

Association pour le Développement Durable (ADD)



MANGROVE - PROTECTING OUR COASTS FOR POSTERITY

Over the years, fish stocks around Mauritian coasts have dwindled. Large tracts of the coast have continued to degrade. In many places, soil carried by floods have spoiled the sandy beaches. Sea waves and tides incessantly erode the coast leaving extensive areas desolate. The situation has deteriorated with often inconsiderate human action. With sea-level rise and filling of wetlands, salt water intrusion is expected to contaminate underground coastal freshwater resources.

Mangrove is a major instrument in the arsenal of measures that could restore fisheries resources,



protect the beach and boost the economy of the village to alleviate poverty.

A BIT OF HISTORY

Mangrove in ancient history

“In Persia in the Carmanian district, where the tide is felt, there are trees [*Rhizophora mucronata*] . . . [that] are all eaten away up to the middle by the sea and are held up by their roots, so that they look like a cuttlefish”

Theophrastus (370–285 B.C.E). Enquiry into Plants IV, VII. 5; (Translated by Sir Arthur Holt, 1916)

Eighteenth century Mauritius

“Mon hôte (*Capitaine Gautier*) voulut m’accompagner une partie du chemin; nous fûmes en pirogue (*de Flacq*) jusqu’auprès du poste de Fayette. Presque toute la côte est couverte jusque-là de roches brisées et de mangliers.”

(Jacques-Henri Bernardin de Saint-Pierre, Voyage à l’île-de-France (1773).

Mangroves originated most likely from the South-East Asia where more than 90 species are known to exist. The seeds are thought to have been carried by ocean currents dispersing the plant around the world.

THE TWO VARIETIES IN THE REPUBLIC

In Mauritius, only the *Rhizophora mucromuta* and *Burquiera gymnorrhisa* species are found, the former being more common.

Some studies claim that up to four species existed at one time in Mauritius. In Rodrigues, only the *Rhizophora mucromuta* species is present.

Other islands of the Indian Ocean have more species. Seychelles, for example has eight varieties.



‘Manglier’ or rather ‘Palétuvier’

Mangrove is often translated as ‘manglier’ rather than *palétuvier* in Mauritius. In fact the word ‘manglier’ refers to two other species which are not aquatic but grow inland at intermediate altitudes. The two indigenous species belong to the **Sapotaceae** family known in Mauritius as manglier vert (*Sideroxylon cinereum*) and manglier rouge (*Sideroxylon puberulum*).

From a botanical point of view, they are totally different from *Rhizophora mucromuta* and *Burquiera gymnorrhisa* of the coastal regions in Mauritius (*palétuvier* in French).

The confusion in name arises probably from the appearance of very old ‘manglier’ tree – the inside of their trunks are nearly empty and their roots look like stilts.

(Adapted from Guy Rouillard et Joseph Guého’s Histoire des plantes d’intérêt horticole, médicinal et économique à l’île Maurice (1981-1985))

MANGROVE – NATURAL GROWTH AND PROPAGATION

“Le **manglier** croît directement dans la mer. Ses branches et ses racines serpentent sur le sable, et s’y entrelacent de telle sorte qu’il est impossible d’y débarquer.
Son bois est rouge, et donne une mauvaise teinture”

(Jacques-Henri Bernardin de Saint-Pierre, Voyage à l’Île-de-France (1773), (édition de 1835).

SEEDLINGS

The mangrove propagules or seedlings are smooth but elongated like *murunga* fruits with pointed lower ends. When ripe they fall and may penetrate the soft sediment below and take a foot hold and thus grow naturally. Some are carried by the ocean current and grow elsewhere. Areas sheltered from local currents may not be favourable for the growth of propagules.

Mangrove propagules develop roots in a few weeks. Otherwise, they may remain viable in seawater for several months. They serve as food for crabs and insects. During establishment and early growth, they are vulnerable. The period from flowering to fruiting may vary from 2-3 months. Mangroves are pollinated by a diverse group including bats, birds and insects.

The natural propagation process programme has to be complemented by the propagation programmes.

