

## Field Report of Project

**Title:** Conserving the avifauna of the unprotected Njinsing–Tabenken (CM011) forest; an important Bird Area for the endemic *Platysteiralaticincta* and *Tauracobannermani*

**Location of project:** *The Njinsing montane forest is located west of the road between Kumbo and Nkambe, North-East of Mount Oku (CM012), Cameroon.*

**Amount of funding receive from ABC (in UK £):** 2,271.86

**Project start and end dates:** September 2018-march 2020

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**Academic status:**

*University degree (Master's thesis)*

**Member of ABC:** Member

**Project Abstract:**

### ABSTRACT

This study dubbed **Conservation challenges of the endemic Banded Wattle Eye and the Bannerman's Turaco in the Njinsing -Tabenken forest, North Western Cameroon** was carried out from August 2018 to February 2019 and sought to determine the population size, conservation challenges and perceptions of the local population on the conservation of the Banded Wattle Eye and Bannerman's Turaco in the Njinsing-Tabenken Forest. The study used point transects to collect information on the population size and species' conservation challenges. Point stations had radius of 50m and measured 100m apart. Transects were 500m long and were randomly stratified following an altitudinal gradient. Semi-structured questionnaires were also used to collect additional information on conservation challenges. Results obtained revealed that out of a total number of 54 Bannerman's Turaco Banded and 18 Banded Wattle Eye individual species (giving a total of 72 species) were recorded. Bannerman's Turaco individuals were estimated at 5.4/km<sup>2</sup> and Banded Wattle individuals at 1.8/km<sup>2</sup>. From the 72 individual species recorded (Banded

Wattle Eye and Bannerman Turaco), Bannerman Turaco had the highest number of individual species (n=32) during the dry season with Banded Wattle Eye recording the least number (n=8). In the rainy season Bannerman Turaco recorded 22 individual species while the Banded Wattle Eye recorded 10 individual species. Between the two villages sampled, Tabenken village recorded more individuals of both species than Binka (n=49), and (n=23) respectively). Habitat assessment of the Njising-Tabenken forest showed a reduction through bushfires, logging, foot paths, and extensive cattle grazing with farming constituting the main anthropogenic threat. Despite the opinion of the 138 respondents (92%) out of 150 who said birds should be protected, avoidance of encroachment into the forest by the villagers could be a better option to as improve on the bird population within the seasons.

