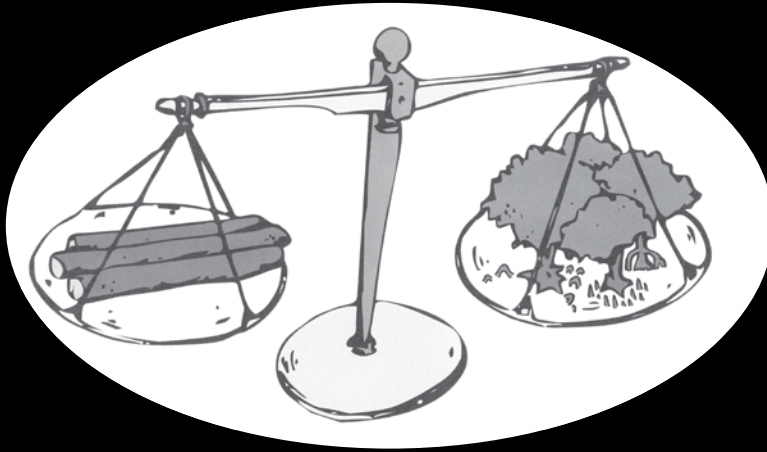


SHORT-TERM GAIN

Short term uses are uses in which mangroves are harvested or converted to another land-use for short term economic gain. Examples of short term mangrove uses include the charcoal industry, shrimp aquaculture and timber. Short term mangrove uses usually benefit only a few individuals. A mangrove area used for short-term gain will not be of substantial economic value for another 15-30 years while new mangrove trees grow.

**SHORT TERM
VS.
LONG TERM**

Mangrove Utilization



LONG-TERM GAIN

Mangrove resources can be managed to provide economic value continuously over a long period of time. Capture fisheries in and near mangroves, sustainable harvest of wood for building and biomass energy (fuel-wood, charcoal), making traditional medicine, raising honey bees among mangroves, and conservation for eco-tourism are examples of economic utilization of mangrove areas that are both long term and sustainable.

Mangrove Action Project
mangroveapp@olympus.net
www.earthisland.org/map.html



Sources: Costanza et. Al. (1997), Ronnback (1999)

Economic Value of Mangrove Ecosystems (per hectare/year)	
3400	Fisheries Products
870	Non-Timber Forest Products
500	Recreation (Eco-tourism)
1700	Storm Protection
6840	Wastewater Treatment & Other Env. Services
13,310	TOTAL VALUE

- Elimination uses*
- Agriculture (rice fields)
 - Aquaculture (shrimp ponds)
 - Fisheries Products
 - Non-Timber Forest Products
 - Recreation (Eco-tourism)
 - Storm Protection
 - Wastewater Treatment & Other Env. Services
- Elimination uses*
- Agaculture (rice fields)
 - Aquaculture (shrimp ponds)
 - Salt ponds
 - Plantations (palm, sugar)
 - Mining
 - Industrial development
 - Urban development
 - Ports
 - Airports
 - Waste assimilation
 - Road Development
 - Pasture and grazing lands
- Source: The Ecology of the Indonesian Seas Volume VIII

- Potentially sustainable uses*
- Fisheries products
 - Food
 - Medicine
 - Honey
 - Alcohol (fuel)
 - Riverbank protection
 - Flood runoff engineering
 - Shoreline protection
 - Prevent salt water intrusion
 - Recreation (eco-tourism)
 - Education
 - Construction timber
 - Wood chips
 - Paper
 - Charcoal
 - Firewood
 - Tannins
- *Potentially implies under appropriate management.



MANGROVE ACTION PROJECT

How Much is a Mangrove Forest



Worth???

