

FRONTIER

TANZANIA

COASTAL FOREST RESEARCH PROGRAMME

SITE DESCRIPTION AND EVALUATION:

Kazimzumbwi Forest, Kisarawe District, Tanzania

Neil Burgess and Alex Dickinson

??? 1993

THE SOCIETY FOR ENVIRONMENTAL EXPLORATION
AND
THE UNIVERSITY OF DAR ES SALAAM

PREFACE

THE SOCIETY FOR ENVIRONMENTAL EXPLORATION

The Society is a non-profit making Company Limited by Guarantee and was formed in 1989. The Society's objectives are to promote and advance field research into environmental issues and implement practical projects contributing to the conservation of natural resources. Projects organised by The Society are joint initiatives developed in collaboration with national research agencies in cooperating countries. The Society also acts to promote links between scientists from industrialised and non-industrialised countries.

THE FRONTIER-TANZANIA PROJECT

Frontier-Tanzania started in July 1989 and to date has involved over 400 people from both Tanzania and overseas. Field research is being undertaken on a variety of habitats in Tanzania's coastal zone, chosen for their high biological interest and conservation value. Habitats under study include mangroves, coral reefs, coastal forests and savanna. The projects have been developed with the assistance and collaboration of the University of Dar es Salaam, the Ministry of Lands, Natural Resources and Tourism, Tanzania National Parks and Tanzania Fisheries Research Institute.

THE COASTAL FOREST RESEARCH PROGRAMME

The coastal forests of Tanzania comprise small and geographically isolated forest remnants supporting large numbers of endemic and near-endemic plants and animals. The forests were once extensive but have been largely removed to provide timber and farmland. Their status, distribution and biological character are extremely poorly known. Since July 1989 Frontier-Tanzania has run a programme to locate, map and assess the status of these forests, to investigate their ecology and inventorise their entire flora and fauna. So far over 40 forests have been identified of which 10 have been characterised thoroughly.

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EXECUTIVE SUMMARY

Site: Kazimzumbwi Forest

Map sheet: Ordnance Survey 1: 50,000 series Y742, sheet 186/3

Grid Reference: Between 39° 02' -39° 04' East and 6° 55' -7° 02' South

Locality: Kisarawe District, Coast Region, Tanzania

Status: Protective Forest Reserve

Managed by: Kisarawe District

Area: 35.5 kilometres squared (23.5 km squared of forest)

Tenure: Government land under district authority control

Site description: A dissected range of kaolinitic sandstones, supporting diverse vegetation communities. The forest supports many internationally rare and threatened species, including several endemic to the Pugu Hills.

Recommended Management Objectives:

1. To preserve the site as one of the best remaining coastal forests in Tanzania.

To carry out and foster research and educational use of the site.

To repair human modifications to the forest vegetation and control further damaging activities.

Main management recommendations:

- A) To prevent illegible exploitation of the forest resource.

To replant the area within the forest reserve that has been degraded.

To redemarcate the boundaries of the forest reserve.

To strengthen the patrolling of the site by forest guards.

To liaise with government bodies and seek links with local NGOs leading to a more secure future of the site.

To investigate the potential of the site in supporting an educational facility.

Maps:

- 1) Location of Kazimzumbwi forest reserve.
- 2) Forest reserve boundaries.
- 3) Physical features and vegetation types of Kazimzumbwi forest reserve.

1.0 Introduction

This document provides a description and evaluation of Kazimzumbwi forest reserve, close to Kisarawe and Dar es Salaam.

2.0 Site Features

2.1 General Information

Site name: Kazimzumbwi Forest

Region: Coast

District: Kisarawe

Nearest large town: Dar es Salaam

Forestry Office: Kisarawe

Access: Accessible by vehicle using forestry roads.

Grid reference: Between 39° 02' - 39° 04' East and 6° 55' - 7° 02' South

Area: 35.5 kilometres squared (23.5 km squared of forest)

Maps: Ordnance Survey 1: 50,000 series Y742, sheet 186/3

The main features of the site are a forest reserve comprising a dissected range of sandstone hills supporting a diverse forest vegetation community.

