

# Mangrove Management Handbook

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COASTAL RESOURCE MANAGEMENT PROJECT

of the



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UNITED STATES AGENCY  
FOR INTERNATIONAL DEVELOPMENT

# MANGROVE MANAGEMENT HANDBOOK

by

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**Front cover:** *Background:* A portion of a multi-age and multi-layered canopy of mangrove plantation in Banacon Island, Getafe, Bohol, Philippines, using *Rhizophora stylosa*. The tree is focused on the lower left corner of the cover. *Center:* Coastal community members in Tambobo Bay, Siit, Siaton, Negros Oriental – fishing on the river with intact natural mangrove vegetation. **Back cover:** *Left:* School children with mangrove propagules before planting to protect their school building from strong waves, Inabanga, Bohol, Philippines. *Right:* Participants in a mangrove trainors training during a practicum on mangrove plantation establishment in Sta. Cruz, Davao del Sur, Philippines. Photos by C.E. Yao.

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# List of acronyms

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AWP/RUP	Annual Work Plan/Resource Use Plan
ANR	Assisted Natural Regeneration
BFAR	Bureau of Fisheries and Aquatic Resources
CBFMA	Community-Based Forest Management Agreement
CDA	Cooperative Development Authority
CDF	Countryside Development Fund
CENRO	Community Environment and Natural Resources Office
CIDA	Canadian International Development Agency
CO	Community Organizer
CRMF	Community Resource Management Framework
CRMP	Coastal Resource Management Project
CSC	Certificate of Stewardship Contract
DA	Department of Agriculture
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOLE	Department of Labor and Employment
EO	Executive Order
FLA	Fishpond Lease Agreement
GIS	Geographic Information System
GPS	Global Positioning System

HHW	Higher High Water
IRA	Internal Revenue Allotment
IRUP	Interim Resource Use Permit
ISFP	Integrated Social Forestry Program
LGU	Local Government Unit
LLW	Lower Low Water
MAO	Municipal Agricultural Officer/Municipal Agriculture Office
MC	Memorandum Circular
MFA	Mangrove-Friendly Aquaculture
MHHW	Mean Highest High Water
MLLW	Mean Lowest Low Water
MMC	Mangrove Management Component
MPDC	Municipal Planning and Development Council
MSA	Mangrove Stewardship Agreement
NAMRIA	National Mapping and Resource Information Agency
NGO	Nongovernment Organization
PCRA	Participatory Coastal Resource Assessment
PENRO	Provincial Environment and Natural Resources Office
PO	People's Organization
PPDO	Provincial Planning and Development Officer
SB	<i>Sangguniang Bayan</i>
SEAFDEC	Southeast Asian Fisheries Development Center
SEC	Securities and Exchange Commission
TWG	Technical Working Group

# Foreword

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The Department of Environment and Natural Resources (DENR) takes pride in producing this *Mangrove Management Handbook* as the accepted Philippine government information guide to assist coastal communities in the rehabilitation, management, protection and maintenance of the mangrove forests of the country and the coastal environment as a whole. This handbook will strengthen our capability to enhance the mangrove forests, thereby contributing positively in the productivity and maintenance of coastal ecosystems. It clearly identifies the roles and responsibilities of the communities, the local government units, the field personnel of the department and the other partners in mangrove management and development.

The DENR enjoins all users of this handbook to work together for the sustainable management of our mangrove forest resources.

To this end, the DENR conveys gratitude and appreciation to the Coastal Resource Management Project and the unwavering support of the United States Agency for International Development, for without them this publication would not have been possible.



**DEPARTMENT OF ENVIRONMENT AND  
NATURAL RESOURCES**  
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# Preface

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This *Mangrove Management Handbook* is comprised of six chapters packed full of useful information on how to protect and manage mangroves as a natural and productive resource. It is intended to help people anywhere who wish to become stewards of mangrove forest resources. People's organizations, nongovernment organizations and local government are the primary audience but of course others can benefit from the information presented in this volume.

The mangrove forest resources of the Philippines have deteriorated significantly during the last 50 years. The country now has less than 120,000 hectares of mangroves remaining and much of that is only secondary growth and by no means pristine. The culprits in the decline of mangroves are many but the primary one is conversion to aquaculture ponds and more recently conversion to urban land reclamation and other land uses. If this trend continues, there will be virtually no mangroves left in the Philippines after another 50 years.

