



INTERNATIONAL WATERS RESULTS NOTES

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The Role of the Coastal Ocean in the Disturbed and Undisturbed Nutrient and Carbon Cycles

GEF ID#: 514 GEF Agency Project ID# GF/1100-99-07 Project Status: Completed



1. The project developed 170 budget models for nutrients and carbon sites in coastal areas around the world, representing the aggregated effect of all the living components of the coastal ecosystem on nutrient fluxes and transformations as net ecosystem metabolism
2. Nine (9) regional and global assessments of the nutrient/carbon status and the impacts of enhanced nutrients on coastal waters were completed
3. A combined 3-region report and a global report were published with supplementary CDs and a global synthesis volume as part of the LOICZ Synthesis Book.

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PROJECT OBJECTIVE

The goals of the project were 1) To estimate the impact of nutrient enrichment on coastal water; 2) To estimate the changes on regional and global biochemical cycling of nutrients and carbon flux from coastal and shelf seas to the atmosphere; 3) To assist governments in assessing the role of their coastal waters as sinks/sources of carbon; 4) To resolve scientific uncertainties concerning the Global Carbon Cycle.

RESULTS: PROCESS

INDICATOR#1 (Training of developing country scientists as regional advisors on methods and analyses, establishing a network of trained modelling advisors in developing region + Regional workshops held)

An essential aspect of the project involved advanced training for 10 scientists; 4 acted as regional mentors, 5 acted as national focal points; 1 acted as project analyst. All 10 were involved in network building, being resource people for training workshops and two were extended into postgraduate training (1 PhD and 1 MSc candidature). A network of trained modeling advisors was set up in developing regions, with about 180 scientists trained and continuing in the network. Additional scientists are being trained through adoption of methodologies in University curricula (e.g., South Africa, Philippines, Mexico, Brazil, Russia, Black Sea area). Networks continue to grow through the on-going LOICZ programme.

The project adopted a Driver-Pressure-State-Impact-Response (DPSIR) framework as a means to extend the analysis subsequent to the assimilation of the data from the budget sites and initial correlation with human factors through the typology.

INDICATOR#2 (Regional budget workshops held)

A first tier of 8 preliminary regional workshops was held over a period of 20 months, beginning in 1999 and taking place in Central America, Southwest Atlantic, East Africa, West Africa, Northwest Pacific, East Asia, South Asia, and the Southeast Pacific. This was followed by a second tier of more synthetic workshops organized by ecosystem and climate type that cross-cut geographic regions and involved regional leaders.

RESULTS: STRESS REDUCTION

INDICATOR#1 (The LOICZ Biogeochemical budget modeling methodology provides an assessment technique that can be applied to coastal ecosystems)

The coastal zone comprises less than 20% of the Earth's land surface area, but contains over 40% of the human population, 75% of cities with over 10 million inhabitants, yields 75% of the world's fisheries and provides over 25% of global biological productivity.

Along with the combined controls on nutrient loads, it was shown that both population density and run-off are major anthropogenic drivers of change. In addition, coastal classifications – most notably dissolved inorganic phosphorus and dissolved inorganic nitrogen loads – can be used as flux predictors, and the additional data and tools required to fully implement up-scaling approaches were identified.

INDICATOR#2 (Use of project outputs in national planning and nutrient reduction)

LOICZ-IPO has reported that the tools and methods developed under LOICZ are being utilized in the North Sea, South Africa, and the USA.

Discussions have taken place on the relevance of nutrient fluxes to coastal oceans in UNEP-GPA, reflecting the institutional dimensions such as the Water Framework Directives and regional seas planning which draw on methodologies and findings of this project.

RESULTS: WATER RESOURCE AND ENVIRONMENTAL STATUS

INDICATOR#1 (Publication of regional and global assessments of the nutrient/carbon status and impacts of enhanced nutrients to coastal waters)

Nine (9) regional reports and a global assessment have been completed, during which a nutrient load model was developed and applied to regional differentiation of disturbance to coastal systems. In addition, a combined 3-region report and a global report was published with supplementary CDs and a global synthesis volume as part of the LOICZ Synthesis Book.

An assessment of relative carbon sinks/sources of near coastal seas was completed and peer-review publications were released. Hardcopy reports and CDs containing analyses of impacts of enhanced nutrients on coastal carbon flux were distributed and uploaded to the LOICZ website. Peer review literature has been published and is continuously in preparation. In addition, a policy and management related synthesis is published and globally distributed.

INDICATOR#2 (Additional nutrient and data models to website)

About 170 budget models were developed in workshops, while more continue to be contributed. About 400 have now been developed by the ongoing work of LOICZ. There were 40 budget models in place before the start of the project, but the focus during its implementation was on sub-tropical and tropical sites where data was previously limited, enabling more comprehensive global assessments to be made.

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