NATURAL PROPAGATION

Mangroves grow at the intersection between land and sea where most plants would be choked. Their aerial and salt-filtering roots (*pneumatophores*) and for some species the salt-excreting leaves also specialize in the exchange of gases. Generally, their growth is determined by the length of the propagule, planting depth, soil type, salinity, pH and light intensity.

AFFLUENCE OF LIFE FORM

Mangroves are botanical amphibians that provide unique ecological and socio-economic services

Breeding and nursery grounds for a number of marine organisms including fish, shrimp and crabs species

Source of food for marine organisms - mollusc, crabs and shrimps- from decomposed leaves, fruits and branches by bacteria and algae

Host to a variety of life-forms such as invertebrates, amphibians and birds

COMPLEMENTING THE NATURAL PROPAGATION PROCESS

The Albion Fisheries Research Centre’s Initiative

Over the period from 1995 to 2004, a phased rehabilitation programme was initiated covering the zones from Providence to Baie du Cap (2.4 ha), Petite Rivière to Le Morne (2.4 ha), Poudre d’Or to Roches Noires (2 ha), Providence to Pointe du Diable (2.9 ha), Grande Rivière Noire (2.5 ha), Anse Petite Sable and Pte Brocus (0.7 ha).

The overall survival rate was about 78%.



HEALTH OF THE PLANET

Buffer zone between the land and sea and as Nature’s barrier against heavy seas and strong winds from tropical cyclones

Purification of the water by absorbing harmful contaminants and heavy metals

Preventing soil from spoiling the lagoon and damaging vital ecosystems such as coral reefs and sea grasses

Mitigation of climate change by fixing and storing significant amount of carbon



MANGROVE PROPAGATION AT LE MORNE VILLAGE

At Le Morne, a few scattered mangrove clusters planted in the 90's exist. The site was selected for mangrove propagation.

Bassin Léon (October 2008-November 2009)

The first phase was part of the **ADD/DCP/EU** project. Nearly 10 000 mangrove trees were planted over one hectare mainly by the villagers.

Bassin Léon and near Football ground (January 2011-February 2012)

COLLECTION OF PROPAGULES

Between March and June 2011, propagules were collected by the workers at La Gaulette, St Martin and Macondé with the permission of the Ministry of Fisheries and Rodrigues

PLANTING 'DIRECT METHOD'



The '*seeding*' technique involves placing the mature propagules directly into the soft muddy ground. About 2 000 propagules were collected at a time followed immediately by planting.

'INDIRECT METHOD'

The method involves '*transplantation*' as a first step. The propagules are sown in plastic bags filled with wet soil. These are kept in a '*nursery*' where the tides keep the seedlings moist. Some three months later, the seedlings bear 3 to 4 leaves and are ready for plantation. The plantation was carried out over the period July to October 2011.



MANGROVE PROPAGATION AT QUATRE SOEURS

The mangrove propagation programme was extended to Quatre Soeurs Village where the coast has characteristics quite different from Le Morne. The sea floor slopes less gently and the heavy swells and the tidal movements bring in algae and swamps the relatively narrow coastal strip more often – making mangrove plantation more difficult.



PARTNERING WITH VILLAGERS AND MINISTRY OF FISHERIES AND RODRIGUES

The Project implementation involved the inhabitants to ensure ownership and stewardship. A Programme Implementation Committee (PIC) was constituted to oversee and provide guidance in the implementation of the project. It comprised 7 members from the village and 2 from ADD.



SENSITIZATION PROGRAMME

Awareness-raising of the local communities on the importance of mangrove formed an integral part of the programme. On-site visits and direct planting were organized for fishers, women, senior citizens, youth, and NGOs from the Village. Presentations on mangroves made by experts from the Ministry of Fisheries and Rodrigues and ADD members were complemented by related talks that may empower the villagers to improve

their socio-economic status. Fruit trees of economic value were distributed to the community.

Special attention was given to school children. The *Nature Corner* within the school yard at *Le Morne Government School* served as a training ground on value of plants and on the need for caring.



ISLAND-WIDE SURVEY

An island-wide survey was conducted using 2008/2009 aerial photos from the Ministry of Housing and Lands and field validation surveys to ascertain areas with mangrove plants and identify potential areas for propagation.

