LEGADO: NAMULI

LEGADO

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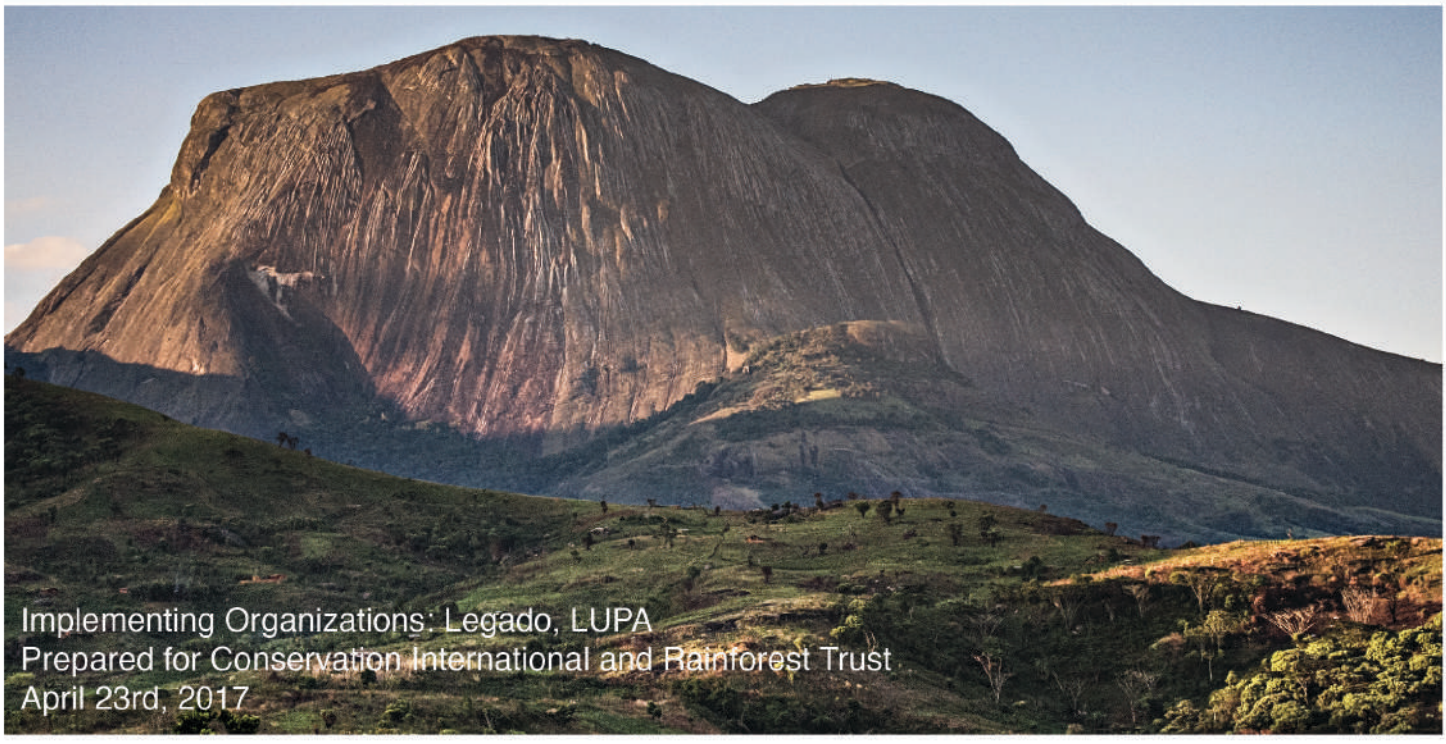
PROJECT: LEGADO: NAMULI

Employing a Conservation Agreement to Advance Conservation of Biodiversity and Ecosystem Services in Concert with Improving Human Livelihoods on Mount Namuli, Mozambique Feasibility Study



Implementing Organizations: Legado, LUPA
Prepared for Conservation International and Rainforest Trust
April 23rd, 2017

Contents

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

A conservation agreement with the communities that surround Mount Namuli and the subsequent creation of a community managed protected area covering the priority high-altitude zone is viable and vital to ensuring a thriving future for the Namuli communities and the environment upon which their livelihood depends. This study outlines Legado: Namuli's proposed strategic approach towards establishing a community conservation area as the foundation of the landscape conservation effort and the role of the proposed conservation agreement towards achieving this goal.

Situated in Gurue District, Zambezia Province of central-northern Mozambique, the Namuli massif covers an area of roughly 200 km^2 above 1200 m altitude, incorporating numerous spectacular granite peaks. Mount Namuli is the highest peak. Extending to the west is an elevated plateau area, above 1700m and some 50 km^2 in extent, separated from the surrounding areas by a steep escarpment. Known as the Murretxa Plateau or Namuli Uplands, this consists of a mosaic of Afomontane forest and grassland communities, interspersed by shrublands, shallow soil plant communities and additional rock peaks.

Such high-altitude communities are rare in Mozambique and are of particularly high biodiversity value. Due to the presence of a numerous of endemic, range-restricted and threatened species, including mammals, birds, reptiles, butterflies and plants, this area is recognized as one of the most important biodiversity areas in the country. Namuli has been designated as a Level 1 Priority Key Biodiversity Area by the Critical Ecosystems Partnership Fund, as an Important Bird Area, an Important Plant Area, and an Alliance for Zero Extinction Site, yet it remains without any formal protection. The area is equally important in terms of the ecosystem services it provides to surrounding communities and as an essential source of water for many downstream users. It is also the most important cultural site to the Mucua and Lomwe people who live in this region.

The surrounding lower elevation areas around Mount Namuli are settled and intensively cultivated, with crop production being the primary livelihood activity. Although there are no settlements in the uplands, in response to growing land pressure in the lower areas, some farmers have started to clear upland forests in recent years, principally to grow Irish potatoes as a source of income. This practice has escalated markedly in the last five years and is having a direct and unsustainable impact on the forests. Analysis of satellite imagery indicates that over the last ten years, overall forest extent has been reduced by one third, and that at the present rate of loss the remaining forest can be expected to be exhausted within eight years.

Recent expert assessment of the status of the Namuli upland forest confirms that the present rate of clearing is not sustainable, that the remaining forests represent an essential and viable conservation target, and that there is strong potential for forest regeneration on previously cleared land.

The proposed Mount Namuli upland core conservation area includes parts of the four villages of Mucunha Sede, Murabue, Muresse, and Carrico, within three localities of Mucunha, Muresse and Murrimo. The upland area would initially be protected using a conservation agreement and could later be formalized under law as a Community Conservation Area. Following a process of intensive consultations, leaders of all these localities and villages have expressed support in writing for establishing a conservation agreement and a protected area covering Mount Namuli and the adjacent Murretxa Plateau area. Moreover, in recent years and prior to the present intervention, the leaders of Mucunha provided informal protection to the Ukalene Forest at the base of Mount Namuli, a locally-conceived measure that has been effective in protecting this part of the forest from cultivation. This demonstrates a local, inherent understanding and interest in the conservation of Namuli's forest resources, and demonstrates that the communities can effectively make and enforce decisions regarding resource management.

Applying the framework of a UNESCO Biosphere Reserve, the scope of the Legado: Namuli landscape conservation approach extends beyond the upland core conservation area to include a transition zone in which economic and human development activity is fostered in an ecologically sustainable manner. The project's measure of success will extend

beyond protection of the critical biodiversity and ecosystem services of the core area, to the amount of land in the transition zone in which farmers have adapted conservation agriculture best practices, so minimizing erosion and ensuring the freshwater ecosystem service of rivers that originate on the Namuli massif is retained to the millions of downstream users in Zambezia and Nampula provinces.

Legado: Namuli's strategic approach is based on and informed by a theory of change analysis. The theory of change identifies the principal threats to natural resources and the underlying issues, articulates conservation and livelihood goals, and outlines what needs to be done to address these threats and issues in order to achieve desired changes in the overall system. The theory of change and approach for Namuli is based on a number of sources of information, including several biodiversity surveys, a participatory rural appraisal, GIS analysis, and both formal and informal community engagement by the project teams and other experts (See Figure 6 for Theory of Change).

Implementation activities will proceed in two phases: 2017 and 2018-2020. The activities are organized under three strategic lines of action:

1. Economic Viability activities will serve to develop alternative income generation options such that community members are able to stop current destructive practices in the high-altitude region,
2. Legacy Leadership activities are designed to inspire community members to want to protect their environment, and
3. Resource Governance activities will provide communities with the necessary knowledge and skills to establish and manage a protected area, as well as sustainably use their natural resources throughout the wider landscape.

Initial activities, during 2017, will lay the foundation for establishing a moratorium on extractive activities in the proposed protected area. From 2018-2020 the focus will be on establishing a conservation agreement which will halt further deforestation and degradation and enable the subsequent creation of the proposed conservation area while scaling up sustainable livelihood initiatives and providing socioeconomic options more attractive than current unsustainable practices.

Development and implementation of a conservation agreement will primarily be achieved by a partnership between two NGOs, Legado and LUPA, working with local communities, district authorities and other technical experts. LUPA is a Mozambican NGO with over 20 years-experience working on community natural resource management and land tenure. Legado is an international NGO with extensive experience in designing and assessing conservation projects and their effectiveness, and with strong roots in international capacity and leadership development. Through this initiative Legado will serve as a mentor to LUPA, to train and empower them to deliver the envisaged protected area for Mount Namuli according to best practices of conservation and community development and professionalism in regards to reporting, accounting and communication.

Based on assessments of the area's biodiversity importance, the feasibility of community-based natural resource management in the region, Mount Namuli presents a unique opportunity for community conservation agreements and one of Mozambique's first ever Community Conservation Area. Legado: Namuli's proposed landscape conservation approach on the Namuli massif can provide long term ecological sustainability while enabling, educating and empowering communities to ensure a thriving future for themselves and their environment.

INTRODUCTION

Reaching an altitude of 2,419 meters in northern Mozambique's Zambézia Province, Mount Namuli's slopes are covered by a mosaic of forests, grasslands, and agricultural land. 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 estimated at 8,000-12,000 people residing on the mountain, as well as those served by Namuli's waters far beyond the massif itself.

(Mount Namuli, Zambezia, Mozambique)

Although its ecological and biological importance has been recognized for many years, the area is not formally protected. The wider landscape surrounding Mount Namuli is largely community land that is heavily populated and intensively cultivated. Subsistence agriculture is the principal livelihood activity for the resident communities. In recent decades, and escalating markedly during the last five years, increasing numbers of farmers have started to open fields in the high

elevation plateau forests. This has been driven principally by growing human populations coupled with declining soil fertility and crop yields in the lower landscape.

Starting in 2011, Legado, an international diverse group of scientists, conservationists and climbers, began carrying out a series of activities aimed at the ecological exploration, conservation and livelihood development of Mount Namuli. Two biodiversity assessments yielded a number of species new to science and emphasized the importance of the region. More recently, Legado has partnered with LUPA, a Maputo-based Mozambican conservation and rural development NGO, and to commence a process of engaging local communities with the aim of strengthening natural resource management and conservation. Together, Legado and LUPA have developed sound working relationships with key government agencies in Mozambique, from local to national levels, with international conservation organizations and funders such as the Rainforest Trust, Conservation International, the Critical Ecosystem Partnership Fund and World Wildlife Fund, and with private companies such as Ethiopian Airlines, Clif Bar and Patagonia, which have provided financial and in-kind support.

Last year the partnership implemented detailed participatory rural assessments covering six communities adjacent to Mount Namuli. Through this process, the scale of threat to the upland forests and the need for immediate conservation action has become starkly apparent. Informed by results of this work, the approach of Legado: Namuli was more clearly defined. The initiative aims to support local communities to develop a formal protected area covering the priority high altitude portion of Mount Namuli, whilst at the same time providing development assistance to participating communities in the form of improved agricultural practices, basic social services and environmental health.

According to recent legislative changes in Mozambique, the most appropriate vehicle for bringing the Mount Namuli highlands under formal protection is through development of a Community Conservation Area. Given the urgent need to address ongoing cultivation and regular burning in the highland areas, the intention of Legado: Namuli is to immediately develop and implement a conservation agreement with the surrounding communities that will serve to stabilize the situation in the short term. This will provide the time and foundation on which to engage in the necessarily longer process of developing a community conservation area.

The aim of the conservation agreement process is twofold:

- To establish a moratorium on clearing in the upland core area, and
- To define and agree on the forms of investment necessary for the impacted communities to develop thriving agricultural livelihoods, improved human development and a healthier environment in the surrounding transition zone.

This document presents a feasibility assessment for developing conservation agreements with the Namuli communities and achieving a sustainable community conservation area. It is organized into seven main sections. The *Overview* section provides an outline of the biodiversity significance, the ecosystem services provided and the cultural significance of Mount Namuli. This is followed by an assessment of the *Operating Context,* which provides an overview of current threats to and status of biodiversity and ecosystem services. It also provides a situation analysis in terms of stakeholders, land rights and tenure, an assessment of the ability of communities to be effective conservation partners, and a description of the policy and legal context with respect to establishing the proposed community conservation area.

The remaining sections describe the aims of the Namuli Initiative and how these aims will be accomplished. The *Strategic Approach* sets out the overall vision, as summarized in a “theory of change” analysis. It also describes how implementation of three strategic lines of action - Economic Viability, Legacy Leadership and Resource Governance - will ultimately lead to the creation and long term effective community management of a protected area for the Namuli uplands.

Details on implementation are provided in the subsequent section, *Implementing the Conservation Agreement*, which describes the proposed phased approach, as well as modes of interactions with communities, and the capacity, roles and responsibilities of Legado and LUPA as the lead agencies for the proposed works.

The remaining three sections provide additional details on *Project Costs*, including opportunity costs to the communities and how these will be offset, *Financing Options*, including anticipated sources of finance for the main streams of activities, and *Management Sustainability*, including a plan for how communities will gradually come to assume full responsibility for management of the protected area and so provide a viable exit strategy for Legado and LUPA.

Additional supporting information is included in the Appendices.

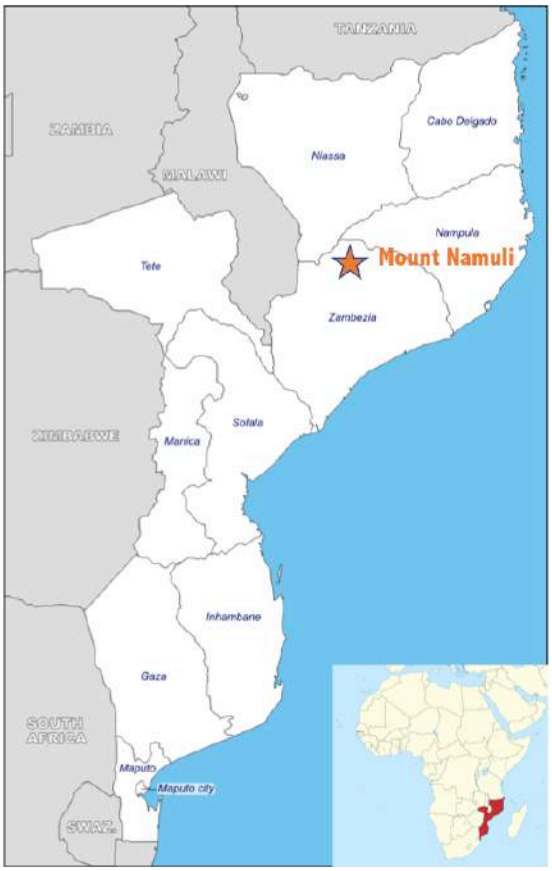
OVERVIEW OF MOUNT NAMULI

Conservation Priority

Geography and Ecosystem

Mount Namuli lies at the heart of the Namuli massif, at the far southern end of the Eastern Afromontane Biodiversity Hotspot and has been designated as a Key Biodiversity Area and identified as a priority for conservation action in Mozambique's national biodiversity strategy. 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 special conservation interest are several types of montane forest, grassland and sheer rock faces.

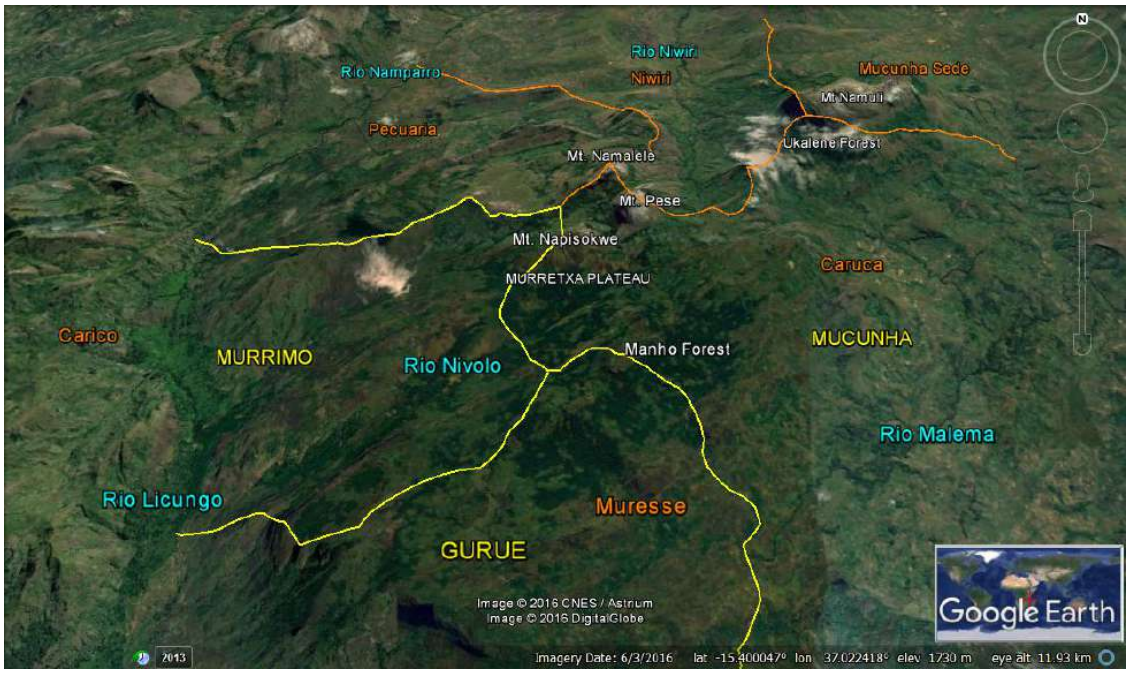
Figure 1. Mount Namuli Location



Namuli comprises one of several high-altitude regions in northern Mozambique and the adjacent part of Malawi. Mozambique's Mount Mabu and Mount Chiperone, and Mount Mulanje in Malawi, all support afromontane habitats. However, Namuli is especially important due to its unusual mosaic of forest, shrubland, grassland and other vegetation on shallow soils over rock. Further, it hosts a particularly high number of endemic species, species of restricted range and threatened species, making it one of the most important conservation priorities in the country.

The Namuli massif comprises a dual system of limited uplands (c. 1,600 to 2,000 m altitude) and extensive surrounding lower lands (c. 1,000 to 1,600 m altitude). The area of conservation interest comprises the small, relatively intact upland portion of Mount Namuli and the adjacent Murretxa plateau, including the associated peaks of Mount Pese, Mount Namalele and Mount Napisokwe and extending west to Serra de Gurue overlooking Gurue town (Figure 2). Settlements are confined to and scattered throughout the extensive surrounding lower lands, and which have been extensively modified for cultivation. The transition from the lower landscape to the uplands is generally abrupt and marked by a distinct, steep escarpment, with cultivation extending up into the steep escarpment slopes. The highland portion comprises a mosaic of bare rock and sparsely vegetated slopes on the mountain peaks, interspersed by irregular and interwoven patches of grassland, shrubland and Afromontane forest.

Figure 2. Mount Namuli Geography



Biodiversity Significance

Mount Namuli is designated as a Level 1 Priority Key Biodiversity Area by the Critical Ecosystems Partnership Fund,[1] as an Important Bird Area,[2] an Important Plant Area,[3] and an Alliance for Zero Extinction site.[4] Despite its global significance, Namuli lacks any formal protection. It is one of only a few priorities identified as requiring further conservation action in Mozambique's national biodiversity strategy (2015 – 2025).[5]

Twenty-nine threatened species were noted in the 2012 CEPF Eastern Afromontane Ecosystem Profile (26 plants, two birds, one amphibian and one mammal), including several range-restricted endemics. Multiple other endemic and near endemic species have been found on the Namuli massif since the 2012 profile and are included below.

Horsehoe Bat

Species endemic to Mount Namuli include:

- Vincent's bush squirrel (*Paraxerus vincenti*)
- The Namuli Horseshoe Bat (*Rhinolophous sp. nov)*
- Namuli Endemic Frog (*Notophryne sp. nov)*
- Namuli Endemic Crab (*Potamonautes namuliensis)*
- Namuli Pygmy Chameleon (*Rhampholeon tilburyi)*
- Four endemic butterfly species (Pseudathyma sp. nov, Philiolaus sp.nov, Uranothauma sp. nov, Neocoenyra bioculata ssp. nov.) and four near-endemic butterfly species (Epamera malaikae - Namuli and Mabu, Cymothoe baylissi - Namuli, Mabu, Inago, Gonatomyrina sp. nov - Namuli, Mabu, Inago, Papilio

[1] http://www.cepf.net/where_we_work/regions/africa/eastern_afromontane/Pages/default.aspx

[2] http://www.birdlife.org/datazone/sitefactsheet.php?id=6693

[3] http://www.plantlife.org.uk/uploads/documents/International_IPA_brochure_2010.pdf

[4] http://www.zeroextinction.org/sitedata.cfm?siteid=10091

[5] NBSAP, 2015 – MITADER. 2015. National Strategy and Action Plan of Biological Diversity of Mozambique. Maputo, MITADER, 112 pp.

- The near-endemic bush snake (Atheris mabuensis) – Namuli, Mabu.
- Seven Afromontane endemic or near-endemic bird species including the Namuli apalis (Apalis lynesi), the only endemic bird within Mozambique
- 19 endemic plant species including, two succulents (Aloe torrei and Euphorbia namuliensis), two woody plants (*Pavetta gurueensis* and *Dombeya lastii*), and six Papilionoid legumes.
- 13 near endemic plant species, nine of which are shared only with Mount Mulanje

Additional aspects of Namuil's biodiversity significance as of the writing of this report include:

Namuli Apalis

- 530 plant taxa (species or subspecies) recorded on the Namuli Massif
- About 155 bird species have been recorded to date on Namuli
- Approximately 42 small mammal, monkey and antelope species remain in the Namuli upland
- 16 amphibian and 23 reptile species have been recorded on Namuli

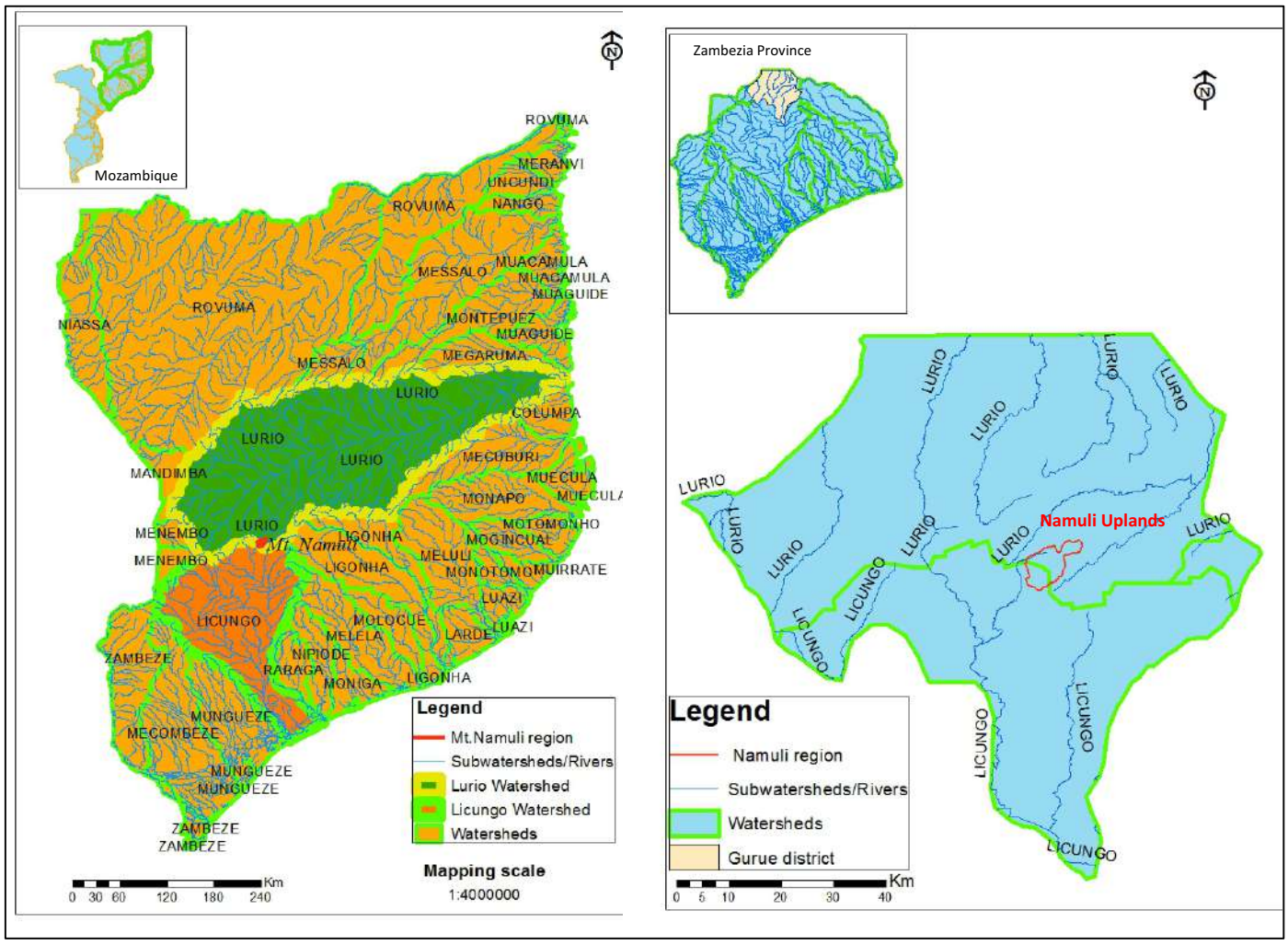
It is important to note that several of the IUCN red list assessments of these species are somewhat out of date; due to a lack of updated information since 2008 revision has not been possible. Many of the species listed as endangered have been given this listing due to small known ranges and the high level of threat to this habitat. Thus, we suspect that the status of several of these and potentially other species may warrant upgrading given what we know of the habitat loss since 2008. We hope that our work on Namuli and development of a protected area will enable further research while also preserving the remaining habitat for these species. There are areas of the massif that have not yet been surveyed, and that surveys were often limited in duration, specific to one taxa and with large time gaps between surveys. Therefore, it is likely that the known species information is not exhaustive.

Ecosystem Services

Locally, Mount Namuli's high altitude rainforests are vital to capturing rainfall and retaining groundwater that feed the surface waters. These are the primary source of drinking water and a key source of water for agricultural irrigation in the Namuli communities and beyond. Drainage is split between the Lurio catchment to the east, via the Malema River and its northern tributaries the Namparro and Niwiri Rivers, and the Licungo catchment to the west, comprising the Licungo headwaters and the Nivolo River. The rivers that originate in the Namuli massif, serve the freshwater needs of the approximately 3.5 million downstream users living within the Rio Licungo and Rio Lurio watersheds (Figure 3). However, these rivers have experienced disastrous flooding causing an estimated $150M USD in damage during rains in 2014 and 2015[6]. These floods highlighting the need for land use management in the watershed to retain rainfall, minimize soil erosion, and mitigate sedimentation of surface waters.

[6] UNICEF Annual Report, Mozambique, 2015.

Figure 3. Namuli Watershed Interaction



Beyond freshwater, the Namuli massif provides a number of other natural resources on which the communities rely. As the Namuli region has minimal access to external markets, almost everything that communities consume and income they earn is derived from natural resource extraction, or from agricultural production drawing on the water, soils and pollinators provided by the mountain ecosystem. Thus, local communities are fully dependent on the environmental health of the Mount Namuli ecosystem.

In order to effectively partner with communities to promote sustainable use of these resources, Legado and LUPA completed a Participatory Rural Appraisal in six Namuli communities in 2016, representing approximately 50 percent of the total Namuli population, to understand how the communities use local natural resources and the extent to which they depend on these resources. Communities identified the resources they used or extracted from the forests and grasslands on the mountain; these are listed in Table 1 and pictured in photos below. Note that these uses are based on wide interpretation that includes Namuli uplands (target conservation area) and lower altitude forests and grasslands.