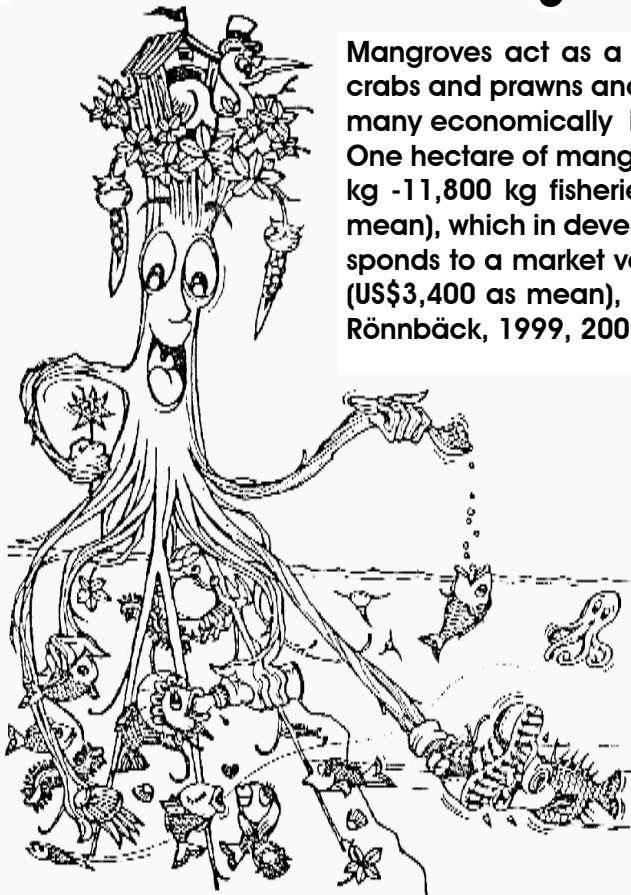
Sustainable Harvest



Mangroves have been cut for centuries for building timbers, firewood, charcoal production and bark for tanning. For example, mangrove poles have been cut in Kenyan and Tanzanian estuaries for some 2,000 years for export to Arab countries. The 40,000 hectares of managed mangrove forest in Matang, West Malaysia yield \$10 million in timber and charcoal and over \$100 million in fish and prawns every year.

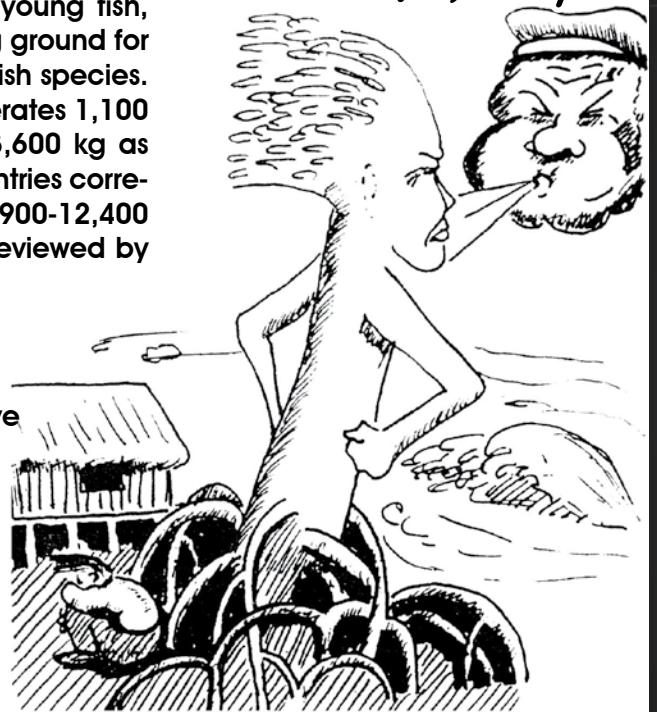
Most economic assessment methods only consider short time scales when valuing resources (3 to 5 years). The growth of mangrove trees varies in different places but they can usually be harvested over a 20-30 year cycle. Direct extractive values of mangroves can be obtained continuously when mangroves are harvested carefully and sustainably, but they lose their value if they are over-harvested.

Fisheries - \$3,400/ha/yr



Mangroves act as a nursery to young fish, crabs and prawns and a feeding ground for many economically important fish species. One hectare of mangroves generates 1,100 kg -11,800 kg fisheries catch (3,600 kg as mean), which in developing countries corresponds to a market value of US\$900-12,400 (US\$3,400 as mean), annually (reviewed by Rönnbäck, 1999, 2000).