2.2 Establishment, Status, Administration and Management

Official Status: District Forest Reserve

Land Tenure and Rights of Way: Wholly owned by the government of the United Republic of Tanzania. There are no official motorable roads through the forest reserve, although there are many illegal access tracks for logging operations. There are also many footpaths through the forest.

Management Authority and Current Management Control

Public land in the pre colonial era. The site is currently a protective forest reserve (gazetted in ??????), and extractive use is not permitted. This forest reserve is closely adjacent to Pugu forest reserve and on the same range of hills. The site is under the control of the central government forest and beekeeping division of the Ministry of Tourism, Natural Resources and Forestry through a Regional Forestry Officer based at Kibaha. However, most management decisions are made at the district level by the district forestry officer and his personnel.

Site Definition and Boundaries: There is some confusion over the present boundaries of the forest reserve. Local forestry officers use the 1976 map and a sign post demarcating the forest reserve boundary on the

Eastern access route lies on the 1976 boundary rather than that shown on the 1987 map. However, according to the 1987 map, there are currently farms within the legal forest reserve boundary. Also, according to the 1976 map, the forest reserve covers 48.6 kilometres squared with all this extra area located to the South where there is almost no forest. Map 3 shows the forest boundary (mapped by Frontier-Tanzania in 1991-2) and the present recognised reserve boundaries as drawn in 1976, and 1987.

2.3 Environmental Features

Climate: Site subject to relief rainfall from westward moving warm sea air with a four month dry season (June - September). Rainfall is most intense during the periods October-December and March-June. An average of 1,236 millimetres of rain falls annually at Kisarawe, the nearest town with a rain-gauge. Rainfall in the forest is, however, likely to be higher than this. Over January to March 1991 the daily maximum temperature inside the forest varied between 25°C and 31°C with a mean of 28.8°C and the nighttime temperature varied between 20.5°C and 24.5°C with a mean of 22.2°C. In a forest clearing the minimum temperature was 2°C lower at night and a maximum of 8°C higher during the day. Inside the forest the humidity rarely fell below 70%, with rainfall leading to levels of 95-100%.

Hydrology: The site lies within the catchment of streams supplying a small river which leads to Dar es Salaam. Some of the water courses may be permanent.

Geology: A forest grows on a kaolinitic sandstone of Miocene age.

Soils: Variable. All areas possess a thin and dark humous layer. Classical catenary soil successions on slopes appear to exist from the ridge tops through to the valley bottoms.

Altitude and Range: The site has an altitude ranging between 120 and 280 meters above sea level.

2.3.2 Biological Aspects

Habitats: Semi-deciduous coastal monsoon forest: 23.5 kilometres squared

Thicket and Woodland: 12 kilometres squared

Map 2 shows the distribution of these habitats

The forest vegetation can be divided into distinctive wet valley bottom, dry ridge top and intermediate valley side vegetation communities.

Flora: The site is botanically rich and several of the species endemic to the Pugu Hills and other rare coastal forest species were recorded in early 1991. Such species were *Millettia puguensis*, ???? and *Ecobolium umbrossus*. Forests of the Pugu Hills, particularly those of Pugu Forest Reserve are the best studied of any in Tanzania and their botanical importance is well known (see e.g. Howell, 1981).

Vegetation Communities: Distinctive ridge top, valley side, and valley bottom vegetation communities are present in the better preserved areas

of forest. Areas where canopy has been removed have been altered to coastal thicket, which has its own distinctive species associations (similar to the ridge-top forests). The edges of the forest grade into the typical savannah woodland with deciduous plant species. Areas of wetland also support distinctive swampland communities.

Vegetation Structure:

Canopy type: Semi deciduous

Canopy Height: Between 7-10 meters (ridge top) to 35 meters (valley bottom)

Canopy Cover: Variable between 0 and 100%

Shrub Layer Height: 3-5 meters

Shrub Cover: ???

Herb Cover: ???