Table 1. Community Natural Resource Use

Forest Land	Non-timber Forest Products
• Crops (cleared land) • Pasture (cleared land) • Cemeteries (cleared land) • Source of clean water	• Wild fruits and other foods such as mushrooms and edible tubers • Honey collected from wild bee hives • Traditional medicines • Wildlife as a protein source • Edible insects • Bamboo for making baskets • Grass for thatching huts • Fiber for construction
Forest Trees/Wood	**Grassland Resources**
• Poles for construction • Firewood • Timber for making household items • Wood for handles for tools, grinding sticks, bowls • Charcoal • Ash for fertilizer	• Pasture Land • Hunting of small mammals • “Murretxa” (Kniphofia sp.) plants used for weaving

Cultural Significance

Millions of Lomwe and Macua people of Mozambique and Malawi consider Mount Namuli to be their ancestral home. Namuli’s cultural significance is cited in Padre Ciscato's NAMÚLI: A montanha das origins, as the origin of all life on earth

and as home to the stone "where the first footprints of man and woman can be seen" as well as where you can "find the footprints of all living things, large and small, and samples of all plants and seeds."[7]

According to a 2016 report on the people of Mount Namuli, a popular narrative in the Namuli communities is that the first people originated from caves of the Mount Namuli and then lived on the large plateau of Namúli.[8] At some point after, there was an increase of the population and conflicts over access and management of the few existing resources, culminating in an exodus from the sacred mountain and the dispersion of Lomwe people into the present provinces of Zambézia, Nampula, Niassa and Cabo Delgado, and reaching the eastern part of the Republic of Malawi and southern Tanzania. Community elders report that many people living in the larger region fled to Namuli to hide in the caves during the Mozambican Civil War (1977 – 1992) and many of those people ended up settling in the Namuli region which was previously more sparsely populated.

For the natives of Namuli, the *Namuli apalis* represents the spirit of the Great Mother of the Lomwe-Macua people. The concept of the Great Mother has existed for thousands of years. It is present in the first human civilizations. A common belief shared by the elders contacted during the 2016 study, is that, "the Namúli Mountains constitute the place where the soul, the spirits of the Ancestors rest softly, for it is there that all the peoples who are there born, return.[8]

> *All of us, descended from a Great Mother who inhabits the mountains of Namúli. The name given to the Great Mother Macua is Nipele. Name that does the whole thing Sense ... The Breast, which feeds, gives life. Another name given to Grande Mother would be Errukhulu (Womb). The Great Mother would have sent 4 children, Namúli, to humanize the territories north of the Zambezi River. This movement spread from Zambézia, passing through Nampula, Tete, Cabo Delgado and into Tanzania*.[8] – Namuli Community Elder

One of the most unique aspects of the Namuli communities is that the means of subsistence (natural resources) are "controlled" by the matriarch of each household. The local Queen of Namuli, considered to be a spiritual leader as well as customary governance figure, is strongly linked to Namuli as her spiritual home.

Curruca Community, Mount Namuli

Mount Namuli's South face in the familiar clouds

Legado and LUPA have been in conversation with Mozambican and Portuguese anthropologists about a complete ethnography of Namuli to further understand its cultural context and current and historical importance.

[7] Ciscato, E. "Namuli: A montanha das origins." 2003. Unpublished Paper

[8] Namuli Estudo. Khaiya Editores Servicos. 2016. Funded by CEPF.

OPERATING CONTEXT

Threats to Biodiversity and Ecosystem Services

Conservation Targets

Conservation targets on Namuli include high-altitude rainforest forest cover, high-altitude rainforest priority species, high-altitude grasslands priority species, and hydrological processes that the Namuli watershed provide to the surrounding communities and downstream populations. These targets encompass all known endemic and endangered flora and fauna species of the Namuli Massif.

Threats and Impact on Conservation Targets

Geo-spatial analysis suggests that significant deforestation of the high-altitude primary rainforest in the core area began in 2005 and has accelerated over the last ten plus years (Table 2, Figure 4). The forest cover in 1972 is estimated at 1250 ha while current remote sensing analysis provides a 2016 forest cover of 771 ha. The period from 2013 to 2016 shows an average annual deforestation of 98 hectares/year, seven times greater than the period from 2006 to 2013. The total deforestation from 1972 to 2016 is 479 ha. The forest cover in 2016 is ~62% that of 1972 forest cover with approximately 38% lost to deforestation. If no action is taken to mitigate current unsustainable practices, the trend will likely continue for some time, and then start to slow as standing forest (and therefore the rich soils it protects) becomes scarce. For reference, current deforestation in Mozambique is

Table 2. Namuli Deforestation History

Year	Total Forest Cover as of Initial Year of Range (Ha)	Total Forest Loss for Period (Ha)	Annual Rate of Loss (ha/year)
1972* - 2006	1250	87	2.5
2006† - 2013	1163	97	14
2013† - 2016	1066	295	98
2016†	771	-	-

* Analysis by Timberlake et al. 2009 quantified the deforestation from a 1969 airphoto

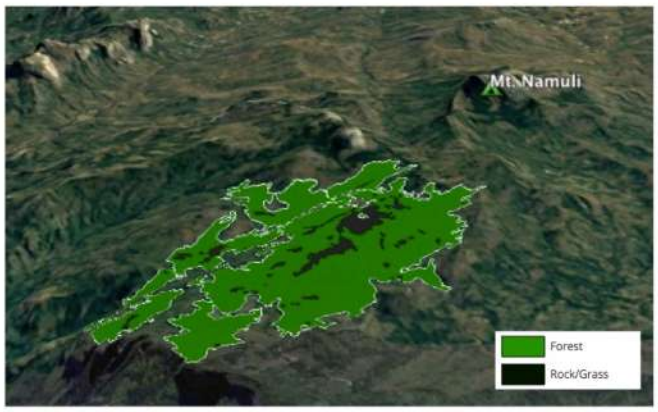
† Analysis by Legado: Namuli quantified the deforestation from Landsat imagery taken in 2006, 2013 and 2016.

Impact on Priority Wildlife Populations

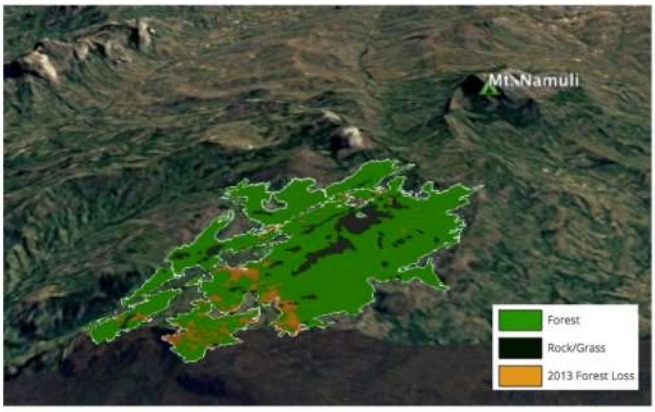
Some bird species of conservation concern occur at higher densities at medium altitude, where deforestation has been significant. As a result, populations of species such as Cholo Alethe and probably Green Barbet have been seriously reduced. The fate of White-winged Apalis (a bird absent from montane forest altogether) depends on the protection of some strips of riparian forest on the lower slopes. The species has little chance of surviving on Namuli otherwise. On the other hand, other birds are confined to Afromontane forest, and the future of Dapplethroat in particular should be fairly secure if the main blocks of high-altitude forests are preserved. The Namuli Apalis is common at both high and medium elevations, and protection of forest above 1500m will certainly save a substantial proportion of the population of this bird, despite habitat loss lower down.[9]

Many of the small mammal, amphibian and reptile species reside in the high-altitude rainforests and riverine areas. While population counts have not been completed, it is likely that populations have been significantly reduced by deforestation in the Namuli uplands.

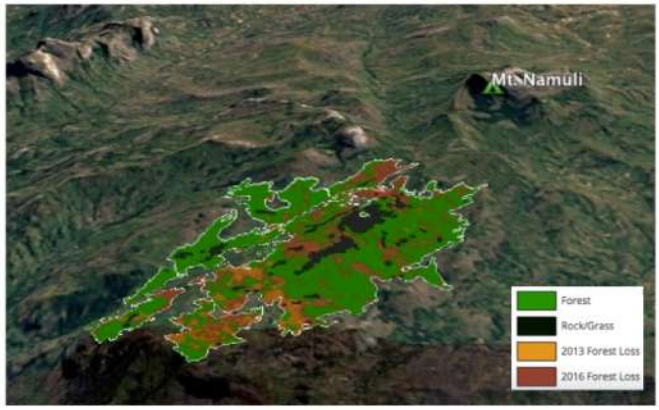
Figure 4. Deforestation Progression on Namuli Massif (2006 – 2016)



2006



2013



2016

[9] Timberlake, J. R., et al. "Mt Namuli, Mozambique: biodiversity and conservation." *Report for Darwin Initiative Award* 15 (2009): 036.

Threat Rating

A threat rating (Table 3) was developed, based on methodology of the Open Standards for the Practice of Conservation, which is supported by the IUCN Threats Classification Framework. The rating was informed by the 2016 participatory rural appraisal, as well as past and ongoing studies and observations. Based on this analysis, smallholder agriculture in the high-altitude core region is the greatest threat to all four conservation targets collectively, in addition to being the greatest direct threat to each. It also is the main contributor to uncontrolled wildfires, and soil erosion and sedimentation, which are the other major threats to the conservation targets. Hunting and collecting of terrestrial animals as a food source is a primary threat to the species targets. Small-scale timber and fuelwood harvest and alien and invasive species are relatively minor threats to forest cover and priority species. More detail on each of these threats is provided below.

Table 3. Rating of the Threats to Conservation Targets

Threats/*Targets*	***High-Altitude Rainforest Priority Species***	***High-Altitude Rainforest Forest Cover***	***High-Altitude Grasslands Priority Species***	***Hydrological Processes***
Smallholder Agriculture	4 - Very High	4 - Very High	3 - High	4 - Very High
Hunting & collecting terrestrial animals as food source	3 - High	1 - Low	3 - High	1 - Low
Subsistence/Small Scale Timber and Fuelwood Harvest	2 - Medium	2 - Medium	1 - Low	2 - Medium
Alien and Invasive Species	2 - Medium	2 - Medium	2 - Medium	2 - Medium
Uncontrolled Wildfires started by Humans	3 - High	3 - High	3 - High	3 - High
Smallholder Livestock Grazing	1 - Low	1 - Low	2 - Medium	1 - Low
Soil erosion, sedimentation	2 - Medium	2 - Medium	1 - Low	4 - Very High
Harvesting of Grasses	1 - Low	1 - Low	2 - Medium	1 - Low
Gathering terrestrial plants for medicinal use	1 - Low	1 - Low	1 - Low	1 - Low
Habitat shifting & alteration of climate	2 - Medium	2 - Medium	2 - Medium	4 - Very High
Storms and Flooding	2 - Medium	2 - Medium	2 - Medium	4 - Very High

Very High and High Threats

Smallholder Agriculture. Namuli farmers use slash-and-burn agricultural practices to clear land for agriculture. “Irish potatoes” are the most important crop, and are grown primarily for income generation. To open new fields, initially the forest vegetation is cut and left to dry before being burned. In addition to the direct impact of clearly, the practice of burning particularly damaging to the forest. Fire destroys the in-situ soil seed bank, inhibiting forest regeneration, and fires often spread into neighboring forest areas, causing much more extensive damage and clearing than to just the target field.

As agricultural practices are very basic and tend not to incorporate soil augmentation or erosion mitigation, fields become exhausted quickly - typically within two to three years. Farmers are then required to clear new areas. As available lowland areas are depleted, agricultural activity must move higher on the mountain which has led to significant deforestation in the upland core conservation area. People travel considerable distances to open and manage new fields.

In the results of the 2016 appraisal, the earliest stated use of the high-altitude forest for crop cultivation was by people from Murabue locality, who reportedly started cultivating there in 1968; residents of the Murabue locality noted that the rate of opening new fields had escalated greatly during the last five to ten years.

Hunting and Collecting Terrestrial Animals as Food Source. Community members hunt for bushmeat including monkeys, duikers and small rodents in the upper elevation primary forests and grasslands. The most common method is to hunt with dogs. The dogs are used to corner animals that are then killed with spears. Another approach is to start a fire that flushes out animals that are killed as they try to escape. These fires are often uncontrolled and can cause significant damage in the grasslands as well as damaging upper elevation primary rainforest.

Small-scale Timber Logging. Minor and informal extraction of timber for local construction, as well as for sale in the city that borders the southwest flank of the Namuli massif, Gurue, occurs in the upper elevation primary forests and along riparian areas. There is no organized extraction of timber and the small amount of extraction that does occur is done by a mix of local people and residents of neighboring localities. The impact of timber extraction on upper altitude forests is minor compared to the impact of slash and burn agriculture, although impacts on riparian areas appear significant.

Subsistence Fuelwood Harvest. Community members from local communities partake in minor deforestation of smaller trees for use as a cooking fuel. Most of this extraction occurs in the lower elevation Miombo woodlands and not in the upper elevation primary forest. Given population density in the region, there is potential that community reports are underestimating the fuelwood harvest from the Namuli uplands.

Uncontrolled Wildfire. Wildfires are caused by humans both as a means to hunt wildlife and as a consequence of forest clearing using uncontrolled burn methods. According to community members, wildfire also is caused by children, who start fires for fun.

Soil Erosion/Habitat Shifting and Alteration of Climate/Storms and Flooding. The impact of these threats is primarily an outcome of smallholder agriculture due to the slash and burn practices. As more lands are deforested, an expected increase in high intensity storms due to climate change in the region exacerbates the soil erosion as well as changes to the rainforest microclimate.

Expert Opinion on Status of Conservation Targets and Threats

Jonthan Timberlake, the lead scientist on the Mount Namuli Kew Biodiversity expedition in 2007, visited Namuli in February of 2017 to assess the current state of biodiversity, deforestation and potential for regeneration. Timberlake's full report can be found in Appendix C. The main findings of his report are as follows.

1. The **loss of Afromontane forest** due to clearance for potato cultivation over the last 10 years is extensive and significant.
2. The current **rate of forest clearance** in the Namuli uplands is not sustainable if reasonable levels of moist forest cover are to remain.
3. Once left fallow after one of two potato crops, patches are generally covered by copious growth of scrambling plants and bracken. However, this vegetation cover apparently dies back annually and is also readily flammable. Areas do not remain bare or become invaded by flammable grasses. After clearance and a few cultivated cycles, the **soils still retain enough humus to allow for natural forest regeneration**; the soils have not become baked.
4. Little evidence was seen of **natural forest regeneration** taking place in old agricultural clearings owing to frequent (often annual) wild fires. Forest regeneration would – in most instances – be possible from rootstocks and seed from adjacent forest, but is repeatedly destroyed by fire. For any recovery to take place, control of the frequency and extent of wildfires is as important as limiting the extent of new forest clearance.
5. In essence, **uplands agriculture is a nutrient mining exercise**, with richer pickings in the first few years followed soon after by abandonment of fields. Cropping in the uplands is not a sustainable source of income for communities.
6. Regarding **forest connectivity,** the pockets and patches of forest remaining are adequate to provide seeds, etc. for regeneration of previously cleared patches through bird and similar dispersal methods. Most patches are quite close together. However, if more forest is cleared, connectivity for small forest-dwelling reptiles (Mabu Atheris, Pygmy Chameleon) might become an issue; it is unlikely to become so for birds, butterflies or small mammals.
7. The **grasslands** – both on deeper peat and on shallow soils – do not appear to have been unduly affected by the increase in agricultural activity. They are still ecologically intact and retain their conservation importance and

PRA Community Meeting

significance. However, it needs to be recognized that burning is probably more frequent and widespread than it was 10 years ago, which may be having a chronic effect on grassland biodiversity.

Community Relationship to Resources and Perception of Threats

Farming is the primary livelihood activity in all communities. Irish potatoes are an important cash crop, well suited to the area but relatively demanding in terms of soil nutrients. Currently farmers do not use any fertilizers, and with intensive cultivation the fertility of soils is generally declining and resulting in lower yields and reduced quality of crops. Within these are the last remaining patches such that some local farmers are now targeting these areas for production.

There is a strong overlap between farmers and users of other resources. Often it is the same people who hunt wildlife and collect other resources such as poles and firewood, honey, edible insects and medicinal plants, with such use often being carried out opportunistically in conjunction with farming activities. For example, few if any women go to the uplands specifically to harvest firewood but, after tending their fields, some women will collect and carry a load of firewood down to their homes. In other cases, people specifically go to Murretxa to harvest resources such as timber and fiber. Demand for poles and firewood, although presently low, can be expected to grow in future in line with continuing deforestation of the surrounding lower lying areas.

The communities clearly recognize that they are losing resources and observe dramatic changes in their environment. During the participatory rural appraisal and community dialogue process, respondents from Murabue locality estimated that all forests will be cleared by 2045 (~30 years), other communities estimated that the forest would be gone by 2025 (< 10 years).

While community members noted that crop production has a strong positive impact for producers in terms of household income, they also acknowledged that the impact to the forest was negative. Recently, local leaders decided to protect Ukalene Forest from cultivation (but not from other forms of exploitation such as for timber and poles), but are readily allowing farming to take place elsewhere in the upland areas.

Community members observed that soil fertility has markedly declined and community members predict this to continue to decline due to human population growth and intensive use of land as well as monoculture production, which they are aware may be problematic for soil health. Community members observe a marked decline in wildlife and anticipate further decline due to increased hunting. The increase in hunting is reportedly motivated by limited production of livestock and the absence of alternative forms of meat.

Where community members note changes in hydrology on the mountain, they tend to attribute the change to normal seasonal and locational variation. However, given the science related to forest/climate dynamics and the significant alteration of the Namuli landscape in recent years, it is very likely, that human activity on the mountain has had microclimatic and hydrological impacts, given.

Stakeholders and Governance

Communities and Land Rights

The Namuli uplands include parts of three *Localities*: Mucunha, Gurue and Murrimo, all of which are part of the Administrative Post of Gurue Sede within Gurue District (Figure 5). Each Locality is further divided into villages and cells (Table 4). The core area includes parts of four villages: Mucunha Sede and Murabue in Mucunha Locality, Muresse in Gurue Locality, and Carrico in Murrimo Locality. The entities Mucunha Sede, Niwiri and Pecuaria correspond to cells within Mucunha Sede village, and Carruca is a cell within Murabue village, this being the portion of Murabue included within the upland core area. The surrounding transition zone includes, the full extent of Mucunha Sede and Murabue villages plus four additional villages of Murrui, Nawitela, Nicau and Mujaua within the Mucunha Locality and in Gurue and Murrimo Localities larger portions of Muresse and Carrico villages, respectively.

Currently, no significant conflict (e.g. regarding boundaries) was reported or observed between the communities of Mucunha, Muresse and Murrimo Localities, nor their constituent villages.

Table 4. Namuli Upland Communities

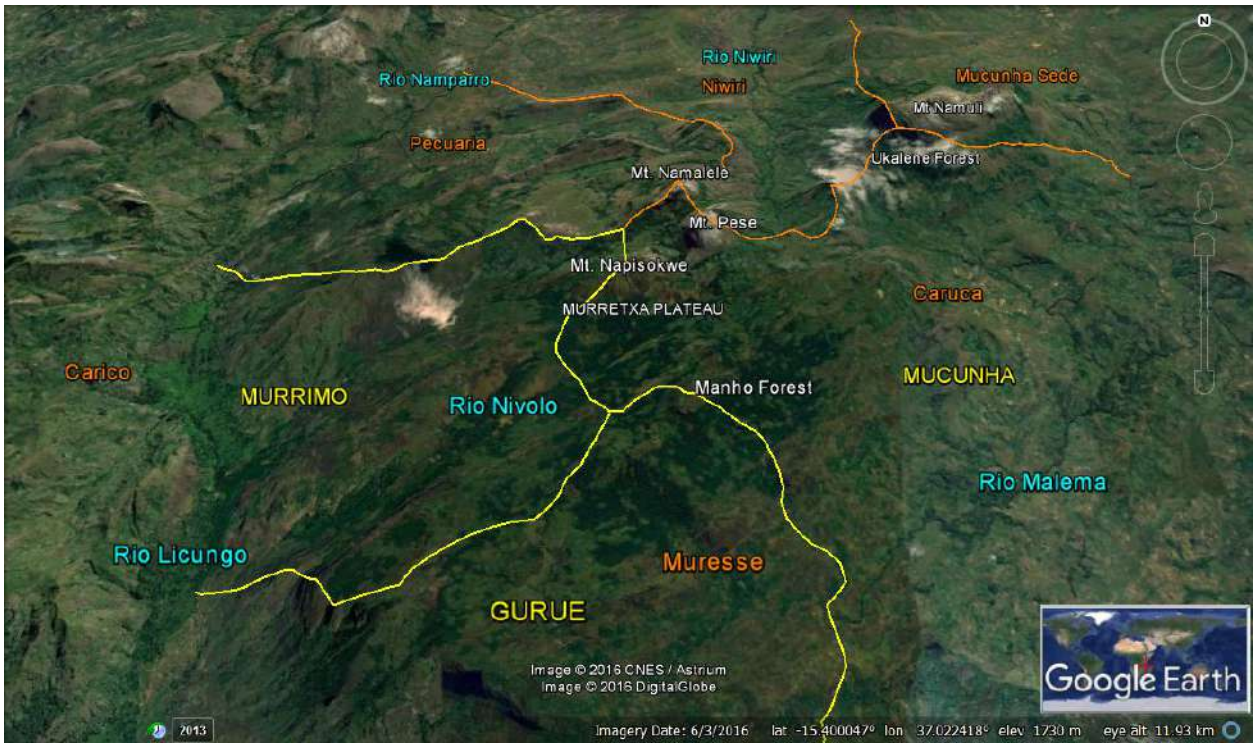
Locality	Village	Cell
Mucunha	Mucunha Sede	Mucunha Sede
		Niwiri
		Pecuaria
	Murabue	Carruca
	Murrui	
	Nawitela	
	Nicau	
	Mujaua	
Gurue	Muresse	
Murrimo	Carrico	

The Namuli region encompassing the target communities is composed of customary land under the authority of the respective constituent communities. Further, the Land Law (Law No. 19/97) confers to local communities, by occupation, the legal right to occupy and use land and natural resources. Therefore, the communities do hold legally recognized rights to the land within the proposed conservation area.

For the purpose of facilitating administration of land, fostering local development and avoiding land conflicts, the Land Law established a process for formal delimitation of community areas culminating in the issuance and registration of a title and right of use of land, known as a DUAT. The DUAT further strengthens the communities' rights to the land. Given the technical complexity and cost of delimiting and demarcating a DUAT area, relatively few communities in the country have achieved this, and none of the Namuli communities. It is a slow and lengthy process, and communities in Namuli would require considerable technical and financial support to achieve this. Thus, whilst existing rights are adequate for communities to proceed with creation of a Community Conservation Area, part of the strategy for conservation of

Namuli is to provide the necessary support to communities to enable them to attain respective DUATs. This would likely be considered by many in the community as a benefit of partnership with the Legado: Namuli initiative.

Figure 5. Community Boundaries



Yellow = Locality; Orange = Community

Local Power Analysis

Customary Leadership. The parties with direct power and influence over how Namuli resources are used and managed are primarily the members of the communities of Mucunha Sede, Caruca, Murabue, Muresse, Carrico, Pecuaria and Niwiri. The bulk of the resource users come from these communities, and access to the upland resources is controlled through the leadership of these communities.

Queen Adelina Jackson

The current customary leader of the Mucunha Locality is a Queen, Adelina Jackson. She was selected for the role by her father, who was king, and will pass the role on to one of her children. Those under her domain, approximately 12,000 people organized into four communities to the northeast and northwest, have direct access to the Namuli uplands. Two other communities that fall outside of the Queen's direct zone of influence have access to the Namuli uplands from the southwest with populations of approximately 1,500 people each. Based on the assessment and community engagement conducted thus far, it seems that neither Gurue nor the Murrimo localities have a cultural leader similar to the Queen in the Mucunha Locality.

Villages and cells each have their respective leaders; in Mucunha Locality these are subordinate to the Queen. It is the community and cell leaders who provide permission to community members for use of natural resources within these

communities in general, and specifically concerning the use of resources within the proposed conservation area. In practice, some farmers apparently also bypass cell and village leaders, and gain access to land for cultivation by making a direct arrangement with a farmer who is already cultivating land in the high-altitude forests and is prepared to share part of his land with the newcomer (often a family member). Local culture dictates that property is passed down based on matriarchal lineage and local legend states that the only way to establish land rights on Namuli is to marry into a Namuli family via a woman.

Other important leaders are village secretaries, who are representatives of the political leadership, community judges, of which there are three in Mucunha, and leaders of religious organizations (in this case churches, particularly the Catholic Church and the United Baptist Church).

Local and Regional Government. The key figures are the District Administrator and Permanent Secretary, and the Chief of the Post, all three of which are based in Gurue. The Chefe da Localidade is the lowest level of administration, is typically resident within the locality and has direct contact and interaction with the communities. Technical support is provided by District Services for Economic Activities (SDAE, which includes agriculture and agricultural extension) and District Services for Planning and Infrastructure (SDPI). These are both relatively small institutions, with limited budgets and without any permanent field presence. For example, SDPI has two technicians, based in Gurue, responsible for environmental management throughout the district.

NGOs. The presence of NGOs is very limited, with virtually no other development work currently being carried out within the target communities. Very little was conducted in previous years aside from a World Vision livelihood project implemented during the late 1990s and early 2000s.

Private Sector. The private sector is well represented in Gurue District, particularly in terms of agriculture and forestry enterprises. Although absent from Mucunha, there are large tea plantations in both Muresse and Murrimo Localities. A company called Murrimo Macadamias manages large areas of macadamia nuts and other field crops such as soya beans and maize in Murrimo. Based on former experiences with colonial settlers, local communities are extremely wary of private companies and the possibility of losing land to large investors. Specifically, there has been some conflict in Murrimo relating to the establishment of Murrimo Macadamias and the apparent displacement of some community members.

Legal Context

The existing legal framework of Mozambique provides a robust framework for the protection and sound management of natural resources, although the implementation of laws is generally perceived as being relatively weak.

The **Constitution of the Republic of Mozambique** of 2004 of December 22 in its Article 90 enshrines the right of all citizens to live in a balanced environment and the duty to defend it. The same article authorizes the state and local authorities, with the collaboration of environmental associations, to adopt policies to protect the environment and to ensure the rational use of all natural resources. Likewise, under Article 117 of the Constitutional Law it is incumbent on the state to promote initiatives to ensure ecological balance and conservation and preservation of the environment aiming at improving the quality of life of citizens, and to ensure the rational use of natural resources, safeguarding their capacity for renewal, ecological stability and to fulfill the rights of future generations.

There are **several international agreements** to which Mozambique is a signatory that provide support for the conservation of biodiversity in Mozambique. Mozambique is signatory to a number of international biodiversity related agreements, chief amongst which is the Convention on Biological Diversity (CBD). Others include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on the Conservation of Migratory Species of Wild Animals or Bonn Convention (CMS), Convention on Wetlands (popularly known as the Ramsar Convention).

The **Environmental Law** (Law No. 20/97 of 1 October) obliges the government to create appropriate mechanisms to involve the various sectors of civil society and local communities, in particular environmental associations, in the development of a National Environmental Management Program. Further, it prohibits all activities that threaten the conservation, reproduction, quality and quantity of biological resources, especially those threatened with extinction. The same law obliges the government to ensure that adequate measures are taken to maintain and regenerate animal species, to recover damaged habitats and to create new habitats, with particular attention being paid to the activities or use of substances that may harm wildlife species and their habitats, as well as to provide for the special protection of endangered plant species or isolated or group botanical specimens which, because of their genetic potential, size, age, rarity, scientific and cultural value, require it.

The Forest and Wildlife Development Policy and Strategy (Resolution No. 8/97, of April 1) and ensuing **Law on Forests and Wildlife** (Law No. 10/99 of July 7), promote and provide for the involvement of local communities in the management and conservation of forest and wildlife resources through delegation of powers to communities and regulating the establishment of Natural Resource Management Councils, and mechanisms for the sharing of benefits generated by the use of resources.

As part of its implementation of the Convention on Biological Diversity, **Mozambique prepared a National Biodiversity Strategy and Action Plan**.[10] Within this document, Mount Namuli is formally recognized as a conservation hotspot and one of the specific stated targets is that by 2025 it (and all Afromontane centers of endemism) should be included within the national network of conservation areas.

The government is authorized to establish various areas of environmental protection, and the range of potential protected area types has been extended under the recently promulgated **Conservation Law** (Law No. 16/2014 of 20 June). The Conservation Law now provides for the establishment of **Community Conservation Areas**. Such Community Conservation Areas consist of specific delimited areas of the community public domain, under the management of one or more local communities where they have the right to use the land and natural resources, and dedicated to the conservation of fauna and flora and sustainable use of natural resources. These areas aim to protect and conserve existing natural resources in the area of customary community use, including conserving natural resources, sacred forests and other sites of historical, religious, spiritual and cultural importance to the local community, ensure the sustainable management of natural resources so as to result in local sustainable development, and ensure the access and longevity of plants for medicinal use and biological diversity in general. The Conservation Law also establishes penalties for illegal activities and use, especially of endangered species, and for causing wild fires.

This is the legal mechanism envisaged for the Namuli uplands under this initiative. It is important to note that the legal mechanism for Community Conservation Areas has not yet been tested, and much of the process of setting up, gazetting, and implementing has not been fully defined. Therefore, Namuli would be considered the first or one of the first pilot sites to go through the process, testing the application, process and implementation of the law while doing so. Lessons learned could be used to advocate for clarity or act as precedent on which other communities could base their applications.

At the **local level**, there is relatively sound integration between customary and formal legal systems. Minor infringements are dealt with under customary processes, with more serious matters being referred upwards to the formal legal system. However, application of the formal system is relatively weak, hampered both by lack of knowledge and capacity and, in some cases, political will. This is one of the primary motivations for seeking to establish a Community Conservation Area rather than a more formal designation such as a national park, as the direct management

[10] NBSAP, 2015 – MITADER. 2015. National Strategy and Action Plan of Biological Diversity of Mozambique. Maputo, MITADER, 112 pp.

remains local. Moreover, Community Conservation Areas are specifically intended to be more flexible in terms of accommodating sustainable use of natural resources than total conservation areas such as national parks.

