

BIODIVERSITY AND CONSERVATION OF MOUNT NAMULI, MOZAMBIQUE



COMPILED BY LEGADO

A GLOBAL VENTURE CATALYZING LEGACY-DRIVEN LEADERSHIP TO SUPPORT A FLOURISHING FUTURE FOR THE PEOPLE AND BIODIVERSITY IN AFRICA, IN CONJUNCTION WITH LEGADO: NAMULI.

WHAT MAKES MT. NAMULI UNIQUE?

Mount Namuli rises over 2,000 meters above a mosaic of forest and agricultural land in northern Mozambique's Zambézia Province. As the nation's second highest peak, Namuli presents a dramatic and stunningly beautiful landscape, yet its real value is its unique flora and fauna and the ecosystem services it provides to the communities below.

Mount Namuli falls within the Namuli massif at the far southern end of the Eastern Afromontane Biodiversity Hotspot and has been designated as a Key Biodiversity Area, the highest-level conservation priority within the region. The Namuli massif is a complex of granitic inselbergs, including nine other peaks of similar elevation, linked by a high plateau. Namuli's particular combination of geography and geology has led to the development of diverse habitats, many of which are now rare in the region. Of particular interest are several types of forest, grasslands and sheer rock faces. Due to the presence of endangered and endemic species, Namuli has been designated an Important Bird Area, an Important Plant Area, and an Alliance for Zero Extinction site. These designations serve to highlight the mountain's importance for biodiversity not only with Mozambique but globally.



Since the 1800's, scientists have undertaken numerous expeditions to Namuli, yet its remote location and the challenges of past conflict and poor infrastructure have limited efforts to study its diverse habitats. Discoveries have been made with each successive exploration, including many new species just in the past few years. Several recent surveys have collected species previously thought to be endemic to Mt. Mulanje in Malawi, showing clear links between the two massifs, and highlighting the gaps in our knowledge of this region. Also poorly studied is the relationship between the thousands of people who call Namuli their home and the natural resources upon which they heavily depend.

Despite its importance for biodiversity and ecosystem services, Namuli lacks any type of conservation protection. To ensure its unique flora and fauna remain for future generations, a deeper understanding of the mountain's biodiversity and socioeconomic context is essential. This information, and process of participatory land use planning, is essential for communities and other stakeholders to inform wise choices regarding development and conservation on Mount Namuli.

EXPLORATION OF MT. NAMULI

Namuli was first mentioned in English literature in 1883 by Henry O'Neill, British Consul in Mozambique, and a number of specimens were collected from the region around that time. In addition to mapping and collecting botanical and faunal specimens, the explorers recorded observations about the communities of Namuli. O'Neill documented the Lomwe people as being closely tied to Mt. Namuli, believing that the mountain "gave birth to the first of the human race." In 1932, Jack Vincent from the Natural History Museum in London, collected birds, plants, small mammals, and molluscs. His descriptions of the mountain habitats and surrounding human settlement, as well as the early tea plantations, are not very different from the landscape today. One difference was the presence of megafauna, such as leopards and wild pig, which have since disappeared. Vincent collected 53 bird species as well as mammals, molluscs and plants. Several of these were new to science, including two endemic species: the Namuli apalis (*Apalis lynesii*) and Vincent's bush squirrel (*Paraxerus vincenti*).

A number of expeditions were completed in the 1940's and 60's, largely focused on botanical collection. In the early 2000's several zoological expeditions were undertaken by the Field Museum of Natural History (Chicago) and American Museum of Natural History. This was followed by a major effort in 2005-2007 by a collaborative group of institutions funded by the UK Government Darwin Initiative. The project compiled existing data and completed a series of expeditions on the Namuli Massif. The project report provides the most comprehensive documentation of Namuli's ecosystem currently available. Surveys recorded 420 plant species above 1000–1300 meters, including five new to science, and a number of new vertebrate and butterfly species.



In 2014, Legado organized an entomological and herpetological research team composed of scientists from several different institutions as well as professional rock climbers. The team accessed previously unexplored habitats on the mountain's rock face. The expedition added 11 species to known herpetofauna of Namuli, and one snake and one frog species new to science. The survey also found five ant genera never before collected in Mozambique.

