

REPORT ON AVIAN SURVEY IN THE NORTH WESTERN RIDGE OF NGURU SOUTH FOREST RESERVE & ADJACENT AREAS.

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1.1 INTRODUCTION:

Eastern Arc forests are marked by the large number of restricted – range species and genera (e.g Collar and Stuart 1988, Lovett 1988, Lovett and Wasser 1993) many of which are currently known from just one or a few sites. Thus the Eastern Arc is of very high conservation importance. For birds, which are the best-known groups of living organisms, no less than 12 of the World's c.1,111 Threatened species (as listed by Collar et al. 1994, corresponding 11% of the World's c.9000 bird species) are endemic to the Eastern Arc forests.

The Nguru South Forests Reserve (06° 10 'S, 37° 30' E) with an area of 32,908ha and altitudinal range of 380 to 2,400m are in the w.central part of the Eastern Arc Mountains in Tanzania, have long been recognized as one of the key sites for conservation of biodiversity in Africa. Some actions for protecting the forest have already been initiated. However, some portions of the Nguru south FR and adjacent areas have remained unexplored ornithologically prior to this survey.

1.2 Principal values of the Nguru South forests.

Water catchment and prevention of soil erosion and siltation of rivers. The mountain forests of the Nguru forests are extremely important for water catchment. They are of vital importance for the people living on the slopes of the Ngurus, because they.

- Secure a stable and good water supply.
- Maintain a humid climate suitable for agriculture.
- Have a high value for prevention of soil erosion and siltation of rivers and streams in the agriculture areas further down the slopes. This is because they keep much of the water that falls during heavy rains.

The forests are also the main catchment for rivers of highly importance for people outside the Nguru.

- Wami River is the main water source for the Bagamoyo District residents.

1.3 Bird species of special conservation value.

- (a) Banded Sunbird (*Anthreptes rubritroques*)
 - this species qualifies as **Vulnerable**
- (b). Southern Banded Snake- Eagle (*Circaetus fasciolatus*)
 - this species qualifies as **Near Threatened**
- (C) Moreau's Sunbirds (*Nectarinia moreaui*)
 - this species qualifies as **Near Threatened**

A further five forest restricted- range species (breeding range less than 50,000 km² and therefore also of special conservation interests) occur in the mountain forests. The species include.

- (a) white – chested Alethe (*Alethe fuelleborni*)
- (b) Sharpe's Akalat (*Sheppardia sharpie*)
- (c) Chapin's Apails (*Apalis Chapini*) recorded in my previous survey
- (d) African Tailorbird (*Orthotomus metopias*)
- (e) Spot – throat (*Modulatrix stictigula*)

2.1 Fieldwork activities:

The survey was conducted in Feb- March 2005

Localities visited (see Table 1 for localities, duration etc)

2.2 Methods used in this survey.

(i) Mistnetting for 3-4 days

Aim: To obtain a relative measure of the abundance of lower strata species, especially the most skulking ones and to obtain standard biometric data and blood samples and other anatomical materials of the birds for later analysis of evolutionary relationships of Eastern Arc montane forest species.

Technique: Usually one full day was used to put up the mistnets. The following 3 days nets were opened just before the onset of the first bird activity (usually around 5.30 a.m) and kept open until about half an hour before darkness (usually around 6.15 p.m). They were normally checked every hour but more frequently in the early morning or when the weather conditions were not optimal. The nets were closed during the night to avoid entangling of bats and destruction by nocturnal ground dwelling mammals. Attempt was made to mistnet the unidentified owl during the night using modified fishnets in vain.

The length of the net series was the same in both sites where mistnetting was conducted. I generally placed the nets where they would be least visible, but attempted to cover all microhabitats such as shrubs, clearings and areas with mainly open forest floor. Clearing were usually covered by placing the nets just inside the forest edge since a fully visible net in a glade may have a low catch rate.

(ii) General field observation

Aim: To record these species which often occur at such low densities that the above overlooks them mentioned method. Furthermore to record the complete altitudinal range. This was the only method used in the localities where mistnetting was not conducted

Technique: At each locality I searched the area as thoroughly as the time allowed, in order to locate rare species. Where possible I attempted to cover the entire elevational gradient. Special interest was paid to mixed feeding parties where these occurred in order to find rare or Threatened species.