No policies have been identified that can specifically be considered as unfavorable to the proposed project. However, potential challenges exist in terms of overlapping rights and legislation, particularly in terms of the Mining Law (Law no. 20/2014) and the Hydrocarbons Law (Law No. 21/2014). This risk is minimized from a practical perspective in that granitic inselbergs, such as Mount Namuli, are not known to harbor any significant mineral resources (e.g. hydrocarbons, precious metals or stones). More pertinent perhaps, is legislation relating to water resources (Law 16/91 of August 3, 1991) and renewable energy, this being an area with high rainfall and elevation with potential for hydropower production.

Community Members as Conservation Partners

The Namuli communities are the rightful users of the land. They are the source of the threat to the ecosystem due to unsustainable nature resource use, and they are also at the greatest and most immediate risk if the ecosystem is depleted. Communities will be the core of the natural resource management approach and ultimately responsible for the management and sustainability of the protected area as well as surrounding natural resources.

Local communities have good potential for being effective conservation partners. Although community members remain strongly reliant on natural resources for their livelihoods, they recognize that the current use of many resources is not sustainable, that the status of many resources is declining and that this will lead to detrimental impacts to future livelihoods. They recognize the need for conservation interventions that will enable improved natural resource management. In particular, communities recognize the current system of use of upland forests is deleterious to the natural resources and that under continued use for cultivation they will soon disappear.

Traditional leadership is recognized as being relatively strong and coherent within these communities, thus providing a means for the community to act as an institution and to make and implement effective decisions. This is well illustrated by the case of Ukalene Forest, situated directly at the base of Mount Namuli. Several years ago, the Queen in conjunction with the other community leaders of Mucunha, declared Ukalene Forest to be protected, whereby community members could harvest forest resources such as firewood, poles and medicines, but were not allowed to clear or cultivate crops. This was done without any direct influence from Legado and LUPA. Despite its proximity to the Curuca community, this forest has been effectively protected and remains intact, albeit under some level of stress due to harvesting particularly of young trees for poles. This is in stark contrast to the rapid decline of forests elsewhere on the Murretxa plateau, including those under the control of the same Caruca community.

This example of the Ukalene Forest clearly demonstrates that the ability of these communities to be effective conservation partners. It also shows a real interest in the conservation of forest resources and a willingness to change behavior. Finally, it illustrates how local leadership can make and enforce decisions such that the community can act as an effective institution. This is a most promising indicator for the establishment of a larger conservation area covering the Mount Namuli uplands.

Furthermore, community leaders have explicitly expressed willingness in engaging in a conservation agreement that will lead to the formation of a community conservation area covering the Namuli uplands. Following recent discussions with community leaders, 15 leaders from Mucunha, Muresse and Murrimo Localidades and villages signed a memorandum of understanding which confirms their support for and intention to continue with the process of discussions towards developing a conservation agreement and establishing a community conservation area covering the Namuli uplands (Appendix B). A process of further outreach and discussions is still required to obtain full endorsement by the overall community members.

The scope of the conservation project on Mount Namuli includes the high conservation value core area above about 1,200 meters on the Namuli Massif. This scope covers the mosaic of habitats in the Namuli Massif, specifically capturing the remaining intact and high conservation value high-altitude primary rainforest and grasslands. The proposed core conservation area does not encapsulate any homesteads and would not require any relocation of families. The initial proposal for the community conservation area is designed to capture all key biodiversity areas without encroaching on high use community lands.

"Padre" Elias Faustino

The key commitment required of communities in the short to medium term will be to stop cultivating new areas and reduce the incidence of fires in the upland areas. The cost of this behavior change will be born as an opportunity cost of future agricultural land. The price will need to be met with a combination of understanding the benefits of the remaining forest for ecosystem services and cultural values and through increasing the opportunity to produce more and/or earn more income in the transition zone. Limiting fires is likely to require additional physical works such as implementing firebreaks and/or barrier plantings of fire suppressant species. There will also be need for some form of policing and monitoring. To achieve these goals, Legado: Namuli will provide support towards institutional development and technical training.

Community Engagement by Legado: Namuli

Legado: Namuli has been engaged with the Namuli communities since 2011, with a sustained working presence since 2015. We have been clear with communities of our intent to assist them in practicing sustainable natural resource management and increasing their socioeconomic status but have made no direct promises or direct asks to date. This approach allows us to design a conservation agreement in partnership with the communities and sufficient time to ensure that we can deliver on our side of the agreement before raising hopes within the communities as to project benefits.

Further, the communities are highly sensitive to the possibility of losing land to external private investors. In Murrimo, in particular, a large portion of land has recently been allocated to the company Murrimo Macadamias for large scale agricultural development. Although the land in question appears to have comprised former abandoned tea estates, by the time of its reallocation to Murrimo Macadamias, parts of the land had been settled and were being cultivated by members of adjacent communities. The displacement of these people is a source of ongoing conflict within this community. The allocation of additional land to a conservation area is an aspect that will thus need to be managed sensitively, although the issue should be largely negated through creating a Community Conservation Area whereby the land remains under the authority and control of the respective communities rather than an external entity.

Of the four relevant villages in the Namuli region, two communities, Murabue and Muresse, practice the greatest amount of natural resource use in the proposed protection area. Thus Murabue (Caruca) and Muresse will be targeted with the primary intervention strategies, and these will subsequently be extended to the other communities of Mucunha Sede and Carrico. The intention is to establish a single Conservation Agreement between Legado: Namuli and all the relevant Namuli communities, but within that agreement, differing levels of socioeconomic programming will be allocated to different communities based on their willingness to engage in the Conservation Agreement and their current dependence on extraction activities within the Namuli uplands. Guided by the Namuli Resources Governance Council, the process will be fully transparent such that each community will be aware of what social and economic

benefits the others are receiving, and of the rationale and methodology used to apportion these benefits. This will be an important mechanism to avoid future potential conflicts between the communities.

During recent meetings held in Gurue in March 2017, fifteen community leaders from all three Localities expressed their written support for improved biodiversity conservation and natural resource management, including development of a formal conservation agreement and the establishment of a Community Conservation Area on the Namuli massif (Appendix B).

The following are local stakeholders within the communities and local government that are supportive of the project. These stakeholders were vital in explaining the project objectives to all community members, clarifying initial community suspicions that the project did not intend to raise cattle or use community land for private profit.

- **Community Leaders** of Mucunha (Mucunha Sede, Murabue, Caruca and Niwiri), Muresse and Murrimo (Carrico) – Community leaders have guided the field team in fact finding missions to determine natural resource use in the core protection area as well as explain community governance and community desires for socioeconomic development.
- **Queen of Namuli –** The cultural leader of the Mucunha region, the Queen of Namuli, has welcomed the project and its intentions. She has been integral to introducing the Legado: Namuli field team in each community and ensuring positive relationships with community leaders.
- **Judge of Namuli –** The Mucunha communities have three community appointed judges (Juiz) who settle inter and intra-community disputes. In particular, the Judge of Mucunha Sede accompanied the field team in all initial meetings with local community members to ensure the establishment of trust between the project and communities.
- **Chief of the Locality of Mucunha and of Secretary of the Locality of Mucunha -** The representatives of the government in the Mucunha Locality have been engaged from the beginning of the field work in 2016 in all meetings with local community leaders. They have spent time with the field team within communities, participated in expeditions to the Ukelene Forest.
- **Chief of the Locality of Murrimo and Chief of the Post of Gurue –** More recently, these additional government leaders have taken the lead in initiating discussions and introducing the project to additional communities within these Localities.
- **District Administrator and District Permanent Secretary of Gurue –** Gurue is the district that encompasses the Namuli Massif. The District Administrator has been regularly kept informed of progress and developments and the District Permanent Secretary of Gurue has expressed written commitment to supporting the initiative and assisting to overcome any challenges in working with the local government.

In addition, Legado: Namuli hosted the **Beira Legacy Leadership Summit** in July of 2015 in Beira, Mozambique attended by community leaders from the Mucunha Locality, the Namuli Judge, the Chief of the Locality of Mucunha, and the Director of the Gurue District Service of Agriculture and the Economy (the main district government contact). The Summit served to unite the community leaders, Legado and LUPA in an effort to design a legacy for the Namuli region. Legado: Namuli activities are entirely based on the Legacy Approach in which Legado: Namuli empower's communities to realize the legacy they want to leave for future generations and then support communities in achieving that legacy.

Legado and LUPA have also lead multiple **Permagardening Trainings** based on water and soil conservation techniques within the Namuli communities which have further served to develop community relations. These trainings are the basis for future agricultural extension work within the Namuli communities as the Legado: Namuli field team has identified farmers that are excited by the agricultural opportunities proposed within the project framework who will be vetted to serve as agricultural community change agents.

Legado: Namuli recognizes that the project is entering a vital juncture in regards to community relations as we begin to design a conservation agreement with the Namuli communities. In order to facilitate a smooth, productive and positive conservation agreement design and implementation process with the Namuli communities, Legado: Namuli will depend on the first two of our five core principles:

- **Legacy-driven leadership**: We cultivate a culture of individual and collective leadership and work with local organizations and communities to articulate and then fulfill their own vision for their future by providing technical assistance as well as opportunities for capacity-building.
- **Free, Prior, Informed Consent**: We do not advance work with local organizations or communities unless they have agreed freely and with sufficient advance notice, consultation, and information.

Groups indirectly affected by how Namuli resources are used and managed will largely benefit from its conservation. These include other immediate downstream water users (i.e. Gurue town, which draws water from the Licungo River) and other downstream users along the Licungo, Malema and Lurio Rivers. Even further afield, scientists and tourists may be drawn to the area to study and experience the biodiversity and unique habitats of Mount Namuli.

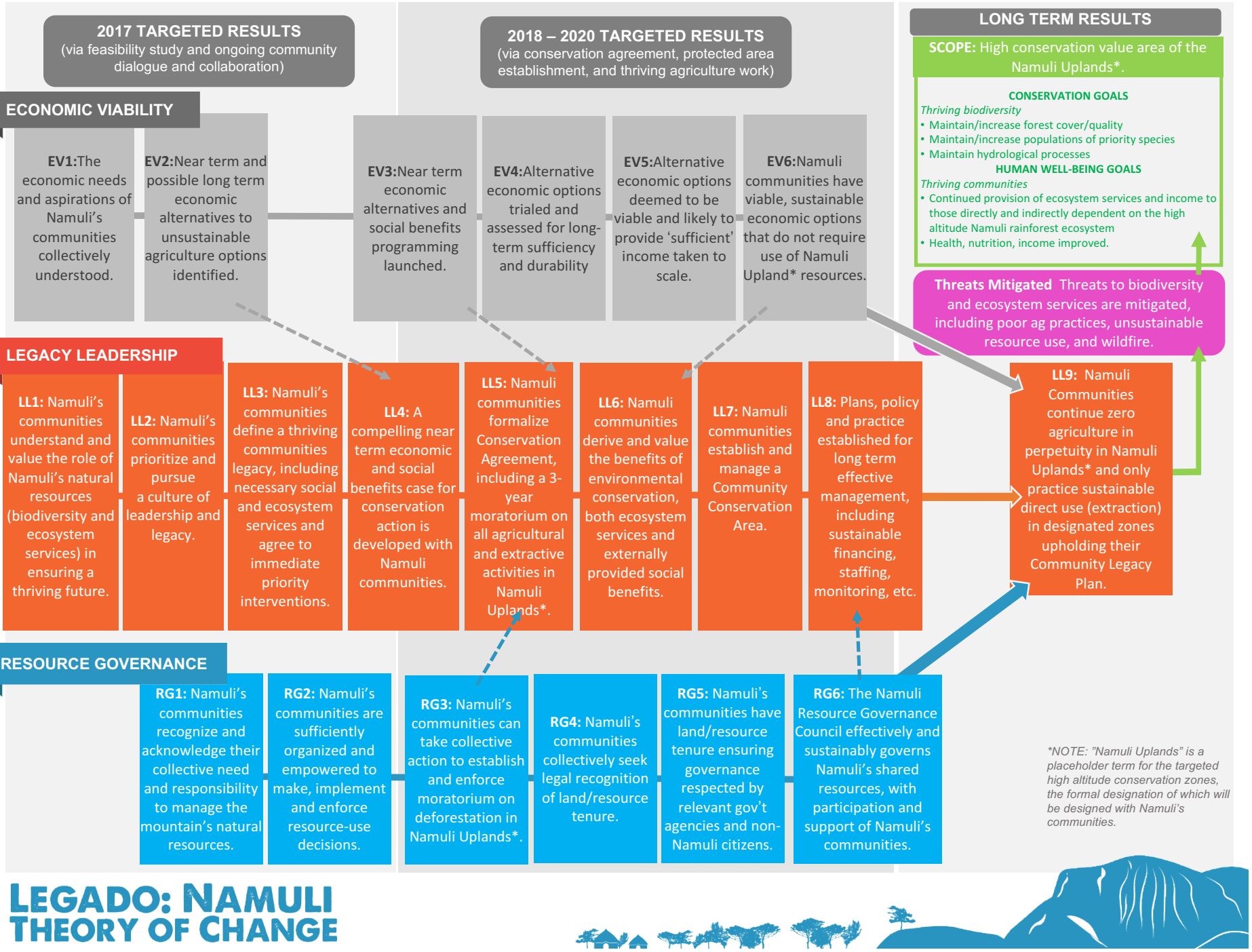
STRATEGIC APPROACH

Theory of Change

In order to mitigate the threats to Namuli's priority biodiversity, forest cover and hydrologic services, a community-managed conservation area will be created and effectively managed in the uplands of the Namuli Massif through the implementation of activities under three strategic lines of action: Economic Viability, Legacy Leadership, and Resource Governance.

Economic Viability activities ensure that Namuli communities have income generation options that do not require further forest clearing and are thus **able to** cease smallholder agriculture, timber harvest and hunting in the high-altitude region. Legacy Leadership activities inspire community members to **want to** protect their surrounding environment. Resource Governance activities ensure that communities **know how to** establish and manage a community conservation area as well as sustainably use their natural resources.

Figure 6. Legado: Namuli Theory of Change



Conservation Targets, Goals, and Objectives

As previously stated, the conservation targets on Namuli include high-altitude rainforest forest cover, high-altitude rainforest priority species, high-altitude grasslands priority species, and hydrological processes that the Namuli watershed provide to the surrounding communities and downstream populations. These targets encompass all known endemic and endangered flora and fauna species of the Namuli Massif.

Table 5. Conservation Targets

Namuli Conservation Targets	**Nested Targets**
High-altitude rainforest cover	Riparian forests/vegetation
High-altitude rainforest priority species	Endemic small mammals Endemic/ near-endemic endangered birds Endemic/ near-endemic amphibians Endemic plant species
High-altitude grassland priority species	Endemic plant species Endemic small mammals
Hydrological Processes	Watershed and freshwater resources

Toward achieving conservation of these targets, the project's ultimate **conservation goals** are:

- By end 2020, maintain and increase forest cover and quality
- By end 2020, maintain and increase populations of priority species
- By end 2020, stabilize soils and increase/restore vegetation cover in support of maintaining hydrological processes

Toward achieving these goals, the following **threat mitigation objectives** must be attained:

- By end 2017, conversion and harvest of primary forest within the proposed core area is reduced to zero
- By end 2018, no primary forests have been cleared for agricultural purposes since the conservation agreement was established.
- By end 2019, active farming activity within the proposed core area is eliminated
- By end of 2018, wildlife take in proposed core area is eliminated
- By end 2018, incursions of stock into proposed core area are eliminated
- By end 2018, incidence of human-caused fire within the proposed core area is reduced by 75%.
- By the end of 2022, 25% of deforested areas within to the proposed core area are showing signs of natural regeneration
- By the end of 2022, 50% of farmlands in the lower elevations are practicing sustainable smallholder agriculture and agroforestry that minimizes soil erosion.

Strategies and Priority Activities

2017 – Preparation for a Conservation Agreement

Based on the defined theory of change, Legado: Namuli plans to implement activities in two phases incorporating three strategic lines of action: Economic Viability, Legacy Leadership and Resource Governance. The objective of the conservation agreement is to establish an immediate moratorium on slash and burn agriculture in the upper elevation primary forest. In order to achieve this objective, during the first phase – 2017, the foundation will be laid upon which the conservation agreement can be built. In phase one, the Economic Viability strategy creates an immediate income generation alternative for high-altitude farmers. The Legacy Leadership strategy ensures the communities understand

the value of protecting the Namuli uplands, empowers communities to design a legacy that enables a thriving future for each community and their environment and incentivizes the community to participate in a conservation agreement via high visibility social benefits projects. Lastly, the Resource Governance strategy develops community based institutions that will enable communities to be able to be active and engaged participants in a conservation agreement and managing a future community conservation area.

Economic Viability

Through community dialogue undertaken during the **Participatory Rural Appraisal and Feasibility Study**, the *economic needs and aspirations of Namuli's communities are collectively understood (EV1)*. Namuli communities have stated the following as their priorities for development: transportation infrastructure, education for youth, rural electrification, improved access to health services and increased income generation. Through continued community dialogue, Legado: Namuli and the Namuli communities will identify *near term and possible long term economic alternatives to unsustainable agriculture options (EV2).* The proposed short term provision is infrastructure improvement of bridges on high-use pathways and/or school facilities which will provide immediate employment for farmers currently cropping in the upper elevations. This program and long term options are detailed in Appendix A. Based on the identified alternatives, *near term economic alternatives and social benefits programming will be launched (EV3).* The infrastructure improvement project provides an immediate income generation opportunity for farmers currently cropping in the core area as well as community-wide benefits. Two other social benefits projects, rural electrification and the community education fund (both detailed in Appendix A) strictly serve to incentivize community-wide support of the conservation agreement and demonstrate that Legado: Namuli is committed to investing in community development.

Legacy Leadership

Through the Participatory Rural Appraisal process and community permagarden trainings, Legado: Namuli has worked with communities to demonstrate the importance of conserving the upper elevation forests, explaining how forests sustain surface water flows that communities depend on for drinking water and the retention of groundwater that feeds the lower elevation agricultural fields. Community leaders understand these direct benefits and have stated that these benefits are a motivation for entering into a conservation agreement. Furthermore, Legado: Namuli has impressed upon community leaders that the international development community is primarily interested in the biodiversity that exists in the upper elevation forests. Community leaders do understand that any future investment by the international development community or income derived by communities from scientific expeditions or tourism is directly linked to the existence of the upper elevation forests. They also understand that the international community is interested in supporting them to conserve that forest through initiatives like Legado: Namuli. This outreach will continue with the support of community leaders to ensure that *communities as a whole understand the value of conserving the Namuli uplands (LL1)*

As Namuli communities begin to internalize the value of conserving the Namuli uplands, it is envisioned that *Namuli's communities prioritize and pursue a culture of leadership (LL2)* and that *Namuli's communities each define a thriving community legacy, including necessary social and ecosystem services and agree to immediate priority interventions (LL3).* Legado: Namuli will implement the Lightyear Leadership model to design this legacy (Appendix A). The model focuses on long-term thinking, and the ability of individuals and groups to determine their own aims and work towards goals. This empowering method matches well with the community conservation agreement model by strengthening the communities' ability to engage fully in the agreement process. The outcome of this legacy design will be a basic agreement to immediate priority interventions that will lead into the formal Conservation Agreement. Through the legacy definition, *a compelling near term economic and social benefits case for conservation action and participation in the conservation agreement will be developed with Namuli communities* (LL4).

Resource Governance

Through community dialogue during the feasibility study, communities have expressed their understanding of the value and the need to conserve the natural resources of the Namuli uplands. Community leaders from Mucunha, Gurue Sede and Murrimo Localities have expressed an interest in participating in a conservation agreement. Thus, *Namuli's communities recognize and acknowledge their collective need and responsibility to manage the mountain's natural resources (RG1).* Going forward in 2017, Legado: Namuli will reinforce this understanding while investing in developing the institutional capacity of the Namuli communities to be *sufficiently organized and empowered to make and enforce resource-use decision (RG2).* While the specific design of community institutions will be based on community input, the two proposed institutions are Community Conservation Committees and the Namulli Resource Governance Council (NRGC). Details are in Appendix A.

2018-2020 – Establish a Conservation Agreement Limiting Extractive Activities

The first step in the second phase (2018 – 2020) is to establish the formal conservation agreement. This conservation agreement will clearly define the target area, and establish a moratorium on:

- slash and burn agriculture in the target area,
- timber extraction from the upper elevation forests,
- hunting of bushmeat in the Namuli uplands, and
- the use of wildfire for hunting purposes.

Once the agreement is in place, the activities in this phase will focus on ensuring the moratorium and prohibitions are properly implemented and monitored. Simultaneously, the process will begin to formalize the protected area with management systems and institutions, and to put in place sustainable alternative income options.

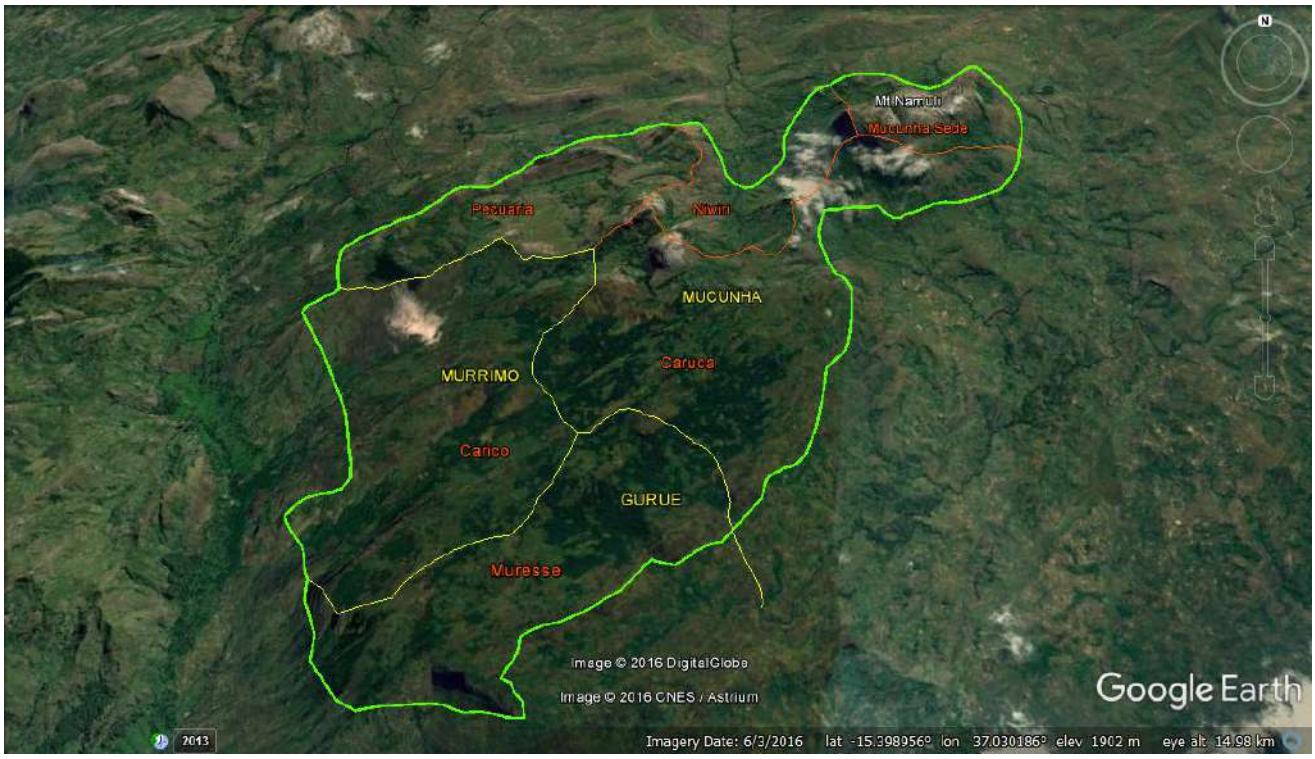
The classic framework of a UNESCO Biosphere Reserve consists of three interrelated zones that aim to fulfill three complementary and mutually reinforcing functions [11]:

- The core area(s) comprises a strictly protected ecosystem that contributes to the conservation of landscapes, ecosystems, species and genetic variation.
- The buffer zone surrounds or adjoins the core areas, and is used for human natural resource extraction activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.
- The transition area is the part of the reserve where the greatest activity is allowed, fostering economic and human development that is socio-culturally and ecologically sustainable.

On Mount Namuli we have proposed a two-zone approach designating a core area (Figure 7) and a transition zone (Figure 8). Due to the high conservation value of the core area and the proximity of community settlements to the core area, a functional 'buffer zone' is not considered feasible, although it is possible that some sustainable human natural resource extraction activities that are compatible with sound ecological practices may take place within the core zone. The bulk of development activities in support of improved and sustainable livelihoods will take place in the surrounding larger transition zone. The core area is approximately 5,600 ha and the total community conservation area including the transition zone is approximately 47,300 ha.

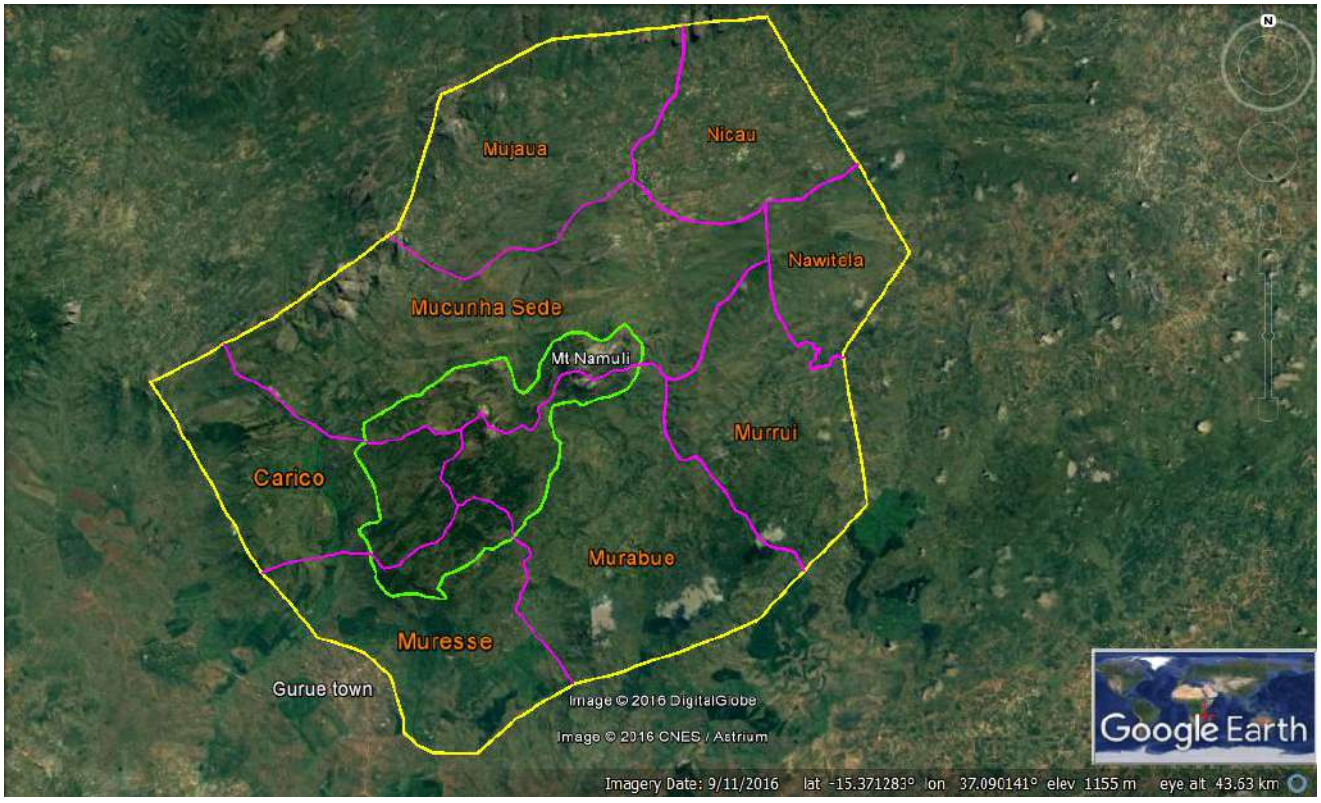
[11] http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/

Figure 7. Proposed Core Area of Community Conservation Area



Green: Boundary of Core Area, Orange = Informal Community Land Tenure: Yellow = Locality

Figure 8. Proposed Community Conservation Area



Green: Boundary of Core Area, Yellow: Boundary of Transition Zone, Purple: Boundary of Communities

Economic Viability

Under the Economic Viability strategy, Legado: Namuli will implement the immediate economic alternative and the social benefits programs. This will transition into piloting full-scale sustainable income generation alternatives which enable the community to generate income from sources other than extractive activities in the Namuli upland core area. The proposed programs have been selected based on initial discussions with community leaders and their relative viability, but are subject to adaptation as the project progresses. Agricultural extension programming implemented in the transition zone is at the centre of this approach with tourism and animal husbandry as accompanying pilot programs. An in-depth discussion of each of these approaches can be found in Appendix A. The Namuli communities will *trial and assess these alternative economic options and decide which options to take full scale (EV4)*. Based on results of the pilot programs, including novel high value crops, agroforestry and animal husbandry, *alternative economic options deemed to be viable and likely provide 'sufficient' income will be taken to scale (EV5).* The outcome of the Economic Viability strategy is that Namuli communities are thriving and *have viable, sustainable economic options that do not require use of Namuli uplands resources (EV6).*

Legacy Leadership

By 2018, Namuli communities will have the initial socioeconomic incentive and be sufficiently organized to enter into the formal Conservation Agreement. The Legacy Leadership strategy will enable communities to establish and benefit from this agreement with Legado: Namuli, and then establish a legally recognized Protected Area for Mount Namuli, likely in the form of a Community Conservation Area, sustainably manage and protect that area, and have secured sustainable funding for management activities. The Community Conservation Area will include both the core area and transition zone.

