

# **Mozambique**

**Last updated: 31-01-2004**

## **Location and area**

Mozambique is an independent republic in southeastern Africa, bordered on the north by Tanzania, on the east by the Mozambique Channel of the Indian Ocean, on the south and southwest by South Africa and Swaziland, and on the west by Zimbabwe, Zambia, and Malawi. It has a total area of 799,380 km<sup>2</sup>. (Microsoft Encarta Encyclopedia 2002).

## **Topography**

Coastal lowlands make up two fifths of Mozambique. Inland, the terrain rises to the west in a series of low hills and plateaux to reach high points of 2,436 m on Mount Binga near the western border and 2,419 m in the Namuli mountain range in the north. To the northwest, the Angonia Plateau forms the western edge of Africa's Rift Valley - here occupied by Lake Malawi (Nyasa) and the Shire River. Soils are generally infertile except along river valleys and in parts of the Angonia Plateau.

The country's many rivers flow from the western highlands to the Mozambique Channel in the east. Chief among these is the River Zambezi, which, in its upper reaches, forms a lake behind the Cabora Bassa Dam. Other major rivers include the Ruvuma, which forms part of the Tanzanian border, and the Save and Limpopo rivers. Lake Malawi (Nyasa) forms part of the Malawi border and drains south through the Shire River into the Zambezi. (Microsoft Encarta Encyclopedia 2002).

## **Climate**

Mozambique has a tropical climate, with a dry season that lasts from April to October. July (winter) temperatures average 21° C in Pemba in the north and 18° C in Maputo in the south. January (summer) temperatures average about 27° C along the coast and are lower in upland areas. Average annual rainfall decreases from 1,400 mm in the north to 750 mm in the south. There are regularly prolonged droughts alternating with devastating floods. (Microsoft Encarta Encyclopedia 2002).

## **Land use**

Less than 20 % of Mozambique's land is wooded. Dense tropical rainforest is found in the river valleys, while a more open woodland-grassland cover predominates in the drier regions and uplands. (Microsoft Encarta Encyclopedia 2002).

## **Wetlands**

3% of the area of Mozambique is humid with substantial wetland areas. The major soil types found in the wetlands are peat and hydromorphic sandy soils.

Tinley (1967) mentions the presence of swamp forests in the coastal plain of Southern Mozambique. (cf. adjacent Maputoland).

Mozambique is a coastal country, crossed by many rivers running to the Indian Ocean. Beach ridge complexes, beach plains, and coral reefs extend along the coast for about 2,500 km. The swales between the beach ridges are generally swampy (Brito et al. 1998). Mangrove swamps dominate in the deltas of the Zambezi, Pungoé, and Save rivers. They are almost continuous along the open coastline in the north and centre, but less common in the south (Hughes & Hughes 1992). The total area of mangroves is about 3,960 km<sup>2</sup> (Saket & Matusse 1994, cited in Brito et al. 1998). Without further reference, Lappalainen & Žurek (1996c) give a total wetland area of 100 km<sup>2</sup> (cf. Andriessse 1988).

The largest inland wetland in Mozambique are the floodplains and swamps that follow the main drainage system (Hughes & Hughes 1992). Palustrine wetlands include coastal lakes, lagoons, swamps, springs, peatlands, and dambos. They occur along rivers, lakes or coastal area, or in the form of seepage or spring (Chabwela 1991). A map of the wetlands of Mozambique is presented in Fig. 1.

Fig. 1: Map of the wetlands of Mozambique (from Brito et al. 1998).

## Peatlands

Kivinen & Pakarinen (1981) mention the presence of peatland in Mozambique but present no estimates for its area.

According to Bord na Mona (1985) and Shrier (1985), referring to Pereira Coutinho (1949), extensive but unquantified peat deposits occur in mangrove swamps and in river valleys and estuaries along the coast. Some depressions between old coastal dunes contain relatively pure peat while others contain mixed peat and alluvium with ash contents ranging from 20 to 50 %. Markov et al. (1988) report on peatlands at the Indian ocean, with peat layers of about 1-3 (5) meters thick. Andriessse (1988) estimates the extent of organic soils in Mozambique to be 100 km<sup>2</sup>.

The organic (peat) soils called *machongos*<sup>1</sup> are generally fertile and have a very good soil structure for plant growth. They generally have a peat layer of 0.4 to 1.0 m thick. Peat soils are common in the south, where semi-arid climatic conditions predominate.

The occurrence of peat and hydromorphic soils has been mapped for southern Mozambique at 1: 4,500,000 scale ([www.fao.org/DOCREP/003/X6611E/x6611e04c.htm](http://www.fao.org/DOCREP/003/X6611E/x6611e04c.htm)) (Figure 2, Table 1). Some of the areas identified as hydromorphic sandy soils in Figure 2 might also be peat soils. Lack of information does not allow an accurate distinction between the two soil units.