2.3 Principal findings of the fieldwork

177 bird species of 47 families were recorded (see Table II)

175 blood samples were ed forest bird species (see Table III)

43 bird skins were collected from 16 forest bird species (see Table III)

7 Skeletons were collected from 3 forest bird species (see Table III)

44 Pickles were collected from 20 forest bird species.(see Table III)

TABLE 1: Surveyed sites, coordinates, altitudes, habitat description, duration, net –meter hrs and observation hrs.

Surveyed site	Coordinates	Altitude	Habitat Description	Duration of Survey	Amount of time mistnetting(Net/- meter hrs	Obsevationhrs
A. Mtibwa Teak plantation (Mtibwa Forest Reserve)	Longitude: E 37 ⁰ 39' 04" Latitude: S 6 ⁰ 07' 36"	420 m asl	A Teak plantation with no understorey. It was a harvesting time during the survey	February 25-27,2005	No mistnetting conducted due to lack of understorey birds	24hrs (8hrs a day for 3days)
B.Msolokelo camp (Miombo woodland)	Longitude: E 37 ⁰ 41' 12" Latitude: S 6 ⁰ 01' 12"	420- 460 m.asl.	Brachystegia miombo woodland	March 1- 6,2005	No mistnetting conducted due to security reason (peoples,cattle & fire)	72hrs
Jengale Camp	Longitude: E 37 ⁰ 34', 54" Latitude: S 6 ⁰ 00' 28"	1360- 1500m.asl.	Secondary montane forest, many clearance with cardamom shambas.	March 8- 14,2005	5544 net- meter hrs.	
C. Lukindo River Camp	Longitude: E 37 ⁰ 35' 00" Latitude: S 6 ⁰ 02' 28"	1600- 1760m.asl	Secondary montane Forest,with cardamom shambas	March 15- 21,2005	7392 net- meter hrs	13hrs
D.Ubiri camp	Longitude: E 37 ⁰ 33' 39" Latitude: S 6 ⁰ 04' 10"	900m.asl	Sub montane, very disturbed forest patch with cardamom shambas.	March 22-25,2005	No mistnetting conducted	18hrs
F.Mkwajuni Marsh	Longitude E 37 ⁰ 35' 15" S 6 ⁰ 03' 05"	350m.asl	Marsh with papyrus, sarounded by pady fields	March 26-28,2005	No mistnetting conducted due to habitat	14hrs

TABLE II: Systematic list of recorded species (+ = recorded)

FAMILY /SPECIES	Mtibwa Teak Plantation	Msolokelo miiombo woodland	Jengale camp	Lukindo rive	Ubiri cam	Mkwajumi Mars
<i>Family: Phalacrocoracidae</i> Long- tailed Cormorant (<i>Phalacrocorax africanus</i>)						+
<i>Family: Anhingidae</i> African Darter (<i>Anhinga rufa</i>)						
<i>Family: Ardeidae</i> Striated Heron (Green – backed heron) (<i>Butorides striatus</i>)						
Little Egret (<i>Egretta garzetta</i>)						+
Black – headed Heron (<i>Ardea melanocephala</i>)						+
<i>Family: Scopidae</i> Hamerkop (<i>Scopus umbretta</i>)						+

Family: Ciconiidae						
African Open- billed Stork (<i>Anastomus lamelligerus</i>)						+
Family: Accipitrinidae						
Palm – nut Vulture (<i>Gypohierax angolensis</i>)	+ ,flying over					
Brown Snake- Eagle (<i>Circaetus cinereus</i>)		+				
Southern Banded Snake- Eagle (<i>Circaetus fasciolatus</i>)				+		
Lizard Buzzard (<i>Kaupifalco monogrammicus</i>)		+				
African Goshwak (<i>Accipiter tachiro</i>)			+	+	+	
African Cuckoo- Hawk (<i>Aviceda cuculoides</i>)		+				
Bat Hawk (<i>Macheiramphus alicinus</i>)		+				
African Harrier- Hawk (<i>Polyboroides typus</i>)					+	
Augur Buzzard (<i>Buteo augur</i>)		+			+	

Mountain Buzzard (<i>Buteo oreophilus</i>)			+	+		
Tawny Eagle (<i>Aquila rapax</i>)		+				
African Hawk-Eagle (<i>Hieraaetus spilogaster</i>)		+				
Bateleur (<i>Terathopius ecaudatus</i>)		+				
African Crowner Eagle (<i>Stephanoaetus coronatus</i>)			+	+		
Common Kestrel (<i>Falco tinnunculus</i>)		+				
African Hobby (<i>Falco cuvieri</i>)						
Family: Falconiidae						
Red – necked Falcon (<i>Falco chicquera</i>)		+				
Family: Numididae						
Helmeted Guineafowl (<i>Numida meleagris</i>)		+				
Crested Guineafowl (<i>Guttera pucherani</i>)				+		
Family: Phasianidae						
Hildebrandt's Francolin (<i>Francolinus hildebrandti</i>)		+				