The strategy includes establishment of local resource management governance structures: Community Conservation Committees and a Namuli Resource Governance Council made up of members of the Committees. These groups, along with other members of the Namuli communities and local government, will work with Legado: Namuli to design a single Conservation Agreement between Legado: Namuli and the Namuli Communities. Within that agreement, differing levels of socioeconomic programming will be allocated to different communities based on their willingness to engage in the Conservation Agreement and their current dependence on extraction activities within the proposed protected area. Within this conservation agreement, the goal is that *communities agree to a 3-year moratorium on all agricultural and extractive activities in the Namuli uplands (LL5).* The Conservation Agreement will clearly define the economic and social benefits activities that Legado: Namuli commits to providing in each Namuli community. It is important to note that Legado: Namuli believes a transparent process in which each community understands what the others will receive under the agreement. This approach could cause raise equality issues, but these can be overcome through transparent cost-benefit analysis and negotiation processes, leading to a more sustainable agreement. The Agreement will also define which regions of the Namuli uplands each community is responsible for and the allowable natural resource use in the Namuli uplands and extended buffer zone under the established natural resource management plans.

In addition to continuing to receive benefits from social benefits programming (e.g. infrastructure investment, rural electrification and community education fund), the Young Environmental Leaders Program and RARE Pride Campaign will encourage communities to understand and value natural resources (Appendix A). *Namuli communities derive and value the benefits of environmental conservation, both ecosystem services and the externally provided social benefits continued from 2017 including infrastructure improvement, rural electrification and community education (LL6).*

By the end of 2020, Namuli communities will have the knowledge, ability and incentive to create a legally recognized protected area for Mount Namuli, and *agree to establish and manage a Community Conservation Area (LL7).* Legado: Namuli legacy leadership will have empowered the Namuli Resource Governance Council with the capacity to govern natural resource use and land management in the Namuli region. Legado: Namuli legacy leadership will have given

Conservation Committees the tools to manage and police the core protected area as well as enforce the regulations of the Namuli Joint Natural Resource Use Management Plan and Conservation Agreement (see following section).

Plans, policy and practice established for long term effective management, including sustainable financing, staffing, monitoring, etc will be established within community based institutions (LL8). Long term sustainable funding, both internal and external of communities will continue to pay for management costs as well as social benefits programming to continue to incentivize communities to not breach the conservation agreement. External funding options include the Mozambique Forest Investment Project and/or a Freshwater Trust while internal options include a Community Solar Trust and/or Community Tourism Fund. These options are described in greater detail in the *Financing Options* section of this report. Legado: Namuli has trained and provided continued institutional support within the NRGC and Community Conservation Committees for effective and sustainable management and monitoring of the protected area.

Resource Governance

The Resource Governance strategy for 2018 – 2020 will ensure that Namuli communities have the institutional capacity, land rights and organization to take collective action to create and manage a Community Conservation Area for the Namuli Massif. This work includes establishing formal land rights for the target Community Conservation Area and ensuring community institutions are supported and capable of designing resource management plans and enforcing those plans in accordance with the Conservation Agreement. While designation of proposed community conservation area boundaries will be determined during the design stage, demarcation and legal establishment will be completed with community leaders during the implementation stage of the conservation agreement

Once the Namuli Resource Governance Council (NRGC) and Community Conservation Committees are fully operational, Legado: Namuli will assist the Namili Resource Governance Council to create the Namuli Joint Natural Resource Management Plan with input from each Community Conservation Committee. The Joint Management Plan will have a subsidiary Community Natural Resource Management Plan for each community which will be incorporated into the conservation agreement with each community. These management plans will be incorporated into the Conservation Agreement. At this point, *Namuli's communities can take collective action to establish and enforce moratorium on Namuli uplands deforestation (RG3).*

The NRGC will represent the Namuli communities in all negotiations with external actors regarding community land rights to the high-altitude rainforests and grasslands. Legado: Namuli will support the NRGC to complete the necessary land delimitation and prepare all documentation required to pursue legal recognition of land/resource tenure under Mozambican law such that *communities collectively seek legal recognition of land/resource tenure (RG4).* Legado: Namuli will support the NRGC to navigate the legal and political system and provide the legal counsel necessary to complete the Mozambican formal land tenure process so that *Namuli's communities formally obtain land/resource tenure ensuring governance respected by relevant gov't agencies and non-Namuli citizens (RG5)*

Continued institutional support and capacity building by Legado: Namuli within the NRGC will empower the NRGC with the capacity to govern natural resource use and land management in the Namuli region. Legado: Namuli will work with each Conservation Committee to provide them with the tools to manage and enforce regulations in the core protected area as well as enforce the regulations of the Joint Natural Resource Use Management Plan and Conservation Agreement. *The Namuli Resource Governance Council will effectively and sustainably govern Namuli's shared resources, with participation and support of Namuli's communities (RG6).*

Beyond 2020 – Thriving Future for Namuli's Communities and their Conservation Area

Through the Community Conservation Agreement and establishment of a protected areas, the Namuli communities will have eliminated habitat clearing in the core area, made significant progress towards well-functioning protected area management systems, will be engaging in more sustainable income generation alternatives, secured sustainable funding

for protected area management activities, and been granted formal land/resource rights and government recognition of Mount Namuli as a Community Conservation Area. Communities agricultural systems will be providing increased nutrition and income leading to better health and the infrastructure projects have made it easier to access each community. All public school and health facilities will have electricity and the Namuli communities are better educated due to this and the opportunity many students continue to have in attending secondary school in Gurue.

The primary threats of smallholder agriculture, timber removal, bushmeat hunting and wildfires will be fully mitigated. The high-altitude rainforest in the core area will have begun regenerating naturally due to the cessation of wildfires and priority flora and fauna populations are increasing. Namuli's hydrologic services will be retained and have the opportunity to rehabilitate in future years as forest cover increases and sedimentation and erosion decreases and the microclimate begins to recover. The high-altitude grasslands will be thriving without the threat of wildfire. Communities will continue to receive the hydrological ecosystem benefits of protecting the upper elevation rainforest and implementing conservation agriculture best practices in the transition zone and sustainably use other natural resources such as grasses for construction and medicinal plants. *Namuli Communities will continue zero agriculture in perpetuity in the core protected area and only practice sustainable direct use (extraction) in designated zones upholding their Community Legacy Plan (LL9).*

IMPLEMENTING THE CONSERVATION AGREEMENT

Shared Objectives with the Conservation Agreement

The following objectives are a draft set of socioeconomic objectives that complement the conservation objectives stated in section on Conservation Targets, Goals and Threat Objectives section above together would be the basis of the Conservation Agreement. These are not finalized, but have been designed considering community desires for socioeconomic development reflected in the Participatory Rural Appraisal and feasibility study community dialogue, as well as an understanding of the local conditions and development context. Once the project secures funding for design and implementation of the conservation agreement, meetings with communities will be held to develop a final set of shared objectives, using this set as a starting point.

2017 - 2020

Agricultural Production and Income Generation

- By end 2019 increase agricultural productivity in transition zone by 15%
- By end 2020, market value of Namuli products has increased by 20% due to collective sales agreements with establish value chains by producer associations
- By end 2020, community income derived from agriculture has increased by 25%

Land Rights

- By end 2018, communities have official land tenure rights for protected area, including the transition zone.
- By end 2018, families within communities have official land tenure documentation for their family lands

Infrastructure Rehabilitation

- By end 2019, at least one bridge on the main access road in each community has been rebuilt to be able to withstand future flooding
- By end 2019, at least one primary school in each community has been rebuilt and refurbished

Rural Electrification

- By end 2017, at least half of the primary schools in each community are equipped with solar energy systems and cell phone charging stations accessible to the community
- By end 2017, all rural health posts are equipped with solar energy

Community Education

- By end 2018, 10 students per community per year are fully funded for tuition & room and board to attend secondary school in Gurue

Beyond 2020

Agricultural Production and Income Generation

- By end 2022 increase agricultural productivity in transition zone by 50%
- By end 2022, market value of Namuli products has increased 50% due to collective sales agreements with establish value chains by producer association.

- By end 2022, community income derived from agriculture has increased by 50%

Rural Electrification

- By end 2021, all primary schools in each community are equipped with solar energy systems and cell phone charging stations accessible to the community

Community Education

- By 2022, 50 students per community have attended secondary school thanks to funding by the Community Higher Education Fund

Capacity in anticipated activities

Legado

Legado's mission is catalyzing legacy-driven leadership to support the flourishing future of people and biodiversity in Africa. Legado's objective for Mount Namuli is that by 2025, a site scale legacy-driven model for conservation and sustainable development has been piloted and refined such that it is realizing positive and significant outcomes, and has generated learning that is informing similar efforts in other places. Combined, the Legado team has over 60 years of experience designing and assessing conservation projects and their effectiveness and has equally strong roots in international capacity and leadership development.

For the Legado: Namuli project, Legado serves first as a capacity builder and mentor to LUPA to backstop their implementation efforts and train and empower them to deliver the protected area for Mount Namuli according to best practices of conservation and community development and professionalism in regards to reporting, accounting and communication. Legado's goal is that, within the timeframe of this project, LUPA will have taken full responsibility for continuing operations on Mount Namuli and capable of replicating the approach on other Mozambican inselbergs without further backstopping by Legado. Legado is prepared to continue to be engaged in the Legado: Namuli project if establishing the community conservation area and developing the community management capacity takes longer than the proposed timeframe.

Legado also facilitates linkages and connectivity between Legado: Namuli's initiative to create a protected area and other key sectors such as development, science, and higher education. Legado further ensures that sister interventions upon which the sustainability of the protected area depend, such as the sustainable agricultural intervention and alternative income generation activities, are implemented in concert with the creation of the protected area.

Legado will lead strategic design and provide technical backstopping to the program, ensuring Legado: Namuli leads the way in Mozambique in the creation of community-based protected areas following international best practices, and alignment with the Mozambican context and priorities. Lastly, Legado will provide vital quality assurance and monitoring of the project activities.

Legado's approach is built around employing best practices for community conservation, including from UNEP's Community Conservation Area toolkit[12], Namati's land protection toolkit[13], and Conservation International's Conservation Steward's Program model. We also apply the following guiding principles to all of our work:

[12] http://www.unep.org/dewa/portals/67/pdf/ICCA_toolkit.pdf

[13] https://namati.org/resources/community-land-protection-facilitators-guide/

- *Legacy-driven leadership*: We cultivate a culture of individual and collective leadership and work with local organizations and communities to articulate and then fulfill their own vision for their future by providing technical assistance as well as opportunities for capacity-building.
- *Free, Prior, Informed Consent*: We do not advance work with local organizations or communities unless they have agreed freely and with sufficient advance notice, consultation, and information.
- *Viable, durable livelihoods*: We aim to go beyond "alternative livelihoods" that simply offset unsustainable practices, understanding that many communities want improvements, including greater income generation and stability. We aim to enable communities to begin livelihood practices that will meet their both immediate needs and aspirations, and that will endure.
- *Realistic ambition*: We have big goals regarding biodiversity health and well-being of communities but we also understand and continually remind our partners and funders that attainment of such goals takes time, careful and respectful process, attention to long-term sustainability, and adequate resourcing.
- *Design for impact*: We apply best adaptive management to our work with an eye always on the end results of improved status of targeted biodiversity and of human livelihoods. This includes thoughtful strategic design and monitoring and evaluation that informs decision making and adaptation to achieve greater results.

LUPA

LUPA is a Mozambican NGO that has been the primary local partner of Legado. LUPA focuses on community conservation, participatory rural appraisal, and land tenure issues. They also have a thorough understanding of the socio-political context and dynamics of conservation in Mozambique including developments in legislation and multi/bi-lateral agreements. LUPA has more than 20 years of experience working in southern region of Maputo province with issues related to communities access to land, conflicts and land delimitation/demarcation. While LUPA does not have direct experience creating PAs, it has extensive experience working on community natural resource management and land tenure, two key pieces of PA creation for Mount Namuli. Projects of land tenure and sustainable use of natural resources were carried out in Matutuine district in Maputo province (2002 – 2010) and Mabalane, Massingir, Mapai districts, province of Gaza (2011 – 2015). These projects intended to contribute to the increase in income at the community level through land security and sustainable exploitation of natural resources. Primary outcomes included a) Increasing the organizational capacity technical and local associations b) Strengthening the capacity of local economic associations c) Reducing land conflicts d) promoting partnerships between local associations and private sector.

For the purposes of Legado: Namuli, LUPA, with support from Legado, designs program implementation efforts. LUPA manages the field team implementing the program activities and is responsible for reporting on implementation successes and failures. LUPA fosters linkages within Mozambique with government and non-governmental conservation initiatives and promote Legado: Namuli within Mozambique to attract future funding and partners. LUPA develops relationships with Namuli and Gurue local government, NGOs and civil society organizations to create a representative group of stakeholders and ensure long-term support and endorsement of the Legado: Namuli in the Namuli region.

Additional Partners

On the following select primary activities, Legado: Namuli plans to partner with the associated additional actor(s) for activity design and implantation. All other activities will be led solely by LUPA with technical support and backstopping from Legado.

Conservation Agriculture Best Practices – Legado: Namuli and the Food and Agriculture Organization of the UN (FAO) are partnering to run Farmer Field Schools in all six target Namuli communities to promote smallholder agriculture best practices and organize producer associations. Activities will start in May, 2017. Through our partnership, we aim to

maximize the increase in agricultural yields in larger agricultural fields and increase the production of vegetables high in nutritional and market value produced in homestead permagarden plots managed by household matriarchs.

Introduce Novel High Value Crops – Legado: Namuli is developing a partnership with Winrock International, funded by the USAID ClimateSmart Agriculture Initiative to introduce novel high value crops to the Namuli region. Winrock International is assisting Legado: Namuli to determine which crops to target and implementation strategies for promoting these novel crops within communities.

Linking Producer Associations to Value Chains – Legado: Namuli plans to partner with TechnoServe, which has a regional office in Gurue, to access existing value chains for Namuli agricultural production.

Rural Electrification - Currently developing proposal in partnership with the Fundação de Desenvolvimento Comunitária (FDC) to bring solar energy to primary schools and health facilities in the target Namuli communities. FDC is a Mozambique based and run NGO with over twenty years of experience completing rural development projects including rural electrification via solar.

Infrastructure Improvement - Currently assessing construction groups, based in Gurue, with which Legado: Namuli will partner with to complete school and road infrastructure projects.

Animal Husbandry - Multiple NGOs have lead animal husbandry programs for rural farmers in Northern Mozambique. Legado: Namuli will link with one such partner to design and possibly assist in implementation of the animal husbandry project.

PROJECT FINANCE

Financing Options and Sustainability

Legado: Namuli programming falls under two thematic areas, (1) Resource Governance and Legacy Leadership – protected area creation and management, and, (2) Economic Viability – Community Socioeconomic Incentives. Initial funding for project activities under each of these two overarching thematic areas is derived from a mixture of bilateral and multilateral institutions, private donors, foundations, non-profit organizations and corporate donors. Legado: Namuli's goal is to implement activities funded by initial investments to create sustainable community income generation and develop funding mechanisms for protected area management activities. When successful, Legado: Namuli programming would thereby create local mechanisms that do not require any further investment from funding sources external to the Namuli region to ensure project objectives are achieved in perpetuity.

Resource Governance and Legacy Leadership – Protected Area Creation and Management

Initial **Legado: Namuli project funding for design and implementation** of programming to develop resource governance institutions and establishment of the protected area and associated community management structures comes from multiple sources. The Rainforest Trust is committed to funding project activities that are directly associated with the creation and management of the protected area.

Long-term sustainable financing for protected area management activities that employ community members and continue to fund community social benefits programs is imperative to sustaining conservation. Legado: Namuli has identified multiple potential sources of long-term financing for management activities both external and internal to communities.

Sustainable Finance Options External to Community

- Mozambique Forest Investment Project – The Mozambican Government in partnership with the World Bank signed a Letter of Intent to sell Nine Million tons of CO_2 Equivalents into a carbon fund. The Mozambique government will distribute funding aimed to support community based organization to complete activities to achieve this goal as well as funds to continue these efforts once the initial goal is achieved. Within this project, the Zambezia Integrated Landscape Management Program will fund community based organizations to complete forest conservation and reforestation efforts. Mount Namuli is one of the focal regions.
- Freshwater Trust – Multiple for profit ventures, including the tea plantations of Gurue and multiple water bottling operations, depend on the freshwater that is sourced from the Namuli watershed. Legado: Namuli is vetting the options for establishing a Namuli Freshwater Trust in which corporations and/or government invest in community protected area management. Winrock International, funded through USAIDs ClimateSmart Ag program has expressed interest on partnering with Legado: Namuli to create a Freshwater Trust linking the Namuli communities to Winrock International's downstream private large agriculture producers that depend on the Licungo River for irrigation.

Sustainable Finance Options Internal to Community

- Community Solar Trust – Aside from the solar social benefits package targeting schools and health facilities, two solar business models, community recharging stations and household solar units, will be assessed to determine if the expected demand for solar within the Namuli communities is sufficient to derive a profit. Profits from the solar programming would be held in a trust for PA management.
- Community Tourism Association – The Queen of Namuli currently manages the funds derived from Namuli's limited tourism. Legado: Namuli will work in concert with the Queen to set up a community conservation fund

whereby funds derived from tourism go towards supporting community conservation committees and their activities. It is important to note that at this time, Legado: Namuli will not work to increase tourism on Namuli, choosing instead to focus on the host of local, sustainable, and community-driven opportunities detailed in this report. Even without an increase from the current estimates of 20-30 tourists a year, tourism funds can potentially support social welfare programming depending on the level of funding derived. Legado: Namuli will work toward the creation of a women-led community based organization to support and manage the tourism funds.

Economic Viability – Community Socioeconomic Incentives

Design and implementation

Economic viability programming will provide alternative income generation and social welfare opportunities to incentivize communities to engage in a conservation agreement in the short-term and be economically empowered to uphold the agreement in the long-term. Legado: Namuli envisions a thriving future for both the Namuli communities and the environment on which they depend. Therefore, our goal is that the *Community Incentives* programming achieves income and well-being benefits to the communities far beyond what is required to offset the opportunity cost of conservation which is theoretically the base requirement to incentivize community participation in a conservation agreement.

In the first year (2017), immediate external funding sources will provide employment for the target population, farmers currently practicing agriculture in the upper elevations, via infrastructure projects. External funding will also provide socioeconomic benefits in the form of electricity and education to the entire community. Long term (2018 – 2020) programming will expand the scope of socioeconomic programming to invest in a full-scale Thriving Agriculture programming to enable communities economically to continue participating in the moratorium. During which socioeconomic benefits programming will continue to incentivize communities to not breach the conservation agreement. By end 2020, Legado: Namuli economic viability programming will be successful so as communities no longer have any incentives to practice unsustainable resource extraction in the protected area and external funds will no longer be necessary.

Long term sustainable funding to offset the opportunity cost of conservation will be derived internally by each community due to the success of the economic viability programming (See following section, Opportunity Cost of Conservation and Community Social Benefits).

Project funding for Legado: Namuli economic viability programs will come from multiple sources. Through the Conservation Stewards Program from Conservation International, Legado: Namuli aims to secure $250,000 USD. The European Union has allocated funds for creation of a conservation area for Mount Namuli and has solicited Legado: Namuli to serve as the implementer; amount of funding is pending but expected in the $100,000 to $500,000 range. LUPA, in March of 2017, received a 20,000 Euro grant from the French Development Agency. Family foundations have committed $25,000 USD and are projected to provide another $75,000. Private donors have committed $12,500 USD and are projected to provide another $50,000. The Food and Agriculture Organization of the UN will provide in kind funding to support agricultural extension activities within the Thriving Agriculture Program.

Legado: Namuli is in discussions with the World Bank in regards to three projects of which Legado: Namuli would qualify for funding at a projected $100,000.

- Forest Investment Project: Within FIP, the Zambezia Integrated Landscape Management Program will fund forest conservation and reforestation efforts and Mount Namuli is one of the focal regions.
- FCPS REDD+: Tackling drivers of deforestation in Zambezia province.

- Landscape Initiative: Funding conservation agriculture and reforestation initiatives in Nampula and Zambezia provinces.

Opportunity Cost of Conservation and Community Benefits

The primary objective of the Economic Viability programming is to ensure that communities are initially receiving and eventually internally generating income sufficient to offset the opportunity cost of conservation, cessation of all agricultural activities in the Namuli uplands.

Agriculture is the primary source of income generated from natural resource use in the target areas of Namuli uplands. While timber removal does occur, it is rare and is not seen by the communities as a significant source of income relative to agriculture. Therefore, the opportunity cost analysis includes only income derived by target communities from agriculture in the Namuli uplands.

Table 6. Opportunity Cost of Conservation

OPPORTUNITY COST	Unit	Annual Average Income From Upper Elevation Agriculture		
		Annual Average Income	Units	Total Cost
Agriculture				
Mucunha Locality	Household	$ 119	200	$ 23,829
Muresse Locality	Household	$ 119	50	$ 5,957
Murimu Locality	Household	$ 119	25	$ 2,979
Total			**275**	**$ 32,764**

The annual average income of $119 USD was determined by interviewing thirty farmers at their upper elevation fields. Initial values were taken in MZN, the Mozambican currency, then translated to USD using an exchange rate of 70 MZN to 1 USD. The annual average income was calculated by combining the farmer reported annual production with farmer reported income/unit of each crop. The total number of farmers in each community is an estimation based on discussions with community leaders and upper elevation farmers.

The opportunity cost of conservation will be offset by a combination of employment, long-term agricultural programming and social benefits. As demonstrated in Table 7, initially, the opportunity cost of conservation offset and community-wide incentives to participate in agreement will occur through employment by the infrastructure projects and the social benefits programming summing to a Year 1 (2017) benefit of $46,250 USD. Long-term the opportunity cost of conservation will be offset through increased agricultural income due to the success of the Thriving Agriculture Program, employment of community members to participate in the patrol and social benefits programming. By Year 3 of the project, the economic benefit to the community is projected to be $128,208 USD. This assessment does not include the ecosystem service value to the communities of protecting the high-altitude forests and grasslands. Legado: Namuli will complete an analysis in the near future that will employ natural capital valuation methodologies to estimate this ecosystem service value.

Table 7. Community Projected Alternative Income Generation

Community Benefits	Unit	YEAR 1			YEAR 2			YEAR 3			TOTAL
Monetary		Benefit/ hh	# Units	Annual Benefit	Benefit/ hh	# Units	Annual Benefit	Benefit/ hh	# Units	Annual Benefit	
Infrastructure Development Wages	Household	$ 150	275	$ 41,250	$ 152	275	$ 41,663	$ 153	138	$ 21,040	$103,952
PA Patrol Wages	Person	$ 300	0	$ -	$ 303	50	$ 15,150	$ 306	50	$ 15,302	$ 30,452
Agricultural Intervention Targeting Upper Elevation Farmers	Household	$ -	0	$ -	$ -	0	$ -	$ 60	275	$ 16,382	$ 16,382
Agricultural Intervention Targeting Entire Community	Household	$ -	0	$ -	$ -	0	$ -	$ 40	1,500	$ 59,571	$ 59,571
Social											
Community Education Fund	Scholarships	$ 200	30	$ 6,000	$ 206	60	$ 12,360	$ 212	90	$ 19,096	$ 37,456
Total				**$ 47,250**			**$ 69,173**			**$ 131,391**	**$247,813**

Project Budget

The overall project budget has been separated into two components, the design stage and the implementation stage according to Conservation International guidelines. The design stage activities will take place in 2017, and the associated budget captures the costs of designing the conservation agreement with a total cost of approximately $150,000. The implementation stage activities will begin in 2018 and continue through 2020 and the associated budget represents the cost of implementing the conservation agreement with a total of cost of approximately $1.8M. Legado: Namuli recognizes that the proposed timeline timeline is ambitious to achieve the stated objectives and initial investments may be extended over a longer timeframe.

Design Stage		
COST ELEMENT	**Description**	**2017**
		Cost
Labor		
Maputo Management Staff	LUPA	$ 7,500
Namuli Field Team Staff	LUPA	$ 41,250
US Based Technical Support Staff -	Legado	$ 36,750
Subtotal Labor		**$ 85,500**
TRAVEL COSTS		
Long Distance Travel	International	$ 5,276
Protected Area Staff Domestic Travel (for Moz staff)	Domestic	$ 3,500
Subtotal Long Distance Travel		**$ 8,776**
Activities COSTS		
Field equipment for Namuli field team	Motorbikes/Field Base of Operations	$ 10,000
Training in Project Management for Wildlife Conservation - LUPA	LUPA Capacity Building - Project Launch	$ 20,000
Community Meetings	Establish NRGC, CCCs	$ 12,600
District, provincial and national government meetings	Facilitate formal recognition of Namuli as a Community Conservation Area	$ 1,875
Subtotal Activities		**$ 44,475**
OTHER DIRECT COSTS		
Zambezia Office Equipment and Operations	Rent, Equipment, Communications	$ 3,000
Subtotal ODCs		**$ 3,000**
Total Direct Costs		**$ 141,751**
INDIRECT COSTS		
Maputo office operations	Rent, Communications, Legal, Insurance	$ 5,400
Subtotal Indirect Costs		**$ 5,400**
TOTAL DESIGN STAGE		**$ 147,151**

Implementation Stage		
COST ELEMENT	**Description**	**2018-2020 Cost**
FIELD IMPLEMENTATION		
MOZAMBIQUE STAFF		
Maputo Management Staff	LUPA	$ 39,093
Namuli Protected Area Creation Field Team Staff	LUPA	$ 206,217
Namuli Socioeconomic Activities Field Team Staff	LUPA/Partner TBD	$ 248,498
Subtotal Labor		**$ 488,542**
ACTIVITIES COSTS		
Protection/Enforcement		
Field equipment for Namuli field team	Motorbikes, Field Base of Operations	$ 18,704
Land demarcation	For Community Lands and Protected Area	$ 46,000
Creation of official maps and signage	Protected Area	$ 2,000
Training of Community Proteced Area Management Personnel	Train commuunity patrols in their role as an enforcer of the Conservation Agreement	$ 12,500
Field equipment for Namuli patrol	Boots, uniforms, 1 gps, notepads, etc.	$ 10,000
Conservation Activities		
Formal inter-community land tenure and zoning agreements	Between communities to establish community designed Protected Area	$ 4,060
Formal establishment Namuli Protected Area	Fees for legal procedures	$ 15,000
Training conflict mitigations and resolution	For NRGC and CCCs - process for infraction enforcement, etc.	$ 9,000
Community Environmental Education Programming	Youth Environmental Leadership Program and Adult Environmental Education Outreach	$ 30,450
District, provincial and national government meetings	Facilitate formal recognition of Namuli as a Community Conservation Area	$ 6,950
COMMUNITY BENEFITS COSTS		
Programming for Socioeconomic Dev't Activities		
Field equipment for Namuli Socioeconomic field team	Motorbikes, Field Base of Operations	$ 18,090
Solar Electrification	Provide energy in all schools and health facilities	$ 56,500
Community Education Fund	Education Fund providing scholarships to 10 students per locality per year to attend secondary school in Gurue	$ 37,456
Livestock Husbandry Activities	Trainings and promotion of smallholder animal husbandry best practices	$ 30,450
Thriving Agriculture Program Trainings - Agricultural Best Practices	Trainings in agricluture best practice and continued extensionist support as well as seed provision	$ 30,300
Meetings to Form Namuli Producer Associations and Value Chain Linkages	Producer Associations formed within communities and representatives will travel to establish relationships with existing strong value chains.	$ 24,300
Thriving Agricuture - Novel Crops for Income Generation	Extension support and provision of necessary materials and equipment to communities to pilot and take full scale novel crops	$ 95,000
Compensation for Management Activities		
Community Infrastructure Upgrade and Direct Employment	Employ communtiy members to complete Road/Bridges/School Infrastructure Improvements - Type depends community desire	$ 133,517
Salary and Rations for community Protected Area management personnel	Each locality will be responsible for patrolling their section of the Protected Area	$ 46,364
Subtotal Activities		**$ 626,640**
MONITORING AND EVALUATION COSTS		
Monitoring and Evaluation of Biological Status		$ 46,364
Monitoring and Evaluation of Socioeconomic Status		$ 23,182
Subtotal M&E		**$ 69,545**
OTHER DIRECT COSTS		
NLP Leadership Annual Meetings in Maputo	Annual meeting among local, provincial and national stakeholders to ensure transparency and cohesiveness and share experiences and best practices.	$ 15,455
Domestic Travel	Mozambique Staff	$ 33,591
Zambezia Office Operations	Rent, Equipment, Communications	$ 11,364
Subtotal ODCs		**$ 60,409**
INDIRECT COSTS		
Indpendent Financial Audit		$ 5,000
Maputo office operations	Rent, Communications, Legal, Insurance	$ 18,545
Subtotal Indirect Costs		**$ 23,545**
Total Field Implementation Costs		**$ 1,268,682**

COST OF LONG-TERM TECHNICAL SUPPORT		
US Based Staff		
Technical Support Staff	Legado	$133,568
Subtotal Labor		**$ 133,568**
LONG DISTANCE TRAVEL COSTS		
Namuli Programmatic	All international travel pertaining to Legado: Namuli	$ 35,493
Inselberg Initiative Development	All international travel pertaining to the Inselberg Initiative	$ 15,455
Subtotal Long Distance Travel		**$ 50,947**
OTHER DIRECT COSTS		
US Legado Field Equipment	Equipment required for Legado field work	$ 3,091
Office Costs and Communications	Legado Communications, supplies, postage, bank fees	$ 10,126
Subtotal ODCs		**$ 13,217**
INDIRECT COSTS		
Legado Indirect Costs	Legal, Insurance, Bookkeeping	$ 27,818
Subtotal Indirect Costs		**$ 27,818**
Total Long-Term Technical Support Costs		**$ 225,550**
PROJECT DEVELOPMENT AND FUNDRAISING ACTIVITIES TO SECURE LONG TERM FINANCE		
Legado Staff		$152,982
Subtotal Labor		**$ 152,982**
OTHER DIRECT COSTS		
Fundraising Development (copywriting, strategic planning)	Copywriting, strategic planning, donor meetings, travel	$ 37,091
Subtotal ODCs		**$ 37,091**
Total Development and Fundraising Costs		**$ 190,072**
TOTAL IMPLEMENTATION COSTS		**$ 1,684,304**
LEGADO: NAMULI GRAND TOTAL		**$ 1,831,455**

MANAGEMENT SUSTAINABILITY

What are the prospects for long-term management of the conservation agreements?