NAMULI'S HABITATS

Namuli's geology and dramatic altitudinal gradient has led to diverse habitat types. The 2010 study of Namuli categorized its natural vegetation above 1200 meters into five groups: forest, woodland, scrub, grassland, and patches on rocky slopes. They estimated around 1250 ha of moist evergreen forest remain on the Namuli massif. Much of this found between 1600 and 1900 meters in elevation and includes montane, mid-altitude and riverine forest types. Woodland is primarily found at altitudes on the margins of true forest and on the slopes below 1700 meters. Much less information is available about Namuli's woodland biodiversity as most studies have focused on its forests such as the Manho Forests. Likewise, scrub habitats appear to be the product of intense and regular fires, often resulting from clearance for agriculture, and cover large patches on the edges of forest and grasslands.

Grasslands cover about 300 hectares of Namuli at altitudes of 1850 to 2000 meters. The 2010 study found that much of the grassland "is found on deep peat deposits, presumably built up through waterlogging and acidic conditions, whilst other areas are on deep moist soils. It is probable that marked seasonal waterlogging is the factor that inhibits invasion by forest or scrub vegetation, and causes grassland to develop." In fact, Namuli retains one of the largest extents of upland peat grassland in the country, which is rare throughout the region and critical for several endemic species as well as plant diversity. Forest patches, some a few hectares, are found scattered throughout the grasslands and are important for birds and other wildlife.



Namuli's rock faces are perhaps its most iconic and extensive habitat. The vegetation on these rocky outcrops and slopes is adapted to drought as well as significant variation in temperature, and some of these areas burn frequently. The gradient of the slope, level of exposure and amount of perennial water available dictates the type of plant life present, from lichens and mosses, to ground orchids and aloes, and various types of grasses.

UNIQUE FLORA AND FAUNA

Namuli's habitat variation supports high levels of biodiversity, with many unique assemblages of species within close proximity to each other and several species found nowhere else. The plant and birdlife in particular make Namuli incredibly important for conservation, resulting in its designation as both an Important Plant Area and an Important Bird Area. To date, 530 plant taxa (species or subspecies) have been recorded on the Namuli Massif, 16 of which are thought to be endemic to the region. Two of these are succulents (*Aloe torrei* and *Euphorbia namuliensis*), three are woody plants (both *Pavetta* spp. and *Dombeya lastii*), and six are Papilionoid legumes. Further, in 2008 the conservation status of several species was evaluated. This study found that *Aloe torrei* and two other species (*Senecio peltophorus* and *Exacum zombense*) qualify as Endangered per IUCN Red List criteria, and three others (*Alloeochoaete namuliensis*, *Crotalaria torrei* and *Plectranthus guruensis*) are Critically Endangered.

About 155 bird species have been recorded to date on Namuli, including 27 species of afro-montane endemic or near-endemic birds. Namuli is considered particularly important for conservation due to presence of the endemic Namuli Apalis



(*Apalis lynesii*), as well as globally significant populations of Cholo alethe (*Alethe choloensis*), dapple-throat (*Modulatrix orostruthus*), spotted ground-thrush (*Zoothera guttata*) and others. Several of these

birds are found almost exclusively in forests of the lower slopes, where degradation has already occurred or is occurring now, making them even more vulnerable. The IUCN Red List lists both the spotted ground-thrush and Cholo alethe as Endangered.

Many of the large mammals such as lion and leopard were



extirpated from the region decades ago; approximately 42 small mammal, monkey and antelope species remain. Of these, the endemic Vincent's bush squirrel (*Paraxerus vincenti*) is of particular concern.

Listed as Critically Endangered, it is known only in forests above 1000 meters on Namuli and, along with several other squirrel species, is hunted for food by local communities. Bat diversity appears to be particularly rich on Namuli. Two species collected in 2007, *Pipistrellus rusticus* and *Eptesicus hottentotus*, were the first and second record, respectively, of these species in Mozambique.

