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The world's mangroves 1980–2005

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A thematic study prepared in the framework
of the Global Forest Resources Assessment 2005

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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FAO is grateful for the support of all countries, organizations and experts inside and outside the organization that have made this study possible. Institutional and individual contributors are listed in Annex 1. FAO also recognizes the important collaboration, support and financial resources provided by the International Tropical Timber Organization (ITTO) in the framework of the interagency initiative for a revised *World atlas of mangroves*.

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Foreword

Mangroves are commonly found along sheltered coastlines in the tropics and subtropics where they fulfil important socio-economic and environmental functions. These include the provision of a large variety of wood and non-wood forest products; coastal protection against the effects of wind, waves and water currents; conservation of biological diversity, including a number of endangered mammals, reptiles, amphibians and birds; protection of coral reefs, sea-grass beds and shipping lanes against siltation; and provision of habitat, spawning grounds and nutrients for a variety of fish and shellfish, including many commercial species.

High population pressure in coastal areas has, however, led to the conversion of many mangrove areas to other uses, including infrastructure, aquaculture, rice and salt production. Numerous case studies describe mangrove losses over time, but information on the status and trends of the extent of mangroves at the global level has, so far, been scarce.

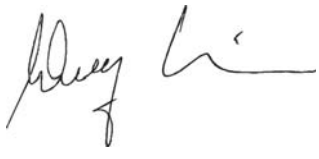
The first attempt at estimating the total mangrove area in the world was undertaken as part of the FAO/United Nations Environment Programme (UNEP) Tropical Forest Resources Assessment in 1980, where the world total was estimated as 15.6 million hectares. More recent estimates have ranged from 12 to 20 million hectares. Countries with small areas of mangroves have been excluded from many studies because of lack of information and because their combined area of mangroves would not significantly affect the world total.

With the preparation of the present report, FAO aims to facilitate access to comprehensive information on the current and past extent of mangroves in all countries and territories in which they exist. The information provided in this report, as well as the gaps in information that it highlights, will assist mangrove managers and policy- and decision-makers worldwide.

The results obtained indicate that global mangrove area is currently about 15.2 million hectares, with the largest areas found in Asia and Africa, followed by North and Central America. An alarming 20 percent of mangrove area, or 3.6 million hectares, has been lost since 1980. More recently, the rate of net loss appears to have slowed down, reflecting an increased awareness of the value of mangrove ecosystems, but the annual rate of loss is still disturbingly high.

As mentioned in this study, changes in methodologies and definitions over time make it difficult to compare results from different assessments. Regular updating of information on the extent and condition of mangroves is needed as an aid to policy- and decision-making for the conservation, management and sustainable use of the world's remaining mangrove ecosystems.

The findings of the present study will also contribute to the revised edition of the *World atlas of mangroves*, first published in 1997 by the International Society for Mangrove Ecosystems (ISME) in collaboration with the International Tropical Timber Organization (ITTO) and the UNEP World Conservation Monitoring Centre (UNEP-WCMC). The second edition is being developed as a joint initiative of ISME, ITTO, the Man and the Biosphere Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO), UNEP-WCMC, the International Network on Water, Environment and Health of United Nations University, and FAO. The atlas will promote conservation, restoration, management and sustainable use of mangrove ecosystems. Further information on and contacts for this initiative are available at www.fao.org/forestry/site/mangrove-atlas.



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Acronyms and abbreviations

FRA	Global Forest Resources Assessment
GIS	Geographic Information System
ISME	International Society for Mangrove Ecosystems
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
SIDS	small island developing states
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNU	United Nations University

Executive summary

High population pressure in coastal areas has led to the conversion of many mangrove areas to other uses and numerous case studies describe these mangrove losses over time. Nevertheless, information on the current status and trends in the extent of mangroves at the global level is scarce.

With the preparation of the present report, FAO aims to facilitate access to comprehensive information on the current and past extent of mangroves in all countries and areas in which they exist. The information provided in this report, as well as the gaps in information that it highlights, will serve as tools for mangrove managers and for policy- and decision-makers worldwide.

The world's mangroves 1980–2005 was prepared in collaboration with mangrove specialists throughout the world and was cofunded by the International Tropical Timber Organization (ITTO). It builds on a 1980 assessment by FAO and the United Nations Environment Programme (UNEP), on the FAO Global Forest Resources Assessment 2000 (FRA 2000) and 2005 (FRA 2005), and on an extensive literature search and communication with mangrove and forest resources assessment specialists.

Some 2 900 national and subnational data sets on the extent of mangrove ecosystems have been collected during this process, permitting the compilation of an updated list of the most recent reliable estimate for each of the 124 countries and areas in which mangroves are known to exist. Regression analyses based on historical data provided revised estimates for 1980, 1990, 2000 and a forecast for 2005 for each country. Changes in definitions and methodologies over time make it difficult to compare results from different assessments, and the extrapolation to 2005 was constrained by the lack of recent information for a number of countries. This estimate is thus indicative and is likely to change when results from ongoing and future assessments become available.

The results obtained indicate that global mangrove area currently equals about 15.2 million hectares, with the largest areas found in Asia and Africa, followed by North and Central America. An alarming 20 percent, or 3.6 million hectares of mangroves, have been lost since 1980. More recently, the rate of net loss appears to have slowed down, although it is still disturbingly high. About 185 000 ha were lost every year in the 1980s; this figure dropped to some 118 500 ha per year in the 1990s and to 102 000 ha per year (–0.66 percent) during the 2000–2005 period, reflecting an increased awareness of the value of mangrove ecosystems.

Even though mangroves are often used for the collection of wood forest products and as a source of subsistence for local populations, removal of wood and non-wood forest products is rarely the main cause of the loss of mangroves. Human pressure on coastal ecosystems and the competition for land for aquaculture, agriculture, infrastructure and tourism are often high and are major causes of the decrease in area reported. The relatively large negative change rates that occurred in Asia, the Caribbean and Latin America during the 1980s have been caused primarily by large-scale conversion of mangrove areas to aquaculture and tourism infrastructure.

Regular updating of information on the extent and condition of mangroves is needed as an aid to policy- and decision-making for the conservation, management and sustainable use of the world's remaining mangrove ecosystems.