

# Chimanimani Mountains

MOZTIPA003B



Country: **Mozambique**

Administrative region: **Manica (Province)**

Central co-ordinates: **-19.80678 N, 33.11202 E**

Area: **319km<sup>2</sup>**

## Qualifying IPA criteria

A(i), A(iv), B(ii), C(iii)

## IPA assessment rationale

The Chimanimani Mountains qualify as an IPA under all three criteria. Under Criterion A(i) the site supports important populations of 29 globally threatened plant taxa. Half of these are endemic to this mountain range, with the remainder mostly being range-restricted Chimanimani-Nyanga endemics, six of which are only recorded at this site within the Mozambique IPA network. In addition, five potentially threatened range-restricted endemics occur here, qualifying the site under Criterion A(iv). The Chimanimani Mountains support an exceptional number of species of high conservation importance with three site endemics and 92 regional endemics with a restricted range of less than 10,000 km<sup>2</sup> – many of these are Chimanimani endemics that occur on both sides of the Mozambique-Zimbabwe border. This total of 95 qualifying taxa is just short of 20% of the total list of sub-criterion B(ii) qualifying species for Mozambique, making this the richest site botanically in Mozambique. Under criterion C(iii) the site includes the largest extent of montane grassland in Mozambique, this being one of Mozambique's national priority habitats recognised during the first Mozambique TIPAs workshop in Maputo in January 2018. In addition, the site supports small areas of medium altitude moist forest and montane moist forest, two further national priority habitats, but it does not qualify as one of the five best sites for these two habitats.

## Site description

The Chimanimani Mountains extend across the Mozambique-Zimbabwe border from Sussundenga District in Manica Province of Mozambique, into Manicaland Province in Zimbabwe.

Mozambique's Chimanimani Mountains IPA encompasses the montane area over 1,200 m elevation, up to the border with Zimbabwe, including both the main massif and an area known as 'The Corner' to the north, which is separated from the main massif by the Musapa Gap. The IPA site includes the highest mountain in Mozambique, Monte Binga at 2,436 m elevation. The Chimanimani Mountains are protected on both sides of the border as National Parks, which together form the Chimanimani Trans-Frontier Conservation Area (TFCA). Immediately to the south and east of the Chimanimani Mountains IPA, below 1,200 m, the lower mountain slopes of the Chimanimani National Park and adjacent Forest Reserves and community lands are included within the Chimanimani Lowlands IPA.

## Botanical significance

The Chimanimani Mountains are Mozambique's most valuable site for plant endemism and have high international conservation significance. The IPA includes Mozambique's largest areas of montane grassland and scrubland, here occurring mainly on quartzite rock but also with extensive areas of grassland on schist. In the rugged montane landscape, steep quartzite crags, ledges and boulders form habitats that support species-rich lithophytic plant communities with many endemic species. Of the 74 endemic plants of the cross-border Chimanimani Mountains so far recorded, 61 have been found within this IPA to date, many having only recently been found on the Mozambique side of the border during surveys in the mid-2010s (Timberlake et al. 2016; Wursten et al. 2017). Many of the endemics are from plant groups typical of nutrient-poor soils, including three species of *Thesium*, one endemic and two near-

endemic *Erica* species, and one of the few tropical African restio species, *Platycaulos quartziticola* (Cheek et al. 2018). Among the wide range of other plant families and genera represented in the endemic flora, the genus *Aloe* is particularly notable for having five endemic taxa. Three plant species are known only from within this IPA boundary at present: *Streptocarpus montis-bingae* (DD), a small herb known only from Monte Binga; *Dianthus chimanimaniensis* (VU), a tufted perennial herb; and *Centella obtriangularis* (VU), a small creeping herb, although there are unconfirmed records of the latter from the Zimbabwe side. Many more range-restricted species of the Chimanimani-Nyanga (Sub-)Centre of Plant Endemism also occur; overall, 95 species with a range of less than 10,000 km<sup>2</sup> are recorded from within this IPA.