Red- necked spurfowl (<i>Francolinus afer</i>)		+				
Harlequin Quail (<i>Coturnix delegorguei</i>)		+				
Family: Jacanidae						
African Jacana (<i>Actophilornis africanus</i>)						+
Family: Columbidae						
African Green Pigeon (<i>Treron calva</i>)		+				
Olive Pigeon (<i>Columba arquatrix</i>)			+	+		
Emerald – spotted wood- Dove (<i>Turtur chalcospilos</i>)		+				
Blue- spotted Wood- Dove (<i>Turtur afer</i>)		+				
Tambourine Dove (<i>Turtur tympanistris</i>)		+		+		
Ring – necked Dove (<i>Streptopelia capicola</i>)		+				
Red- eyed Dove (<i>Streptopelia semitorquata</i>)		+				
Lemon Dove (<i>Aplopelia larvata</i>)			+	+		

Family: Psittacidae						
Brown – headed Parrot (<i>Poicephalus cryptoxanthus</i>)		+				
Family : Musophagidae						
Purple- crested Turaco (<i>Tauraco porphyreolophus</i>)		+				
Livingstone’s Turaco (<i>Tauraco livingstonii</i>)			+	+	+	
Family: Cuculidae						
Red – chested Cuckoo (<i>Cuculus solitarius</i>)			+			
Black Cuckoo (<i>Cuculus clamosus</i>)		+				
Barred – long tailed Cuckoo (<i>Cercococcyx montanus</i>)			+	+		
Diederick Cuckoo (<i>Chrysococcyx caprius</i>)		+				
Klaas’s Cuckoo (<i>Chrysococcyx klaas</i>)		+			+	
African Emerald Cuckoo (<i>Chrysococcyx cupreus</i>)		+				
White- browed Coucal (<i>Centropus superciliosus</i>)		+			+	
Family: Strigidae						
African Wood Owl (<i>Strix woodfordii</i>)		+	+	+	+	
Verreaux’s Eagle- Owl (<i>Bubo lacteus</i>)		+				
Family: Caprimulgidae						
Fiery – necked Nightjar (<i>Caprimulgus pectoralis</i>)		+				

Family: Apodidae Little Swift (<i>Apus affinis</i>)	+ flying over	+			+	+
White – rumped Swift (<i>Apus caffer</i>)			+			
African Palm Swift (<i>Cypsiurus parvus</i>)		+			+	
Bohm’s Spenetail (<i>Neafrapus boehmi</i>)	+ flying over	+				
Family: Coliidae						
Speckled Mousebird (<i>Colius striatus</i>)		+			+	
Family: Trogonidae						
Bar – tailed Trogon (<i>Apaloderma vittatum</i>)			+	+		
Family : Alcediniidae						
Pied Kingfisher (<i>Ceryle rudis</i>)		+ at Lusonge river				+
Striped Kingfisher (<i>Halcyon chelicuti</i>)		+				
Brown- hooded Kingfisher (<i>Halcyon albiventris</i>)		+				
Giant Kingfisher (<i>Megaceryle maxima</i>)		+ at Lusonge river				
Malachite Kingfisher (<i>Alcedo cristata</i>)						+
African Pygmy Kingfisher (<i>Ispidina picta</i>)					+	

Family: Meropidae						
Little Bee- eater (<i>Merops pusillus</i>)	+ at the edge	+				
White throated Bee- eater (<i>Merops albicollis</i>)		+		+ a flock flew over		
European Bee- eater (<i>Merops apiaster</i>)		+				
Northern Carnime Bee- eater (<i>Morops nubicus</i>)		+				
Family : Coraciidae						
Broad – billed Roller (<i>Eurystomus glaucorus</i>)		+				
Lilac – breasted Roller (<i>Coracias audate</i>)		+				
Family :Phoeniculidae						
Green Wood – hoopoe (<i>Phoeniculus purpureus</i>)		+				
Family: Upupidae						
African Hoopoe (<i>Upupa Africana</i>)		+				