In total, 16 amphibian and 23 reptile species have been recorded on Namuli yet there may be others in habitats less intensely examined. In 2010 an undescribed forest viper previously thought endemic to a location 130 km away, was collected. The endemic Mount Namuli pygmy chameleon (*Rhampholeon tilburyi*) was described only in 2014 yet is Critically Endangered. The small patches of evergreen



Caecilian (Scolecomorphus kirkii)



Thyolo Alethe (Timberlake, 2009)

Afrotemperate forest where it is found are highly fragmented and under intense pressure from forest clearing. Two particularly important discoveries of the Legado expedition in 2013 were a new dwarf gecko (*Lygodactylus regulus*) that is believed to be endemic but its conservation status has not yet been assessed, and a caecilian (*Scolecomorphus kirkii*), only the second record in Mozambique and the fifth and southernmost recording of this species in the world. Such findings highlight a lack of existing knowledge as well as opportunity for discovery on Namuli.

Even less is known about Namuli's invertebrates, most of which have only been studied opportunistically during expeditions focused on plants and vertebrates. The 2014 Legado expedition collected 31 genera of ants from high elevation montane forest, mid-elevation and gallery forests, montane grasslands and vegetation patches on rocky slopes. Five of these (*Agraulomyrmex*, *Axinidris*, *Cyphoidris*, *Euponera*, and *Prionopelta*) were recorded for

the first time in Mozambique. The majority were found in the forests, the remaining being evenly divided between grasslands and rocky areas. The Darwin-funded expeditions collected seven butterfly species new to science, several not previously recorded in Mozambique and several previously thought to be endemics of Mt Mulanje, Malawi. One individual of a *Pseudathyma* species was collected and is of particular interest, as its nearest relatives are known from western or coastal Tanzania. These findings coupled with the 126 taxa in currently on record suggest that Namuli is important for butterflies and more research should be done.



THE FUTURE OF NAMULI

Namuli is situated in an underdeveloped region of Mozambique, yet one that is considered important for agriculture. Tea plantations are common in the region, having collapsed during the civil war and have been rebounding since the civil war ended in the early 1990's. This industry does not, however, provide significant employment for the communities around the mountain.

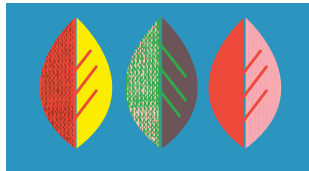
Namuli's soils are classified as Eutric Leptosols, characterized by a shallow soil layer over altered rock, exceptionally high acidity, excessive drainage and high to very high organic matter. According to the USDA Land Capability this type of soil is unsuited for cultivation, and there is a high risk of soil damage. Nevertheless, most of the population is involved in subsistence agriculture and growing for local trade. The most popular crops are "Irish" potato and tomato. Much of this is sold and eaten in the regional hub, Gurue, and is an important source of cash for the communities around Namuli.

Forest clearing has increased since the late 1990's, particularly above 1500 meters. Evidence suggests that rate of clearance for agriculture has increased markedly in the past decade, and there are likely new settlements around these fields, which are farther up the mountain. This raises concern about degradation and eventual clearance of the important forests at higher altitudes. Additionally, the tree species *Faurea wentzeliana* is selectively logged from two of the key forest areas. Gaps in the forest cause changes in the understory detrimental to some important species such as the Cholo alethe and dapple-throat. In addition to direct cutting, fires set by communities spread into the forest and grasslands, causing damage and changes in plant structure when more fire-tolerant species thrive in the understory detrimental to some important species such as the Cholo alethe and dapple-throat. In addition to direct cutting, fires set by communities spread into the forest and grasslands, causing damage and changes in plant structure when more fire-tolerant species thrive.

Although communities surround the mountain, the socio-economic context and use of resources has not received significant attention. In 2010, a Master's student undertook a study of the connections between local communities and their ecosystem on Namuli. The results provided insight into the threats to Namuli's biodiversity and the ways in which communities perceive their future. However, this was preliminary work and already several years old. Documentation of livelihoods of local communities, their reliance on natural resources and ecosystem services, and their current resource governance is essential. Along with further documentation of Namuli's conservation value, the communities and stakeholders of Namuli require a more thorough understanding of the threats and potential options for a sustainable future..



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Legado works to catalyze legacy-driven leadership to support the flourishing future of people and biodiversity in Africa. Legado: Namuli in Mozambique is Legado's flagship initiative.

Learn more about our work at www.legadoinitiative.org

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