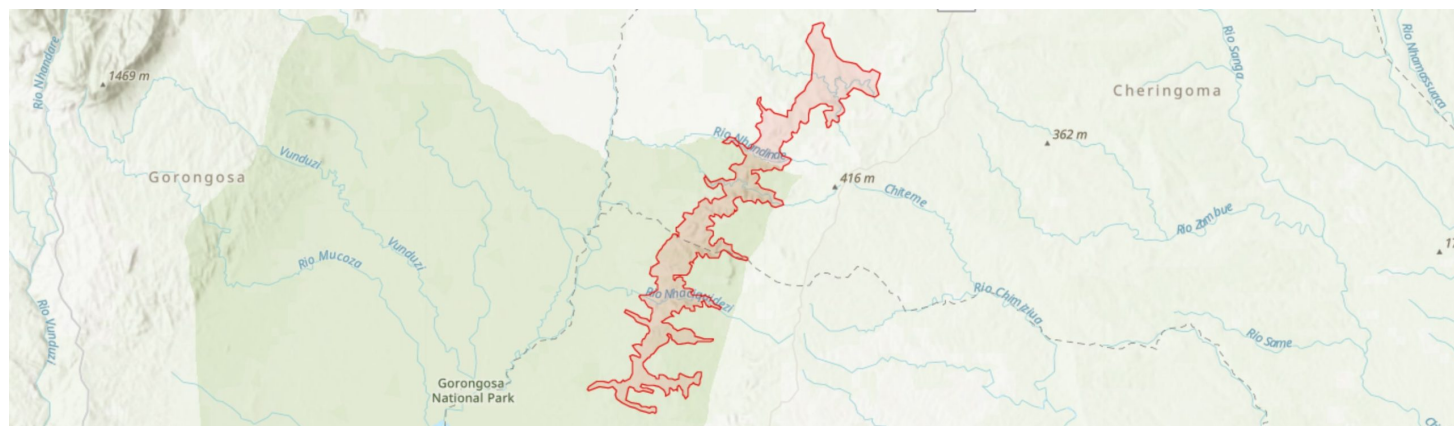


# Cheringoma Limestone Gorges

Desfiladeiros de calcário de Cheringoma (Test version)

**MOZTIPA037**



Country: **Mozambique**

Administrative region: **Sofala (Province)**

Central co-ordinates: **-18.64661 N, 34.76241 E**

Area: **182km<sup>2</sup>**

## Qualifying IPA criteria

A(i), C(iii)

## IPA assessment rationale

The Cheringoma Limestone Gorges qualify as an Important Plant Area under sub-criterion A(i) due to the presence of, *Cola cheringoma* (EN), a species only known from the Cheringoma area. A total of six Mozambican endemic species in total are known from this IPA, falling below the threshold of 3% of Mozambican species (equivalent to 16 species) of high conservation importance within the site required to trigger sub-criterion B(ii). However, as this area has not yet been extensively studied it is possible that more species of conservation importance will be recorded within the gorges with further investigation.

This IPA also covers the only known limestone forest in Mozambique (Cheek et al. 2019). Given the uniqueness of this habitat and its association with narrow range endemic species, the limestone gorge forest qualifies under sub-criterion C(iii) of the IPA criteria.

## Site description

The Cheringoma Limestone Gorges span the border between Muanza and Cheringoma Districts of Sofala Province. Falling mostly within Gorongosa National Park and Buffer Zone, this IPA encompasses the gorge system where the Cheringoma Plateau

meets the southern end of the African Great Rift Valley. The humid conditions within these gorges host forest that, although not yet extensively studied, is known to be biodiverse and of great conservation value (Byrne 2013). This IPA is unique, covering most of the only limestone forest known with certainty from Mozambique. This habitat is rare and threatened across tropical Africa, where it is only known to occur in Kenya, Tanzania and Mozambique (Cheek et al. 2019).

The site boundary closely follows the gorge habitat, delineated by Stalmans & Beilfuss (2008), excluding some of the more degraded patches in the far north, and is 182 km<sup>2</sup> in area. The north of the IPA extends just beyond the Khodzhue Gorge system (-18.52°, 34.90°) and the southern boundary is just beyond Muanza Gorge (-18.82°, 34.68°). Less than 10 km west is a separate IPA, Urema Valley [MOZTIPA038], that encompasses the wetlands of Gorongosa National Park.