Amount of Dead Wood: Highly variable and very high in areas of recent logging/pole removal.

Vegetation Structure Importance to other Biotic Groups: The vegetation structure and climatic conditions created by natural forest are essential to the survival of most of the forest dependent species. Surrounding areas of thicket and savannah woodland support their own different species, these are generally of much wider distribution in East Africa and therefore of lower conservation significance.

Fauna:

Mammals: At least twenty species have been recorded. The forest, including that outside the forest reserve, is the only suitable habitat in the area for many of these mammals. Species of interest are listed below:

???????????????

Birds: 58 species have been recorded in the forest. Several of these are classified as threatened or near threatened in the Bird Red Data Book for Africa. The one threatened species recorded was the East Coast Akalat, and the two near-threatened species recorded were the Violet-backed Sunbird and the Southern Banded Snake Eagle. The avifauna is similar to that at the Pugu forest reserve and the additional rare bird species recorded there are probably also present at Kazimzumbwi.

Reptiles: Several species have been recorded, including the Usambara Centipede Eater (a small snake known only from the Usambaras and Matumbi Hills). Others ???

Amphibians: The second known female specimen of the tree frog *Leptopeilis argenteus* was captured. Abundant tree frogs corresponding exactly to the description of *Afrivalus sylvaticus* were also recorded, a species known only from a single forest batch in Kenya. However, tree

frogs corresponding to *A. brachycnemis* (a very common savannah dweller) were found at the same time at the same site. Many of these frogs showed various combinations of characters intermediate between the two species, suggesting that there may be only one species involved.

Invertebrates: A large number of rare or new to science species have been recorded from the Pugu Hills forests (Howell 1981). Extensive collections have been made by frontier in 1991 and preliminary identifications suggest that a species of snail known only from a single shell fragment previously, and the new sub species of Saturnid Moth has been discovered.

2.4 Cultural, Land Use and Socio Economic Features

Historical Aspects:

In the past the forest of which the Kazimzumbwi forest reserve forms a part used to extend to within 20 km of Dar es Salaam. Since the definition of forest reserve boundaries in the early part of this century, virtually all forest vegetation has been removed from areas outside the reserves. There has also been continuing removal of trees and other forest products from within the forest reserves over many years, leading to the situation where only a proportion of the forest retains its original structure. Small farms are present right up to the forest reserve boundaries, although there are local moves within the forestry division to expand the boundary, remove the farmers, and re-forest large areas around the reserves, to preserve water catchment functions and prevent erosion.

Forestry:

The site is a protected forest reserve and therefore logging activities and other forms of exploitation are banned. However, illegal logging and removal of pole sized trees has continued extensively, especially over the last 15 years when the Forestry Division has had a few financial or other resources available to continue patrolling. All trees of the commercial timber value have been removed from the forest; the locals say this logging finished 15 years ago. Until recently logging was continuing solely to provide trees for charcoal production. These were being cut by handsaws and transported to charcoal pits by tractor and/or lorries. An extensive network of logging trails, of old and new, covers the forest. In early 1991 loggers and charcoal burners were met daily and could be heard operating in the forest day and night. Logging for charcoal production and perhaps for firewood, removes virtually all trees from an area. In early 1992 a project to better protect the forest was initiated by the Wildlife Conservation Society of Tanzania. They have employed additional forest guards and have arrested many of the people undertaking these illegal activities. The amount of wood leaving the forest now has been considerably reduced.

Agriculture:

There is little evidence of agriculture within the forest reserve boundaries. However, agriculture exists right up to the boundaries, and with the disputed nature of the boundary in some areas, agricultural usage maybe occurring within the legal forest reserve boundary. However, agricultural encroachment is not a major issue in these forest reserves at the present time.

Pharmaceutical:

A local medicine man had uses for the majority of the species growing in the forest. The presence of up to 11 species endemic to the forest, must mean its potential pharmaceutical importance is significant. Some of these species have already been collected and tested for anti-cancer and anti-aids properties by the National Cancer Institute of America.

Tourism and Recreation:

None.