Thirty plants that occur within the IPA are assessed as globally threatened, of which eight are Endangered, including two recently described small endemic trees *Empogona jenniferae* and *Olinia chimanimani*, the orchid *Neobolusia ciliata* and the grass *Danthoniopsis chimanimaniensis* (Timberlake et al. 2016; Wursten et al. 2017; Cheek et al. 2018; Shah et al. 2018). Of the Vulnerable species, many are threatened in other parts of their range and the Chimanimani Mountains are considered to be the most secure site for these taxa. A significant proportion of the strict-endemic species are not threatened as their habitats are largely intact and little-disturbed.

A recent checklist of the vascular plants of the massif above 1,200 m elevation on both sides of the Mozambique-Zimbabwe border recorded a total of 977 taxa and noted that, although total species richness is not particularly high in comparison to other mountain sites in the Flora Zambesiaca area, this site holds significantly higher numbers of endemics, with 7.7% of the total flora being endemic, compared with 5.4% on Mount Mulanje in Malawi, 1.7% on the Nyika Plateau in Malawi and 1.4% in the Nyanga Highlands of Zimbabwe (Wursten et al. 2017).

New species to science are still being discovered and described from the site, such as the recently published *Sericanthe chimanimaniensis* (Wursten et al. 2020), and surveys in the mid-2010s uncovered a potential new *Streptocarpus* allied to *S. grandis*, together with unmatched *Erica*, *Coleus* and *Syncolostemon* spp. amongst other potential novelties (I. Darbyshire et al., pers obs.).

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## Habitat and geology

The Chimanimani Mountains IPA is dominated by montane grassland and scrubland habitats within a rugged landscape of mountain peaks, steep crags and boulders. The surficial geology is predominantly a nutrient-deficient quartzite, with a smaller proportion of more nutrient-rich schists; these formations are primarily of the Frontier (Fronteira) Series of the Umkondo Group, dating from the later Precambrian (Timberlake et al. 2016). Quartzite rock outcrops, crags and boulders give rise to a wide range of microhabitats and support a high species diversity. The habitat and geology of this site are discussed in detail in Timberlake et al. (2016) and are summarised here.

Montane grasslands occupy an area of ca. 200 – 250 km<sup>2</sup> across the highlands, occurring mainly on areas of level or rolling terrain. Those on quartzite occur on a thin white sandy soil and are often interspersed with scrub and rock outcrops with the more extensive areas occurring in broad valleys; the dominant grass species is *Loudetia simplex*. Those on schists tend to form rolling hills on a red soil and *Themeda triandra* is the most characteristic species, although *L. simplex* remains common. Scattered bushes occur within the schist grassland, and these can become more frequent in some areas to form a scrubland, 1 – 2 m tall, with several *Protea* spp. and *Leucospermum saxosum* amongst the most common shrubs, with the near-endemic *Myrica chimanimaniensis* also locally frequent. An Ericaceous scrub 0.5 – 3 m tall is frequent on quartzite and is a species-rich assemblage in which many of the endemics occur; a range of *Erica* species are noted, with *E. hexandra* particularly common on the rock outcrops together with other shrubby species and succulents including the impressive *Aloe munchii*. These Ericaceous scrublands are considered to be fire-sensitive but are somewhat protected from the worst fires by the intervening areas of bare rock. Extensive areas of exposed quartzite support a lithophytic community, where the clump-forming sedge *Coleochloa setifera* is common together with the endemic *Xerophyta argentea* and *Aloe hazeliana*. Shaded areas amongst the rocks can support interesting herbaceous species such as *Impatiens salpinx*, *Streptocarpus* spp., orchids and ferns.

