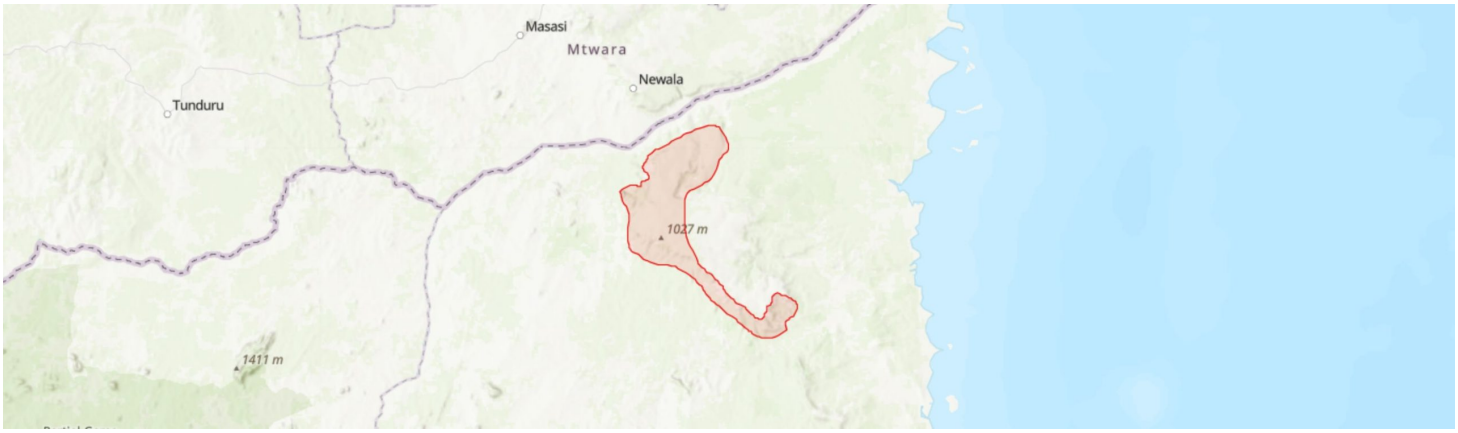
Mueda Plateau and Escarpments

Planalto e Escarpas de Mueda (Test version)

MOZTIPA025



Country: **Mozambique**
Administrative region: **Cabo Delgado (Province)**
Central co-ordinates: **-11.46820 N, 39.56070 E**
Area: **2200km²**

Qualifying IPA criteria

A(i)

IPA assessment rationale

The Mueda Plateau and Escarpments qualify as an Important Plant Area under criterion A(i) as they hold populations of 19 globally threatened plant taxa, of which eight are assessed as Vulnerable, nine as Endangered and two as Critically Endangered. This IPA includes the entire known global population of Uvaria rovumae, and is the only Mozambican IPA known to contain populations of Celosia patentiloba, Lannea welwitschii var. ciliolata, Momordica henriquesii, Monodora carolinae and Paropsia grewioides var. orientalis. Mueda does not yet qualify under criterion B as only ten (ca. 2%) of the B2 qualifying species have so far been recorded from this locality, although this figure is likely to increase with further exploration of the remnant patches of natural vegetation on the plateau and escarpment. Given the extent of transformation and fragmentation of the natural habitats on the plateau, and the very limited extent of Rovuma forest and thicket still present, this site does not qualify as an IPA under criterion C.

Site description

The Mueda Plateau (sometimes referred to as the Makonde or Maconde Plateau) is located in northern Cabo Delgado Province close to the border with Tanzania. The IPA is located mainly within Mueda and Muidumbe Districts, but also extends into Nangade District in the northeast section. This low plateau rises rather gradually on its eastern side and reaches just over 1,000 m elevation at its highest point around Chomba in the west. The northern, southern and particularly the western scarps of the plateau are typically steep and with complex gulley systems. It is bounded to the north by the broad valley of the Rovuma River and to the south by the Messalo River valley. The IPA covers an area of 2,251 km2, extending for ca. 100 km from north to south, and is slightly under 30 km wide at its widest point.

The Mueda Plateau has been settled for at least two centuries and was the cradle of Mozambique's independence movement in the 1960s. A large number of settlements are well established across the site, including the towns of Mueda in the southwest and Mocimboa do Rovuma in the northwest of the escarpment. The plateau is traversed by route 509 which connects Mueda to the coastal town of Mocimboa da Praia, before continuing inland to Montepuez.

This site was previously covered by extensive thickets and dry forests of high botanical importance. The natural vegetation is, however, under severe threat due to the high population and associated habitat transformation, with the key habitats now largely restricted to steeper slopes and inaccessible areas along the plateau escarpments. For this reason, the IPA primarily covers the escarpments, as well as the somewhat less densely populated northern section of the plateau; the main towns and the heavily populated central and southern parts of the plateau are excluded. For the Mueda Plateau to retain its biodiversity value, there is an urgent need for protection and management of the remaining natural habitats, and potentially for a programme of habitat restoration in the less densely populated areas.