Water Supply and Management:

Despite much deforestation, at least one permanent stream emerges from the forest. This provides a water supply to settlements to the east of Dar es Salaam. The water catchment potential of the forest is much reduced in comparison with the past, when the larger forested area used to supply the water to the whole of Dar es Salaam.

Scientific Research:

Research has been conducted in the forests of the Pugu hills for a very long time. However, the location of a military base towards the edge of Kazimzumbuwi forest reserve, has rendered access to the site more difficult than to the adjacent Pugu forest reserve. As a consequence, there is far less known about the former site. Visits by Frontier in middle 1990 and early 1991 provide the majority of the recent information on the flora and fauna of the site.

Squatting:

Very little encroachment by settlement has occurred in this particular forest reserve.

Hunting:

Hunting pressure within the forest is high, with many snares being located in early 1991. Hunting for local, and probably commercial operations occurs. Most common species trapped are Duiker and Bush Pig. Black and White Colobus monkeys and Hippopotamus have already been hunted out from the forest, presumably using fire arms.

Extraction of other Forest Products:

Building materials (poles and lianas for ropes) are collected for local use. Poles are also probably collected commercially for sale in Dar es Salaam. Local villages also collect fuel wood, traditional medicines and gum from the forest, all for home consumption.

Surrounding Land Use:

Agricultural land surrounds the forest, and several villages and the town of Kisarawe are located within close proximity. To the east of the forest grades into savannah woodland/Miombo habitats which form the majority of the Ruwu South forest reserve.

3.0 Evaluation

Size:

Along with Pugu forest reserve, the site is one of the larger coastal forests currently known in Tanzania. The site appears large enough to support healthy populations of the all species recorded there, especially as most large mammals have already been hunted out from this site.

Diversity:

A high diversity of coastal forest vegetation types is present and there is a very high species diversity within these vegetation types. The woodland and swamp habitats add diversity to the area.

Naturalness:

The majority of the forest is the natural vegetation community for the location and geographical area. However, logging and removal of other forest products will have extensively altered the vegetation from the primary state. It is considered, however, that this forest is slightly better preserved than the adjacent Pugu forest reserve. Gradations between distinctive ridge-top, valley side and valley-bottom forest communities are a natural feature reflecting the catenary soil succession down the slope.

Rarity:

The coastal forest vegetation is globally threatened thus any large example should be conserved. In addition this forest supports up to 11 endemic species of plants and a number of globally rare and threatened animals, including the East Coast Akalat and the Usambara Centipede Eater.

Fragility:

Left to itself the site is robust. However, with increasing human activities both within the forest and in the surrounding area, the long term survival of the forest, and certainly of the most drought sensitive elements of the flora and fauna must be in doubt. Desiccation of both the canopy and the forest floor is a persistent threat as the canopy is opened by logging activities, and is unable to rejuvenate sufficiently rapidly between logging events. Many of the forest species are extremely desiccation-sensitive and hence they are extremely fragile in the face of extreme disturbance.

Typicalness:

Given that little is known about coastal monsoon forests this forest reserve appears to hold communities typical of wetter coastal forests and also typical of topographic features within such forests. Along with the Pugu forest reserve Kazimzumbwi is possibly the best example of a moist coastal forest in Tanzania.

Position within an Ecological Unit:

The forest is certainly an isolated remnant of a formally more extensive forest which extended almost to Dar es Salaam. Forest may also have existed far more widely in the area in the historical past. The site is now isolated on a range of hills, and the nearest similar, although drier, forests are some 30 kms to the east and 30 km to the north. Kazimzumbwi forest is isolated within a sea of savanna-woodland and farmland vegetation, and hence there is probably only a very limited exchange of species with other forested areas.

Economic Value:

The destructive forestry practises, which have been continuing at the site for the past 15 years, have removed almost all tree species of commercial value. However, the forest is mainly set aside to protect the water catchment. Value of the forest in terms of water supply provision is difficult to assess, but this function has been decreased by deforestation in and around the forest reserve. The value of using the land for agriculture is extremely marginal as yields are low and the topography unsuitable. However, the land can support a low density of subsistence farmers. The main values of the site are as a repository of biological diversity, as a catchment forest, and as an educational resource for the University of Dar es Salaam. Most of these functions are irreplaceable.