Across the IPA, boggy areas and streams are frequent, draining into several larger rivers, the largest of which is the Rio Mufomodzi in the central-northern part of the massif. Broad river valleys support level areas of grassland and bog vegetation on nutrient-poor alluvial soils and peat. Areas of seepage and wet depressions can support an interesting herb flora including *Xyris* spp., the endemic *Mesanthemum africanum* and *Platycaulos quartziticola*, and a number of orchids and sedges.

Sheltered stream gullies and river gorges support areas of moist evergreen forest, mostly classed here as medium-altitude moist forest (occurring below 1400 m) with a few smaller patches of montane moist forest (mostly occurring over 1600 m). Whilst mainly very small in area, the largest patch noted by Timberlake et al. (2016) measures ca. 4.2 km<sup>2</sup>. These forests have not been well surveyed across the site, but some of the higher altitude patches have been found to be typical Afrotropical forests, with a closed canopy of ca. 10 – 15 m and with characteristic species including *Ilex mitis*, *Macaranga mellifera*, *Podocarpus milanjanus*, *Schefflera umbellifera* and *Syzygium cordatum*. Lianas and epiphytes are frequent, and the ground layer has many ferns and mosses. Although accurate climate data are lacking for the high mountains, rainfall is estimated at ca. 1,500 – 2,000 mm per year, but may reach as high as ca. 3,000 mm on the highest peaks. Rainfall occurs all year round but peaks from November to April. Mists are frequent and supply additional moisture during dry periods. Mean average temperatures are below 18°C, and frost is noted to be frequent above 1,500 m elevation (Ghiurghi et al. 2010; Timberlake et al. 2016).

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## Conservation issues

The Chimanimani Mountains IPA lies almost entirely within the core zone of the Chimanimani National Park (CNP) and Trans-Frontier Conservation Area (TFCA), a protected area that is essentially uninhabited and designated as non-use. This area has a comprehensive management plan (Ghiurghi et al. 2010), although this has not all been implemented. The vegetation within the IPA site is mostly intact and considered to be free of any major threat at present. However, illegal small-scale goldmining, fire frequency and invasive species all pose potential threats to the vegetation and both monitoring and management are recommended. Tourism also needs to be considered as a conservation issue for this site. Illegal gold-mining was first recorded in the CNP in 2004, and increased rapidly with as many as 10,000 miners operating in 2006; by 2016 this had reduced to ca. 1,000 miners, due mainly to the most accessible gold having been exhausted (Dondeyne et al. 2009; Timberlake et al. 2016). The mining has been concentrated along water courses and has not directly impacted the populations of most of the endemic and threatened plant species, most of which occur in different habitats. However, the serious negative impact of goldmining on the upland hydrology and ecology cannot be overlooked. A likely indirect impact of the illegal goldmining has been an increased frequency of wild-fires when fire is used for hunting by the miners or set accidentally. Even though some of the montane habitats, such as the schist grasslands and scrublands, are likely to be adapted to fire to some extent, increased fire frequency above natural levels is likely to impact scrub vegetation and moist forest edges, preventing recovery between fires and affecting recruitment of young plants. Other issues associated with the mining activity and associated presence of traders in the highlands include the use of caves and sheltered rocky areas as temporary to more permanent shelters which can damage the shaded rock flora, including *Streptocarpus* spp., and the gathering of fuelwood, although this latter threat appears to have been minimal (Timberlake et al. 2016). The invasive shrub *Vernonanthura polyanthes* was originally introduced into Mozambique from South America as a nectar source for bees and is now becoming widespread in the lower foot-slopes of Chimanimani Mountains. Recently, several individuals have been recorded within the montane area at 1200 – 1400 m elevation. This shrub is a potential future threat to the forest margin and scrubland vegetation in lower elevation areas of this IPA as it can form dense stands on disturbed ground and fire-damaged areas. However, this is a much more serious threat in the Chimanimani Lowlands IPA. Tourism in the Chimanimani Mountains is considered a potential conservation issue as it may potentially have both a positive and negative impact. The Chimanimani Mountains have strong potential for eco-tourism, providing a wilderness experience and an opportunity for local communities to benefit from conservation of the CNP. However, tourism must be well-managed to avoid damage to habitats and vegetation through trampling, fire and pollution. The Chimanimani Mountains IPA lies within the Chimanimani Mountains Important Bird Area which includes both the high altitude massif and surrounding lowlands. The entirety of the CNP core and buffer area is also designated as the Chimanimani Key Biodiversity Area (KBA), based primarily on its rich flora. The Mountains would qualify as an Alliance for Zero Extinction site on the basis of the