By creating the following institutional structures within each community and between the Namuli communities, a symbiotic relationship between communities and Legado: Namuli can be established which will lead to community organizations assuming full responsibility for management of the protected area.

Community Legacy – Sustainable Natural Resource Management

The long-term sustainability of the conservation agreement is dependent on a strong foundation based on trust between us and the community and principally on community ownership of the project. The joint creation of conservation activities is dependent on the community first understanding the reasoning behind potential actions and being proponents of action themselves. To achieve this foundation, Legado: Namuli will implement the Lightyear Leadership model which empowers individuals to gain the tools to design their own unique legacy, support their legacy through their vision and goals, and recognize the power and responsibility of their actions. The Lightyear model (formerly Igolu) has been used across Ethiopia to drive community-led improvements in education for children and adults by Imagine1day, to create community ownership and encourage action with incredible success. We plan to use the Lightyear approach to empower each community to design their legacy, their own solutions to sustainable natural resource management, as we provide them with the information they need to make informed decisions.

Namuli Resource Governance Council

The NRGC will be comprised of community leaders, local government officials, district government officials and representatives of Legado: Namuli. The NRGC will be responsible for oversight of all conservation activities managed by conservation committees within each community. Conservation committees are responsible at the community level for enforcing the conservation agreement, managing the protected area and managing community use of natural resources. The NRGC will represent the Namuli communities in all interactions with the government to create a formal protected area for the Namuli Massif.

Legado: Namuli will lead the establishment of the NRGC and support the NRGC in oversight of community conservation activities, developing inter-community natural resource management plans and resolving all conflicts between or within communities in regards to the protected area. Legado: Namuli will assist in establishing the NRGC as a formal community based organization with the institutional capacity to complete all aforementioned responsibilities.

Additionally, Legado: Namuli will complete institutional capacity building with the NRGC to enable them to receive funding directly from the World Bank funded Forest Investment Project to support long-term protected area management activities. The NRGC will then disperse these funds to the conservation activities in each community that are implementing conservation activities.

Conservation Committees

Unlike many other areas currently targeted for conservation globally, the Namuli region has no established community committees and relatively weak community governance. The Igolu Lightyear Leadership program will engage trusted and

respected members within each community, ensuring that all ethnographic and demographic groups are represented. As an outcome of the Lightyear Leadership program, in each community, a group of leaders will be selected to serve on the community conservation committee. The conservation committee will serve as the voice of the community and will actively develop programming with Legado: Namuli in regards to natural resource management and the conservation agreement.

The conservation committee in each community will be responsible for management of their zone of influence within the protected area. Conservation committees will be organized into a management structure that enables direct oversight of protected area management as well as enforcement of the community natural resource management plan. Legado: Namuli will work within each conservation committee to increase their organizational and operational capacity to actively manage protected area.

Community members will be employed by the conservation committee in each community to patrol their zone of influence within the protected area. Patrols will be completed on a weekly basis along all established trails. Remote sensing efforts will assist patrols in locating infraction zones. Any infractions will be reported first to the conservation committee. If the infraction was due to a community member from that community, the conservation committee will be responsible for taking action to process and respond to the infraction. If the infraction is completed by a non-community member, the NRGC will be responsible for responding to the infraction.

Additionally, conservation committees must be able to manage funds for continuation of conservation activities after Legado: Namuli has exited the region. Thus, committees must be trained in financial management and supported to register as community based organizations in order to be able to create bank accounts to receive funding from the NRGC. All conservation committee activities will be subject to oversight and regulation by the Namuli Resource Governance Council.

Community Governance Strengthening

Given the strong participation by local leaders to date and their understanding of the community impact on the environment and dependence upon environmental services, we are confident that with sufficient support, conservation committees will be a sustainable environmental leadership group for each community. Given, the current lack of a strong community governance structure in many of the Namuli communities, our goal is that the creation of the conservation committees as well as producers associations will strengthen community cohesion and collective action.

Exit Strategy

Before exiting the Mount Namuli region, Legado: Namuli is committed to ensuring that communities are economically thriving to the extent that they have no incentive to practice slash and burn agriculture nor timber harvesting in the core upper elevation rainforests. Furthermore, that environmentally sustainable management systems around animal husbandry, lower elevation agriculture and agroforestry are established and effectively managed by community leadership in the transition zone.

We believe that our legacy-driven approach to empowering the Namuli communities to take ownership of their natural resource management will be effective. But, we recognize that ultimately, the success of the conservation agreement will hinge on our ability to deliver on both the short term and long term socioeconomic programming to offset the opportunity cost of conservation for each community.

FEASIBILITY STUDY SUMMARY

Table 8: Feasibility Study Summary Table

Conservation Goal	Establish a sustainable community managed protected area for the ~47,300 ha core area and transition zone of the Namuli massif whose core area encompasses the areas of highest biodiversity and ecosystem services value, the high-altitude primary rainforests and grasslands and whose transition zone encompasses key soil and water conservation areas in the broader communal landscape.			
Conservation Outcome	• By end 2020, maintain and increase high-altitude forest cover and quality • By end 2020, maintain and increase populations of priority species • By end 2020, stabilize soils and increase/restore vegetation cover in support of maintaining hydrological processes			
Criteria	**Opportunities**	**Challenges**	**Risks**	**Favorable**
Conservation priority	Mount Namuli is designated as a Level 1 Priority Key Biodiversity Area by the Critical Ecosystems Partnership Fund, as an Important Bird Area, an Important Plant Area, and an Alliance for Zero Extinction site as well as providing vital freshwater ecosystem services, but currently is not protected.	The rate of deforestation demands immediate action if priority species are to be saved and watershed ecosystem services retained.	If action is not taken in the next two years to stop deforestation, key priority species could be lost and the primary high altitude rainforest too fragmented to regenerate naturally.	Yes
Threats to biodiversity or ecosystem values	Smallholder Agriculture is the major threat to biodiversity and ecosystem services and Legado: Namuli has feasible and sustainable strategies, primarily focused around smallholder agriculture in the transition zone to mitigate this threat.	Communities must be provided with alternative income generation opportunities that they view as more attractive than smallholder farming in the Namuli uplands.	If alternative income generation opportunities are not sustainable, communities could return to current agricultural practices in Namuli uplands.	Yes
Resource users as a conservation partner	Leaders of all Namuli communities that access the Namuli uplands for natural resources have committed to working with Legado: Namuli to create a community managed protected area.	Collective action by all community members is necessary, requiring further outreach within communities lead by community leaders.	Need to ensure transparency throughout process to mitigate community fears over "land grabs"	Yes

Resource rights	Namuli communities have customary rights to the land and use of resources on this land; these rights can be formalized and strengthened through registration of a DUAT.	Namuli communities will be provided with necessary technical and financial support to enable them to register one or more DUATs, as appropriate.	Conservation outcomes depend on communities agreeing to restrict rights of use with the protected area as articulated within the Conservation Agreement.	Yes
Legal context	Existing legislation provides a robust framework for the protection and sustainable management of natural resources; in particular, the recent Conservation Law provides for the formal establishment of community conservation areas.	This will be one of the first initiatives in the country to establish a community conservation area, as the enabling Conservation Law was only passed in 2014.	Despite sound legislation, implementation is often relatively weak, due in part to strong capacity constraints.	Yes
Policy context	Creation of a protected area for Namuli directly addresses the stated policy within the 2015 Mozambique National Biodiversity Strategy and Action Plan to provide formal protection to all Afromontane centers of endemism by 2025, specifically including Mount Namuli.	Legado: Namuli has the opportunity to establish one of the first ever Community Conservation Areas in Mozambique and so assist the Mozambican government in creating the framework and policy to facilitate future applications of the new law.	No specific risks have been identified from a policy perspective	Yes
Implementer's capacity and experience with community-based approaches, including gender and FPIC concepts	LUPA has 20 years of experience working on community natural resource management, land tenure and gender equality in Mozambique. Legado's international connections, technical support and backstopping will empower LUPA to be capable of implementing a project of this magnitude and replicate this work on other inselbergs in Mozambique. FPIC is one of the Legado's core principles.	Legado: Namuli will expand the project partnership to include a development partner to assist in the Thriving Agriculture Program and alternative livelihoods activities.	Legado will need to ensure efficient communication and shared objectives between all project partners.	Yes
Stakeholder and conflict analysis	There are no existing conflicts or boundary disputes among Namuli communities. There is	A single conservation agreement will be developed covering all communities; a high	It will be important to manage potential community fears about "land grabs" and to	Yes

	strong alignment and support from higher level district, provincial and national level stakeholders.	level of transparency will be required concerning differing levels of benefits accruing to each community.	maintain regular and effective communications among all stakeholders.	
Project costs	Total budget = $1.98M	N/A	Mozambique's volatile financial situation over the project life could decrease or increase total project costs.	Fair
Financing opportunities	Committed funds from Rainforest Trust for conservation activities with strong potential from Conservation International, the World Bank, the European Union, USAID and the private sector for socioeconomic activities.	The project has strong funding for conservation activities but requires commitment of funds for socioeconomic activities.	Funds need to be committed that can be used for socioeconomic activities as well as conservation activities.	Yes
Management sustainability	Legado: Namuli has a clear strategy to ensure communities will be fully equipped to sustainably manage a Community Conservation Area.	Sustained community engagement will be vital to supporting community conservation institutions establish their systems and procedures.	An interruption in activities due to a gap in funding would significantly hamper Legado: Namuli's momentum in empowering communities to be active managers of the conservation area.	Yes
Exit options	By 2020, Namuli communities will be trained and equipped to sustainably manage the Community Conservation Area, no longer requiring direct engagement by Legado: Namuli to sustain conservation successes.	Given the conditions in Mozambique, the project timeline could be extended.	The project timeframe could be extended to five years in order to allow for complete Legado: Namuli exit from the Namuli region.	Yes

APPENDIX A. Detailed Proposed Priority Activities

2017	**EV2. Immediate Economic Alternative – Infrastructure Improvement** - Through community dialogue, Legado: Namuli has identified road and school facility infrastructure improvements as high visibility community development projects that will directly employ farmers who are currently cropping in the Namuli upland core area. This employment will be a more attractive option to farmers as a source of income relative to the alternative of continuing to practice agriculture within the core area. Thus, the goal is that farmers will cease agricultural activities in the core area.
	EV3. Social Benefit A. Rural Electrification – Namuli communities are not on the main energy grid and only have access to energy via a few handheld household solar panels. Neither primary schools nor health facilities have any energy. We plan to install solar stations in public facilities, initially in primary schools and health facilities. Currently there is limited light (natural only) inside classrooms and high quality, reliable lighting is needed for children's classes held during the day and adult classes at night. Additionally, charging stations will be made available for community members to charge their phones. These charging stations can be used to incentivize community members to attend community meetings. Solar systems are an economically efficient mechanism to benefit social welfare at a community level.
	EV3. Social Benefit B. Community Higher Education Fund – The community education fund will support 10 students per year from each of the three target localities to attend secondary school in Gurue. The funding for each student will cover tuition as well as living costs in student dormitories. Legado: Namuli aims to provide scholarships on a 2:1 ratio for girls to boys in order to increase women's education and empowerment. The program will support each student through the five years of secondary school, thus, after five years, the fund will support a total of 50 students from each locality to attend secondary school.
	LL2 and LL3 Lightyear Leadership model – Empowers individuals to gain the tools to design their own unique legacy, support their legacy through their vision and goals, and recognize the power and responsibility of their actions. The Lightyear model (formerly Igolu) has been used across Ethiopia to drive community-led improvements in education for children and adults by Imagine1day, to create community ownership and encourage action with incredible success. We plan to use the Lightyear approach to empower individuals first to define and design their own legacy and then to use this to support each community to design their legacy. The community legacy leadership work will create community socioeconomic and ecosystem service goals and the communities' own solutions to sustainable natural resource management. This work will be further supported by Legado: Namuli providing the communities the information they need to make informed decisions.
	RG2. Community Institutional Structures **Community Conservation Committees** – A conservation committee in each community would be

	responsible for representing the community in all manners related to natural resource use and in initial discussions regarding the Conservation Agreement. Legado: Namuli will ensure equal representation of women on each conservation committee. **Namuli Resource Governance Council (NRGC) –** The NRGC will be comprised of representatives from each Community Conservation Committee, local government and district government. The NRGC will be responsible for governing use of Namuli natural resources, resolving disputes between communities and representing the Namuli communities in discussions with external stakeholders. Beginning with participation by the Queen of Namuli, Legado: Namuli will ensure equal representation of women on the NRGC. Legado: Namuli strives to leverage the matriarchal leadership that has been established in the Namuli region empower female leaders to lead change.
2018 - 2020	**EV4. Long Term Economic Alternative – Thriving Agriculture Program** The core programming that Legado: Namuli will implement to increase income generation is the Thriving Agriculture Program. The goal of the program is to increase production and income generated from crops in the transition zone. The Thriving Agriculture Program will (1) Provide agricultural extension activities to increase agricultural productivity of existing crops, (2) Pilot novel high value crops, which are ideal for smallholder farming, and, (3) Increase income by forming producer associations and connecting them with established value chains. **1. Conservation Agriculture Extension Activities (Permagarden Approach and Regenerative Agriculture)** Building on the Permagarden methods that Legado: Namuli has already introduced to the Namuli communities through a series of trainings in 2016 and 2017, Legado: Namuli will continue agricultural technical support by teaching simple yet effective approaches to achieve water and soil conservation via agriculture extension activities based on core principles of regenerative agriculture. This technical approach is based on the appropriate use of local resources, water conservation and long-term soil fertility measures to produce a variety of nutritious and accessible food crops. Regardless of the crop, a base knowledge of the value of water and soil (both ecosystem services) and embodiment of the techniques necessary to conserve those resources is imperative to a larger agriculture intervention. The regenerative agriculture method is designed to empower people with knowledge and skills needed to increase *household food production and improve household nutrition.* All of the necessary materials and resources are locally sourced and affordable to the farmers on a year-round basis. The methodology aims to build the capacity of farmers to withstand and adapt to shocks and stresses, whether it is drought, flood, conflict, etc., and still be able to produce nutritious crops throughout the year for subsistence and income generation. Improving smallholder farming system resilience to environmental shocks and stresses requires approaching each particular system with attention to its unique mix of site-specific characteristics through a design process that identifies, and is then informed and shaped by, the unique potentials and challenges of their surrounds. A core component of the regenerative agriculture approach is sediment retention on farmlands. Legado: Namuli will inspire local innovation in the ways farmers approach their soils, water harvesting and use, natural resource integration, creating diverse farm production of trees, plants

and animals and building practical and replicable knowledge to learn and adapt rather than promotion of static solutions to ensure that farmers can flourish in a changing environment. Within this program, Legado: Namuli will promote community understanding that living systems are nested, comprising of smaller living systems and being part of larger living systems, with each contributing to the value-adding process of the larger system. Within a farm system, this requires looking at multiple interconnected levels: the garden or field, the farm, the community and the watershed. By teaching this agriculture approach, to which all Namuli community members can relate, Legado: Namuli will be able to simultaneously emphasize the value of ecosystem services to agriculture and community well-being.

Legado: Namuli plans to promote **decentralized agroforestry** as a component of the resilience agriculture programming on a per household basis to produce future cooking fuel, serve as nitrogen fixers to enhance soil fertility and produce fruit or other goods that have local value. As women and children are primarily responsible for gathering cooking fuels, enabling production of cooking fuels closer to the home would *increase the time women and children can spend on more valuable activities such as agriculture and education*. Larger agroforestry pilot projects as a form of income generation is under consideration, but will depend on future community dialogue as allocating land for a larger community run project has proven difficult.

Within the Thriving Agriculture Program, a specific arm, **Women's Agricultural Empowerment**, will train the matriarch of each household to construct and manage permagardens and enable women to contribute to household nutrition and income. Matriarchs that contribute to household income have an increased voice in familiar decisions.

Existing Crops

The Thriving Agriculture Program will initially focus on improving yields of crops that are currently produced in Namuli communities. Legado: Namuli has recognized the following existing crops as having high value and established value chains in the Namuli region. Legado will implement agriculture extension programming that specifically promotes increased production of common bean, sweet potatoes and tomatoes.

Product	Potential	Limitations
Common Bean	- Well established in Mozambican food culture and are a good source of protein and nutrients - Produced primarily by smallholder farmers on small plots in intermediate and high-altitude growing regions - Production systems are rainfed, use recycled seed, and use little to no external inputs - Women are estimated to be responsible for 80 percent of common bean production in Mozambique - Strong markets and unmet demand for common bean from local buyers and large industrial buyers. - Established value chains in Gurue region from smaller local buyers and large industrial buyers. - USAID Feed the Future program focus crop	- Limited farmers' access to and information about markets.
High Value Vegetables	- Gross margins of up to $1,200/ha - Rich array of major and micronutrients	- Barriers to market entry tend to be high - Northern Mozambique has weak

(Tomatoes, Onions, Potato)	- Smallholders constitute 83 percent of vegetable producers. - Women are active along the trading chain - In 2012, Mozambique imported $12.1M of vegetables, including tomatoes, onions, cabbage, green beans, peppers, and potatoes, which satisfied 90 percent of domestic high-value demand. - Large informal market established in Namuli region and Gurue. - Sweet Potato is a USAID Feed the Future program focus crop	transport infrastructure and limited cold chain, high-value vegetable production will need to be proximate to the markets where it will be sold and consumed. - Low seed quality -- For potato, farmers are holding back the smallest potatoes as seed for the subsequent season, in effect selecting for inferior size characteristics. - Vegetable production requires more skilled labor and management - Lack of food safety knowledge - Limited formal market with larger buyers in Gurue region.
Low Value Vegetables (Pumpkin, Cabbage, Kale)	- Rich array of major and micronutrients - Women are active along the trading chain - Large informal market established in Namuli region and Gurue.	- Most retailers sell at informal spot market locations, ranging from small, roadside locations to medium-sized crossroad retail clusters to village-based informal markets. - Limited larger buyers - Weak value chains - Low seed quality - Vegetable production requires more skilled labor and management - Lack of food safety knowledge

2. Pilot novel high value crops

Legado: Namuli will pilot an array of high value crops that are ideal for production by smallholder farmers in the Namuli agricultural environment. Based on a USAID 2016 study on Value Chain Analysis in Mozambique and further investigative efforts, Legado: Namuli has assessed the following crops for potential agricultural investment in the Namuli region based on the strength of established value chains and production potential[14]. Based on this analysis of established value chains, potential production and potential profit, Legado: Namuli plans to move forward in developing pilot programs around novel crops soybeans, pigeon pea and cowpea. Based on the successes of the pilot programs, Legado: Namuli will select the crop with the highest potential production and income generation to promote on a community-wide scale in the transition zone.

Product	Potential	Limitations
Soybean	- Profitable for small- and medium-scale "emerging commercial" farmers with gross margins averaging from $306 to $371 - Zambezia, particularly Alta Zambezia, responsible for over 60 percent of annual soy production (50 percent of total production from the district of Gurue in which the Namuli massif resides). - Major end markets for soy are animal (primarily poultry) feed companies and exports to Malawi. - USAID Feed the Future program focus crop - USAID Feed the Future already	- Limited quality seed availability. - Limited use of improved inputs and suboptimal farm-level management practices - Inconsistently successful linkages between buyers and suppliers

[14] "Mozambique Agricultural Value Chain Analysis." LEO REPORT #31. Prepared by ACDI/VOCA for USAID. June, 2016.

		working on strengthening value chains in Gurue region.		
	Tropical Fruits (Mangos and Bananas)	- Primary strategic investment products for USAID ClimateSmart Agriculture project for the District of Gurue - Will be strong value chains developed over the next two years - High value	- Transport of fruits difficult - Requires more extensive land management strategy, especially if community plantations will be developed.	
	Sesame Seed	- High financial margins at $261/ha - Uniquely suited to diversified smallholder production systems. - Nampula and Nacala in northern Mozambique have central processing plants. - Zambezia is in top three provinces in current production of sesame. - Established value chains in Gurue region. - Currently inadequate volumes of production to meet demand - USAID Feed the Future program focus crop	- Inconsistently successful linkages between buyers and suppliers - Low yields due to improper management practices - Current production is low quality	
	Ground nuts	- High gross margins averaging $280/ha. - Drought resistant - Short-season production cycle of approximately 95 days fits well into smallholder production systems - Women are very active in groundnut production, post-harvest management, and local transport and sales; - High in vitamins, protein, and digestible fats, and they factor into traditional Mozambican cuisine - 90 percent of groundnut growers sell to local market intermediaries - Local informal markets available in Gurue. - USAID Feed the Future program focus crop	- Inadequate volume to meet demand - Sub-optimal processing options - Poor access to primary seed - Limited formal markets established in Gurue region.	
	Pigeon Pea	- Medium gross margins of $147/ha - Uniquely suited to smallholders – well suited to intercropping; has low input requirements, including a low seed-production ratio; and performs well with stable yields in smallholder systems - Healthy source of proteins and other nutrients - Top production area is Zambezia with two thirds of the production area, 70 percent of total production, and 45 percent of the producers - Robust export market, with particularly strong demand from India	- Only 24 percent of smallholder farmers market any output - Farmers rely primarily on cash sales to local intermediaries and little contracting of production - Limited awareness of market potential and conditions - Poor farmer access to primary seed.	

	- USAID Feed the Future already working on strengthening value chains in Gurue region. - ETG has a processing plant (with 7,000 MT/year capacity) in Gurue, Alta Zambezia. - USAID Feed the Future program focus crop	
Cowpea	- Smallholders are extensively involved in cowpea production - Important to nutrition and food security - Drought tolerant and nitrogen fixing - Established value chains in Gurue region, though limited and largely informal. - Low gross margins estimated at only about $90/ha - USAID Feed the Future program focus crop	- Nationally, only about 9 percent of smallholders sell any of the cowpea that they produce. - Market-driven interventions in the cowpea value chain have limited potential - Not perceived by either large private sector actors or industry expert key informants to have dynamic market demand - Largely informal value chains
Tea leaf	- Established markets and value chains for tea leaf in Gurue - Processing plants available in Gurue - Namuli region has great conditions for growing tea. - High value crop	- Significant land around Gurue overtaken by tea fields and operations, if minor operation established, could garner attention by international tea groups. - Requires extensive land management knowledge and skills
Macadamia Nut	- Currently a Dutch company producing Macadamia Nuts in Gurue with strong yield - High value crop	- Would need to ensure that outside business interests are not able to encroach on Namuli community land. One Namuli community, Carico, has had poor relations with the Dutch company. - Requires extensive land management knowledge and skills
Honey	- High value crop - Producer and processer in Mopeia district, roughly 5 hours from Gurue.	- Requires extensive land management knowledge and skills - Likely would need to create processing systems and value chain.

3. Strengthen Value Chains/Establish Producer Associations

A major challenge in the Namuli communities is that farmers sell their produce individually and due to the need for income, often compete against each other in sales of goods driving down the price of their product. Additionally, post-harvest storage is a challenge as individual farmers often do not have the means to store harvests until the demand and therefore price of the product is higher. A potential solution to both of these issues is to establish producer associations.

Namuli community producer associations could serve as intermediaries and also support producers with provision of seed, mechanical services, post-harvest handling, and in-kind finance for inputs. Namuli producer associations can enter into contracts of varying intensity with large-scale buyers to ensure a fair price for the products and a guaranteed purchase. We aim to empower communities through institutional support in the creation and maintenance of these buyer-supplier relationships, providing technical assistance and training and other forms of assistance to help ensure the success of the relationship, in particular adherence of both parties to agreed-upon contract terms.

	Within each community producer association, a subsidiary will be established by the Women's Agricultural Empowerment program compromised of women practicing permagardening. This Permagardening Producer Association will be led by women and ensure that matriarchs of households have the opportunity to contribute to household nutrition and household income.
2018 - 2020	**EV4. Long Term Economic Alternative – Animal Husbandry** Given the community fear of land grabs for cattle raising, a remnant of the Portuguese colonial era, Legado: Namuli will focus exclusively on poultry and goats. Poultry has a relatively small environmental footprint and is normally confined to a small area directly around the home. For goats, community natural resource use zones, specifically for grazing, will be established and fostered to ensure sufficient sustenance. Currently, the milk of goats is wasted by Namuli communities, Legado: Namuli will introduce options for consuming goats milk as it has high nutritional value. Animal husbandry could serve as an income generating activity for certain families, but the primary objective of the program is to simply provide sufficient protein to disincentivize bushmeat hunting and do so in a manner that does not affect conservation goals.
2018 - 2020	**EV4. Long Term Economic Alternative – Community Tourism Association** The Queen of Namuli currently manages the funds derived from Namuli's limited tourism. Legado: Namuli will work in concert with the Queen to set up a community conservation fund whereby funds derived from tourism go towards supporting community conservation committees and their activities. It is important to note that at this time, Legado: Namuli will not work to increase tourism on Namuli, choosing instead to focus on the host of local, sustainable, and community-driven opportunities detailed in this report. Even without an increase from the current estimates of 20-30 tourists a year, tourism funds can potentially support social welfare programming depending on the level of funding derived. Legado: Namuli will work toward the creation of a women-led community based organization to support and manage the tourism funds.
2018 - 2020	**LL5. Environmental Outreach – Young Environmental Leaders Program** This program will implement environmental education in primary schools to educate children on the value of forests, soil, surface water and dangers of "fires for fun". Tapping into the approach of using children as community agents of change, this program will engage students in the larger protection effort and understanding the value of their environment. This program will in particular target girls to empower them to be active and engaged in natural resource management and environmental protection. For adults, they will continue to receive learnings on the value of conservation through teachings of water and soil conservation through the Thriving Agriculture Program.
2018 - 2020	**LL5. Environmental Outreach – Pride Campaign** Legado: Namuli plans to run a Pride Campaign following methodology developed by the NGO, RARE, to inspire communities to take pride in their natural resources and understand their inherent value to the community through a comprehensive marketing campaign. All community members will continue to derive value from the infrastructure improvements, solar electrification of schools and health facilities and community higher education fund. Through the environmental education outreach and Pride Campaign efforts, Namuli communities will value the conservation agreement beyond the socioeconomic programming that they are receiving. They will truly value and take pride in the natural resources and ecosystem services of the area that they are protecting on the Namuli Massif.

Appendix B: Letter of Support from Namuli Communities (February, 2017)

To Rainforest Trust

Gurué, March 2sd, 2017

Subject matter: Letter of support from community leaders of the Murrimo and Mucunha locality, Administrative Post of Gurué to the Biodiversity Conservation Project on Mts Namuli

We, community leaders of the Administrative Post of Gurué Sede, of the cellule of Muresse, Carico and of the locality of Mucunha including the headquarters, located in the district of Gurué province of Zambézia, we understand that Mts. Namuli, Support prominent ecosystems that harbor a large diversity of rare and unique fauna and flora species in the world and serve as water sources for the major rivers draining almost the entire province of Zambezia and Nampula and for many people living downstream who depend on these Water for daily use.

We also understand that the Mozambican government is strongly committed to the future protection and conservation of these important resources and we recognize that LUPA and LEGADO are working in partnership with local authorities to support conservation and improve the management of these natural resources, Livelihoods and increasing the development of the communities where these resources occur.

We also recognize that current land use practices (burning and inadequate soil management) are having a negative impact resulting in rapid destruction of the remaining forests. Therefore, we publicly express our support and commitment in the promotion of biodiversity conservation, because we believe that the establishment of a community conservation area may lead to restrictions or limitations on continuous cultivation in the mountainous area, as well as other practices harmful to biodiversity conservation.

On the other hand, it is expected that these discussions will lead towards development of a formal conservation agreement, which will listen to all parties directly or indirectly affected by the project. Although this document is not binding in

any respect, it demonstrates our commitment to continue discussions with LUPA and LEGADO on the establishment of the community conservation area on Mts. Namuli.

