GLOBAL FOREST RESOURCES ASSESSMENT 2005
THEMATIC STUDY ON MANGROVES
VIET NAM
COUNTRY PROFILE

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The purpose of this paper is to provide early information on on-going activities and programmes, to facilitate dialogue, and to stimulate discussion.

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INTRODUCTION

Mangroves are found along sheltered coastlines in the tropics and sub-tropics where they fulfil important functions in terms of providing wood and non-wood forest products, coastal protection, conservation of biological diversity and provision of habitat, spawning grounds and nutrients for a variety of fish and shellfish. High population pressure in coastal areas has led to the conversion of many mangrove areas to other uses and numerous case studies describe mangrove losses over time. However, information on status and trends at the global level is scarce. The first attempt at estimating the total mangrove area in the world was undertaken as part of the FAO/UNEP Tropical Forest Resources Assessment in 1980, where the world total was estimated as 15.6 million hectares. More recent estimates range from 12 to 20 million ha. For many of these studies, countries with small areas of mangroves were excluded due to lack of information and because their combined area of mangroves would not significantly affect the world total.

A recent initiative by FAO aimed at facilitating access to comprehensive information on the current and past extent of mangroves in 121 countries and areas (FAO. 2003). This built on the earlier FAO/UNEP assessment and on the recent FAO Global Forest Resources Assessment 2000 (FRA 2000). An extensive literature search yielded additional information. More than 2800 national and sub-national datasets were collected, with the earliest estimates dating back to 1918. One of the results was an updated list of the most reliable, recent estimate for each country, mostly based on inventories or analysis of remote sensing imagery. Regression analyses based on earlier data provided estimates for 1990 and 1980 and an extrapolated estimate for 2000 for each country.

The preliminary results of this initiative showed that mangrove deforestation continues, albeit on a slightly lower rate in the 1990s than in the 1980s. The relatively large mangrove deforestation rates in Asia, the Caribbean and Latin America in the 1980s reflect large-scale conversion of mangroves for aquaculture and tourism infrastructure. Most countries have now banned the conversion of mangroves for aquaculture purposes and require environmental impact assessments prior to large-scale conversion of mangroves areas for other uses.

In order to provide the most accurate and comprehensive evaluation of current mangrove status, FAO is presently updating the above cited preliminary results, which have been sent out to all countries and areas in which they exist (124) for information and validation. Additional literature search, active collaboration with national and international mangrove experts and the use of remote sensing imagery interpretation have further supported the preparation of the final report, which will be published in 2005.

Readers are strongly encouraged to provide feedback and additional information to help update and improve this database for the benefit of all those who may have an interest in mangroves.
Viet Nam

Vegetation description

Viet Nam has a long coastline facing the South China Sea. The largest areas of mangroves in the country are those found in the Mekong Delta, near Ho Chi Minh City, in the Songkoi Delta and further south on the Ca Mau peninsula. Along the central parts of the country only few areas are covered by mangroves since the coastline is generally very rocky and influenced by strong water actions and tidal fluctuations are low; in this zone narrow strips of mangroves are found only along the riverbanks. In the north, mangroves have developed in river deltas and estuaries and on wide tidal flats. There are fewer species here than in the south of the country, possibly due to the lower temperatures, but there are some primary forests with mixed stands of trees reaching 8 m in height. *Rhizophora* and *Bruguiera* trees make up three-quarters of the thriving forests. The main mangrove species in the Camau Peninsula are *Rhizophora apiculata* (syn *R. conjugata*), *Bruguiera gymnorrhiza*, *Ceriops decandra* (syn *C. roxburghiana*) and *Lumnitzera littorea* (syn *L. coccinea*).

Uses and threats

Viet Nam has a very old tradition of mangrove use; they have a wide range of utilization such as charcoal (especially produced from *Rhizophora apiculata* and *Bruguiera parviflora*), fuelwood, honey production, traditional medicines, timber and thatching materials. The charcoal and tannin production have now slowed down, the first because of the impoverishment of the resources and the latter because of the replacement with synthetic tannin. Overexploitation, conversion of mangroves to agricultural land and salt ponds, human settlements, and particularly shrimp aquaculture definitely caused the most serious forest loss in the country. In the south many villages consist of houses built on stilts on the river banks and people make a good part of their living from fish, shrimp and crab fisheries. Severe erosion has occurred in some areas as a direct result of this and vast areas have degraded soils where mangroves have not regenerated, or have formed scrubby and commercially worthless formations. Since the 1980s there have been further considerable losses, particularly in the southwest, with the development of shrimp ponds. Conversion of land to salt ponds and to agriculture has also been widespread, although the latter, only lasts a few years before the soils become degraded.

The original area of mangroves has been reduced considerably, mainly due to the chemical warfare (herbicides and napalm) undertaken during the Viet Nam war (1962-1972) as mangrove forests served as bases for military operations. Thousand of hectares of mangroves have been destroyed in the eastern part of the South zone, the coast of the Mekong Delta and the Ca Mau Peninsular, where primary forest is now absent. Remaining forests consist mainly of secondary growth, much of it scrubby, and plantations.