Endangered endemic plant species noted above.

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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>Aeschynomene aphylla</i> Wild	A(i)	✓	✓	✓	–	–	Unknown
<i>Aloe plowesii</i> Reynolds	A(i)	✓	✓	✓	–	–	Occasional
<i>Aloe rhodesiana</i> Rendle	A(i)	–	–	✓	–	–	Unknown
<i>Aspidoglossum glabellum</i> Kupicha	A(i)	✓	✓	✓	–	–	Scarce
<i>Buchnera subglabra</i> Philcox	A(i)	✓	✓	✓	–	–	Common
<i>Centella obtriangularis</i> Cannon	A(i)	✓	✓	✓	✓	–	Common
<i>Cyanotis chimanimaniensis</i> Faden	A(iv)	✓	✓	✓	–	–	Unknown
<i>Danthoniopsis chimanimaniensis</i> (J.B.Phipps) Clayton	A(i)	✓	✓	✓	–	–	Unknown
<i>Dianthus chimanimaniensis</i> S.S.Hooper	A(i)	✓	✓	✓	✓	–	Unknown
<i>Dierama plowesii</i> Hilliard	A(i)	✓	✓	✓	–	–	Scarce
<i>Dissotis pulchra</i> A.Fern. & R.Fern.	A(i)	✓	✓	✓	–	–	Occasional
<i>Dissotis swynnertonii</i> (Baker f.) A.Fern. & R.Fern.	A(i)	✓	✓	✓	–	–	Occasional
<i>Empogona jenniferae</i> Cheek	A(i)	✓	✓	✓	–	–	Scarce
<i>Erica lanceolifera</i> S.Moore	A(i)	✓	✓	✓	–	–	Occasional
<i>Erica pleiotricha</i> S.Moore var. <i>pleiotricha</i>	A(i)	✓	✓	✓	–	–	Scarce
<i>Gladiolus zimbabweensis</i> Goldblatt	A(i)	✓	✓	✓	–	–	Occasional
<i>Gutenbergia westii</i> (Wild) Wild & G.V.Pope	A(i)	✓	✓	✓	–	–	Occasional