## Botanical significance

Limestone forests are rare in tropical Africa, with known locations limited only to Kenya, Tanzania and Mozambique, while the Cheringoma Limestone Gorges are the only area known to support forest on limestone in Mozambique (Cheek et al. 2019). Globally, limestone is associated with narrowly endemic plant species, as the physiological challenges of the substrate provide a selection pressure through which adaptations may develop, some of which restrict these species to a single or a small number of limestone patches (Cheek et al. 2019). One example of a narrow range endemic within this IPA is *Cola cheringoma*. A globally Endangered species, *C. cheringoma* is described as locally common but is restricted only to Cheringoma limestone forests, with at least one locality known from this IPA. It is likely that the population within the gorges is larger than is currently known, with a number of *Cola mossambicensis* specimens collected here possibly representing

misidentified individuals of *C. cheringoma* (Cheek et al. 2019). In addition to this narrow endemic, an as yet undescribed species of *Justicia*, *Justicia* sp. B of Flora Zambesiaca (LC), is also thought to be endemic to the limestone outcrops of the Cheringoma gorges and, although common at the two localities from which it is known, there has been no collections made outside this IPA (Darbyshire et al. 2019). With further investigation it is possible that more Cheringoma limestone endemics will be documented from these gorges.

In total, six national endemic taxa have been recorded from this IPA and, including *C. cheringoma* (EN), two threatened species. *Khaya anthotheca*, the second threatened species, is known from gorge margin habitat and, despite being assessed as globally Vulnerable, does not qualify under sub-criterion A(i) of the IPA criteria due to its extensive range covering parts of west, central and southern Africa. An additional Vulnerable species, *Diplocyclos tenuis*, has been recorded at this site (Wursten s.n.). However, the IUCN Red List assessment does not take this locality into account, with the range considered including only Tanzania, Kenya and only one locality in Cabo Delgado Province of Mozambique. We therefore could expect this Red List assessment to be downgraded should this additional locality be considered.

Although limited botanical studies of the site have been undertaken to date, two surveys of the limestone forests of Cheringoma have been completed since 2004, with an unpublished checklist from Burrows et al. (2012) numbering around 320 species. This checklist records a number of interesting plant taxa within the gorges, including *Mondia whitei*, a medicinal species categorised as Endangered in both South Africa and eastern Africa (Aremu et al. 2011). *Antiaris toxicaria* subsp. *usambarensis* var. *welwitschia*, a taxon native to Mozambique, Tanzania, Kenya, Zambia and the Democratic Republic of Congo, is also recorded from these gorges. This species is used to make bark cloth in West Africa, while the latex is used for arrow poison (Burrows et al. 2018). Although frequent within the Cheringoma Gorges, *A. toxicaria* subsp. *usambarensis* var. *welwitschia* is rare in Mozambique, known from only two other localities in Cabo Delgado province (Burrows et al. 2018). These northerly localities are threatened, with some areas already transformed and, therefore, this IPA is of great importance to the national population, representing the only legal protection for this species in the Flora Zambesiaca area (J. Burrows, pers. comm. 2021).

In addition, the presence of two fern species, *Thelypteris opulenta* (*Amblovenatum opulentum*) and *T. unita* (*Sphaerostephanos unitus*), within the Cheringoma Limestone Gorges represent the only collections for each respective species within the Flora Zambesiaca region (Burrows et al. 2012).

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## Habitat and geology

Geology is a major contributor to the plant diversity of this IPA. Drainage from the Cheringoma Plateau eroded the overlying sandstone, carving out the deep gorges and revealing the underlying Eocene limestone (Cheek et al. 2019). The gorges, some of which

are 70 m in depth, provide a sheltered environment in which conditions are hot and humid (Byrne 2013; Burrows et al. 2018). The mean annual temperature is 34°C and the mean annual rainfall, of over 1,100 mm, is relatively high for the area (Stalmans & Beilfuss 2008; Burrows et al. 2018). These conditions produce a flora distinct from the *Androstachys johnsonii*-dominated woodland on the gorge lip (Burrows et al. 2018). The limestone gorge forest is of particular conservation interest due to the association of narrow range endemics, notably *Cola cheringoma*. Tree species within the gorge forest include *Albizia glaberrima* (LC), *Celtis philippensis* (LC) and *Khaya anthotheca* (VU), while large shrubs include *Pavetta klotzschiana*, *Grandidiera boivinii* (LC) and *Combretum pisoniiflorum* (Burrows et al. 2018).

The small areas of plateau included in this IPA are populated by miombo woodland, dominated by *Brachystegia spiciformis* and *Julbernardia globiflora*, and are also underlain by limestone (Lötter et al. 2021). Relatively low levels of habitat transformation have been observed on the plateau, although there is some agricultural land towards Muanza Gorge towards the south-east of the IPA (Stalmans & Beilfuss 2008).

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## Conservation issues

Much of this IPA falls within Gorongosa National Park (GNP) and Buffer Zone. The focus of Gorongosa has been set out in the 2020 – 2050 Strategic Plan and involves improving the capacity of the national park to “preserve, protect and manage the diverse ecosystems within the Park” while also working with communities within the buffer zone, making a particular effort to reach women in these communities, to improve sustainable economic opportunities (Parque Nacional da Gorongosa 2019). This IPA also falls with the Gorongosa-Marromeu Key Biodiversity Area and Gorongosa Mountain and National Park Important Bird Area.

