

MARINE AND COASTAL ECOSYSTEMS AND HUMAN WELL-BEING

Synthesis

**A synthesis report based on the findings
of the Millennium Ecosystem Assessment**





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FOREWORD

Humankind depends on the oceans and coasts for its survival, with one third of the world's population living in coastal areas, approximately 4 percent of Earth's total land area. Global changes and a range of other drivers are causing degradation or loss of ecosystem services. Changes to ecosystem services such as food security and employment of nearly 38 million people in the fisheries industry will cause impacts that will reach far beyond the coastal zone.

The Millennium Ecosystem Assessment (MA) is an international initiative that began in 2001 under the auspices of the United Nations. The MA establishes a collaborative and scientific approach to assess ecosystems, the services they provide, and how changes in these services will impact upon human well-being. More than 1,360 leading scientists from 95 countries carried out the Assessment under the direction of a Board that included representatives of four international conventions—the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the Ramsar Convention on Wetlands of International Importance, and the Convention on Migratory Species (CMS)—five United Nations agencies, and international scientific organizations, as well as leaders from the private sector, nongovernmental organizations, and indigenous groups.

This report is a synthesis of the findings from the reports of the MA working groups (conditions and trends, scenarios, response and sub-global assessments) concerning marine and coastal ecosystems. UNEP-WCMC and UNEP's Division of Early Warning and Assessment (DEWA) have coordinated the production of this synthesis report in recognition that the loss of marine and coastal services has impacts on human well-being.

The aim of this synthesis report is to contribute to the dissemination of the information contained within the MA to decision-makers and a wide range of stakeholders of marine and coastal ecosystems through seven key messages. In addition it is envisaged the information contained within this synthesis report will contribute to larger international processes such as the Global International Waters Assessment (GIWA), Global Biodiversity Outlook (GBO), the Global Marine Assessment (GMA), Global Environmental Outlook (GEO), the Regional Seas, the CBD and the Ramsar Convention.

The Netherlands Ministry of Foreign Affairs, Development Cooperation, kindly funded the preparation and publication of this report. This synthesis report has only been possible due to the efforts and commitment of the authors and reviewers, of the MA working groups who contributed their time and knowledge to the development of the assessment. I would like to express my gratitude to the team that prepared this synthesis report.

I hope that this synthesis report will provide a tool that will help those who hold the responsibility for the conservation and sustainable use of our marine and coastal ecosystems through the employment of effective policy, legislative and response options.

Klaus Toepfer
Executive Director,
United Nations Environment Programme

PREFACE

The Millennium Ecosystem Assessment (MA) was carried out between 2002 and 2005 to assess the consequence of ecosystem change for human well-being and to analyse the options available to enhance the conservation and sustainable use of ecosystems. The main findings of the MA were released on March 30, 2005.

The human species, while buffered against environmental changes by culture and technology, is ultimately fully dependent on the flow of ecosystem services. The MA analyses ecosystem services at global and sub-global (local or regional) scales in terms of current conditions and trends, plausible future scenarios, and possible responses for sustainable resource use.

What are ecosystems and ecosystem services?

An *ecosystem* is a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit. The conceptual framework for the MA assumes that people are integral parts of ecosystems and the Report focuses on examining the linkages between ecosystems and human well-being and in particular on 'ecosystem services', which are the benefits that people obtain from ecosystems. (See Figure A.) Ecosystem services include:

provisioning services such as food, water, timber, and fibre;

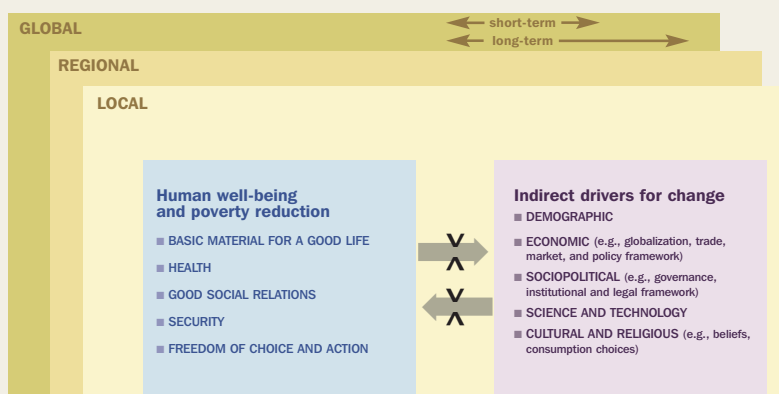
regulating services such as the regulation of climate, floods, disease, wastes and water quality;

cultural services such as recreational, aesthetic, and spiritual benefits; and

supporting services such as soil formation, photosynthesis, and nutrient cycling.

Figure A MA CONCEPTUAL FRAMEWORK OF INTERACTIONS AMONG BIODIVERSITY, ECOSYSTEM SERVICES, HUMAN WELL-BEING, AND DRIVERS OF CHANGE

Changes in drivers that indirectly affect biodiversity, such as population, technology, and lifestyle (upper right corner), can lead to changes in drivers directly affecting biodiversity, such as the catch of fish or the application of fertilizers to increase food production (lower right corner). These result in changes to biodiversity and ecosystems services (lower left corner), thereby affecting human well-being. These interactions can take place at more than one scale and can cross scales. For example, international demand for



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