MANGROVES OF QUITERAJO

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What are Mangroves?

Mangroves are plants that consist of a variety of growth forms, from trees, palms, shrubs, vines, epiphytes, samphires, grasses and ferns. Mangroves form valuable ecosystems along environments. Typical mangrove habitats are periodically subjected to tidal influences. Mangroves grow in soil that is frequently waterlogged by saline water. The first explorers described them as ‘forests of the sea’ (Mastaller 1997). Mangrove Plants (Flora) refers to many plant growth forms that are associated with mangrove ecosystems including vines, grasses, shrubs, chenopods, sedges, forbs, palms, ferns and parasitic plants (Mastaller 1997).

For the purpose of this document seven tree species have been identified as true mangrove communities present in Quiterajo. These species differ in their characteristics, location, appearance, and probably in how they survive in their natural habitats and again what they are used for by local people in Quiterajo.

The geographical distribution of mangroves Worldwide

Mangroves are divided into two main regions, consisting of a Western Group and an Eastern Group. The Eastern Group (Eastern Hemisphere) incorporates East Africa in which Quiterajo is found, the Red Sea, India, Southeast Asia, Southern Japan, the Philippines, Australia, New Zealand and the South Pacific archipelago, as far east as Samoa. The Western Group (Western Hemisphere) comprises African-American regions including, the Atlantic coasts of Africa and the Americas, the Pacific coasts of Tropical America and the Galapagos Islands. Approximately 80% of all known mangroves occur in the Indo- Pacific region (Mastaller 1997).

The total area of mangrove communities across the globe can still only be estimated. Current area estimates are in the range of 15.7 million hectares (Mastaller 1997).

Mangroves in Quiterajo.

Mangroves in Quiterajo conservation area cover an area of 34km2 out of the 300km2 the total area. This area represents 11% of the land cover of maluane conservation vegetation and is the second largest mangrove forest in cabo Delgado apart from Rovuma estuary and is recovering each year.
It is most concentrated in messalo estuary and the area, between messalo and muenhe river, and some patches in quiterajo, milamba, and pequeve in the coastal and along the riverine areas.

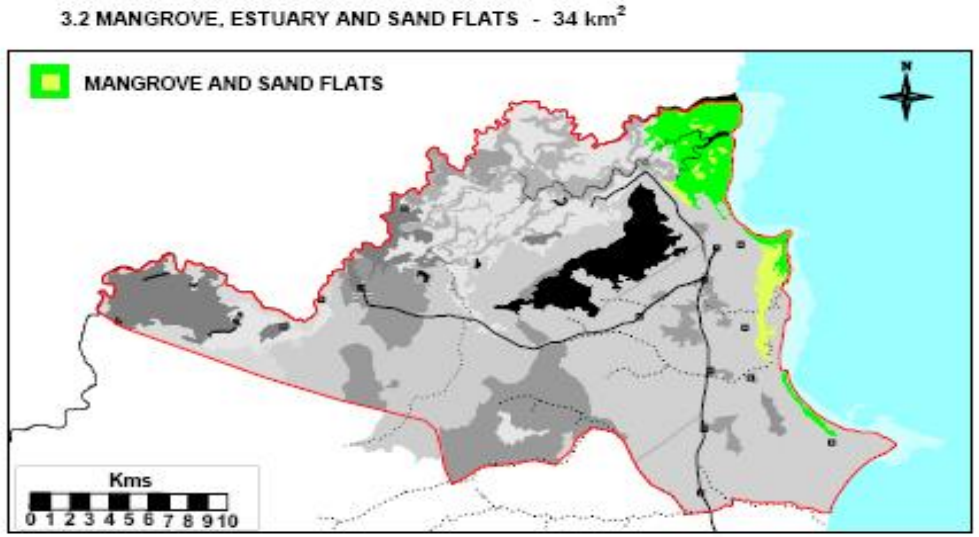

Figure 2. Distribution of mangroves and sand flats in the MWA

Source: Garner 2007

Harsh Conditions

The coastal environment provides challenges which many plants would be unable to cope with. Mangrove plants demonstrate a wide range of adaptations which enable them to thrive in these demanding conditions (Mastaller 1997).

Salt tolerant plants are called halophytes. Halophytes have adaptations which can counteract high concentrations of salt found in their environment. Salt, or sodium chloride (NaCl), poses a significant threat to non-halophytic plants because it can influence the amount of available fresh water and therefore salt can be toxic in high

Concentrations (Knox *et al.* 1994). Plants to survive in these salt environments have developed different types of adaptations.