The leaders cited:

1- Virgílio Pedro - Chefe da Localidade Muecuma
2 - Julieta Ricardo Pacala - chefe do 4º escalão - Nerreimo
3 - Francisco Portugal Líder do 1º escalão de Muarimo
4 - Alexandre Máquina Secretário de Murrece - Murrabue
5 - Asaina Lourenço Secretário do 4º escalão de Murrabue
6 - Valentino Alcino Secretário do 4º escalão de Murrabue.
7 - Horacio Macario Watty - Tec. do ambiente - SDPI
8 - Alvaro Catueia Juiz Comunitário Muecuma
9 - Alfredo Matavaca Secretário de Muecuma
10 - Alfândega Munla Líder Comunitário de Murrabue JRC
- CARLOS IMOLA SABATÃO 1º Secretário de Muecuma Sede
Mauricio Basilio Juiz comunitário de Nicau
Ernesto Correia
TONINHO MARTINHO Secretário de Nicau Sede
Adelina Joaquissone 2º escalão Murrabue SONA Muepo
Atanka de Muecuma Sede

Appendix C: Mount Namuli Legado Conservation Report, Jonathan Timberlake

MT NAMULI – A CONSERVATION UPDATE

Jonathan Timberlake, March 2017

1. Introduction

Mt Namuli, situated in Gurué District, Zambézia Province in north-central Mozambique, is one of the most important sites for plant conservation in the country, yet currently it is under no type of formal protection. The extensive Namuli massif covers about 200 km^2 above 1200 m altitude, although the main peaks and the elevated plateau above 1700 m are probably only around 30 km^2. Namuli's physical features, vegetation, botany and zoology are outlined in a report produced under a Darwin Initiative project carried out by botanists from the Royal Botanic Gardens, Kew in UK and foresters and botanists from the Institute de Investigação Agrária de Moçambique (IIAM) in Maputo, along with other partners (Timberlake *et al.* 2009[1]). This study comprised two expeditions in 2007 along with extensive plant collecting and documentation of vegetation and conservation issues.

The reasons for Namuli's conservation importance are the 19 endemic plant species (i.e. species globally only found on Namuli), a number of range-restricted (i.e. only known from one or two mountains) animal taxa (e.g. the bird Namuli Apalis, Vincent's Bush Squirrel, a pygmy chameleon, the Mabu forest viper and seven new species/subspecies of butterfly), the fairly extensive area of upland peat grassland (rare in south-central Africa) and, in particular, the mosaic of montane moist forest, upland grassland and vegetation on shallow soils over rock. In addition, of course, there is the spectacular montane scenery.

The international NGO Legado, together with the Mozambique national NGO LUPA, are planning to undertake a community-orientated conservation project on and immediately around the Mt Namuli massif. During earlier visits in July and October 2016 Legado/LUPA noted that there was extensive clearance of the Afromontane forest on the Namuli plateau for small-scale potato farming. This had been noted during the 2007 field trips, but was of very limited extent at that time.

After initial discussions with Legado, the Rainforest Trust (Virginia, USA) expressed some interest in funding such a conservation project. However, some questions were raised on its viability, particularly regarding the extent of forest remaining and the community's willingness to participate. To address some of these concerns, as a conservation biologist I was asked to carry out a short return visit to the mountain 10 years after the original Darwin expeditions to see: (a) what changes may have occurred in the upper parts over the last 10 years, particularly as regards forest extent, (b) what possibilities still exist for natural regeneration of the cleared upland forest areas, (c) whether connectivity of the remaining forest patches is adequate for such regeneration, and (d) what the threats to and conservation status of the flower-rich montane grasslands are. This report is the result. It represents the personal opinion of the author based on what was noted during this brief trip as well as previous experience on Namuli and on other mountains and forests in

[1] Timberlake, J.R., Dowsett-Lemaire, F., Bayliss, J., Alves T., Baena, S., Bento, C., Cook, K., Francisco, J., Harris, T., Smith, P. & de Sousa, C. (2009). **Mt Namuli, Mozambique: Biodiversity and Conservation**. Report produced under the Darwin Initiative Award 15/036. Royal Botanic Gardens, Kew, London. 114 p.

Mozambique, Zimbabwe and Malawi, and restricts itself solely to the biophysical and biodiversity conservation aspects.

The brief trip took place over five days from 22-27 February 2017, accompanied by Rob Cunliffe (Legado Namuli initiative advisor), Sergio Cumbula (LUPA, Maputo), Noé dos Santos Hortiço (Faculdade do Engenheiro Florestal, Universidade de Zambezi, Mocuba), Domingos Reis and Dias Antanavano (LUPA, Gurué) and Anthony Muron (Peace Corps, Ilé). The main guide and informant was Carlitos Benedito from Carruca village, Mucunha. We walked up to the Muretha plateau from Carruca village on the eastern slopes and camped on the grassland plateau, walking out from there to Manho forest, the upper Rio Nivolo valley below Mt Pesse, the Naconha plateau, the slopes above Niwiri village and Ukalini Forest. The main localities are shown on the Google Earth image below.

2. Main Findings

The main findings from this field visit are:

1. The loss of Afromontane forest due to clearance for potato cultivation over the last 10 years is extensive and significant. Figures have not been properly assessed but are at least 20% for the greater Manho Forest and up to 80% for the upper reaches of the Nivolo valley below Mt Pesse. A few small forest patches on the main part of the Muretha Plateau have been totally or substantially cleared.
2. The current rate of forest clearance is not sustainable if reasonable levels of moist forest cover are to remain on the Namuli plateau.
3. Little evidence was seen of natural forest regeneration taking place in old agricultural clearings owing to frequent (often annual) wild fires. Forest regeneration would – in most instances – be possible from rootstocks and seed from adjacent forest, but is repeatedly destroyed by fire.
4. For any recovery to take place, control of the frequency and extent of wildfires is as important as limiting the extent of new forest clearance.
5. Once left fallow after one or two potato crops, cleared patches are generally covered by copious growth of scrambling plants and bracken. However, this vegetation cover apparently dies back annually and is also readily flammable. Areas do not remain bare or become invaded by flammable grasses.
6. After clearance and a few cultivated cycles, the soils still retain enough humus to allow for natural forest regeneration. The soils have not become baked.
7. The apparent levels of potato productivity from cleared patches can initially be moderately high, and obviously provide an important cash income to communities living below. However, this seems to be just for two to three cycles before the patch is abandoned. Sometimes these abandoned clearings are later used for other crops such as maize, although it is not known for how long this is viable.
8. In essence, agriculture up on the plateau is a nutrient-mining exercise, with richer pickings in the first few years followed by abandonment soon after.
9. As regards forest connectivity, the pockets and patches of forest remaining are adequate to provide seeds, etc. for regeneration of previously cleared patches through

bird and similar dispersal. Most patches are quite close together. However, if much more forest is cleared, connectivity for small forest-dwelling species such as reptiles (Mabu Atheris, pygmy chameleon) might become an issue; it is unlikely to become so for birds, butterflies or small mammals.

10. The grasslands – both on deeper peat and on shallow soils – do not appear to have been unduly affected by the increase in agricultural activity. They are still ecologically intact and retain their conservation importance and significance. However, it needs to be recognised that burning is now probably more frequent and widespread than 10 years ago, which may be having a chronic effect on grassland biodiversity.

Some aspects of these findings are elaborated upon below.

3. Forest Clearance

Using Google Earth as part of an earlier exercise (January 2017), where plant species that are Namuli endemics or near-endemics were assessed for conservation status using IUCN categories, the extent of moist forest was estimated at 1070 ha (Ukalini Forest 62.5 ha, greater Manho Forest 610 ha). An earlier estimate (Timberlake *et al.* 2009) using 1960 airphotos was around 1250 ha (1115 ha above 1600 m). However, owing to the very different techniques used in developing the estimates this reduction cannot be said to be necessarily real. In addition, a comparison of September 2013 and November 2015 Google Earth time-series imagery suggested a loss of forest cover from clearance of perhaps 10-30%. This, more substantial, figure was borne out by observations in the field. Using similar techniques it was estimated that the extent of well-developed peat grasslands (i.e. tussock grassland on deeper peat deposits but not grasslands on shallow soil or with bracken) between 1850 and 2000 m altitude was around 232 ha; using a much broader definition of grassland it was probably around 900 ha.

The extent of forest clearance seen on this trip showed a very large increase on the relatively few cleared patches noted in 2007. The rate also seems to be ramped up in recent years, judging from the dates of first clearance of many plots given by our guide (2010-2014).

An assessment of the extent of loss since 2007 was not possible from ground-based observation, but would seem to be in the order of 10-20% in the lower part of Manho Forest, upwards of 50% in the upper reaches of Manho Forest, and perhaps almost 80% loss in the steep upper Nivolo valley below Mt Pesse. In addition, a number of relatively small (0.5 to 2 ha) patches of forest in or around the grassland of the main Muretha plateau have been substantially cleared.

It was also noted that there had been a certain amount of death of forest trees (e.g. skeletal trees among a live canopy) resulting from high winds as well as stress from recent drought years, and possibly also just old age. This can be considered "natural" and is not related to clearance for cultivation. Not all dead trees are the result of human interference.

An assessment last year (by Cunliffe, Reis & Antanavano) showed that most cleared fields were each around 0.2 to 0.3 ha in size, but that individual farmers expanded clearing to an adjacent area in subsequent years. Over a period of years, cleared areas could thus become several hectares in extent. Individual fields were only used for cropping potatoes for a

relatively few years (see later). Casual observation suggests that steeper slopes were preferred over lower-lying areas closer to streams (e.g. upper Manho, upper Navalo valley), although there has certainly been some clearance of forest strips along streams, and of forest patches in the middle of the grasslands.

Areas of Afromontane forest mostly contain plant species that are moderately widespread across montane areas in central and northern Mozambique, Zimbabwe and Malawi, however there are a number of scarce or range-restricted vertebrates found in them, especially birds and reptiles. Birds of particular interest include Mozambique's only endemic bird, the Namuli Apalis (territories about 0.5-0.6 ha), Dapple-throat, Cholo Alethe, Green Barbet, Spotted Ground Thrush and Eastern Mountain Greenbul. While reptiles include the Mabu forest viper (previously thought to only occur on Mt Mabu) and a pygmy chameleon. These are all species essentially confined to moist forest.

It is probable that forest clearance, without some form of control, will progress to a certain point then tail off. There will always be some patches of forest on very steep slopes or on very shallow or rocky soil that remain relatively unscathed. And the potato farming "industry" requires a certain level of production to remain viable. What is not clear is (a) when this is likely to occur at current rates, and (b) how much forest would then remain. I would suggest that, in such a case, the remaining forest would be at least 100-200 ha, but possible far more, down from the original c.1250 ha in the late 1960s.

It was interesting to note that Ukalini Forest below the main Namuli peaks shows less extensive clearing, although some patches have been cleared inside the forest and exploitation for timber and poles is still quite marked. Fire is also slowly eating into this patch. This is possibly because the forest is considered somewhat sacred and is under some form of protection from the queen at Mucunha.

4. Fire

Fire is a major problem for the forests on Namuli, and without some form of control on both frequency and extent, further forest loss is inevitable. However, with a significantly reduced fire incidence, natural forest regeneration could take place. Although most fires take place around September-October and are "hot", even cool fires earlier in the season can kill off regenerating forest species.

Under the present fire regime, once a forest patch is cleared, it is very difficult for it to revert back to forest. The only exceptions are clearings within existing forest, where fire is much less likely to enter (unless the patch is specifically ignited in situ when dry).

Extensive areas of secondary vegetation were seen across the mountain (see photos at end) that I believe are a result of previous burning. These patches may not necessarily have previously been forest, but were perhaps scrubby areas where, after a series of wet years, forest could establish. They are characterised by bracken fern, shrubs of *Tetradenia ripara*, *Kotschya* and others, and sometimes have small remnant patches of forest within or near them. They comprise essentially fire resistant (e.g. *Cussonia spicata*) or fire tolerant (e.g. bracken) species. Such vegetation is probably "natural", but its extent would seem to have increased significantly over the last 20 or so years. Patches were noted in 2007, prompting the strong recommendation for fire control in the 2009 report, but are now more extensive.

5. Forest Regeneration

Forest regeneration was especially looked for. Even if forest patches are being cleared, if the soil properties (humus levels, not burnt by sun, etc.) remain more/less intact, along with seeds available either in the soil or from nearby trees, this should enable natural regeneration to occur. There are cases on Namuli where succession back to a more mature forest can be seen, such as in Ukalini Forest just below the main peaks of Mt Namuli. Within forest, regeneration will be from the understorey sapling bank, which is obviously removed during clearance, or from the seed bank for those species with non-recalcitrant seeds. Seeds will also be brought in by birds such as pigeons and hornbills, often seen in the area.

However, very little evidence of natural regeneration was noted, even in cleared patches that had apparently not been cultivated or re-cleared for 3 or 4 years. This is undoubtedly due to the build-up of fuel in the form of leaves/stems of a twining legume (name not yet available) that dies back every year, dry bracken, etc. and the regular, even annual, fires that sweep through.

It appears that much of the plateau area is burnt almost every year, often around October when it is driest and fires are likely to be most hot. In only very few instances was regeneration of forest species in old clearings seen. In nearly all cases, subsequent vegetation cover was dominated by the scrambling trifoliate legume, a scrambling species of *Ipomoea*, shrubs or small trees of *Tetradenia* (*Iboza*) *riparia*, and bracken fern, sometimes with shrubs of *Kotschya recurvifolia* (a scrubby legume) and *Erica* (*Phillipia*) *benguelensis*. Any seedlings or saplings of forest shrubs or trees are likely to be destroyed in the face of such fires, unless they can reach sufficient size to get out of the reach of it, perhaps five or so years old. The tree *Cussonia spicata* is often seen around cleared patches and appears to be much more fire-tolerant than others.

Species noted to reappear in cleared forest patches that are somewhat protected from fire (e.g. are inside the forest and not at its margins) include *Trema orientalis*, *Anthocleista grandiflora* and *Polyscias fulva*, all well-known forest gap species and which show the potentials for regeneration. In drier areas, *Erica benguellensis* is seen.

In general, the soils noted in the areas of cleared forest were still adequate for forest regeneration. There still was a reasonable amount of humus in the soil (which helps retain both moisture and nutrients), and rarely were bauxite-like concretions seen that indicate a one-way "soil burning" and which tend to result in a cover of ferns such as bracken or poor grassland.

One suggestion has been that some level of tree planting could take place in previously-cleared forest in order to speed up regeneration. I would not normally recommend this as the science of forest regeneration and our understanding of forest ecology in south-central Africa is still very limited. The biggest issue of course is to make sure that the overriding limiting factor, i.e. regular fire, is substantially controlled, otherwise planting efforts will be wasted. In addition, there is a danger that a project may end up planting non-native species, or at least genotypes not native to the Namuli area. If such a path was to be followed, perhaps the best way to approach it would be to establish boundary or barrier plantings along a forest soil margin using pioneer species such as *Albizia gummifera* (which is found on

Namuli but is surprisingly not that common) that form a low and spreading canopy that would start to supress growth of "fuel plants" such as bracken and the scrambling legume. Once fuel and fires are supressed, regeneration of other species would probably follow naturally, if the soil is still intact, and thus form a "natural" as opposed to man-made forest.

6. Soil Erosion and Loss of Nutrients

Some evidence was seen of soil erosion resulting from clearance, particularly on the steeper slopes such as in the upper Nivolo valley. However, no gully formation was noted. Soil erosion in small clearings, although present, was not considered significant; it was more apparent when numerous small clearings coalesced, such as in the upper reaches of Manho Forest. What is probably more significant is the increased loss of soil nutrients, both through burning and through runoff from exposed soil.

As pointed out by Rob Cunliffe, it has to be recognised that agriculture up on the plateau is essentially a "nutrient mining" exercise, similar in how it plays out to artisanal gold mining – a sort of nutrient "gold rush". The high nutrient status of the forest soils is exploited for 2 to 3 crops, then fields are left, with no costs associated with extraction other than labour and no reinvestment or attempts to ensure some level of sustainability. This is unlike the situation in the Malema valley below where fields are presumably more stable and perhaps there is some investment in terms of improvement. In these lower areas all forest patches have already been cleared, so the uplands offer the last remaining forest patches in the landscape. Coupled with increasing populations and intensity of cultivation in the lower areas, decreasing nutrient levels and productivity down below are driving this move to the plateau.

7. Crops

The crop planted in the cleared fields is primarily Irish potato. It seems the undergrowth is first cut and left to dry, then burnt. After which the trees are then cut and generally burnt. It appears that one or two crops of potato are harvested, depending on the soil fertility (which is definitely not uniform across the forest areas), after which there are one to three years (usually two) rest or fallow. After this another potato crop is planted. But, where we asked, there were very few cases where the soil was sufficiently fertile for a third or further potato crop. A certain level of yield is required, and presumably of reasonable-sized potatoes, to make it worthwhile as the seed potatoes are raised in the Malema valley below and brought up.

After 2 to 3 potato crops, in some instances maize has been planted, and rarely other crops such as pumpkins or cabbage/rapolo. The maize plants we saw looked strong and with good growth and with a full head, but I do not know how long such yields might continue. There is a distinct danger that subsequent crops of maize or some other crop will become a new norm, even when the area becomes unsuited for potatoes.

8. Hydrology

The trip took place during the rainy season with frequent rains. There was much runoff during this time and it is possible (but not confirmed) that runoff may be more rapid in areas that have lost forest cover. If so, this would result in the mountain becoming less of a "sponge" as regards reliable water supplies for the communities below, as stream flow is more likely to be rapid and less evenly-distributed over the year. It also increases the

probability of soil erosion along with an accelerated loss of nutrients from the montane system.

No evidence was seen of increased pollution or turbidity of runoff below the cleared forest patches.

9. Grassland

The flower-rich grasslands with their orchids and other bulbous plants, are still in good ecological condition. In particular these included many species of ground orchid (e.g. species of *Satyrium*, *Disa*, *Habenaria*, *Eulophia*), Iridaceae (e.g. *Moraea*, *Gladiolus*, *Crocosmia*) and other bulbous species (e.g. *Ledebouria*). Although they appear to be burnt annually, no evidence was seen of species loss, although this may have occurred in the past. The diversity and frequency of many grassland species was very high; to an extent they have probably evolved in the face of moderate fire pressure.

There was no evidence that the peat grasslands were drying out, as has happened elsewhere, or are being drained owing to changes in land use. Their ecological integrity would appear to be intact and their conservation status is good.

10. Some Additional Ecological Observations

Vegetation Tension Zones

Growing/ecological conditions for forest, particularly access to a long-term reliable perennial source of moisture, are not equal or optimal across the plateau. Thus some Afromontane forest patches on Namuli will be marginal or under stress, and inherently less stable than other patches. Even with winter rains and low cloud and drizzle across the upland massif, there is still a relatively long dry season with far less rainfall. Forest patches near streams or in gullies would be under less stress, but those on upper slopes away from a reliable moisture supply would be more liable to longer stress periods; it is only in the more moist, mesic sites that forest is truly stable up on the mountain. "Tension zones", vegetation that is naturally in a state of flux, are not stable. Such stressed forest patches can readily be pushed back to scrub or bracken, not only by fire but also by a set of dry years. This means fire can have a particularly damaging effect as it effectively pushes back forest to a previous more stable state rather than just pushing a succession back. In the case of such vegetation patches, it would take a succession of wetter years, as well as a lack of fire, to allow them to become forest again.

Loss of Nutrients from the Whole Montane System

The grassland flora, and particularly that on shallow soils, is obviously adapted to a certain amount of waterlogging, as well as to periodic severe drought. It has also evolved to hold on to any nutrients; nutrients in the soil are readily removed through the high rainfall. This situation of low nutrient levels that have to be held in the biomass rather than the soil is now presumably exacerbated by regular fires that remove a significant amount of accumulated nitrogen and phosphorous. Phosphorous is often the limiting nutrient in such ecosystems (e.g. Chimanimani Mts). Thus it would seem that at an ecosystem level there has been an increasing loss of nutrients over the last 50 years or so, and it is not known what effect this may be having on the flora. It is also well-known that in forest systems much of the nutrients are held in the biomass and rapidly recycled through the roots after leaf fall or

on a trees' death. Widespread forest clearance is interfering with this cycle, with a probable marked loss of nutrient loss to the system through fire. The whole montane ecosystem is, in effect, becoming depleted of nutrients with little to buffer this.

11. Awareness of Namuli and its Conservation at National and International Levels

Even before the 2007 Darwin expeditions, Mt Namuli was known to be an important area for biodiversity conservation. However, the publicity the main Darwin project created from 2008 onwards and the 2009 report raised its national profile significantly. Among other things, this has resulted in a number of zoological expeditions to the mountain in recent years.

It is particularly significant from a plant diversity viewpoint as it is the home to 19 endemics plus 13 near-endemics (most of them shared with Mts Mulanje and Mabu). Recently a workshop was held in Maputo, hosted by IIAM (Instituto de Investigação Agrária de Moçambique, the government's national agricultural research institute), to carry out conservation assessments of 12 species using the IUCN guidelines. Seven were considered to be under threat (VU, EN or CR), and four grassland species to be Least Concern. These will go up on the IUCN Red List website in due course. This has also resulted in the Namuli massif being recognised as a major Important Plant Area, as well as having already been recognised as an Important Bird Area.

Immediately after the workshop a seminar was held to present the ideas behind IPAs to a wider national audience, and an opportunity was taken to specifically highlight the importance and threats to Namuli. These included BioFund (Alexandra Jorge), MozBio/World Bank (Madyo Couto), UEM Department of Biology, and the main ministry, MITADER. There is also particular interest in Namuli in IIAM, especially the Conservation and Biodiversity Programme (Camila de Sousa), Forest Research (Tereza Alves) and the Departamento do Terra e Agua (Jorge Francisco). BioFund is running a provincial-level exhibition this year on Zambézia Province, and it is hoped Namuli can feature prominently in this.

12. Conclusions

a) Clearance: Forest clearance is not only extensive across much of the upland parts of the Namuli massif, but seems to have greatly increased in its rate in recent years. The areas involved are large and significant. This is not sustainable and will probably result in increased threats to some of the special vertebrates found in forest.

b) Fire: Aside from further forest clearance, this is by far the largest danger to forest and biodiversity across the Namuli massif. It is essential that some controls are introduced, otherwise even existing forest can be slowly eaten away. The regular fires inhibit or even stop all natural regeneration of forest vegetation, and result in vegetation cover and species that are fire-tolerant.

c) Regeneration: Forest regeneration is still possible in the sense that suitable soils are still present. However, this is not occurring owing to frequent and extensive burning across the plateau.

d) Proposed Activities: These should centre on establishing controls on fire as well as reducing or stopping further forest clearance for agriculture. From a conservation

perspective, there should be no suggestion of agricultural improvement up on the plateau; all such efforts should be focussed on fields lower down, below 1500 m altitude.

13. Suggestions for Further Work

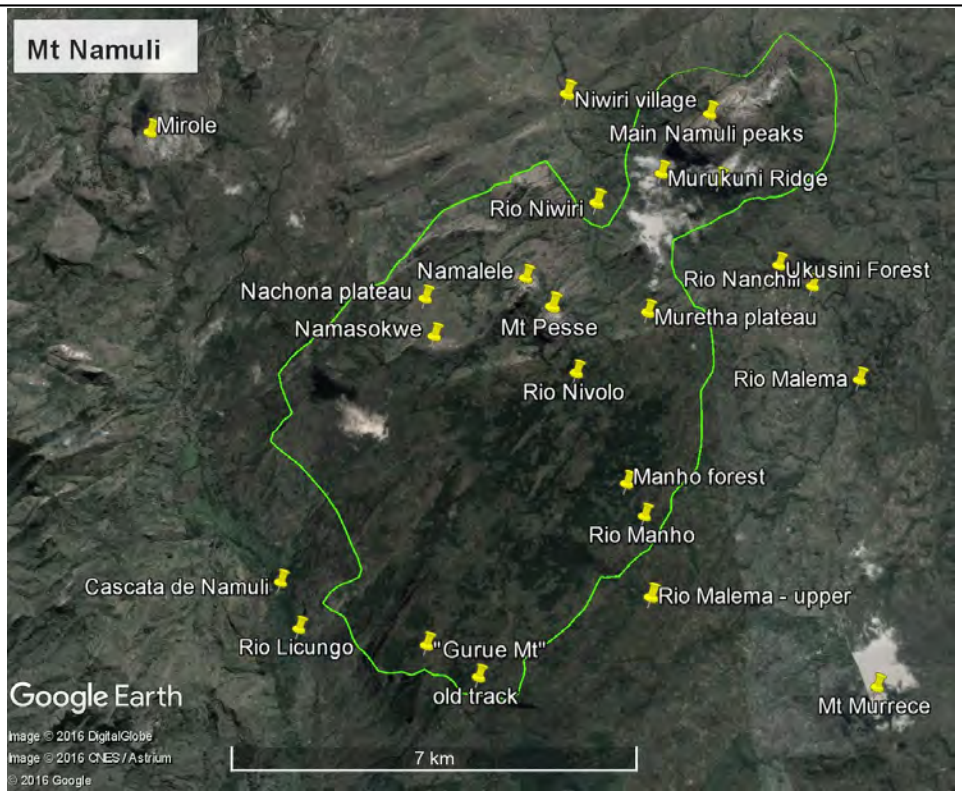
1. Extent of clearance: Using Google Earth or more recent imagery, carry out a GIS analysis of the actual extent of clearance over the last 5 or 10 years, and in which areas this has primarily occurred. At the same time the length of fallows could be confirmed, and evidence looked for on more significant revegetation of clearings. [This may have already been done by Rainforest Trust]

2. Grassland Burning: It would be useful to try and get some quantitative data on the frequency and extent of burning, especially of grasslands and areas adjacent to forest patches.

3. Plant Collecting: There were many plants in flower at the time of our visit, especially in the grassland areas or in vegetation over shallow rock. Previous botanical trips have not taken place in the middle of the rainy season. It would be very interesting to undertake another plant collecting trip at this time (January to March) focussing on grassland plants. This was not possible on this trip owing to lack of permits and collecting gear (e.g. presses), although many photos were taken and identifications have been done by various specialists. I suspect that if collecting had been possible on this trip, followed by identification in a good herbarium, there would be 5 to 10 new records for Namuli (i.e. species not collected during the 2007 expeditions or earlier) and perhaps even one or two new plants to science. Given the present paucity of information, it would also have provided much better information to assess species' conservation status, and would also have allowed a better description of the species/vegetation coming in after clearance or in fallows. However, none of this detracts from the main conclusions here.

4. Consolidation of Biodiversity Information: The Darwin Namuli report was very comprehensive, but dates back to 2009. Since then there have been a number of additional studies and survey trips, especially zoological. It would be useful to compile and consolidate all this into a brief report on the biodiversity and conservation significance of the Mt Namuli massif, and place the massif in context of other inselberg-like mountains across northern Mozambique and Malawi.

Clockwise from top left: 1, Muretha plateau grassland with Mt Pesse; 2, grassland with *Gladiolus*; 3, view over grassland and lower Manho Forest; 4, grassland at end of Naconha plateau.



Main places on Namuli plateau referred to in text.

Clockwise from top left: 1, small cleared forest patch on Muretha Plateau, now with maize; 2, older cleared forest patch showing impacts of regular burning, 3, vegetative cover in ravine forest resulting from hot burn; 4, cultivated slopes of upper Nivolo valley; 5, vegetation after clearance inside forest; 6, legume that comes in after clearance and burning.

Clockwise from top left: 1, cultivation on steep slopes, Nivolo valley; 2, recently burnt and cleared forest; 3, bracken coming in after burning with burnt trees in background; 4, vegetative cover in clearing inside Manho Forest; 5, recent forest clearing and burning, upper Manho Forest; 6, maize growing on old potato field.

Species Lists for Mount Namuli, Mozambique

This document compiles and provides updates to the lists of species found on Mount Namuli. The document draws from a number of sources, primarily a report produced by a collaborative project funded by the UK Government Darwin Initiative called "Monitoring and Managing Biodiversity Loss on South-East Africa's Montane Ecosystems" (Timberlake, et al 2009) and from the results of the 2014 Legado Initiative expedition.