The survey will be a useful in planning an island-wide mangrove monitoring and reforestation programme.

PARTICIPATION OF MCB STAFF



About 30 MCB staff participated in mangrove planting. Following a brief presentation on mangroves at Le Morne Community Centre, they visited the sites and had hands-on experience with direct planting.

THE PLANTATION

Mangroves were planted at 5 sites at Le Morne. By September 2012, about 18 months later, the plants had reached about 100 cm.

The survival rate was almost 95% on most sites. In a few areas, mortality had been high. Monitoring and evaluation provided valuable information on optimum conditions for growth.



PUBLIC-PRIVATE-NGO-CIVIL SOCIETY PARTNERSHIP

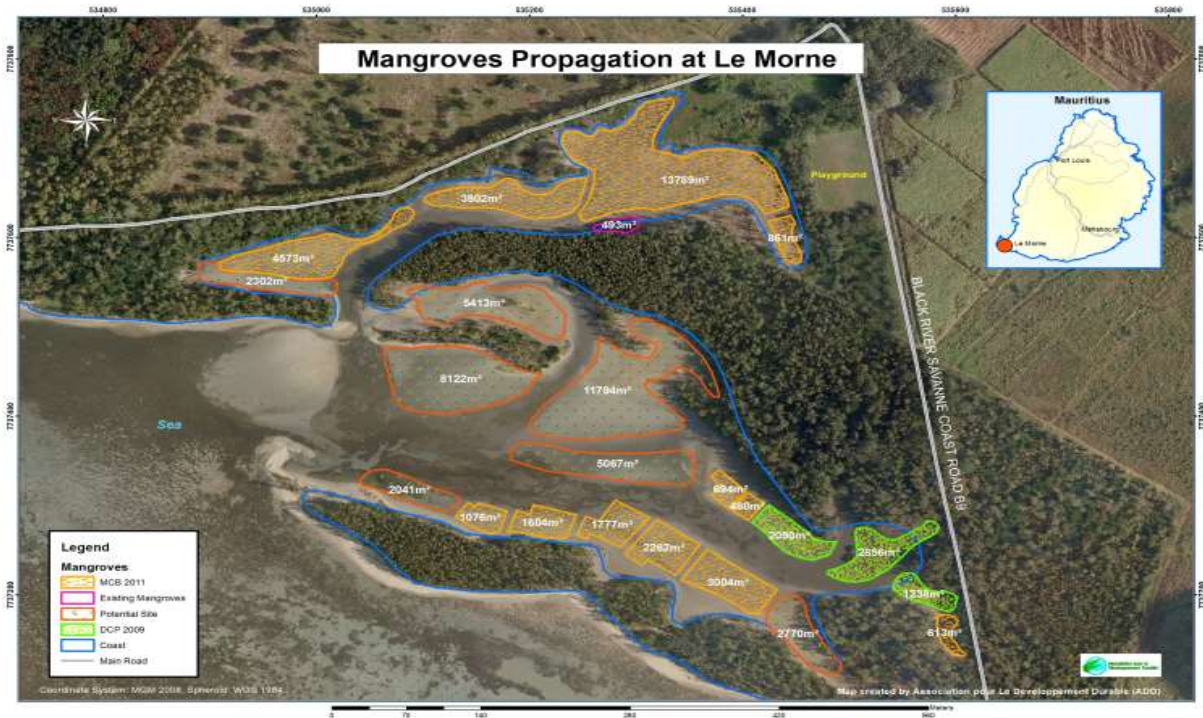
Largest mangrove forest grown in Mauritius

Since 2008, the Association pour le Développement Durable (ADD) has planted some 50 000 seedlings (5 ha) with the support of AFRC, the Village Council and the Black River District Council, local NGOs and the participation of local inhabitants.

Since the 18th century, most of the areas to the East and other parts of Mauritius have been cleared.

Over the period 1997/1998, the AFRC had planted some 10 000 seedlings over 5 000 m² at Le Morne.





DCP/EU funded the rehabilitation of one hectare (*green in the map*). Subsequently, MCBFF has funded the cultivation of over 4 ha (*in brown*). The potential areas are *in pink*.