Types of adaptations to salt in mangroves

1. Salt Exclusion

Don't let the salt in! Many of the major mangrove plants including *Avicennia*, *Bruguiera*, *Ceriops*, and *Rhizophora* are able to selectively take in water while filtering most of the salt out. This type of adaptation is called ultra-filtration (Claridge & Burnett 1993).

2. Salt Excretion

Getting the salt out. Some mangroves are able to actively pump salt out from their leaves. In plants such as *Avicennia* and *it* is possible to see salt which has been excreted in the form of crystals on the outside of leaves (Claridge & Burnett 1993).

3. Storage

Keep the salt for a while, and then get rid of it! Salt which has been taken up by a mangrove plant can be selectively transported by the plant to the most expendable leaves. This salt will be totally lost from the plant when these leaves are dropped. Salt may also be stored in bark (Claridge & Burnett 1993).

Seed Dispersal and Establishment

The seeds of mangroves are well adapted to dispersal by water and establishment in tidal areas. Large quantities of buoyant seeds are produced to account for high levels of predation and destruction. Additionally some mangroves are viviparous (Claridge & Burnett 1993).

Vivipary means giving birth to live young, as opposed to producing eggs. For example mammals are considered to be viviparous, while birds are not. When referring to a plant, vivipary means that a fertilised seed actually begins to grow while still attached to the parent plant (Claridge & Burnett 1993).

The seeds produced by the mangroves germinate while still attached to the parent tree to form seedlings, called propagules. When the seedling falls to the ground it has already started to develop a root system which will assist it to anchor to the muddy substrate despite constant wave actions and tidal inundation (Claridge & Burnett 1993).

Rhizophora stylosa propagules can often be spotted along the high tide mark . Like all mangrove seeds, *Rhizophora* propagules are able to float, allowing them to be dispersed with the tide far away from the parent plant. This is one way that mangroves are capable of colonising new areas.

Species of Mangrove in Quiterajo

• *Avicennia marina* (White or grey mangrove)
• *Bruguiera gymnorhiza* (Orange mangrove)
• *Ceriops tagal* (Yellow mangrove)
• *Rhizophora mucronata* (Stilt rooted mangrove)
• *Sonneratia alba* (Mangrove apple)
* Xylocarpus granatum

Avicennia marina (Grey mangrove

Description

This is the most widespread mangrove species in quiterajo. *Avicennia marina* generally takes the form of a multi-stemmed tree between 4 and 10 metres high, however in some areas these trees can reach 25 metres. *Avicennia* is found in varied environments, including the upper tidal limit of estuaries, salt flats and along the seaward margin (Brock1988). The bark of the *Avicennia* is generally pale white to grey/green

Roots

Another distinguishable feature of this tree is the pencil like sized peg type pneumatophores which protrude upwards through the mud from lateral roots below.These assist with the aeration of the plant (Brock 1988).

Leaves

The leaves are light green, elongated (up to 10 cm) long, a shiny upper surface and a pale grey to silvery-grey colour undersurface. it is this colour which accounts for the common name. The underside of the leaf has special secreting salt glands for secreting excess salt.

Flowers

The flowers of *Avicennia are* Small, orange to pale orange that are pollinated by bees and other insects. Flowering generally occurring between October and January

Fruit

The fruits are small almond sized, green, slightly furry and dish-like capsules.. The fruiting period is between January and February. They mature in two months, ripening in summer

Bruguiera gymnorhiza (Orange mangrove)

Description

These spreading trees are generally between 3 and 10 metres high they may grow up to 25 m tall. The trunks of *Bruguiera* are often buttressed and surrounded by many knee like pneumatophores. The bark of these trees is generally dark and fissured along the trunk and at the roots. *Bruguiera* is generally found in the landward zone of mangrove communities (Brock 1988).

Roots

Buttresses at the base of the trunk and knee roots.

Leaves

This species has large (10-20 cm), thick leathery leaves which are found clustered towards the ends of branches.

Flowers

The flowers, which give this mangrove its common name, are bright orange to red and are surrounded by a green calyx and remain attached to the propagule when it falls.These are found between May and November.

Fruit

The propagules are green, cone to cigar shaped, between 10 and 20 cm long and can be found throughout the year. The fruit, occurring between June and December, (Brock 1988).