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Family	**Species**
PTERIDOPHYTA	
Aspleniaceae	Asplenium dregeanum Kunze
Aspleniaceae	Asplenium mannii Hook.
Aspleniaceae	Asplenium megalura Hieron.
Aspleniaceae	Asplenium rutifolium (Bergius) Kunze
Aspleniaceae	Asplenium sandersonii Hook.
Aspleniaceae	Asplenium stuhlmannii Hieron. Blechnum tabulare (Thunb.) Kuhn
Cyatheaceae	Cyathea dregei Kunze.
Cyatheaceae	Cyathea manniana Hook
Dennstaedtiaceae	Pteridium aquilinum (L.) Kuhn subsp. aquilinum
Dryopteridaceae	Dryopteris inaequalis (Schltend.) Kuntze
Hymenophyllaceae	Hymenophyllum kuhnii C.Chr.
Hymenophyllaceae	Hymenophyllum sibthorpioides (Willd.) Kuhn
Lomariopsidaceae	Elaphoglossum acrostichoides (Hook.& Grev.) Schelpe
Lycopodiaceae	Huperzia dacrydioides (Baker) Pic.Serm. subsp. dacrydioides
Lycopodiaceae	Huperzia ophioglossoides (Lam) Rothm.
Lycopodiaceae	Huperzia verticillata (Lf.) Trevis.
Lycopodiaceae	Selaginella sp. - not matched
Marattiaceae	Marattia fraxinea J.F.Gmel. var. salicifolia (Schrad.) C.Chr.
Oleandraceae	Nephrolepis undulata (Sw.) J.Sm.
Oleandraceae	Oleandra distenta Kunze
Polypodiaceae	Loxogramme abyssinica (Baker) Price
Polypodiaceae	Pleopeltis macrocarpa (Willd.) Kaulf.
Vittariaceae	Vittaria isoetifolia Bory
GYMNOSPERMS	
Podocarpaceae	Podocarpus milanjianus Rendle
MONOCOTYLEDONS	
Aloaceae	Aloe mawii ChristiaN
Aloaceae	Aloe torrei I.Verd.& Christian
Amaryllidaceae	Cyrtanthus welwitschii Baker
Anthericaceae	Chlorophytum paucinervatum (Poelln.) Nordal
Anthericaceae	Chlorophytum sphacelatum (Baker) Kativu subsp. milanjianum (Rendle) Kativu
Anthericaceae	Chlorophytum stolzii (K.Krause) Kativu
Asphodelaceae	Kniphofia splendida E.A.Bruce
Behniaceae	Behnia reticulata (Thunb.) Didr.
Commelinaceae	Aneilema hockii De Wild.
Commelinaceae	Commelina africana L.
Commelinaceae	Cyanotis lanata Benth.
Commelinaceae	Cyanotis speciosa Hassk.
Commelinaceae	Murdannia simplex (Vahl) Brenan
Dracaenaceae	Dracaena laxissima Engl.
Eriocaulaceae	Eriocaulon zambesiense Ruhland
Hyacinthaceae	Drimia calcarata (Baker) Stedje

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Hyacinthaceae	Merwillia lazulina (Wild) Speta
Hypoxidaceae	Hypoxis nyasica Baker
Iridaceae	Aristea ecklonii Baker
Iridaceae	Crocosmia aurea (Hook.) Planch subsp. aurea
Iridaceae	Dierama formosum Hilliard
Iridaceae	Dietes iridioides (L.) Klatt
Iridaceae	Gladiolus atropurpureus Baker
Iridaceae	Gladiolus crassifolius Baker
Iridaceae	Gladiolus dalenii Van Geel var. dalenii
Iridaceae	Gladiolus zimbabweensis Goldblatt
Iridaceae	Moraea schimperi (Hochst.) Pic.Serm.
Juncaceae	Juncus lomatophyllus Spreng.
Orchidaceae	Angraecopsis parviflora (Thouars) Schltr.
Orchidaceae	Bulbophyllum scaberulum (Rolfe) Bolus
Orchidaceae	Disa welwitschii Rchb.f.
Orchidaceae	Epipactis africana Rendle
Orchidaceae	Eulophia horsfallii (Bateman) Summerh.
Orchidaceae	Eulophia milnei Rchb.f.
Orchidaceae	Eulophia speciosa (Lindl.) Bolus
Orchidaceae	Eulophia streptopetala Lindl.
Orchidaceae	Eulophia zeyheri Hook.f.
Orchidaceae	Habenaria malacophylla Rchb.f.
Orchidaceae	Herschelianthe baurii (Bolus) Rauschert
Orchidaceae	Jumellea usambarensis J.J.Wood
Orchidaceae	Polystachya transvaalensis Schltr.
Orchidaceae	Polystachya zambesiaca Rolfe
Orchidaceae	Roeperocharis bennettiana Rchb.f.
Orchidaceae	Satyrium breve Rolfe
Orchidaceae	Satyrium chlorocarys Rolfe
Orchidaceae	Satyrium neglectum Schltr.
Poaceae	Alloeochaete namuliensis Chippind.
Poaceae	Andropogon eucomus Nees subsp. huillensis (Rendle) Sales
Poaceae	Andropogon schirensis Hochst.
Poaceae	Digitaria maitlandii Stapf & C.E.Hubb.
Poaceae	Eragrostis nindensis Ficalho & Hiern
Poaceae	Eragrostis racemosa (Thumb.) Steud.
Poaceae	Eragrostis volkensii Pilg.
Poaceae	Eriochrysis pallida Munro
Poaceae	Exotheca abyssinica Anderss.
Poaceae	Festuca costata Nees
Poaceae	Heliotrichon milanjianum (Rendle) C.E.Hubb.
Poaceae	Hyparrhenia cymbaria Stapf
Poaceae	Hyparrhenia sp.
Poaceae	Loudetia simplex (Nees) C.E.Hubb.
Poaceae	Melinis repens (Willd.) Zizka
Poaceae	Panicum cf. inaequilatum Stapf & C.E.Hubb.
Poaceae	Panicum wiehei Renvoize
Poaceae	Panicum sp.
Poaceae	Pennisetum unisetum (Nees) Benth.
Poaceae	Phacelurus schliebenii (Pilg.) Clayton
Poaceae	Rhytachne rottboellioides Ham.
Poaceae	Rytidosperma davyi (C.E.Hubb.) Cope

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Poaceae	Setaria sphacelata (Schumach.) Moss
Poaceae	Sporobolus mauritianus (Steud.) T.Durand & Schinz
Poaceae	Spoprobolus pyramidalis P.Beauv.
Poaceae	Stereochlaena cameronii (Stapf) Pilg.
Poaceae	Themeda triandra Forssk.
Restionaceae	Restio mahonii (N.E.Br.) Pillans
Smilacaceae	Smilax anceps Willd.
Velloziaceae	Xerophyta kirkii (Hemsl.) L.B.Smith & Ayensu
Velloziaceae	Xerophyta splendens (Rendle) N.L.Menzes
Velloziaceae	Xerophyta viscosa Baker
Xyridaceae	Xyris congensis Büttner
Xyridaceae	Xyris makuensis N.E.Br.
Xyridaceae	Xyris peteri Pollen.
Zingiberaceae	Aframomum alboviolaceum (Ridley) K.Schum.
Dicotyledons	
Acanthaceae	Anisotes pubinervis (T.Anderson) Heine
Acanthaceae	Asystasia gangetica (L.) T.Anderson
Acanthaceae	Asystasia malawiana Brummitt & Chisumpa
Acanthaceae	Brachystephanus africanus S.Moore
Acanthaceae	Hypoestes aristata (Vahl) Roem.& Schult.
Acanthaceae	Isoglossa sp.
Acanthaceae	Justicia striata (Klotzsch) Bullock
Acanthaceae	Mimulopsis solmsii Schweinf.
Acanthaceae	Sclerochiton hirsutus Vollesen
Amaranthaceae	Achyranthes aspera L.
Amaranthaceae	Cyathula cylindrica Moq.
Anacardiaceae	Rhus acuminatissima R.& A.Fernandes
Anacardiaceae	Rhus sp.
Annonaceae	Annona senegalensis Pers.
Apiaceae	Alepidea peduncularis A.Rich.
Apiaceae	Heteromorpha arborescens (Spreng.) Cham.& Schltdl. var. montana P.J.D.Winter
Apiaceae	Lefebvrea grantii (Hiern) Droop
Apiaceae	Peucedanum eylesii Norman
Apiaceae	Peucedenum nyassicum H.Wolff
Apiaceae	Pimpinella mulanjensis C.C.Towns.
Apocynaceae	Carissa bispinosa (L.) Brenan subsp. zambesiensis.
Apocynaceae	Kupicha Carvalhoa campanulata K.Schum
Apocynaceae	Mussaenda arcuata Poir
Apocynaceae	Tabernaemontana stapfiana Britton
Aquifoliaceae	Ilex mitis (L.) Radlk.
Araliaceae	Cussonia spicata Thunb.
Araliaceae	Polyscias fulva (Hiern) Harms
Araliaceae	Schefflera goetzenii Harms
Araliaceae	Schefflera umbellifera (Sond.) Baill.
Asclepiadaceae	Sarcostemma mulanjense Liede & Meve
Asclepiadaceae	Sarcostemma viminale (L.) R.Br.
Asclepiadaceae	Secamone alpini Schult.
Asclepiadaceae	Trachycalymma cristatum (Decne.) Bullock
Asclepiadaceae	Xysmalobium undulatum (L.) Aiton f.
Asteraceae	Ageratum conyzoides L.

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Asteraceae	Anisopappus chinensis (L.) Hook.& Arn. var. buchwaldii (O.Hoffm.) S.Ortíz, Paiva & Rodr.Oubiña var. dentatus (DC.) S. Ortiz, Paiva & Rodr.-Oubiña
Asteraceae	Anisopappus kirkii (Oliv.) Brenan
Asteraceae	Bothriocline cf. glomerata (O.Hoffm.& Muschl.) C.Jeffrey
Asteraceae	Bothriocline longipes (Oliv.& Hiern) N.E.Br.
Asteraceae	Crassocephalum crepidioides (Benth.) S.Moore
Asteraceae	Crassocephalum montuosum (S.Moore) Milne-Redh.
Asteraceae	Crassocephalum rubens (Jacq.) S.Moore
Asteraceae	Emilia decipiens C.Jeffrey
Asteraceae	Gerbera viridifolia (DC.) Sch.Bip
Asteraceae	Helichrysum adenocarpum DC.
Asteraceae	Helichrysum buchananii Engl.
Asteraceae	Helichrysum sulphureofuscum Baker
Asteraceae	Lactuca inermis Forssk.
Asteraceae	Senecio erubescens Aiton
Asteraceae	Senecio milanjianus S.Moore
Asteraceae	Senecio peltophorus Brenan
Asteraceae	Senecio picridifolium (DC.) S.Moore
Asteraceae	Senecio tabulicola Baker
Asteraceae	Solanecio mannii (Hook.f.) C.Jeffrey
Asteraceae	Tagetes minuta L.
Asteraceae	Tolpis capensis (L.) Sch.Bip.
Asteraceae	Vernonia natalensis Walp.
Asteraceae	Vernonia wollastonii S.Moore
Balsaminaceae	Impatiens oreocallis Launert
Balsaminaceae	Impatiens sylvicola Burtt Davy
Balsaminaceae	Impatiens zombensis Baker
Balsaminaceae	Impatiens sp. - not matched
Bignoniaceae	Tecomaria capensis (Thunb.) Spach subsp. capensis
Cactaceae	Rhipsalis baccifera (J.Mill) W.T.Stearn
Campanulaceae	Cyphia lasiandra Diels
Campanulaceae	Lobelia blantyrensis E.Wimmer
Campanulaceae	Lobelia goetzei Diels
Campanulaceae	Lobelia trullifolia Hemsl. subsp. trullifolia
Campanulaceae	Wahlenbergia abyssinica (A.Rich.) Thulin
Campanulaceae	Wahlenbergia virgata Engl.
Celastraceae	Maytenus acuminata (L.f.) Loes. var. acuminata
Celastraceae	Maytenus undata (Thunb.) Blakelock
Celastraceae	Mystroxylon aethiopicum (Thunb.) Loes.
Celastraceae	Pterocelastrus echinatus N.E.Br.
Chrysobalanaceae	Parinari curatellifolia Benth.
Chrysobalanaceae	Parinari excelsa Sabine
Clusiaceae	Garcinia kingaensis Engl.
Clusiaceae	Harungana madagascariensis Poir.
Clusiaceae	Hypericum peplidifolium A.Rich.
Clusiaceae	Psorospermum febrifugum Spach
Convolvulaceae	Cuscuta cassytoides Engelm.
Convolvulaceae	Ipomoea involucrata Beauv. var. operosa (C.H.Wright) Verdc.
Crassulaceae	Crassula globularioides Britten
Crassulaceae	Crassula sarcocaulis Eckl.& Zeyh.
Crassulaceae	Crassula setulosa Harv.

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Crassulaceae	Crassula schimperi Fisch.& Mey. subsp. transvaalensis (Kuntze) R.Fern. var. H denticulata (Brenan) R.Fern.
Cucurbitaceae	Oreosyce africana Hook.f.
Cucurbitaceae	Peponium vogelii (Hook.f.) Engl.
Dipsacaceae	Cephalaria pungens Szabo
Droseraceae	Drosera dielsiana Exell & Laundon
Ebenaceae	Diospyros mespiliformis A.DC.
Ebenaceae	Diospyros whyteana (Hiern) F.White
Ebenaceae	Euclea crispa (Thunb.) Gürke subsp. crispa
Ericaceae	Agauria salicifolia (Lam.) Oliv.
Ericaceae	Erica benguelensis (Engl.) E.G.H.Oliver var. benguelensis
Ericaceae	Erica hexandra (S.Moore) E.G.H.Oliver
Ericaceae	Erica mannii (Hook.f.) Beentje subsp. usambarensis (Alm & T.C.E.Fr.) Beentje
Ericaceae	Erica pleiotricha S.Moore
Ericaceae	Erica silvatica (Engl.) Beentje
Ericaceae	Erica simii (S.Moore) E.G.H.Oliver
Erythroxylaceae	Erythroxylum emarginatum Thonn.
Escalloniaceae	Choristylis rhamnoides Harv.
Euphorbiaceae	Acalypha welwitschiana Müll.Arg.
Euphorbiaceae	Alchornea hirtella Benth. forma glabrata (Prain) Pax & K.Hoffm.
Euphorbiaceae	Antidesma vogelianum Müll.Arg.
Euphorbiaceae	Bridelia micrantha (Hochst.) Baill.
Euphorbiaceae	Clutia abyssinica Jaub.& Spach var. abyssinica
Euphorbiaceae	Drypetes gerrardii Hutch. var. grandifolia Radcl.-Sm.
Euphorbiaceae	Erythrococca polyandra (Pax & K.Hoffm.) Prain
Euphorbiaceae	Erythrococca trichogyne (Müll.Arg.) Prain var. trichogyne
Euphorbiaceae	Euphorbia depauperata A.Rich.
Euphorbiaceae	Euphorbia namuliensis Bruyns.
Euphorbiaceae	Macaranga capensis (Baill.) Sim
Euphorbiaceae	Macaranga mellifera Prain
Euphorbiaceae	Phyllanthus leucanthus Pax
Fab: Caesalpinioideae	Brachystegia spiciformis Benth.
Fab: Caesalpinioideae	Chamaecrista stricta E.Mey
Fab: Caesalpinioideae	Chamaecrista sp.
Fab: Caesalpinioideae	Senna singueana (Delile) Lock
Fab: Mimosoideae	Albizia adianthifolia (Schumach.) W.F.Wight
Fab: Mimosoideae	Albizia gummifera (J.F.Gmel.) C.A.Sm.
Fab: Mimosoideae	Newtonia buchananii (Baker) G.C.C.Gilbert & Boutique
Fab: Papilionoideae	Aeschynomene sp.
Fab: Papilionoideae	Argyrolobium rupestre (E.Mey.) Walp. subsp. aberdaricum (Harms) Polhill
Fab: Papilionoideae	Craibia brevicaudata (Vatke) Dunn subsp. baptistarum (Büttner) J.B.Gillett
Fab: Papilionoideae	Crotalaria caudata Baker
Fab: Papilionoideae	Crotalaria cleomifolia Baker
Fab: Papilionoideae	Crotalaria goetzei Harms
Fab: Papilionoideae	Crotalaria lachnocarpoides Engl.
Fab: Papilionoideae	Crotalaria lanceolata E.Mey. cf. subsp. prognatha Polhill
Fab: Papilionoideae	Crotalaria lanceolata E.Mey. subsp. exigua Polhill
Fab: Papilionoideae	Crotalaria natalita Meisner var. rutshuruensis De Wild.
Fab: Papilionoideae	Crotalaria sp. nov. near C. argyrolobioides Baker
Fab: Papilionoideae	Crotalaria spartea Baker
Fab: Papilionoideae	Crotalaria stolzii (Baker f.) Polhill
Fab: Papilionoideae	Crotalaria torrei Polhill

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Fab: Papilionoideae	Desmodium setigerum (E.Mey.) Benth.
Fab: Papilionoideae	Erythrina abyssinica Lam.
Fab: Papilionoideae	Erythrina latissima E.Mey.
Fab: Papilionoideae	Indigofera sp. nov. near I. longipedicellata J.B.Gillett
Fab: Papilionoideae	Indigofera lyallii Baker subsp. nyassica J.B.Gillett
Fab: Papilionoideae	Kotschya recurvifolia (Taub.) F.White subsp. recurvifolia
Fab: Papilionoideae	Lotus namuliensis Brand
Fab: Papilionoideae	Millettia lasiantha Dunn
Fab: Papilionoideae	Mucuna poggei Taub. var. pesa (De Wild.) Verdc.
Fab: Papilionoideae	Rhynchosa clivorum S.Moore subsp. gurueensis Verdc.
Fab: Papilionoideae	Rhynchosa torrei Verdc.
Fab: Papilionoideae	Sesbania macrantha E.Phillips & Hutch. var. macrantha
Fab: Papilionoideae	Tephrosia aequilata Baker
Fab: Papilionoideae	Tephrosia vogelii Hook.f.
Fab: Papilionoideae	Tephrosia whyteana Baker f. subsp. gemina Brummitt
Fab: Papilionoideae	Vigna gazensis Baker f.
Fab: Papilionoideae	Vigna vexillata (L.) A.Rich. var. vexillata
Flacourtiaceae	Aphloia theiformis (Vahl.) Benn.
Flacourtiaceae	Gerrardina eylesiana Milne-Redh.
Flacourtiaceae	Rawsonia lucida Harv.& Sond.
Gentianaceae	Exacum zombense N.E.Br.
Gentianaceae	Sebaea longicaulis Schinz
Gentianaceae	Swertia curtioides Gilg
Geraniaceae	Geranium arabicum Forssk.
Gesneriaceae	Streptocarpus goetzei Engl.
Gesneriaceae	Streptocarpus hirtinervis C.B.Cl.
Haloragaceae	Laurembergia tetrandra (Schott) Kanitz
Hamamelidaceae	Trichocladus ellipticus Eckl.& Zeyh. subsp. malosanus (Baker) Verdc.
Hydrostachyaceae	Hydrostachys polymorpha Klotzsch
Icacinaceae	Apodytes dimidiata E.Mey.
Lamiaceae	Aeollanthus buchnerianus Briq.
Lamiaceae	Aeollanthus serpiculoides Baker
Lamiaceae	Aeollanthus subacaulis (Baker) Hua & Briq. var. linearis Ryding
Lamiaceae	Aeollanthus ukamensis Gürke
Lamiaceae	Clerodendrum cephalanthum Oliv.
Lamiaceae	Haumaniastrum villosum (Benth.) A.J.Paton
Lamiaceae	Leucas milanjiana Gürke
Lamiaceae	Micromeria imbricata (Forssk.) C.Chr. var. imbricata
Lamiaceae	Ocimum obovatum Benth.
Lamiaceae	Platostoma rotundifolium (Briq.) A.J.Paton
Lamiaceae	Plectranthus alboviolaceus Gürke
Lamiaceae	Plectranthus guruensis A.J.Paton
Lamiaceae	Plectranthus laxiflorus Benth.
Lamiaceae	Plectranthus mandalensis Baker
Lamiaceae	Plectranthus pubescens Baker
Lamiaceae	Plectranthus sanguineus Britten
Lamiaceae	Plectranthus stenosiphon Baker
Lamiaceae	Pycnostachys urticifolia Hook.
Lamiaceae	Stachys aethiopica L.
Lamiaceae	Stachys didymantha Brenan
Lamiaceae	Tetradenia galpinii (N.E.Br.) Phillipson & C.F.Steyn
Lamiaceae	Tetradenia riparia (Hochst.) Codd

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Lamiaceae	Vitex payos (Lour.) Merr.
Lauraceae	Cryptocarya liebertiana Engl.
Lauraceae	Ocotea kenyensis (Chiov.) Robyns & Wilczek
Loganiaceae	Anthocleista grandiflora Gilg
Loganiaceae	Buddleja salviifolia (L.) Lam.
Loganiaceae	Mostuea brunonis Didr. var. brunonis
Loganiaceae	Nuxia congesta Fresen
Loganiaceae	Strychnos spinosa Lam.
Loganiaceae	Strychnos usambarensis Gilg.
Loranthaceae	Actinanthella menyharthii (Schinz) Balle
Loranthaceae	Englerina inaequilatera (Engl.) Gilli
Loranthaceae	Englerina kwaiensis (Engl.) Polhill & Wiens
Loranthaceae	Englerina sp. nov. near E. longiflora
Loranthaceae	Erianthemum schelei Tiegh.
Loranthaceae	Helixanthera cf. verruculosa Wiens & Polhill
Malvaceae	Pavonia columella Cav.
Melastomataceae	Antherotoma naudinii Hook f.
Melastomataceae	Dissotis phaeotricha (Hochst.) Hook.f. var. phaeotricha
Melastomataceae	Dissotis princeps (Kunth) Triana
Meliaceae	Ekebergia capensis Sparrm.
Melianthaceae	Bersama abyssinica Fresen.
Molluginaceae	Corrigiola drymarioides Baker f.
Monimiaceae	Xymalos monospora (Harv.) Warb.
Moraceae	Ficus ingens (Miq.) Miq.
Moraceae	Ficus natalensis Hochst.
Moraceae	Myrianthus holstii Engl.
Myricaceae	Morella pilulifera (Rendle) Killick
Myricaceae	Morella serrata (Lam.) Killick
Myrsinaceae	Embelia schimperi Vatke
Myrsinaceae	Maesa lanceolata Forssk.
Myrsinaceae	Myrsine africana L.
Myrsinaceae	Rapanea melanophloes (L.) Mez
Myrtaceae	Eucalyptus alba Reinw.
Myrtaceae	Eugenia capensis (Eckl.& Zeyh) Sond. subsp. nyassensis (Engl.) F.White
Myrtaceae	Syzygium cordatum Krauss
Myrtaceae	Syzygium guineense (Willd.) DC. subsp. guineense
Myrtaceae	Syzygium owariense (Beauv.) Benth.
Ochnaceae	Ochna holstii Engl
Olacaceae	Strombosia scheffleri Engl.
Oleaceae	Olea capensis L. subsp. macrocarpa (C.H.Wright) I.Verd.
Oliniaceae	Olinia rochetiana A.Juss.
Oxalidaceae	Oxalis oblinquifolia A.Rich.
Passifloraceae	Oxalis semiloba Sond.
Piperaceae	Passiflora edulis Sims
Piperaceae	Peperomia retusa (L.f.) A.Dietr. var. retusa
Piperaceae	Peperomia tetraphylla (G.Forst.) Hook.& Arn.
Pittosporaceae	Pittosporum viridiflorum Sims
Polygonaceae	Polygala adamsonii Exell
Polygonaceae	Polygala virgata Thunb. var. decora (Sond.) Harv.
Polygonaceae	Rumex abyssinicus Jacq.
Proteaceae	Faurea racemosa Farmar
Proteaceae	Faurea racemosa Farmar

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Proteaceae	Faurea saligna Harv.
Proteaceae	Faurea wentzeliana Engl.
Proteaceae	Protea petiolaris (Hiern) Baker subsp. elegans Chisumpa & Brummitt
Ranunculaceae	Protea welwitschii Engl.
Ranunculaceae	Clematis viridiflora Bertol
Rhizophoraceae	Thalictrum rhynchocarpum Dill.& Rich.
Rosaceae	Cassipourea malosana (Baker) Alston
Rosaceae	Alchemilla kiwuensis Engl.
Rosaceae	Prunus africana (Hook.f.) Kalkm.
Rosaceae	Rubus chapmanianus Kupicha
Rosaceae	Rubus pinnatus Willd.
Rubiaceae	Anthospermum welwitschii Hiern
Rubiaceae	Breonadia salicina (Vahl) Hepper & J.R.I.Wood
Rubiaceae	Canthium oligocarpum Hiern
Rubiaceae	Chassalia parvifolia K.Schum.
Rubiaceae	Coffea mufindensis Bridson subsp. australis Bridson
Rubiaceae	Conostomium natalense (Hochst.) Bremek.
Rubiaceae	Fadogia elskensii De Wild. var. elskensii
Rubiaceae	Hymenodictyon floribundum (Steud.) B.L.Robinson
Rubiaceae	Ixora scheffleri K.Schum.& K.Krause subsp. scheffleri
Rubiaceae	Keetia venosa (Oliv.) Bridson
Rubiaceae	Lasianthus kilimandscharicus K.Schum. subsp. glabrescens Jannerup var. glabrescens
Rubiaceae	Oldenlandia goreensis (DC.) Summerh.
Rubiaceae	Oxyanthus speciosus DC. subsp. stenocarpus (K.Schum) Bridson
Rubiaceae	Pauridiantha paucinervis (Hiern) Bremek.
Rubiaceae	Pauridiantha symplocoides (S.Moore) Bremek.
Rubiaceae	Pavetta gurueënsis Bridson
Rubiaceae	Pentas zanzibarica (Klotzsch) Vatke subsp. milangiana (Verdc.) Verdc.
Rubiaceae	Psychotria ealaensis De Wild.
Rubiaceae	Psychotria zombamontana (Kuntze) Petit
Rubiaceae	Pyrostria chapmanii Bridson
Rubiaceae	Rothmannia engleriana (K.Schum.) Keay
Rubiaceae	Rutidea fuscescens Hiern
Rubiaceae	Rutidea orientalis Bridson
Rubiaceae	Rytigynia uhligii (K.Schum.& K.Krause) Verdc.
Rubiaceae	Tarenna pavettoides (Harv.) Sim
Rubiaceae	Vangueria infausta Burch.
Rutaceae	Clausena anisata (Willd.) Benth.
Rutaceae	Clausena anisata (Willd.) Benth.
Rutaceae	Toddalia asiatica (L.) Lam.
Santalaceae	Osyridicarpus schimperianus (A.Rich.) A.DC.
Sapindaceae	Allophylus chaunostachys Gilg
Sapotaceae	Chrysophyllum gorungosanum Engl.
Sapotaceae	Englerophytum magalismontanum (Sond.) T.D.Penn.
Sapotaceae	Synsepalum brevipes (Baker) T.D.Penn.
Sapotaceae	Synsepalum muelleri (Kupicha) T.D.Penn
Scrophulariaceae	Alectra sessiliflora (Vahl) Kuntze
Scrophulariaceae	Buchnera lastii Engl. subsp. lastii
Scrophulariaceae	Diclis tenella Hemsl.
Scrophulariaceae	Gerardiina angolensis Engl.
Scrophulariaceae	Halleria elliptica Thunb.

Mt. Namuli Plants Above 1300 m (Above 1000 m on Western Side)	
Scrophulariaceae	Lindernia stictantha (Hiern) Skan
Scrophulariaceae	Lindernia whytei Skan
Scrophulariaceae	Sopubia ramosa (Hochst.) Hochst.
Scrophulariaceae	Striga angustifolia (Don) Saldanha
Scrophulariaceae	Torenia thouarsii (Cham.& Schltdl.) Kuntze
Solanaceae	Solanum aculeatissimum Jacq.
Solanaceae	Solanum nigrum L.
Sterculiaceae	Dombya lastii K.Schum.
Theaceae	Camellia sinensis (L.) O.Kuntze
Thymelaeaceae	Gnidia chapmanii B.Peterson
Thymelaeaceae	Peddiea fischeri Engl.
Tiliaceae	Sparrmannia ricinocarpa (Eckl.& Zeyh.) Kunze
Ulmaceae	Trema orientalis (L.) Blume
Urticaceae	Boehmeria macrophylla Hornem.
Urticaceae	Laportea alatipes Hook.f.
Urticaceae	Pilea rivularis Wedd.
Urticaceae	Urera hypselodendron (A.Rich.) Wedd.
Valerianaceae	Valeriana capensis Thunb.
Violaceae	Rinorea angustifolia (Thouars) Baill. subsp. myrsinifolia (Dunkley) Grey- T Wilson
Violaceae	Rinorea ferruginea Engl.
Violaceae	Viola abyssinica Oliv.
Vitaceae	Cyphostemma kilimandscharicum (Gilg) Descoings
Source: Timberlake, J.R.; Dowsett-Lemaire, F.; Bayliss, J.; Alves, T.; Baena, S.; Bento, C.; Cook, K.; Francisco, J.; Harris, T.; Smith, P.; de Sousa, C. 2009. Mt. Namuli, Mozambique: Biodiversity and Conservation. Report produced under the Darwin Initiative Award 15/036. Royal Botanic Gardens, Kew, London.	