Family: Bucerotidae						
Von der Decken's Hornbill (<i>Tockus deckeni</i>)		+				
African Grey Hornbill (<i>Tockus nasutus</i>)		+				
Crowned Hornbill (<i>Tockus alboterminatus</i>)					+	
Trumpeter Hornbill (<i>Bycanistes bucinator</i>)		+	+	+	+	
Silvery – cheeked Hornbill (<i>Bycanistes brevis</i>)			+	+		
Family: Capitonidae				+		
Yellow – rumped Tinkerbird (<i>Pogoniulus bilineatus</i>)						
Green Barbet (<i>Stactolaema Olivacea</i>)			+	+	+	
d' Arnaud's Barbet Trachyphonus darnaudii		+				
Family: Indicatoridae						
Greater Honeyguide (<i>Indicator indicator</i>)		+				
Scaly – throated Honeyguide (<i>Indicator variegates</i>)			+		+	
Lesser Honeyguide (<i>Indicator minor</i>)		+				

Family: Picidae						
Cardinal Woodpecker (<i>Dendropicos fuscescens</i>)		+				
Olive Woodpecker (<i>Dendropicos griseocephalus</i>)				+		
Family: Eurylaimidae						
African Broadbill (<i>Smithornis capensis</i>)			+	+	+	
Family: Hirundinidae						
Mosque Swallow (<i>Hirundu senegalensis</i>)	+, flying over	+				+
Lesser Striped Swallow (<i>Hirundu abyssinica</i>)	+, flying over					
Black Saw – wing (<i>Psalidoprocne holomelas</i>)			+	+	+	
Family: Motacillidae						
African Pied Wagtail (<i>Motacilla aguimp</i>)	+, at the headquarters	+, at the settlement				+, at the settlement
Mountain Wagtail (<i>Motacilla clara</i>)				+		
Family: Campephagidae						
Black Cuckoo – shrike (<i>Campephaga flava</i>)		+				
White – breasted Cuckoo-shrike (<i>Caracina pectoralis</i>)		+				
Family: Pycnonotidae						
Common Bulbul (<i>Pycnonotus barbatus</i>)	+, at the edge	+			+, at the edge	

Little Greenbul (<i>Andropadus virens</i>)			+	+	+	
Montain Greenbul (<i>Andropadus nigriceps</i>)				+		
Shelley's Greenbul (<i>Andropadus masukuensis</i>)						
Stripe – cheeked Greenbul (<i>Andropadus milanjensisi</i>)			+	+	+	
Yellow – streaked Greenbul (<i>Phyllastrephus flavostriatus</i>)			+	+		
Cabanisi's Greenbul (<i>Phyllastrephus cabanisi</i>)			+	+		
Tiny Greenbul (<i>Phyllastrephus debilis</i>)			+	+		
Family: Turdidae			+	+	+	
White – starred Robin (<i>Pogonocichla stellata</i>)						
Sharpe's Akalat (<i>Sheppardia sharpie</i>)			+	+		
White – chested Alethe (<i>Alethe fuelleborni</i>)			+	+		
White – browed Robin – Chat (<i>Cossypha heuglin</i>)		+				

Olive Thrush (<i>Turdus olivaceus</i>)				+		
Kurrichane Thrush (<i>Turdus libonyanus</i>)		+				
Orange Ground – Thrush (<i>Zoothera gurneyi</i>)			+	+		
Sport – Throat (<i>Modulatrix stictigula</i>)			+	+		
Common Rock – Thrush (<i>Monticola saxatilis</i>)		+				
White –browed Scrub – Robin (<i>Cercotrichas leucophrys</i>)		+				
Family: Sylviidae						
Yellow – throated Woodland Warbler (<i>Phylloscopus ruficapillus</i>)			+	+		
Kretschmer’s Longbill (<i>Macrosphenus kretschmeri</i>)					+	
Red – faced Crombec (<i>Sylvietta whytii</i>)		+				
Green – caped Eremomela (<i>Eremomela Scotops</i>)		+				
Croaking cisticola (<i>Cisticola natalensis</i>)		+				
Rattling Cisticola (<i>Cisticola chiniana</i>)		+				
Red – Winged warbler (<i>Heliolais erythroptera</i>)		+				
Tawny – flanked Prinia (<i>Prinia subflava</i>)	+, at the edge					+, at the edge