Cultural Value:

The forest is an important source of building materials, fuel wood and traditional medicines for the inhabitants of villages surrounding it.

Activities Likely to Damage the Site and its Futures:

- a) Further logging or removal of trees for production of charcoal.
- b) Further intensive removal of poles for building.
- c) Uncontrolled hunting within the forest reserve.
- d) Clearance of the forest for cultivation:
- e) Pest control activities by local farmers which affect monkey populations.

Potential Value of Forest Reserve:

The site has a high conservation value, and supports a high biological diversity. It could be important as a source of genetic material, which could yield untold financial benefits to the country. It is also an example of one of very few remaining coastal forests in Tanzania, all of which have considerable biological importance. The forest is also important for water catchment protection. As there are currently no coastal forests totally protected in Tanzania, a case could be made to upgrade the protected status of the forest, given that resources will have to be made available to ensure the protection and integrity of the site.

4.0 Recommended Management Objectives

To preserve the site as one of the best known coastal monsoon forests remaining in Tanzania with the broad aim in conserving and improving the habitat for all the living there.

To prevent further human encroachment into the site and strictly control....

5.0 MAIN FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

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6.0 MANAGEMENT OPTIONS AND RECOMMENDATIONS

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7.0 APPENDICES

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7.2 Maps

1. Main habitats in reserve.
2. Site definitions and boundaries.
3. Access routes from Dar Es Salaam

SUMMARY OF MANAGEMENT PLAN

SITE: Kazimzumbwe Forest Reserve

MAP SHEET: 1:50000 United Republic of Tanzania series Y742 (D.O.S.422),
sheet 186/3.

GRID REF: 39Deg.03'E 6Deg.56'S

LOCALITY: Kisarawe District, Tanzania, East Africa.

STATUS: Protected Forest Reserve.

MANAGED BY: Regional Natural Resources Office, Coastal Region, P.O. BOX
30080, Kibaha.

DISTRICT FOREST OFFICER: Mr C.A. Secha, Natural Resources (Maliasili),
Kisarawe.

AREA: 3500ha (Total area of reserve), 800ha (Area of forest). (check T207
Epart)

SITE DESCRIPTION:

Kazimzumbwe Forest Reserve lies 15km S/SW of Dar Es Salaam in the Pugu Hills at an altitude of 100-260m above sea level. The vegetation consists of dry to moist evergreen coastal forest, and Miombo wooded grasslands.

The Pugu Hills have had 30 million years of evolution isolated from other forest blocks in Tanzania. This has resulted in a unique island habitat of global importance. Endemism in forest trees of this coastal region is as high as 48% (White 1983). The reserve is a refuge for a unique and diverse fauna including Sykes Monkey (*Cercopithecus sp.*), bushbabies (*Galagos spp.*), bush pig (*Potamochoerus porcus*), duiker (?), Bells' hinged tortoise (?), flap-neck chameleon (?), over 12 species of bat, and more than 87 species of bird.

Botanically the forest has an immense reserve of genetic material, over 500 species having been collected so far.

MANAGEMENT POLICY

- To help conserve the forest.
- To develop scientific research of the forest ecosystem.
- To promote its potential as an education centre.
- To increase local, national and international awareness.

MAIN PRESCRIPTIONS AND OPERATIONS

To liaise with the Forest Department and the Wildlife Conservation Society of Tanzania over conservation and management of the reserve.

To set up a permanent research and education centre near to the reserve.

To maintain a scientific research programme with the University of Dar Es Salaam.

To encourage Tanzanian education establishments to use the center for the benefit of their students and staff.

To increase awareness of this habitat through seminars, articles and reports.

PRESENT AREAS OF MAIN HABITATS IN RESERVE:

For main habitats see map 1. *S FICUS ALBA*