Shoreline Protection - \$1,700/ha



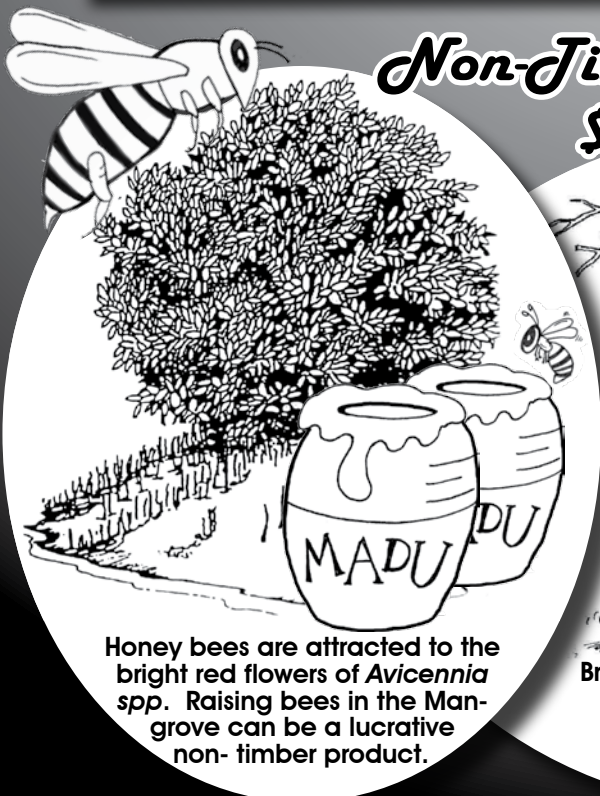
Mangrove forests protect coastal villages from waves & storms.

Although ascribed a value of \$1700/ha. (Costanza et al. 1997), countless people have survived tsunami and typhoons by clinging to mangrove trees such as *Avicennia* and *Nipah*, making them priceless in terms of dollars.

Non-Timber Forest Products

\$870/hectare/yr

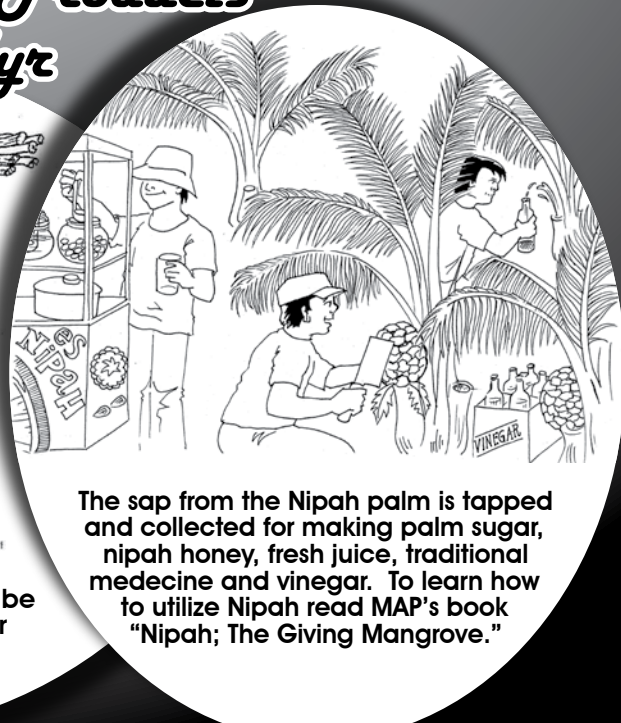
(Costanza et al, 1997)



Honey bees are attracted to the bright red flowers of *Avicennia* spp. Raising bees in the Mangrove can be a lucrative non-timber product.



Branches from mangroves can be gathered along the beach or carefully pruned from living trees for fuel-wood or making charcoal.



The sap from the Nipah palm is tapped and collected for making palm sugar, nipah honey, fresh juice, traditional medicine and vinegar. To learn how to utilize Nipah read MAP's book "Nipah; The Giving Mangrove."