Ceriops tagal (Yellow mangrove)

Descriptions

Ceriops tagal can form as small tree or shrub, generally between 2 and 6 metres high.The base of *Ceriops* is often buttressed. The bark is generally Cream coloured that varies from pale to dark brown spots which can be flaky within the buttresses. *Ceriops* generally cannot tolerate high levels of water inundation and as a consequence are mainly found on the landward fringe of mangrove communities and in salt pan areas (Brock 1988).

Roots

Buttresses at the base of the trunk and knee roots.

Leaves

The leaves of *ceriops* trees are small (up to 7 cm), yellowish green in colour, oval- shaped occurring in groups at the end of branches. (hence the common name yellow mangrove).The leaves are often orientated straight up in the air to avoid strong midday sunlight.

Flowers

The flowering period is between June and November. They are small green brown flowers in clusters with pale orange petals

Fruits

Fruit is present on the plant between June and December. The fruits are smooth, cone shaped and approximately 1.3 cm long.

RHizophora mucronata (Stilt rooted mangrove)

Descritpion

Rhizophora mucronata is probably the best known mangrove plant because of its distinctive arching prop root system which originates from the base and lower branches of the tree and widespread distribution. Bark is rough, brown to dark green. It can grow up to 20 m tall. (Brock 1988).

Roots

The root originates from the base and lower branches of the tree. This rooting system have proved highly successful in enabling *Rhizophora* to colonize the seaward edge of mangrove communities, despite constant tidal inundation and wave action

Leaves

Rhizophora leaves are thick, about 10 cm long, leathery, lighter green undersurface covered with brown speckles and have a small point projecting at the apex . Leaves are arranged in clumps at the end of branches.

Flowers

The flowers are small, white feathery which are pollinated by wind or insects and occur between April and November.

Fruit

The fruits (propagules) are smooth, brown and pear shaped is 1-2 cm in diameter, 20-40 cm long and tapered at one end. The fruiting period normally takes place between April and November, (Brock 1988).

Sonneratia alba (Mangrove apple)

Description

Sonneratia alba is generally spreading tree with a height between 4 and 5 metres high. However, it can reach 8 metres in height. The **bark is g**rey to brown and slightly cracked. *Sonneratia* are found in the seaward zone.

Roots

The roots are thick, large, cone shaped, tall peg type above ground.

Leaves

The leaves of *Sonneratia* are bright green, thick and fleshy about 7 cm long, rounded and opposite each other on the branches. The tips of the leaves are slightly turned under.

Flowers

Sonneratia alba has white flowers with many coloured stamen and do not have visible petals. Flowers only open for one night and the flowering period do take place between March and October.

Fruits

The fruits are large (4 cm wide) green, flattened, leathery globular berries with a star-shaped base which give *Sonneratia* its common name. As the fruit forms the calyx is forced into a star shape (Brock 1988).
The fruiting period occurs between March and October,

Xylocarpus granatum Cannonball Mangrove

The Cannonball Mangrove gets its name from its large cannonballshaped fruit (sometimes known as monkey-puzzle nuts). These trees can grow to 25 m tall.
Bark Mottled pink-orange bark which is smooth but flakes off

Roots
Buttresses at the base of the trunk and plank or ribbon type above-ground roots.

Leaves

Leaves are oval-shaped and thickened at the base where they meet the stem. This thickening allows the leaves to either face or avoid the sun.

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Flowers

Small pink flowers

Fruits

The large, round fruit, containing 12 to 18 tightly packed seeds, ripens to a golden-brown colour. The seeds are often seen on the beaches.

USES OF MANGROVE IN QUITERAJO

Species such as ceriops tagal, rhizophora mucronata and avicennia marina are used for construction in the area by local communities. Rhizophora is also used for dye in basket weaving while xylocarpus granatum is used as medicine. Avicennia manina is also used for boat building, ceriops tagal for house fencing, rhizophora mucronata for firewood.

Fauna in mangrove

The mangrove area in quiterajo is the breeding site for herons and egrets, breeding sites for prawns and this area support all Shrimp fishery to mocimboa da praia, mitacata village that is taken for sale in macomia, montepuez, muidumbe and pemba. The sand beaches along mangroves are nesting areas for turtles and local communities ambush and kill them for meat.

Tourism

Excellent potential for bird watching which can be readily integrated with existing community utilization Sport fishing especially fly fishing.

There are 3 navigable rivers that pass through mangrove and suitable for the development of boating excursions for bird-watching in one hand and on the other to develop sport fishing zones – (canoe based)

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