankind cannot consider environmental issues to be a luxury. Coastal ecosystem goods and services continue to be misunderstood, undervalued and mismanaged, taking us ever further from sustainable use of the very ecosystems that we ultimately depend on.

Alice Newton

LOICZ SSC Chair

Faculty of Science and Technology

University of Algarve, Portugal

Email: anewton@ualg.pt

References

1. OECD. 1993. OECD Core Set of Indicators for Environmental Performance Reviews. A Synthesis Report by the Group on the State of the Environment. OECD, Paris.

How to get involved in LOICZ science

If you wish to participate in the global survey of case studies on coastal zone depredation, please submit your study to Alice Newton, anewton@ualg.pt. You should describe the case study in two to three paragraphs, attach a visual for which you have copyright and answer the questions below:

- What was the main driver of the change?
- Why did things go wrong and how?
- What were the main pressures?
- Were there any indicators of change of state; what were they and why were they ignored?
- Was there any foresight or environmental impact assessment?
- Was this ignored or did no-one think about the consequences and impacts?
- Were ecosystem goods and services ravaged or misunderstood?
- Were the impacts environmental, ecological, economic, social?
- Is it reversible with appropriate response or are we now so far into another “stable” state that we may not be able to go back?
- What can we learn from this?

To participate in the pilot study on coastal tourist areas in the Mediterranean, and other coastal tourist localities, contact Alice Newton at anewton@ualg.pt.

And for more information:

- **on the biogeochemical budgets**, with new tools such as conceptual diagrams and report cards, please contact Dennis Swaney, dps1@cornell.edu. And look up
 - ASSETS, the assessment of estuarine eutrophication methodology, see <http://www.eutro.org/>.
 - conceptual diagrams and report cards, see <http://ian.umces.edu/>
- **on Lagoons**
 - Workshop on Indian Lagoons, in the LOICZ newsletter *IMPRINT 3* (2008) page 16, <http://www.loicz.org/products/publications/newsletter/index.html.en>
 - Participate in the workshop on Lagoons in the Middle East and North Africa, Rabat 11-16 May 2009, contact Prof. Maria Snoussi, snoussi@fst.ac.ma.