Grey – backed Camaroptera (<i>Camaroptera brachyura</i>)		+				
Yellow – breasted Apalis (<i>Apalis flavida</i>)		+				
Black – headed Apalis (<i>Apalis melanocephala</i>)			+			
Bar – throated Apalis (<i>Apalis thoracica</i>)				+		
Family: Muscicapidae						
Sported Flycatcher (<i>Muscicapa striata</i>)		+				
Pale Batis (<i>Batis soror</i>)		+				
Forest Batis (<i>Batis mixta</i>)			+			
African Paradise – flycatcher (<i>Terpsiphone vividis</i>)		+	+	+	+	
Blue mantled Crested Flycatcher (<i>Trochocercus cyanomelas</i>)					+	
White – tailed Crested – flycatcher (<i>Trochocercus albonotatus</i>)			+	+		
Family: Timalidae						
Arrow – Marked Babbler (<i>Turdoides jardineii</i>)		+				
Family: Remizidae						
African Penduline – Tit (<i>Anthoscopus caroli</i>)		+				
Family: Zosteropidae						
Yellow White – eye (<i>Zosterops senegalensis</i>)				+		

Family: Nectariniidae						
Moreau's Sunbird (<i>Cinnyris moreau</i>)				+		
Amethyst Sunbird (<i>Chalcomitra amethystine</i>)		+				
Banded Green Sunbird (<i>Anthreptes rubritorques</i>)				+		
Olive Sunbird (<i>Cynomitra olivacea</i>)			+	+	+	
Scarlet - chested Sunbird (<i>Chalcomitra senegalensis</i>)		+				
Collared Sunbird (<i>Hedydipna collaris</i>)			+			
Family: Malaconotidae						
Tropical Boubou (<i>Laniarius aethiopicus</i>)		+			+, at the edge	
Black – backed Puffback (<i>Dryoscopus cubla</i>)		+	+	+		
Black – crowned Tchagra (<i>Tchagra senegala</i>)		+				

Sulphur – breasted Bush – shrike (<i>Malaconotus sulfureopectus</i>)		+				
Grey – headed Bush – shrike (<i>Malaconotus blanchoti</i>)		+				
Black – fronted Bush - Shrike (<i>Malaconotus nigrifrons</i>)			+	+		
White – crested Helmet – shrike (<i>Prionops plumatus</i>)		+				
Ret'z Helment – shrike (<i>Prionops retzii</i>)		+				
Family: Dicruridae Fork – tailed Drongo (<i>Dicrurus adsimilis</i>)		+				
Square – tailed Drongo (<i>Dicrurus ludwigii</i>)			+	+	+	
Family: Corvidae Pied Crow (<i>Corvus albus</i>)	+, at the settlement	+, at the settlement				+, the the settlement
White – napped Raven (<i>Corvus albicollis</i>)			+	+		
Family: Oriolidae African Black - headed Oriole (<i>Oriolus larvatus</i>)		+				

Green – headed oriole (<i>Oriolus chlorocephalus</i>)			+	+	+	
Family: Sturnidae						
Red - winged starling (<i>Onychognathus morio</i>)					+	
Waller’s Starling (<i>Onychognathus walleri</i>)			+	+		
Violet – backed starling (<i>Cinnyricinclus leucogster</i>)		+				
Family: Ploceidae						
Grey – headed Sparrow (<i>Passer griseus</i>)	+, at the headquarters					+, at the settlement
Black - headed Weaver (<i>Ploceus cucullatus</i>)		+				
Lesser Masked Weaver (<i>Ploceus intermedius</i>)		+				
Spectacled Weaver (<i>Ploceus ocularis</i>)					+	
Grosbeak Weaver (<i>Amblyospiza albifrons</i>)					+	
Dark – Backed Weaver (<i>Ploceus bicolor</i>)			+			

Red – Billed Quelea (<i>Quelea quelea</i>)		+				
Red – headed Weaver (<i>Anaplectes rubriceps</i>)		+				
Fan – tailed Windowbird (<i>Euplectes axillaries</i>)		+				
Yellow Bishop (<i>Euplectes capensis</i>)		+				
Black – winged Red Bishop (<i>Euplectes hordeaceus</i>)		+				
Family: Estrildidae						
Green – winged Pytilia (<i>Pytilia melba</i>)		+				
Red – faced Crimsonwing (<i>Cryptospiza reichenovii</i>)			+	+	+	
Red – cheeked Cordon – bleu (<i>Uraeginthus bengalus</i>)		+				
Red – billed Firefinch (<i>Logonosticta Senegala</i>)		+				
Yellow – bellied Waxbill (<i>Estrilda quartinia</i>)					+, at the edge	
Common Waxbill (<i>Estrilda astrild</i>)		+				