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>Kleinia chimanimaniensis</i> van Jaarsv.	A(iv)	–	–	✓	–	–	Unknown
<i>Lopholaena brickellioides</i> S.Moore	A(iv)	–	–	✓	–	–	Unknown
<i>Myrica chimanimaniana</i> (Verdc. & Polhill) Christenh. & Byng	A(i)	✓	✓	✓	–	–	Frequent
<i>Neobolusia ciliata</i> Summerh.	A(i)	✓	✓	✓	–	–	Occasional
<i>Olinia chimanimani</i> T.Shah & I.Darbysh.	A(i)	✓	✓	✓	–	–	Occasional
<i>Polygala zambesiaca</i> Paiva	A(i)	✓	✓	✓	–	–	Occasional
<i>Protea enervis</i> Wild	A(i)	✓	✓	✓	–	–	Unknown
<i>Raphionacme pulchella</i> Venter & R.L.Verh.	A(i)	✓	✓	✓	–	–	Scarce
<i>Rhynchosia chimanimaniensis</i> Verdc.	A(i)	✓	✓	✓	–	–	Unknown
<i>Schistostephium oxylobum</i> S.Moore	A(i)	✓	✓	✓	–	–	Occasional
<i>Schizochilus lepidus</i> Summerh.	A(i)	✓	✓	✓	–	–	Unknown
<i>Sericanthe chimanimaniensis</i> Würsten & De Block	A(i)	✓	✓	✓	–	–	Occasional
<i>Streptocarpus grandis</i> N.E.Br. subsp. <i>septentrionalis</i> Hilliard & B.L.Burtt	A(iv)	✓	✓	✓	–	–	Occasional
<i>Streptocarpus hirticapsa</i> B.L.Burtt	A(i)	✓	✓	✓	–	–	Occasional
<i>Syncolostemon oritrephes</i> (Wild) D.F.Otieno	A(i)	✓	✓	✓	–	–	Scarce
<i>Tephrosia longipes</i> Meisn. var. <i>drummondii</i> (Brummitt)	A(iv)	–	–	✓	–	–	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
<i>Brummitt</i>							
<i>Wahlenbergia subaphylla</i> (Baker) <i>Thulin</i> subsp. <i>scoparia</i> (Wild) <i>Thulin</i>	A(iv)	✓	✓	✓	—	—	Unknown
<i>Xyris asterotricha</i> <i>Lock</i>	A(i)	✓	✓	✓	—	—	Scarce

## 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
Montane Grassland	C(iii)	—			
Medium Altitude Moist Forest 900-1400 m	C(iii)	—	—	—	
Montane Moist Forest >1600 m	C(iii)	—	—	—	

## General site habitats

GENERAL SITE HABITAT	PERCENT COVERAGE	IMPORTANCE
Grassland - Subtropical/Tropical High Altitude Grassland	—	Major
Shrubland - Subtropical/Tropical High Altitude Shrubland	—	Major
Forest - Subtropical/Tropical Moist Montane Forest	—	Minor
Wetlands (inland) - Permanent Rivers, Streams, Creeks [includes waterfalls]	—	Minor
Wetlands (inland) - Bogs, Marshes, Swamps, Fens, Peatlands [generally over 8 ha]	—	Minor
Rocky Areas - Rocky Areas [e.g. inland cliffs, mountain peaks]	—	Major

## Land use types

LAND USE TYPE	PERCENT COVERAGE	IMPORTANCE
Nature conservation	—	Major
Extractive industry	—	Minor
Harvesting of wild resources	—	Minor

## Threats

THREAT	SEVERITY	TIMING
Invasive & other problematic species, genes & diseases - Invasive non-native/alien species/diseases - Named species	Unknown	Future - inferred threat
Human intrusions & disturbance - Recreational activities	Low	Future - inferred threat
Natural system modifications - Fire & fire suppression - Increase in fire frequency/intensity	Unknown	Ongoing - trend unknown
Energy production & mining - Mining & quarrying	Low	Ongoing - trend unknown
Pollution - Industrial & military effluents - Seepage from mining	Medium	Ongoing - trend unknown

## Protected areas

PROTECTED AREA NAME	PROTECTED AREA TYPE	RELATIONSHIP WITH IPA	AREAL OVERLAP
Chimanimani National Park	National Park	protected/conservation area encompasses IPA	—
Chimanimani Trans-Frontier Conservation Area	Trans-Frontier Conservation Area (core zone)	protected/conservation area encompasses IPA	—

## Conservation designation

DESIGNATION NAME	PROTECTED AREA	RELATIONSHIP WITH IPA	AREAL OVERLAP
Chimanimani Mountains (Mozambique)	Important Bird Area	protected/conservation area encompasses IPA	—
Chimanimani	Key Biodiversity Area	protected/conservation area encompasses IPA	—

## Management type

MANAGEMENT TYPE	DESCRIPTION	YEAR STARTED	YEAR FINISHED
Protected Area management plan in place	Chimanimani National Reserve Management Plan	—	—

## Bibliography

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