Botanical significance

The botanical significance of the Mueda Plateau is associated primarily with the extensive thickets, woodlands and dry forests that are believed to have originally covered much of this site. These habitats contain a number of rare and range-restricted species of the proposed Rovuma Centre of Plant Endemism (Burrows & Timberlake 2011; Darbyshire et al. 2019). It is a critical site for several species, notably Hugonia grandiflora (EN), for which the majority of known localities are on the Mueda Plateau (Wabuyele et al. 2020), as well as Monodora carolinae (EN) and Paropsia grewioides var. orientalis (EN), for which this IPA is the only known Mozambican site. Tarenna sp. 53 if Degreef (2006), which is currently under description (I. Darbyshire et al., unpubl. data) is also present in the remnant forest patches. Although the herbaceous flora is not well documented, the discovery in 2009 of a population of Celosia patentiloba (CR) on the plateau (A. Banze #106) is of particular note as this is only the second confirmed record of this Critically Endangered species, the type being from Newala on the adjacent Makonde Plateau in Tanzania where it is highly threatened by extensive losses of suitable habitat (Howard et al. 2020). Potential records of this species from the Rondo Plateau in Tanzania in fact refer to a closely related but distinct and apparently undescribed species (I. Darbyshire, pers. obs.).

The southeastern escarpment near Muidumbe holds an important outlier population of the rock-dwelling Aloe ribauensis (EN), otherwise known only from the Ribáuè Mountains in Nampula Province (McCoy et al. 2014; Osborne et al. 2019).

Also included within the IPA boundary is an area of lowland woodland-dry forest mosaic along the northeastern side of the plateau and south of the town of Nangade, which supports the only known population globally of the Critically Endangered species Uvaria rovumae (Deroin & Lötter 2013). Although heavily disturbed, there are still reasonably extensive patches of this lowland mosaic away from the Nangade to Namau road. Additional new species may still be discovered here; for example, Lagynias (=Vangueria) sp. A of Burrows et al. (2018) is known only from a single collection from close to the locality for U. rovumae.

In total, 19 globally threatened plant taxa are known to occur on the Mueda Plateau and adjacent footslopes, although in some cases their continued existence at this site requires confirmation given the scale of habitat transformation. The loss of most of the natural woody vegetation is likely to have had a profound impact on many of these species. This site is also of interest as the only known locality in Mozambique for a number of taxa including Ancylobothrys tayloris (LC), Cassia angolensis, C. burttii, Vernonia (Jeffreycia) zanzibarensis (LC) and Whitfieldia orientalis; one of only two known Mozambican localities for the rare Streblus usambarensis; and a noted locality for the scarce and over-exploited timber tree Pterocarpus megalocarpus (J. Burrows, pers. comm. 2021). It is also worth noting that there are some highly localised species have been recorded from the lowlands to the west of the Plateau and towards Negomano, including the only Mozambican site for two species, Blepharispermum brachycarpum (EN) and Crotalaria misella (DD), as well as populations of Paranecepsia alchorneifolia (VU) and Stylochaeton euryphyllus (VU). It is possible that these species will be recorded in the lower elevation areas of the Mueda Plateau IPA in the future.

Habitat and geology

Mueda is one of a series of low plateaux in the Mozambique-Tanzania coastal border region, including the Makonde Plateau which is separated from Mueda only by the Rovuma River valley. Further north, inland from Lindi in Tanzania, lies the Rondo Plateau which is renowned for its botanical importance (Clarke 2001). The dominant underlying geology of the Mueda Plateau is thought to comprise iron-rich sandstone and conglomerates of the Mikindani Formation of mid-Neogene origin (c. 10-15 mya), giving rise to red soils that are well-drained, sand-rich and poorly structured. Along the escarpments there are outcrops of the Cretaceous Maconde Formation conglomerates and sandstones (I.N.G. 1987, reproduced in Timberlake et al. 2010; Hancox et al. 2002). The older formations are overlain by Quaternary or Neogene sedimentary deposits which form a gentle isocline running northwest from the coast, and reaching its highest points on the Mueda Plateau in Mozambique and the Makonde Plateau in Tanzania, with the Rovuma River cutting a sharp channel of c. 10 km wide into the deposits (Clarke 2011). Elsewhere within the coastal Cabo Delgado region, outcrops of the Mikindani sandstones are associated with dry forest patches of high botanical importance (Timberlake et al. 2010).