The natural ecological and economic benefits lost with mangrove loss are significant and non-retrievable. One hectare of healthy mangrove forest supports fisheries alone worth at least P20,000 (US\$500) per year. In addition, there are values for wood, erosion control and waste absorption that vary from site to site but are minimally worth more than the fisheries value. This means that direct economic revenues from a healthy mangrove forest covering one hectare is conservatively P40,000 (US\$1,000). It is difficult to find a natural system that produces this kind of revenue without any investment except protection, and that has practical and economic values at the same time. As we lose these benefits, we as a society, will pay many times more than the cost of this destruction.

This volume holds many answers about how we can protect and manage our mangroves and how we can increase the area of healthy mangrove forest in the country. These are simple procedures understandable by most people. The key is finding the will power to put them into practical use. Here, political and personal support will make the difference. Let us start saving our mangrove forests now!



**COASTAL RESOURCE  
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- CBFMA Application Guide

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**THE AUTHORS**



# List of scientific names, local terms and glossary of technical terms

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## LOCAL NAME

## SCIENTIFIC NAME

<i>Api-api</i>	-	<i>Avicennia officinalis</i>
<i>Bakauan babae</i>	-	<i>Rhizophora mucronata</i>
<i>Bakauan bato</i>	-	<i>Rhizophora stylosa</i>
<i>Bakauan lalaki</i>	-	<i>Rhizophora apiculata</i>
<i>Bakauan</i>	-	<i>Rhizophora</i> spp.
<i>Bungalon puti</i>	-	<i>Avicennia alba</i>
<i>Bungalon</i>	-	<i>Avicennia marina</i>
<i>Busain</i>	-	<i>Bruguiera gymnorrhiza</i>
<i>Buta-buta</i>	-	<i>Excoecaria agallocha</i>
<i>Diluario</i>	-	<i>Acanthus ebracteatus</i>
<i>Dunjon-lati</i>	-	<i>Heritiera littoralis</i>
<i>Kulasi</i>	-	<i>Lumnitzera racemosa</i>
<i>Lagolo</i>	-	<i>Acrostichum aureum</i>
<i>Langarai</i>	-	<i>Bruguiera parviflora</i>
<i>Nilad</i>	-	<i>Scyphiphora hydrophyllacea</i>
<i>Nipa</i>	-	<i>Nypa fruticans</i>
<i>Pagatpat</i>	-	<i>Sonneratia alba</i> (Gedabu)
<i>Pagatpat baye</i>	-	<i>Sonneratia ovata</i>
<i>Pedada</i>	-	<i>Sonneratia caseolaris</i>
<i>Piapi</i>	-	<i>Avicennia lanata</i>
<i>Pototan lalaki</i>	-	<i>Bruguiera cylindrica</i>
<i>Pototan</i>	-	<i>Bruguiera sexangula</i>
<i>Saging-saging</i>	-	<i>Aegiceras corniculatum</i>
<i>Tabau</i>	-	<i>Lumnitzera littoria</i>
<i>Tabigi</i>	-	<i>Xylocarpus granatum</i>
<i>Tangal</i>	-	<i>Ceriops tagal</i>
<i>Tingloy</i>	-	<i>Acanthus ilicifolius</i>

## LOCAL TERMS

<i>Amatong</i>	-	Fish aggregating device made of piled logs/rocks that serve as a niche to marine life
<i>Babalina</i>	-	Local wine made of coconut sap or juice fermented with <i>tangal</i> bark
<i>Banca</i>	-	Dugout canoe/boat
<i>Bantay-dagat</i>	-	Multisectoral team assigned to check illegal fishing

<i>Bantay-bakauan</i>	-	Multisectoral team assigned to check illegal cutting of mangroves in the coastal area
<i>Barangay</i>	-	Barrio
<i>Dagami</i>	-	Rice stalk
<i>Darak</i>	-	Rice hull
<i>Kagawad</i>	-	Representative of the municipal council ( <i>Sangguniang Bayan</i> )
<i>Sangguniang Bayan</i>	-	Municipal council

## GLOSSARY OF TECHNICAL TERMS

Aquasilviculture	-	Raising mudcrab/shrimp adjacent or under mangroves. Also known as silvofishery
Detritus	-	Mangrove leaf particles coated with microorganism in the process of decomposition
Enhancement	-	Rehabilitation by increasing the number of seedlings of planting desirable species
Hardening	-	The conditioning of seedlings through gradual exposure to sunlight and controlled watering prior to outplanting
Groundtruthing	-	Verifying map data on the ground
Propagules	-	The germinating seeds of the Family Rhizophoraceae while still attached to the mother tree. Also known as viviparous seeds
Wildlings	-	Propagules/seeds that germinate and grow naturally on the forest floor, the characteristic of which resembles that of the seedlings/propagules being raised in the nursery. These are sometimes collected using spade (earth-balled or bare-root) and potted in the nursery
Pericarp	-	The walls of ripened ovary of the fruit