Bronze Mannikin (<i>Lonchura bicolor</i>)		+				
Pin – Tailed whydah (<i>Vidua macroura</i>)		+				
Steel – blue whydah (<i>Vidua hypocherina</i>)		+				
Family: Fringilidae						
Yellow – Fronted canary (<i>Serinus mozambicus</i>)		+			+, at the edge	
Yellow – rumped Seedeater (<i>Serinus reichenowi</i>)		+				
Cabanis' s Bunting (<i>Emberiza cabanisi</i>)		+				

LIST III. COLLECTED ANATOMICAL SPECIMERS

SPECIES	DNA SAMPLES	SKINS	SKELETONS	PICKLES
Accipiter tachiro	2	1		1
Aplopelia larvata	1			
Tauraco livingstonii	5	3	1	2
Pogoniulus bilineatus	1			1
Stactolaema olivacea	12	2	1	
Smithornis capensis	3			
Andropadus virens	2			2
Andropadus mesukuensis	31	6	5	6
Andropadus milenjensis	8	4		4
Phyllastrephus flavostriatus	4	3		1
Phyllastrephus debilis	14	8	1	5
Phyllastrephus cabanisi	16	1		4
Pogonocichla stellata	2			
Sheppardia sherpei	16	4		3
Alethe fuelleborni	14			2
Turdus olivaceus	1			1

Zoothera gurneyi	3	1		1
Modulatrix stictigula	4	3		1
Phylloscopus ruficapillus	4	2		1
Batis mixta	1	1		
Terpsiphone viridis	5			
Trochocercus albonotatus	2			1
Cinnyris moreani	1	1		1
Cyanomitra olivacea	15	1		2
Dicrurus ludwigii	1			1
Cryptospiza reichenovii	7	2		4

3.1 Problems:

Population increase, agriculture, fires and resource utilization activities associated with these people are the most significant threats to the continues existence of the forests and adjacent areas and the species they contain.

Cultivation of cardamom

The cultivation of cardamom is an important contributory in the loss of forest in Nguru South. Cardamom is used as a spice for seasoning throughout much of Asia and to flavor coffee in Arab – speaking countries. Cardamom production has grown rapidly since its introduction to Tanzania in the 1960s, and Tanzania has produced over the last two decades up to 9% of the world's output (Slitz 1980). The other major producers of cardamom are India, Sri Lanka, Guatemala and Laos.

Within the Eastern Arc Mountains, the Usambara Mts (East) are the largest producer of cardamom and account for nearly 90% of the country's production although increasing amounts of cardamom is now grown in the Nguru Mts.

Illegal logging, shifting cultivations in adjacent areas

A surveyed Miombo woodland at Msolokelo area between Nguru south and Kanga Forest reserves seems to hold a large number of bird and tree species of conservation interest. Although this area is a public land needs an urgent conservation action. This area attracts many people for agriculture (shifting cultivation), cattle grazing and illegal commercial logging. A businessman from Mtibwa town employ a group of pit - saws with chen-saws working in this miombo woodland illegal. The most affected trees include Mninga (*Pterocarpus angolensis*), Mtondoro (*Brachystegia spiciformis*), Mhembeti (*Dalbergia melanoxylon*), Mvule(*Melicia excelsa*). Charcoal production does occur as well in a big extent.

3.2 Conservation recommendations

The forest reserve in the Nguru South are now known to harbour some globally important birds and some Eastern Arc endemics and near endemics. The reserve and adjacent Miombo woodland appear to be under big threat.

The following recommendations are suggested to promote the conservation of, and to enhance our understanding of the forest and their biota in the Nguru South (see also a detailed review on forest conservation in Tanzania in Rodgers (1993))

- a. The villagers need to be educated about the importance of the forest and be actively involved with indigenous tree- planting activities in the area. These trees could form a shadow suitable for cardamom farming which most of the villagers are interested in. The trees could too form a buffer zone around the forest reserve and could be harvested for timber and firewood on a continuous basis.
- b. Urgent mapping of the remaining needs to be conducted.

- c. All the boundaries need to be clearly marked with tree cordons; although the boundary in Maskati area remained to be completed.
- d. Old forest rangers be transferred. Only with these incentives and co – operative officials, with they be able to prevent any further destruction from taking place in the forests.
- e. Long – term research on birds is requirement in this forest and adjacent Miombo woodland. The Owl that is possible a new species was heard calling in different localities and need to be identified.

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