Namuli Massif Birds Recorded Above 1200 m	
Common Name	**Scientific Name**
Black Cuckoo-shrike	*Campephaga flava*
Cape Batis,.	*Batis capensis*
Garden Warbler	*Sylvia borin*
Miombo Double-collared Sunbird	*Nectarinia manoensis*
Striped Pipit	*Anthus lineiventris*
Grey-headed Bush Shrike	*Malaconotus blanchoti*
African Black Duck	*Anas sparsa.*
African Black Swift	*Apus barbatus*
African Broadbill	*Smithornis capensis*
African Citril	*Serinus citrinelloides*
African Green Pigeon	*Treron calvus.*
African Moustached Warbler	*Melocichla mentalis*
African Paradise Flycatcher	*Terpsiphone viridis*
African Red-winged Starling	*Onychognathus morio*
African Rock Martin	*Hirundo fuligula.*
African Sand Martin	*Riparia paludicola.*
African Yellow Warbler	*Chloropeta natalensis*
Amethyst Starling	*Cinnyricinclus leucogaster*
Ashy Flycatcher	*Muscicapa caerulescens*
Bar-tailed Trogon	*Apaloderma vittatum*
Bertram's Weaver	*Ploceus bertrandi*
Black Saw-wing	*Psalidoprocne pristoptera.*
Black-breasted Snake Eagle	*Circaetus pectoralis*
Black-eyed Bulbul	*Pycnonotus barbatus*
Black-headed Apalis	*Apalis melanocephala*
Black-shouldered Kite	*Elanus caeruleus.*
Black-throated Wattle-eye	*Platysteira peltata*
Black-winged Bishop	*Euplectes hordeaceus*
Blackcap,.	*Sylvia atricapilla*
Bleating Bush Warbler	*Camaroptera brachyura*
Blue-billed Firefinch	*Lagonosticta rubricata*
Blue-cheeked Bee-eater	*Merops persicus*
Blue-cheeked Bee-eater	*Merops persicus.*
Blue-spotted Wood Dove	*Turtur afer.*
Booted Eagle	*Hieraaetus pennatus.*
Broad-tailed Warbler	*Schoenicola platyurus*
Brown-backed Honeyguide	*Prodotiscus regulus*
Brown-headed Tchagra	*Tchagra australis*
Brown-headed Tchagra	*Tchagra australis*
Bully Canary	*Serinus sulphuratus*
Burchell's Coucal	*Centropus superciliosus*
Cabanis's Bulbul	*Phyllastrephus cabanisi*
Cabanis's Bunting	*Emberiza cabanisi*
Cape Eagle Owl	*Bubo capensis*
Cape Robin	*Cossypha caffra*
Cardinal Woodpecker	*Dendropicos fuscescens*
Cholo Alethe	*Alethe choloensis*
Cinnamon Dove	*Aplopelia larvata*
Collared Sunbird	*Anthreptes collaris*
Common Buzzard	*Buteo buteo*
Common Quail	*Coturnix coturnix.*

Namuli Massif Birds Recorded Above 1200 m	
Common Waxbill	*Estrilda astrild*
Croaking Cisticola	*Cisticola natalensis*
Crowned Eagle	*Stephanoaetus coronatus.*
Crowned Hornbill	*Tockus alboterminatus.*
Dapple-throat	*Modulatrix orostruthus*
Dark-backed (Forest) Weaver	*Ploceus bicolor*
Dusky Flycatcher	*Muscicapa adusta*
Eastern Double-collared Sunbird	*Nectarinia mediocris*
Eastern Green Tinkerbird	*Pogoniulus simplex*
Eastern Mountain Greenbul	*Andropadus nigriceps*
Eurasian Bee-eater	*Merops apiaster*
Eurasian Hobby	*Falco subbuteo*
Eurasian House Martin	*Delichon urbicum.*
Eurasian Sand Martin	*Riparia riparia.*
Eurasian Sand Martin	*Riparia riparia*
Eurasian Swift	*Apus apus*
Evergreen Forest Warbler	*Bradypterus lopezi*
Freckled Rock Nightjar	*Caprimulgus tristigma*
Golden-rumped Tinkerbird	*Pogoniulus bilineatus*
Golden-tailed Woodpecker	*Campethera abingoni*
Green Barbet	*Stactolaema olivacea.*
Green-backed Honeyguide	*Prodotiscus zambesiae*
Grey-headed Bush Shrike	*Malaconotus blanchoti*
Gymnogene	*Polyboroides typus*
Half-collared Kingfisher	*Alcedo semitorquata*
Hamerkop	*Scopus umbretta*
Helmeted Guineafowl	*Numida meleagris*
Hildebrandt's Francolin	*Francolinus hildebrandtii*
Indigobird	*Vidua sp.*
Klaas's Cuckoo	*Chrysococcyx klaas.*
Lanner Falcon,	*Falco biarmicus*
Lead-coloured Flycatcher	*Myioparus plumbeus*
Lesser Seedcracker	*Pyrenestes minor*
Lesser Striped Swallow	*Hirundo abyssinica.*
Little Greenbul	*Andropadus virens.*
Little Sparrowhawk	*Accipiter minullus*
Little Swift	*Apus affinis*
Livingstone's Turaco	*Tauraco livingstonii.*
Lizard Buzzard	*Kaupifalco monogrammicus*
Long-tailed Wagtail	*Motacilla clara*
Many-coloured (Black-fronted) Bush Shrike	*Malaconotus multicolor*
Marsh Tchagra	*Tchagra minutus*
Mottled Swift	*Apus aequatorialis*
Mozambique Batis	*Batis soror*
Namuli Apalis	*Apalis (thoracica) lynesi*
Narina's Trogon	*Apaloderma narina*
Olive Sunbird,	*Nectarinia olivacea.*
Olive Thrush	*Turdus olivaceus*
Olive-flanked Robin	*Cossypha anomala*
Orange Thrush	*Zoothera gurneyi*
Orange-breasted Bush Shrike	*Malaconotus sulfureopectus*
Peregrine Falcon	*Falco peregrinus.*

Namuli Massif Birds Recorded Above 1200 m	
Pin-tailed Widow	*Vidua macroura*
Pygmy Kingfisher	*Ceyx pictus*
Rameron Pigeon	*Columba arquatrix.*
Red-backed Mannikin	*Spermestes bicolor*
Red-capped Robin	*Cossypha natalensis*
Red-chested Cuckoo	*Cuculus solitarius.*
Red-chested Flufftail	*Sarothrura rufa.*
Red-collared Whydah	*Euplectes ardens*
Red-eyed Dove	*Streptopelia semitorquata.*
Red-faced Cisticola	*Cisticola erythrops*
Red-faced Crimsonwing	*Cryptospiza reichenovii*
Red-faced Crombec	*Sylvietta whytii*
Red-rumped Swallow	*Hirundo daurica*
Red-winged Warbler	*Heliolais erythropterus*
Richard's Pipit	*Anthus richardi (syn. African, Grassveld or Grassland Pipit A. cinnamomeus)*
Rock Kestrel	*Falco tinnunculus*
Rufous-bellied Tit	*Parus pallidiventris*
Scaly-throated Honeyguide	*Indicator variegatus*
Scarce Swift	*Schoutedenapus myoptilus*
Shelley's Francolin	*Francolinus shelleyi*
Silvery-cheeked Hornbill	*Bycanistes brevis*
Singing Cisticola	*Cisticola cantans*
Southern Black Flycatcher	*Melaenornis pammelaina*
Southern Puffback	*Dryoscopus cubla*
Spectacled Weaver	*Ploceus ocularis*
Spotted Flycatcher	*Muscicapa striata*
Spotted Ground Thrush	*Zoothera guttata.*
Square-tailed Drongo	*Dicrurus ludwigii*
Starred Robin	*Pogonocichla stellata*
Stonechat	*Saxicola torquatus*
Stripe-cheeked Greenbul	*Andropadus milanjensis*
Swee Waxbill	*Estrilda melanotis*
Tambourine Dove	*Turtur tympanistria*
Tawny Eagle	*Aquila rapax*
Tawny-flanked Prinia	*Prinia subflava*
Tree Pipit	*Anthus trivialis*
Tropical Boubou	*Laniarius aethiopicus*
Violet-backed Sunbird	*Anthreptes longuemarei*
Wailing Cisticola	*Cisticola lais*
White-eared Barbet	*Stactolaema leucotis*
White-necked Raven	*Corvus albicollis*
White-tailed Crested Flycatcher	*Elminia albonotata*
White-winged Apalis	*Apalis chariessa*
Willow Warbler	*Phylloscopus trochilus.*
Wood Owl	*Strix woodfordii*
Yellow White-eye	*Zosterops senegalensis*
Yellow-bellied Sunbird	*Nectarinia venusta*
Yellow-breasted Apalis	*Apalis flavida*
Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*
Yellow-streaked Bulbul	*Phyllastrephus flavostriatus*
Yellow-throated Warbler	*Phylloscopus ruficapilla*

Namuli Massif Birds Recorded Above 1200 m
Source: Dowsett-Lemaire, F. 2008. Survey of birds on Namuli Mountain (Mozambique), November 2007, with notes on vegetation and mammals. Dowsett-Lemaire Misc. Report 60. Available at: http://ftp.rbgkew.org.uk/science/directory/projects/annex/namuli-birds-Dowsett.pdf

Namuli Massif Small Mammal Species					
Family	**Species**	**Monadejm, Gurué 2006**	**Bayliss, June 2007**	**Bayliss, Nov 2007**	**Kopp & Curran, Nov 2008**
Primates: Galagonidae	*Galagoides granti*		S	S	
Primates: Cercopithecidae	*Cercopithecus nictitans mitis*		S	S	
*Chiroptera: Pteropodidae	*Eidolon helvum*			S	
Pteropodidae	*Epomophorus cf. crypturus*				X
Pteropodidae	*Epomophorus wahlbergi*	X			X
Pteropodidae	*Lissonycteris goliath*	X			X
Pteropodidae	*Rousettus aegyptiacus leachi*	X			
*Chiroptera: Rhinolophidae	*Rhinolophus cf. blasii*	X			X
Rhinolophidae	*Rhinolophus clivosus zuluensis*	X			X
Rhinolophidae	*Rhinolophus sp.*				X
*Chiroptera: Vespertilionidae	*Eptesicus hottentotus*			X	
Vespertilionidae	*Hipposideros ruber centralis*	X			
Vespertilionidae	*Miniopterus fraterculus*	X		X	X
Vespertilionidae	*Miniopterus inflatus*			X	X
Vespertilionidae	*Myotis bocagii*				
Vespertilionidae	*Myotis tricolor*	X	X	X	X
Vespertilionidae	*Neoromicia africanus*	X			X
Vespertilionidae	*Neoromicia nanus*				X
Vespertilionidae	*Pipistrellus hesperidus*	X			X
Vespertilionidae	*Pipistrellus rusticus*			X	
Vespertilionidae	*Scotophilus dinganii*	X			
Insectivora: Soricidae	*Crocidura luna*		X	X	
Soricidae	*Crocidura mariquensis*		X		
Soricidae	*Crocidura silacea*		X	X	
Macroscelidea: Macroscelidinae	*Petrodomus tetradactylus*			S	
Macroscelidinae	*Rhynchocyon cirnei*			S	
Lagomorpha: Leporidae	*Pronolagus rupestris*			S	
Rodentia: Sciuridae	*Heliosciurus mutabilis*			S	
Sciuridae	*Paraxerus vincenti*			S	
Rodentia: Dendromurinae	*Dendromus melanotis*			X	
Dendromurinae	*Dendromus mystacalis*		X		
Rodentia: Otomyinae	*Otomys angoniensis*		X	X	
Rodentia: Muridae	*Aethomys namaquensis*		X		
Muridae	*Dasymys incomtus*			X	
Muridae	*Mus minutoides*		X		
Muridae	*Mus triton*		X		
Muridae	*Praomys delectorum*		X	X	
Carnivora: Herpestidae	*Herpestes sanguinea*			X	
Herpestidae	*Mungos mungo bororensis*		X		

Namuli Massif Small Mammal Species					
Carnivora: Viverridae	*Genetta tigrina*		X		
Hyracoidea: Procavidae	*Heterohyrax brucei*			S	
Artiodactyla: Cephalophini	*Cephalophus monticola*		X	S	
S = Sight record, X = Collection *Nomenclature follows Kingdon (1997), and Taylor (2001) for bats.					
Source: Timberlake, J.R., Dowsett-Lemaire, F., Bayliss, J., Alves T., Baena, S., Bento, C., Cook, K., Francisco, J., Harris, T., Smith, P. & de Sousa, C. (2009). Mt Namuli, Mozambique: Biodiversity and Conservation. Report produced under the Darwin Initiative Award 15/036. Royal Botanic Gardens, Kew, London. 114 p.					

Namuli Massif Small Mammal Species (2017 Additions)		
Family	**Species**	**Source**
Rhinolophidae	Rhinolophous sp. nov	In press (Curran, Kopp, Bayliss, & Fahr)

Namuli Massif Crab Species		
Family	**Species**	**Source**
Potamonautidae	Potamonautes namuliensis	Daniels & Bayliss 2012

Namuli Amphibians and Reptiles		
Family	**Species**	**Reference**
Amphibians		
Arthroleptidae	*Arthroleptis francei*	J. Bayliss, Farooq & Conradie
Arthroleptidae	*Arthroleptis xenodactyloides*	Farooq & Conradie
Breviceptidae	*Breviceps mossambicus*	Farooq & Conradie
Bufonidae	*Amietophrynus gutturalis*	J. Bayliss
Bufonidae	*Amietophrynus maculatus*	Farooq & Conradie
Hyperoliidae	*Afrixalus brachynemis*	Portik et al. 2013
Hyperoliidae	*Hyperolius marmoratus*	J. Bayliss
Hyperoliidae	*Hyperolius puncticulatus*	J. Bayliss
Hyperoliidae	*Hyperolius cf. spinigularis*	Farooq & Conradie
Hyperoliidae	*Hyperolius nasutus*	J. Bayliss
Hyperoliidae	*Hyperolius substriatus*	Farooq & Conradie
Phrynobatrachidae	*Phrynobatrachus mababiensis*	Farooq & Conradie
Ranidae	*Amietia quecketti*	Farooq & Conradie
Ranidae	*Ptychadena* sp.	J. Bayliss, Farooq & Conradie
Ranidae	*Amnirana* sp.	J. Bayliss
Ranidae	*Strongylopus fuelleborni*	J. Bayliss, Farooq & Conradie
Ranidae	*Notophryne broadleyi*	J. Bayliss, Farooq & Conradie
Scolecomorphidae	*Scolecomorphus kirkii*	Farooq & Conradie
Pyxicephalidae	*Notophryne sp nov.*	Werner et al.
Reptiles		
Agamidae	*Acanthocercus atricollis*	Portik et al. 2012
Agamidae	*Agama kirkii*	Portik et al. 2012
Agamidae	*Agama mossambica*	Farooq & Conradie
Chamaeleonidae	*Chamaeleo dilepis*	Farooq & Conradie
Chamaeleonidae	*Rhampholeon tilburyi*	J. Bayliss, Farooq & Conradie
Colubridae	*Philothamnus angolensis*	Farooq & Conradie
Colubridae	*Thelotornis mossambicanus*	Farooq & Conradie
Elapidae	*Naja melanoleuca*	Portik et al. 2012
Gekkonidae	*Lygodactylus cf. bonsi*	J. Bayliss
Gekkonidae	*Lygodactylus capensis*	Farooq & Conradie
Gekkonidae	*Lygodactylus regulus*	Portik et al. 2013
Gekkonidae	*Hemidactylus mabouia*	Farooq & Conradie
Lamprophidae	*Boaedon fuliginosus*	Farooq & Conradie
Natricinae	*Natriciteres sylvatica*	J. Bayliss
Natricinae	*Psammophylax variablis*	J. Bayliss, Farooq & Conradie
Scincidae	*Trachylepis varia*	P. Ryan, J. Bayliss, Farooq & Conradie
Scincidae	*Melanoseps cf. loveridgei*	Farooq & Conradie
Scincidae	*Afroablepharus wahlbergii*	Farooq & Conradie
Scincidae	*Trachylepis margaritifer*	Farooq & Conradie
Scincidae	*Trachylepis striata*	Farooq & Conradie
Testudinidae	*Kinixys Belliana*	Farooq & Conradie
Viperidae	*Atheris mabuensis*	Branch, W.R.; Bayliss J. 2009
Viperidae	*Bitis arietans*	Farooq & Conradie

Namuli Amphibians and Reptiles

Source:

Branch, W.R. & Ryan, P.G. (2001) Additions to the Mozambique herpetofauna: Two new lizards from the Namuli massif, Mozambique. Herpetological Review 32: 281–282.

Branch, W.R.; Bayliss J. 2009. A new species of Atheris (Serpentes: Viperidae) from northern Mozambique. Zootaxa, 2113: 41–54.

Branch, W., Bayliss, J., Tolley, K. 2014. Pygmy chameleons of the Rhampholeon platyceps complex (Squamata: Chamaeleonidae): Description of four new species from isolated 'sky islands' of northern Mozambique. Zootaxa, 3814 (1): 001–036

Farooq, H.O.M.; Conradie, W. 2015. A second record of Scolecomorphus kirkii Boulenger, 1883 (Gymnophiona: Scolecomorphidae) for Mozambique. Herpetology Notes 8: 59–62.

Portik, D.M.; Mulungu, E.; Sequeira, D.; McEntee ,J.P. 2013a. Herpetological surveys of the Serra Jeci and Namuli massifs, Mozambique, and an annotated checklist of the Southern Afromontane Archipelago. Herpetological Review , 44: 394-406.

Portik, D.M.; Travers, S.L.; Bauer, A.M.; Branch, W.R. 2013b. A new species of Lygodactylus (Squamata: Gekkonidae) endemic to Mt. Namuli, an isolated 'sky island' of northern Mozambique. Zootaxa, 3710(5): 415-435.

Ryan, P., Bento, C., Cohen, C., Graham, J., Parker, V., Spottiswoode, C. 1999. The avifauna and conservation status of the Namuli Massif, northern Mozambique. Bird Conservation International 9:315-331.

In press (Werner et al.)

Mt. Namuli Butterfly Species	
FAMILY Subfamily	**Species**
HESPERIIDAE	
Pyrginae	*Tagiades flesus* (Fabricius, 1781)
Pyrginae	*Eagris sabadius* (Gray, 1832)
Pyrginae	*Sarangesa maculata* (Mabille, 1891)
Hesperiinae	*Metisella abdeli* (Krüger, 1928)
Hesperiinae	*Metisella medea* Evans, 1937
Hesperiinae	*Kedestes mohozutza* (Wallengren, 1857)
Hesperiinae	*Teniorhinus harona* (Westwood, 1881)
Hesperiinae	*Acada biseriata* (Mabille, 1893)
Hesperiinae	*Acleros mackenii* (Trimen, 1868)
Hesperiinae	*Semalea pulvina* (Plötz, 1879)
Hesperiinae	*Chondrolepis niveicornis* (Plotz, 1883)
Hesperiinae	*Artitropa erinnys* (Trimen, 1862)
Hesperiinae	*Monza punctata* (Aurivillius, 1910)
Hesperiinae	*Platylesches tina* Evans, 1937
Hesperiinae	*Zenonia zeno* (Trimen,1864)
Hesperiinae	*Borbo perobscura* (Druce, 1912)
Hesperiinae	*Parnara naso* (Fabricius, 1798)
Hesperiinae	*Gegenes niso* (Linnaeus, 1764)
PAPILIONIDAE	
Papilioninae	*Papilio dardanus tibullus* Kirby, 1880
Papilioninae	*Papilio demodocus* Esper, 1798
Papilioninae	*Papilio desmondi usambarensis* (Koçak, 1980)
Papilioninae	*Papilio echerioides shirensis* (Hancock, 1987)
Papilioninae	*Papilio pelodurus* ssp. nov (Congdon, 2010)
Papilioninae	*Papilio phorcas nyikanus* Rothschild & Jordan, 1903
Papilioninae	*Graphium angolanus* (Goeze, 1779)
Papilioninae	*Graphium policenes* (Cramer, 1775)
PIERIDAE	
Coliadinae	*Catopsilia florella* Fabricius, 1775)
Coliadinae	*Colias electo* (Linnaeus, 1773)
Coliadinae	*Eurema(Eurema) brigitta* (Stoll, 1780)
Coliadinae	*Eurema(Eurema) desjardinsii* (de Boisduval, 1833)
Coliadinae	*Eurema (Eurema) mandarinula* (Holland, 1892)
Coliadinae	*Eurema (Terias) hapale* (Mabille, 1882)
Coliadinae	*Eurema(Terias) hecabe* (Linnaeus, 1758)
Pierinae	*Colotis euippe omphale* (Godart, 1819)
Pierinae	*Belenois creona* (Cramer, 1776)
Pierinae	*Appias epaphia* (Cramer, 1779)
Pierinae	*Appias sabina* (Felder & Felder, 1865)
Pierinae	*Mylothris agathina* (Cramer, 1779)
Pierinae	*Mylothris rueppellii rhodesiana* (Koch, 1865)
Pierinae	*Mylothris sagala dentatus* Butler, 1896
NYMPHALIDAE	
Acraeinae	*Acraea (Acraea) acrita* Hewitson, 1865
Acraeinae	*Acraea(Acraea) calderena* Hewitson, 1877
Acraeinae	*Acraea(Acraea) egina areca* Mabille, 1889
Acraeinae	*Acraea (Acraea) natalica* De Boisduval, 1847
Acraeinae	*Acraea (Acraea) oncaea* Hopffer, 1855

Acraeinae	*Acraea (Actinote) cabira* (Hopffer, 1855)
Acraeinae	*Acraea (Actinote) conradti* Oberthur, 1893
Acraeinae	*Acraea (Actinote) eponina* (Cramer, 1780)
Acraeinae	*Acraea (Actinote) goetzei* (Thurau, 1903)
Acraeinae	*Acraea (Actinote) johnstoni* (Godman, 1885)
Acraeinae	*Acraea (Actinote)* ?*parei* Henning & Henning, 1996
Danainae	*Danaus chrysippus aegyptius* (von Schreber, 1759)
Danainae	*Amauris albimaculata latifascia* Talbot, 1940
Satyrinae	*Aphysoneura pigmentaria* Karsch, 1894
Satyrinae	*Bicyclus campina* (Aurivillius, 1901)
Satyrinae	*Bicyclus safitza* (Westwood, 1850)
Satyrinae	*Henotesia ubenica* Thurau, 1903
Satyrinae	*Ypthima impura* Elwes & Edwards, 1893
Satyrinae	*Neocoenyra bioculata* Carcasson, 1964 subsp. nov.
Argynninae	*Lachnoptera ayresii* Trimen, 1879
Argynninae	*Phalanta phalantha* (Drury, 1773)
Argynninae	*Issoria smaragdifera* (Butler, 1895)
Nymphalinae	*Precis archesia* (Cramer, 1779)
Nymphalinae	*Precis octavia* (Cramer, 1777)
Nymphalinae	*Precis tugela* Trimen, 1879
Nymphalinae	*Junonia oenone* (Linnaeus, 1758)
Nymphalinae	*Junonia orithya madagascariensis* Guenée, 1865
Nymphalinae	*Junonia sophia infracta* Butler, 1888
Nymphalinae	*Cynthia cardui* (Linnaeus, 1758)
Nymphalinae	*Antanartia dimorphica* Howarth, 1966
Nymphalinae	*Antanartia schaeneia* (Trimen, 1879)
Limenitinae	*Neptis alta* Overlaet, 1955
Limenitinae	*Neptis gratiosa* Overlaet, 1955
Limenitinae	*Neptis laeta* Overlaet, 1955
Limenitinae	*Neptis swynnertoni* Trimen, 1912
Limenitinae	*Cymothoe baylissi* sp. nov. (Congdon, 2010)
Limenitinae	*Pseudacraea boisduvali* (Doubleday, 1845)
Limenitinae	*Pseudacraea eurytus* (Linnaeus, 1758)
Limenitinae	*Pseudathyma* sp. nov.
Limenitinae	*Euryphura achlys* (Hopffer, 1855)
Limenitinae	*Hamanumida daedalus* (Fabricius, 1775)
Limenitinae	*Pseudargynnis hegemone* (Godart, 1819)
Limenitinae	*Charaxes achaemenes* Felder & Felder, 1867
Limenitinae	*Charaxes acuminatus* Thurau, 1903
Limenitinae	*Charaxes brutus* (Cramer, 1779)
Limenitinae	*Charaxes cithaeron* Felder & Felder, 1859
Limenitinae	*Charaxes dilutus* Rothschild, 1898
Limenitinae	*Charaxes druceanus proximans* Joicey & Talbot, 1922
Limenitinae	*Charaxes ethalion* (de Boisduval, 1847)
Limenitinae	*Charaxes macclounii* Butler, 1895
Limenitinae	*Charaxes xiphares woodi* van Someren, 1964
Limenitinae	*Charaxes* sp. aff. *margaretae* Rydon, 1980
LYCAENIDAE	
Lipteninae	*Pentila pauli* Staudinger, 1888
Theclinae	*Cigaritis trimeni* Neave, 1910
Theclinae	*Iolaus (Epamera) sidus* Trimen, 1864
Theclinae	*Iolaus (Epamera)* sp. nov.
Theclinae	*Iolaus (Philiolaus)* ?sp. nov.

Theclinae	*Hemiolaus caeculus* (Hopffer, 1855)
Theclinae	*Leptomyrina hirundo* (Wallengren, 1857)
Theclinae	*Leptomyrina handmani* Gifford, 1965
Theclinae	*Capys disjunctus* Trimen, 1895
Polyommatinae	*Anthene amarah* (Guérin-Méneville, 1849)
Polyommatinae	*Anthene definita* (Butler, 1899)
Polyommatinae	*Anthene kersteni* (Gerstaecker, 1871)
Polyommatinae	*Anthene lasti* (Grose-Smith & Kirby, 1894)
Polyommatinae	*Anthene lunulata* (Trimen, 1894)
Polyommatinae	*Anthene princeps* (Butler, 1876)
Polyommatinae	*Pseudonacaduba sichela* (Wallengren, 1857)
Polyommatinae	*Lampides boeticus* (Linnaeus, 1767)
Polyommatinae	*Uranothauma antinorii* (Oberthur, 1883)
Polyommatinae	*Uranothauma falkensteini* (Dewitz, 1879)
Polyommatinae	*Uranothauma poggei* (Dewitz, 1879)
Polyommatinae	*Uranothauma* sp. nov. (Congdon, 2010)
Polyommatinae	*Cacyreus tespis* (=*palemon*) (Herbst, 1804)
Polyommatinae	*Cacyreus virilis* Stempffer, 1936
Polyommatinae	*Leptotes pirithous* (Linnaeus, 1767)
Polyommatinae	*Zizina antanossa* (Mabille, 1877)
Polyommatinae	*Actizera lucida* (Trimen, 1883)
Polyommatinae	*Zizula hylax* (Fabricius, 1775)
Polyommatinae	*Eicochrysops hippocrates* (Fabricius, 1793)
Polyommatinae	*Euchrysops malathana* (de Boisduval, 1833)
Polyommatinae	*Euchrysops osiris* (Hopffer, 1855) *Euchrysops subpallida* Bethune-Baker, 1923
Polyommatinae	*Euchrysops subpallida* Bethune-Baker, 1923
Polyommatinae	*Cupidopsis cissus* (Godart, 1824)
Polyommatinae	*Azanus moriqua* (Wallengren, 1857)
Polyommatinae	*Azanus jesous* (Guérin-Méneville, 1849)
Polyommatinae	*Chilades trochylus* (Freyer, 1843)
Lycaenidae	*Philiolaus sp.nov* (Congdon, 2010)
Lycaenidae	*Epamera malaikae* (Bayliss, 2016)
Lycaenidae	*Gonatomyrina sp nov* (Congdon, 2010)
*Species arrangement and nomenclature follows Carcasson's African Butterflies (Ackery et al. 1995), taking account of some recent changes. 'New to Mozambique' means not listed as occurring in Mozambique according to Ackery et al. (1995), Cabral (2000), d'Abrera (1980), Alan Gardiner (unpublished records), Kielland (1990), Libert (1999, 2004), Pringle et al. (1994) and Williams (2007).	
Collected by Julian Bayliss (2005–2008), Colin Congdon, Ivan Bampton & Martin Hassan (Nov 2008). Identifications confirmed by Steve Collins (African Butterfly Research Institute, Nairobi, Kenya)*	

Mt. Namuli Ant Species			
	Forest	Grassland	Rocky outcrop
Aenictus MZ01	X		
Agraulomyrmex MZ01	X		
Anochetus MZ01	X		
Anochetus MZ02	X		
Axinidris MZ01	X		
Axinidris MZ02			X
Camponotus MZ01	X		
Camponotus MZ02			X
Camponotus MZ03		X	
Carebara MZ01	X		
Cataulacus MZ01	X		
Crematogaster MZ01	X		
Crematogaster MZ02	X		
Crematogaster MZ03	X		X
Crematogaster MZ04		X	
Crematogaster MZ05		X	
Cyphoidris MZ01	X		
Discothyrea MZ01	X		
Discothyrea MZ02	X		
Dorylus MZ01	X	X	
Dorylus MZ02	X		
Euponera MZ01	X		
Hypoponera MZ01	X		
Hypoponera MZ02	X		
Hypoponera MZ03	X		
Hypoponera MZ05	X		
Lepisiota MZ01		X	
Lepisiota MZ02			X
Lepisiota MZ03			X
Leptogenys MZ01	X		
Mesoponera MZ01	X	X	
Monomorium MZ01	X		
Myrmicaria MZ01	X	X	
Nylanderia MZ01	X		
Palthotyreus MZ01	X		
Parasyscia MZ01	X		
Parasyscia MZ02	X		
Pheidole MZ01	X		
Pheidole MZ02	X		
Pheidole MZ03		X	
Plagiolepis MZ01			X
Plagiolepis MZ02		X	X
Prionopelta MZ01	X		

Mt. Namuli Ant Species			
Solenopsis MZ01		X	
Solenopsis MZ02	X		
Strumigenys MZ01	X		
Strumigenys MZ02	X		
Strumigenys MZ03		X	
Syllophopsis MZ01	X		
Tapinoma MZ01	X		
Tapinoma MZ02		X	X
Technomyrmex MZ01	X		
Tetramorium MZ01	X		
Tetramorium MZ02	X		
Tetramorium MZ03	X		X
Tetramorium MZ04			X
Tetramorium MZ06		X	X
Tetramorium MZ07			X
Tetramorium MZ08	X		
Tetraponera MZ01	X		X
Source: Legado (2015) *Report on Ant, Amphibian and Reptile Assessment of Mt. Namuli, Mozambique.* Available at: http://www.legadoinitiative.org/research/			
Collected on Namuli massif, Mozambique (May 2014) X = habitat in which they were collected			