

# Carbon-neutral silviculture in Matang Mangrove Forest Reserve (Malaysia): a becoming reality?

Barrios Trullols Africa<sup>1</sup>, Hugé Jean<sup>1</sup>, Satyanarayana Behara<sup>2</sup>, and Dahdouh-Guebas Farid<sup>1</sup>

<sup>1</sup> Systems Ecology and Resource Management Research Unit, Université Libre de Bruxelles, Campus de la Plaine, Avenue F.D. Roosevelt 50, 1050 Bruxelles, Belgium  
E-mail: [africabatra@hotmail.com](mailto:africabatra@hotmail.com)

<sup>2</sup> Universiti Malaysia Terengganu, T145, 21300 Kuala Terengganu, Terengganu, Malaysia

There is a growing interest in mangrove forests because of the variety of ecosystem functions, goods and services they provide (*e.g.* buffer against coastal erosion, habitat for fish and shellfish, timber and non-timber forest products). Mangroves are the most carbon-rich forests in the world (Donato *et al.* 2011) and have a high economic potential yet they are facing increasing anthropogenic threats.

Matang Mangrove Forest Reserve (hereafter referred to as MMFR) is located on the northwest coast of Peninsular Malaysia (State of Perak at 04°45'N, 100°35'E) and covers approximately 40000 ha along 52 km of coastline. A large part of the area is covered by *Rhizophora apiculata*, which is the most important mangrove species in terms of commercial timber in the Asia - Pacific region (Ong *et al.* 2004). This reserve is under silviculture management by the Perak State Forestry Department since 1902. More than 30000 ha are exploited for charcoal (in 30 year cycles) and pole production (in 20 year cycles) for national and international trade. After harvesting, the area is replanted with *Rhizophora apiculata* and *R. mucronata* seedlings (Azhar *et al.* 2003).

This management process in Matang involves a series of exploitation activities that emit carbon, whereas other natural processes result in carbon sequestration.

The objective of this study is to calculate the emission of carbon produced by the exploitation activities as well as calculating the carbon sequestered by MMFR mangroves (through a meta-analysis of vegetation growth data). The final result will indicate whether or not the carbon release is outbalanced by carbon sequestration. Preliminary results will be presented, including the relative importance of various management activities with regard to carbon emissions, and the method & findings for calculating carbon sequestration by the mangrove forest.

With this project we aim to enhance the understanding of the potential of mangrove forests as key systems in effective climate change mitigation.

Keywords: mangrove forest; carbon emission; carbon sequestration; charcoal and pole production