Given the long history of human impact on this area (see Conservation issues), the original vegetation of the plateau is difficult to ascertain with certainty. The vegetation map of Wild & Barbosa (1968) indicates that much of the Mueda Plateau, particularly on the eastern side, was dominated by a formation of Dry Deciduous Lowland Forest on sandstone and conglomerates (their type 6), a vegetation type that was largely confined in this region to Mueda. Dominant species in this community included Adansonia digitata, Balanites maughamii, Bombax rhodognaphalon, Cordyla africana, Dialium holtzii, Milicia excelsa, Millettia stuhlmannii and Sterculia spp. (Wild & Barbosa 1968). Much of the woody vegetation of the plateau has been removed and replaced with farmland and areas of fallow, and this forest vegetation type is now reduced to small remnants (Lotter et al., in prep.). Even more severely impacted appears to be moist semi-deciduous forest on the highest parts of the plateau, which is today evident only by the presence of scattered moist forest indicator species, such as Casearia gladiiformis, Dracaena mannii, Erythrophleum suaveolens, Harungana madagascariensis and Rinorea ferruginea (Lotter et al., in prep.). A patch of swamp forest is recorded on the western edge of the plateau, this being the source of water for the town of Mueda), and is dominated by Albizia adianthifolia, Synsepalum brevipes, Syzygium owariensis and Voacanga thouarsii together with the climbing swamp fern, Stenochlaena tenuifolia (Lotter et al., in prep.).The remaining woodland and thicket is mostly secondary in nature, with denser and more intact areas largely confined to steeper slopes and gulleys along the escarpments. The areas of the escarpment near Mocímboa da Rovuma and towards Ngapa appear more intact than elsewhere. Miombo woodland , is widespread along the escarpments, typically dominated by Julbernardia

globiflora with Brachystegia spp., Diplorhynchus condylocarpon, Oxytenanthera abyssinica, Pericopsis angolensis, Pterocarpus angolensis, Sterculia quinqueloba and Terminalia stenostachya (Lotter et al., in prep.).
The climate of the Mueda Plateau is highly seasonal, with a prolonged dry season from May to November and a short hot and wet season mainly between December and April. Annual rainfall at Mueda town is approximately 1,100 mm per year (Timberlake et al. 2010), which is comparable to that of the Rondo Plateau in Tanzania.

Conservation issues

The Mueda Plateau and the surrounding lowlands are not currently under any formal protection and this is one of the most severely threatened and degraded IPAs in Mozambique. The plateau has a long history of settlement, starting at least as early as the beginning of the nineteenth century. This was driven in part by the establishment of slaving routes along the Rovuma, which drove local populations onto the adjacent plateaus which were much less accessible and densely wooded (Israel 2005). Indeed, the plateau settlers were named “Makonde” after the densely vegetated uplands. The Makonde (colloquially named the Mavia, or “the nervous”) were mentioned in Livingstone’s journals and were visited in 1882 by Henry O’Neill, British Consul to Mozambique (Timberlake et al. 2010). Timberlake et al. (2010) note that much of the Dry Deciduous Forest of the eastern plateau is likely to have been destroyed through agricultural expansion and logging in the pre-independence period. During the 1960s, the Mueda Plateau became the focus point of the independence struggles, with FRELIMO establishing their main base there, supported by the Makonde and their strong ties to independent and socialist Tanzania immediately to the north (Israel 2005). The area saw much military action, with associated environmental impacts. Following independence, larger and more formal settlements were established on the plateau and it is from this time that clearance of the remaining dense woodlands and thickets is believed to have accelerated.
The reasonably fertile soils and reliable rainfall mean that the plateau is attractive for agriculture, with a variety of grains grown both for subsistence and some export, including millet, vegetables and particularly maize, as well as cashew cultivation. As a result, the vast majority of the original wooded vegetation has been cleared in all but the steeper and less inaccessible areas. Dense vegetation cover (woodland, thicket and forest) is estimated to have declined from an estimated 2,332 km2 historically to only 89 km2 at present, a decline of over 96% (Timberlake et al. 2011), with losses particularly severe on the eastern slopes of the plateau. The steeper escarpments and some areas of the northern portion of the plateau have escaped the worst of the clearance, and a portion of the northwest plateau, escarpment and footslopes (within the current IPA boundary) was proposed as a potential conservation area by Timberlake et al. (2010). However, even the northern parts of the plateau have experienced recent heavy logging following increased settlement there (J. Burrows, pers. comm. 2021).
Studies on the adjacent Makonde Plateau of Tanzania have revealed that the sandy soils have a weakly developed structure and are highly prone to gully erosion in areas where the vegetation has been denuded (Achten et al. 2008; Kabanza et al. 2013). This situation is likely to be equally applicable to the Mueda Plateau which has similar soils (Achten et al. 2008). A further threat is from increased frequency of uncontrolled wildfires due to deliberate burning; such fires are noted to be impacting the populations of Aloe ribauensis in the vicinity of Muidumbe on the southern edge of the plateau (Osborne et al. 2019).
The most urgent conservation priorities on the Mueda Plateau are to raise community awareness and support for sustainable management of the existing remnants of dry forest and thicket vegetation and, potentially, to develop a restoration scheme for these habitats in areas that are not so densely inhabited. Some optimism for such an approach can be taken from the Rondo Nature Forest Reserve in southeast Tanzania, where considerable regeneration of forest has occurred since the cessation of logging in the 1980s. Without such conservation schemes, the Mueda Plateau may soon lose its remaining biodiversity value. Ex situ conservation measures are also required for some of the most range-restricted species that occur on the plateau and adjacent lowlands, such as Celosia patentiloba, Hugonia grandiflora and Uvaria rovumae, given the high extinction risk they face in the wild.

