

# CAN GIO PROJECT



## BACKGROUND

Mangroves create unique ecological environments that host rich assemblages of species. The muddy or sandy sediments of the mangroves are home to a variety of invertebrates. Channels within the mangroves support communities of phytoplankton, zooplankton, and fish. Mangroves play a particularly important role for coastal protection and as a nursery habitat for juvenile fish whose adults occupy other habitats. Before the war, mangrove forest in Vietnam occupied a total area of up to 4.000 km<sup>2</sup>, mainly in the South. However, due to over-exploitation for wood, fuel-wood and charcoal, the mangrove forest area was quickly reduced. In addition, massive defoliant spraying during the war from 1962 to 1971 destroyed 1.049 km<sup>2</sup> of forest. This caused considerable losses of timber, and fishing yields decreased drastically. Because of the high economic impact, there was a strong rehabilitation effort to replant mangroves; between 1976 and 1980, more than 60% of the destroyed areas were replanted.

One of the seriously affected sectors was the Can Gio region, situated in an estuarine complex of tidal flats, where the Vam Co, Saigon and Dong Nai rivers discharge into the sea. Once supporting



a natural mangrove forest, it was almost fully destroyed by Agent Orange during the war. Between 1978 and 1986, the area was reforested and in 2000 the Can Gio was designated as Vietnam's first Man and the Biosphere Reserve. With a total area of 75.740 ha, it represents the largest rehabilitated mangrove area in Vietnam.

An important aspect of the present mangrove vegetation of Can Gio is that its composition is strongly influenced by the reforestation, which concentrated heavily on replanting a single species, *Rhizophora apiculata*. Until now, there have been no attempts in Vietnam to compare replanted forests with previously existing natural ones. The ZMT is participating in a multi-institutional, multi-disciplinary research project in Vietnam, focusing on the understanding of the differences in ecosystem functioning between original and regenerated mangrove forests in the Can Gio Biosphere Reserve. This is linked to other subprojects dealing with the fate of nutrient and organic matter in a mangrove dominated land-ocean interaction zone in South Vietnam.



## PROJECT GENERAL OBJECTIVES

It is hypothesized that replanted and natural mangroves differ in the ecosystem functioning. The Can Gio Project aims to deepen our knowledge on:

1. The dynamics of different natural mangroves and replanted forest communities with regard to nutrient and organic matter cycles.
2. The response of benthic fauna to mangrove deforestation and regeneration.
3. The mangrove structure of the Can Gio reserve, including leaf production, litter fall, and detritus formation in both natural and planted forests.



## German-Vietnamese Cooperation in Mangrove Research

## THE RESEARCH AREA

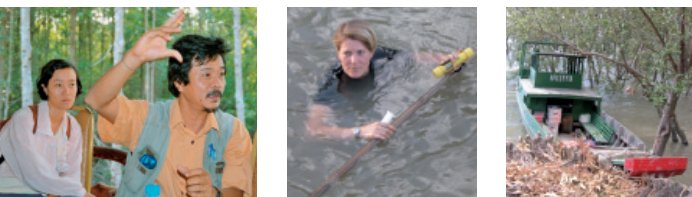
The studies are carried out in the Biosphere Reserve located in the Can Gio District, in South Vietnam, about 65 km south of Ho Chi Minh City (formerly Saigon). It is situated in a typical monsoonal zone with a dry season from November to May and a rainy period from May to October. Average annual rainfall is about 1,336 mm.

Traditionally, the local people have utilized the Can Gio mangrove forest for wood fuel, leaves of the *Nyba* palm for roof thatching, salt production, hunting, and fishery products including fish, shrimp, mussels, and crabs.



## PROJECT OVERVIEW

The Can Gio Project involves various research topics related to forest and benthos ecology, biogeochemistry and sediment dynamics. Investigations are jointly carried out by German and Vietnamese scientists with participation and exchange of Ph. D. and Master students of both countries. Field and laboratory work began in 2003. Project duration is ca. 3 years.



## THE SCIENTIFIC PROGRAM

Integrated studies concerning ecosystem functioning will be conducted by three working groups:

### 1. Forest structure and species composition

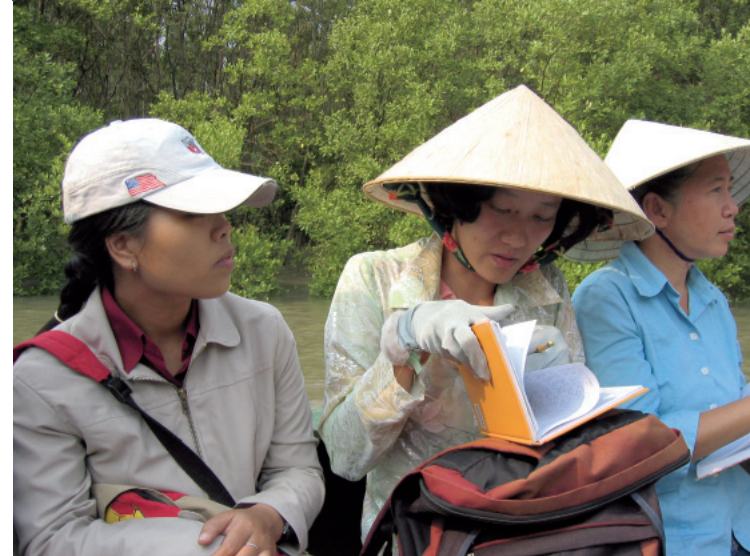
- To describe the differences in forest structure and species composition among mangrove stands of different age classes.
- To compare current mangrove flora with historical vegetation records.
- To infer mangrove ecosystem stability/resilience by using epiphyte communities as a biological indicator.

### 2. Benthic meiofauna

- To infer mangrove ecosystem stability/resilience by using benthic meiofaunal communities as a biological indicator. Analyses will concentrate first on nematodes but may also cover other groups of meiofauna if expertise and resources are available.

### 3. Organic matter and nutrients

- To study the fate of organic matter through the sequence from litter fall and decomposition to available nutrients in the sediment.
- To understand how mangrove structure and age influence the import and export of nutrients.



## TRAINING

The participation and exchange of Ph. D. and Master students of both countries includes stays of several months in Vietnam and in Germany. During that time, intensive training in sampling and analytical methodologies are carried out and lectures on project-relevant topics are held.



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