One of the major threats to biodiversity within GNP is expansion of agriculture and settlements (BIOFUND 2013) but relative to areas outside the national park, the site management offers greater security for plant communities. Outside the national park and buffer zone, north of this IPA, gorge vegetation has been degraded by agriculture, however, GNP are working towards having a large Community Conservation Area declared in this area (M. Stalmans, pers. comm. 2021). This additional protection may therefore offer greater protection to the most northerly gorge habitat in future.

The inaccessibility of the larger gorges likely affords them with additional protection from anthropogenic disturbance. There is, however, some transformation around Muanza Gorge (-18.82, 34.68) within the GNP (Stalmans & Beilfuss 2008). Much of this agricultural land surrounds the road from Muanza town, although the rate of habitat conversion here appears to have peaked in the 2000s and has since slowed (World Resources Institute 2019; Google Earth Pro 2020).

In the buffer zone, the focus of GNP is on economic and social development within communities, with around 200,000 people living within the entire buffer zone (Parque Nacional da Gorongosa 2019). The development of sustainable livelihoods contributes to the

reduction of pressure on land and natural resources around the communities in the area.

While the geology of this site is strongly linked to its unique biodiversity, limestone is also a valuable material that is extracted in the area. Limestone extraction has been observed near Condué, upstream of Antiaris Gorge, (-18.71°, 34.83°) with clearing of vegetation for mining and associated infrastructure such as access roads (Cheek et al. 2019). It appears that similar extraction is occurring to the east of Muanza Gorge (-18.815°, 34.735°) (Google Earth 2020).

The fauna of the Cheringoma Limestone Gorges has not yet been studied extensively, however, some interesting vertebrate taxa have been recorded, including several species of bat and an undescribed species of frog in the genus *Kassina* (Conneely 2013; Parque Nacional da Gorongosa 2016).

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## Site assessor(s)

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## 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 |
|----------------------------------|--------------------------|---------------------------|-----------------------------|------------------------------|--------------------------|------------------------------|-------------------|
| <i>Cola cheringoma</i><br>Cheek  | A(i)                     | ✓                         | ✓                           | ✓                            | —                        | —                            | Frequent          |
| <i>Khaya anthotheca</i><br>C.DC. | 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 |
|---------|--------------------------|---------------------------|----------------------------|------------------------------|------------------------|
|---------|--------------------------|---------------------------|----------------------------|------------------------------|------------------------|

## General site habitats

| GENERAL SITE HABITAT                               | PERCENT COVERAGE | IMPORTANCE |
|--|------------------|------------|
| Forest - Subtropical/Tropical Moist Lowland Forest | 20               | Major      |
| Savanna - Moist Savanna                            | 70               | Major      |

## Land use types

| LAND USE TYPE        | PERCENT COVERAGE | IMPORTANCE |
|----------------------|------------------|------------|
| Nature conservation  | 90               | Major      |
| Extractive industry  | 1                | Minor      |
| Agriculture (arable) | 1                | Minor      |

## Threats

| THREAT   | SEVERITY | TIMING                  |
|--|----------|-------------------------|
| Agriculture & aquaculture - Livestock farming & ranching - Small-holder grazing, ranching or farming | Low      | Ongoing - trend unknown |
| Energy production & mining - Mining & quarrying  | Low      | Ongoing - trend unknown |

## Protected areas

| PROTECTED AREA NAME                     | PROTECTED AREA TYPE | RELATIONSHIP WITH IPA                         | AREAL OVERLAP |
|---|---------------------|---|---------------|
| Gorongosa National Park and Buffer Zone | National Park       | protected/conservation area overlaps with IPA | 690           |

## Conservation designation

| DESIGNATION NAME                     | PROTECTED AREA        | RELATIONSHIP WITH IPA                         | AREAL OVERLAP |
|--------------------------------------|-----------------------|---|---------------|
| Gorongosa Mountain and National Park | Important Bird Area   | protected/conservation area overlaps with IPA | 440           |
| Gorongosa-Marromeu                   | Key Biodiversity Area | protected/conservation area overlaps with IPA | 768           |

## Management type

| MANAGEMENT TYPE                         | DESCRIPTION  | YEAR STARTED | YEAR FINISHED |
|---|--|--------------|---------------|
| Protected Area management plan in place | The focus of Gorongosa has been set out in the 2020–2050 Strategic Plan and involves improving the capacity of the national park to “preserve, protect and manage the diverse ecosystems within the Park” while also working with communities within the buffer zone, making a particular effort to reach women in these communities, to improve sustainable economic opportunities (Parque Nacional de Gorongosa 2019). | 2020         | 2050          |

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