Site assessor(s)

Iain Darbyshire, Royal Botanic Gardens, Kew

IPA criterion A species

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
Monodora carolinae Couvreur	A(i)	✓	✓	✓	–	–	Unknown
Aloe ribauensis T.A.McCoy, Rulkens & O.J.Baptista	A(i)	✓	✓	✓	–	–	Scarce
Salacia orientalis N.Robson	A(i)	✓	✓	✓	–	–	Unknown
Baphia macrocalyx Harms	A(i)	✓	✓	✓	–	–	Unknown
Hugonia grandiflora N.Robson	A(i)	✓	✓	✓	–	–	Scarce
Cuviera schliebenii Verdc.	A(i)	✓	✓	✓	–	–	Unknown
Oxyanthus biflorus J.E.Burrows & S.M.Burrows	A(i)	✓	✓	✓	–	–	Scarce
Tricalysia semidecidua Bridson	A(i)	✓	✓	✓	–	–	Occasional
Erianthemum lindense (Sprague) Danser	A(i)	✓	✓	✓	–	–	Unknown
Paropsia grewioides Mast. var. orientalis Sleumer	A(i)	✓	✓	✓	–	–	Unknown
Sterculia schliebenii Mildbr.	A(i)	–	–	✓	–	–	Unknown
Cuviera tomentosa Verdc.	A(i)	✓	✓	✓	–	–	Unknown
Uvaria rovumae Deroin & Lötter	A(i)	✓	✓	✓	✓	–	Scarce
Celosia patentiloba C.C.Towns.	A(i)	✓	✓	✓	–	–	Unknown
Acacia latistipulata Harms	A(i)	✓	✓	✓	–	–	Unknown
Vismianthus punctatus Mildbr.	A(i)	✓	✓	✓	–	–	Unknown

SPECIES	QUALIFYING SUB-CRITERION	≥ 1% OF GLOBAL POPULATION	≥ 5% OF NATIONAL POPULATION	1 OF 5 BEST SITES NATIONALLY	ENTIRE GLOBAL POPULATION	SOCIO-ECONOMICALLY IMPORTANT	ABUNDANCE AT SITE
Momordica henriquesii Cogn.	A(i)	✓	✓	✓	–	–	Unknown
Rothmannia macrosiphon (K.S chum. ex Engl.) Bri dson	A(i)	–	✓	✓	–	–	Unknown
Lannea welwitschii (Hiern) Engl. var. ciliolata Engl.	A(i)	–	✓	✓	–	–	Unknown

IPA criterion C qualifying habitats

HABITAT	QUALIFYING SUB-CRITERION	≥ 5% OF NATIONAL RESOURCE	≥ 10% OF NATIONAL RESOURCE	1 OF 5 BEST SITES NATIONALLY	AREAL COVERAGE AT SITE
Rovuma Coastal Dry Forest	C(iii)	–	–	–	

General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Forest - Subtropical/Tropical Dry Forest	–	Minor
Shrubland - Subtropical/Tropical Dry Shrubland	–	Major
Savanna - Moist Savanna	–	Major
Artificial - Terrestrial - Arable Land	–	Major
Artificial - Terrestrial - Subtropical/Tropical Heavily Degraded Former Forest	–	Major

Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE
Agriculture (arable)	–	Major
Residential / urban development	–	Minor
Harvesting of wild resources	–	Major

Threats

THREAT	SEVERITY	TIMING
Agriculture & aquaculture - Annual & perennial non-timber crops - Small-holder farming	High	Ongoing - trend unknown

THREAT	SEVERITY	TIMING
Residential & commercial development - Housing & urban areas	Medium	Ongoing - trend unknown
Biological resource use - Logging & wood harvesting	High	Ongoing - trend unknown
Natural system modifications - Fire & fire suppression - Increase in fire frequency/intensity	High	Ongoing - trend unknown
Pollution - Agricultural & forestry effluents - Soil erosion, sedimentation	Unknown	Ongoing - trend unknown

Management type

MANAGEMENT TYPE	DESCRIPTION	YEAR STARTED	YEAR FINISHED
No management plan in place		–	–

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