Figure 2: Peat soils and hydromorphic sandy soils in southern Mozambique (Source: National soil map INIA/DTA,'95, from Brito et al. 1998).

Table 1: Main occurrence of peat soils and hydromorphic sandy soils (locally called *machongos*) in Southern Mozambique (from Brito et al. 1998)

---

<sup>1</sup> The hydromorphic sandy soils are less rich in organic matter than the *machongos*, but they also have a watertable close to the soil surface. Due to the similarity of these soils, in terms of occurrence, wetness/drainage, land use, and vegetation, farmers also commonly call them *machongos*.

Wetlands	Main features		Classification		Area (ha)
	Common	Differentiating	FAO	USDA	
Organic soils - Peat (Ft <sup>1</sup> )	Persistent waterlogging (swampy)	high organic matter content organic soil	Histosols	Histosols	93,000
Hydromorphic sandy soils (Ah <sup>1</sup> )	adapted vegetation e.g.: <i>Phragmites</i> , <i>Cyperus</i> , <i>Juncus</i> , <i>Eichornia</i> , <i>Nymphaea</i> , Grasses	low-moderate organic matter content sandy textured mineral soil	Arenosols Gleyic	Entisols <sup>2</sup> Psammaquents	372,000

1. Symbol used in the national soil map legend (1: 1 000 000) to represent a unit of soil.

2. Associated with aquic conditions. The presence of these conditions is indicated by redoximorphic features.

*Dambos* are mainly concentrated in the central and north high rainfall areas and are a common feature of headwaters of most streams. Peatlands may also occur around the interior lakes Niassa, Chiuta, Chilwa and Amaramba along the border with Malawi (Brito et al. 1998).

The dominant vegetation of peat soils is *Phragmites* sp. and *Juncus* sp. Thick layers of black to very dark grey-brown, raw to well decomposed peat, peat clay and clayey peat, alternating with one or more mineral horizons are most typical. Within one soil profile it is often possible to find individual peat layers in various stages of decomposition. Soil reaction varies between very acid alternating with more alkaline peat soils close to the coast and mangrove areas (Brito et al. 1998)

Table 2: Possible peatland areas (in km<sup>2</sup>) in Mozambique and adjacent countries (after Howard-Williams & Thompson 1985). W = area in wet season, D = area in dry season.

Ndindi marsh	Malawi, Mozambique	Swamp	W 170 D 60
Marromeu	Mozambique	Floodplain	?
Pongolo River	South Africa, Mozambique	Floodplain	W 100 D 26
Pungué River	Mozambique	Floodplain	N. I.
Incomati River	Mozambique	Floodplain, swamp	N. I.
Limpopo R. ?	Mozambique	Floodplain	N. I.
Lake Chilwa	Malawi, Mozambique	Shallow lake	600
		swamp	W 800 D 700
Lake Amaramba	Malawi, Mozambique	Shallow lake and swamp	ca. 50

Based on parallels with the South African side, P.-L. Grundling (pers. comm. 2002) estimates the area of peatlands in the coastal plain of Mozambique on between 1,500 and 2,500 km<sup>2</sup>.

According to the interpreted World Soil Map (Van Engelen & Huting 2002) 17 km<sup>2</sup> of histosols exist in Mozambique and 17,831 km<sup>2</sup> of gley soils.

### Mire and peatland losses

Peatlands and dambos are of enormous importance to small-scale agriculture. Their importance is associated with water availability all year round, as well as easy workability.

Quite a number of the *machongos* are being used by farmers, who are benefiting from the use of residual soil moisture ([www.fao.org/DOCREP/003/X6611E/x6611e04c.htm](http://www.fao.org/DOCREP/003/X6611E/x6611e04c.htm)).

The most affected swamp and floodplain systems are those in the Zambezi River basin and those south of it. The northern river basins have been subjected to less pressure (Hughes & Hughes 1992, Brito et al. 1998). In the Zambezi River, the dams of Kariba and Cabora Bassa reduced downstream peak season flows, but increased the dry season flows (Hughes and Hughes, 1992). As a result the flood regime on the lower Zambezi is now greatly reduced, erratic, and mainly out of season and there is evidence suggesting that the wetlands of the Zambezi Delta have come through severe changes. The Zambezi delta is one of the areas where the reduction of mangroves forest has been quite severe in the past few years (Brito et al. 1998).

Agricultural development, sometimes involving irrigation, can be found in the lower section of the Zambezi River basin (Hughes & Hughes 1992).

Upstream impoundment also affected the annual flows of the Revué/Buzi, Save, Limpopo, Incomati, Umbeluzi and Maputo rivers, decreasing the availability of water during the dry season.

Still to be checked:

**Azevedo**, A.L. 1954. The technology of peaty soils in Mozambique and Angola. Transactions of the 5th International Congress of Soil Science, Leopoldville 3:398-401.