Despite the big forest cover changes suffered by the country over time Vietnam has made considerable efforts to restore mangrove areas and totalizing around 46 600 ha of mangrove plantations. Afforestation efforts begun in 1975, after the unification of the country and were repeated in the early 1990s, when the Government of Viet Nam rehabilitated nearly 53 000 ha. In addition various foreign NGOs supported mangrove rehabilitation projects and around 14 000 ha have been planted from 1991 to 2002 in eight provinces (Quang Ninh, Hai Phong, Ninh Binh, Thanh Hoa, Nghe An, Ha Tinh, Thai Binh and Nam Dinh). Rehabilitation efforts revealed to be successful, thanks to the close cooperation between funding agencies, local authorities and people, and to the mangrove related strategies approved by the Government. In addition, some mangrove nature reserve (i.e. Tien Hai Nature Reserve, the Thanh Phu
Nature Reserve and the Bac Lieu Sanctuary) and two national park (i.e. Xuan Thuy National Park and the Ca Mau National Park) have been also set up in recent years.


National level mangrove estimates

In order to provide the whole range of the information currently available on mangrove area extent for this country, all the national level mangrove area estimates collected so far have been reported in the following table.

Differences in methodologies, classifications, mapping scales etc. may have led to discrepancies in estimations. Only the figures considered as the most accurate and reliable (marked in the Trend column in this table) have been used for the analysis of the area changes over time; the remaining have been reported, but not used for the trend analysis.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (ha)</th>
<th>Source</th>
<th>Trend</th>
<th>Methodology/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>400 000</td>
<td>Ibid.</td>
<td>X</td>
<td>Calculated basing on Granich, S., Kelly, M. and N. Huu Ninh. 1993. (see below) Before 1960 Viet Nam had 400 000 ha of mangroves; between 1962 and 1971 104 123 ha have been destroyed during the war.</td>
</tr>
<tr>
<td>1965</td>
<td>320 000</td>
<td>FAO, UNEP. 1981. Tropical Forest Resources Assessment Project, Forest Resources of Tropical Asia FAO, UNEP, 475 pp</td>
<td>X</td>
<td>Remote sensing</td>
</tr>
<tr>
<td>Year</td>
<td>Area (ha)</td>
<td>Source</td>
<td>Trend</td>
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Mangrove species checklist

Following Tomlinson 1987 classification, mangroves may be divided into three groups according to their features: major elements (strict or true mangroves), minor elements and mangrove associates. Tomlinson list of true mangrove species have been here modified by adding some species commonly found as exclusive mangrove species (Saenger et al. 1983)

In the context of this assessment, only true mangrove species found in the present country will be reported:

Acanthus ebracteatus
Acanthus ilicifolius
Acrostichum aureum
Aegiceras corniculatum
Aegiceras floridum
Avicennia alba
Avicennia marina
Avicennia officinalis
Bruguiera cylindrica
Bruguiera gymnorrhiza
Bruguiera parviflora
Bruguiera sexangula
Ceriops decandra
Ceriops tagal
Excoecaria agallocha
Heritiera littoralis
Kandelia candel
Lumnitzera littorea
Lumnitzera racemosa
Nypa fruticans
Rhizophora apiculata
Rhizophora mucronata
Rhizophora stylosa
Scyphiphora hydrophyllacea
Sonneratia alba
Sonneratia caseolaris
Sonneratia ovata
Xylocarpus granatum
The estimate for 2005 is an expert estimate based on the qualitative information currently available. The plantation efforts currently undergoing in the country may have balanced the small changes occurred since 2000.
Summary status of mangrove area extent over time

<table>
<thead>
<tr>
<th>Country</th>
<th>Most reliable, recent mangrove area estimate</th>
<th>Mangrove area estimate 1980</th>
<th>Mangrove area estimate 1990</th>
<th>Mangrove area estimate 2000</th>
<th>Mangrove area estimate 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viet Nam</td>
<td>ha</td>
<td>year</td>
<td>ha</td>
<td>ha</td>
<td>ha</td>
</tr>
<tr>
<td></td>
<td>157 500</td>
<td>2000</td>
<td>269 150</td>
<td>213 500</td>
<td>157 500</td>
</tr>
</tbody>
</table>

References


Explanatory notes

Figures used for trends
The estimates used for the trend analysis have been marked with an “X” in the “Trend” column of the national level mangrove estimates table; they have been coloured in green - with no patterns - in the chart.

Most recent reliable figures
The figure chosen as the most recent reliable is underlined in the national level mangrove estimates table; it has been bolded in the chart.

Formulas used for the trend analysis
Polynomial trend line:
\[ y = b + c_1 x + c_2 x^2 + c_3 x^3 + \ldots + c_n x^n \]
where \( b \) and \( c_1 \ldots c_n \) are constants.