**Key Words:** *Conservation, Challenges, Banded Wattle Eye, Bannerman's Turaco, Njising-Tabenken Forest.*

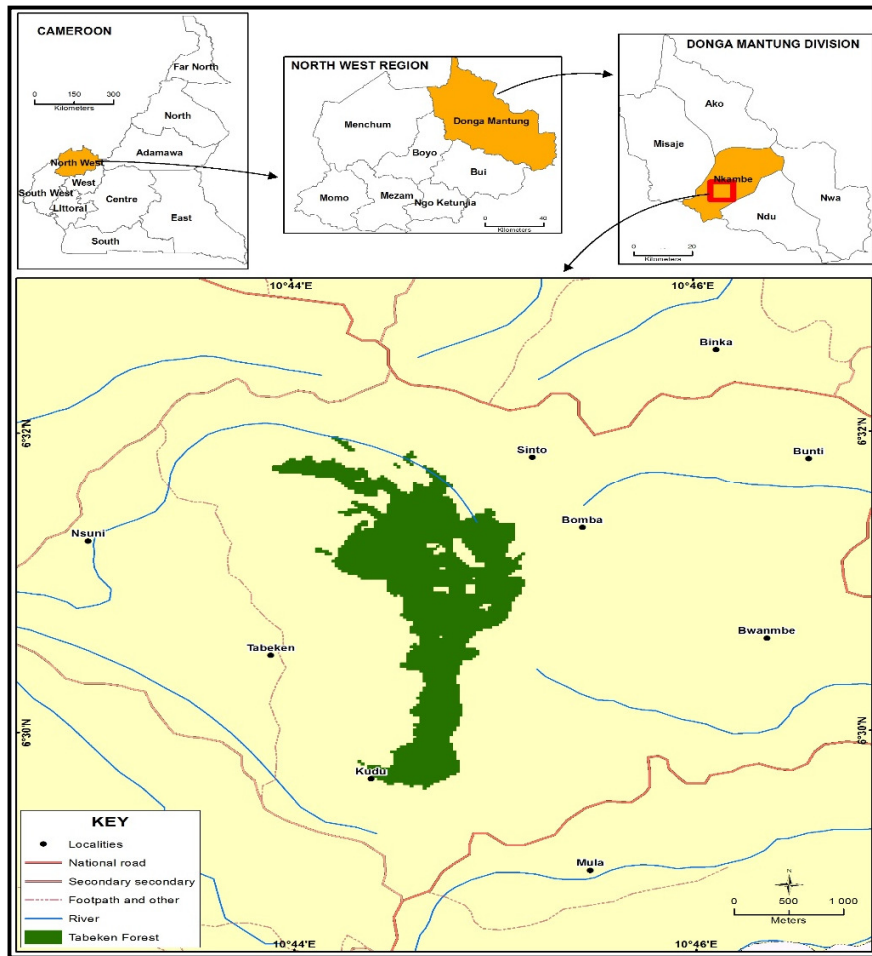
### **Methods:**

The montane forest, known as Njising-Tabenken, is located west of the road between Kumbo and Nkambe, North-East of Mount Oku (CM012). The geographic coordinates are 6° 30' 58" North (6.52°) and 10° 44' 38" East (10.74°). It has a remaining total land surface area of an approximated 2,500 ha, with currently a degraded form in some patches closer to human settlement (Figure 1).

The North-west Regions of Cameroon in general have a typical equatorial highland climate. The seasons are more defined by rainfall since rainfall is more seasonal and distinct. There are two seasons: an extended and intense eight-month wet season extending from March to October and a profound four-month dry season, which lasts from November to February. Mean annual rainfall is 3500 mm with peak rainfall occurring in August, exceeding 6000 mm in some years. The mean annual temperature is 21 °C, with an average maximum of 26°C and a minimum of 19 °C. February is the hottest month with monthly mean maximum temperature of 28°C, while August is the coldest (Neba 1987).

Soils within the Donga Mantung Division are azonal, with hydromorphic alluvial soils being the dominant types. The soils are mostly immature and do not have well defined horizons (Neba, 1987). The volcanic soils found around most of the volcanic areas are of different types depending on the kind of volcanic materials on which they have developed. The soils in this region are generally more fertile and thicker down the valleys than in uphill areas.

The Njising-Tabenken forest is a small strand of sub-montane forest located at the height of 1800 m. It is the main water shed for more than 3 villages. These rivers flow to the two major villages sharing the forest (Tabenken and Binka), dendritically.



**Figure 1.** Geographic location of the Njising-Tabenken forest, North Western, Cameroon

The vegetation is typically montane with emergent species including *Croton macrostachyus*, *Podocarpus latifolius*, *Polyscias fulva*, *Albizia gummifera*, *Schefflera abyssinica* and *Prunus africana*. The forest is greatly disturbed, as it is the main source of fuel wood for the surrounding villages.

Between 60-80 bird species have so far been recorded in the area during surveys done by MacKay (1994), and Njabo & Languy (2000). According to MacKay (1994), fifteen species are restricted to the Afrotropical Highlands Forest biome, four species to the Sudan–Guinea Savanna biome and ten (10) to the Guinea–Congo forests biome (Criterion A3); twelve (12) are restricted to the EBA086 (Criterion A2) and three are of global conservation concern (Criterion A1). Species of global conservation concern include *Turaco Turaco bannermani* (EN), the Bangwa forest Warbler (*Bradypterus bangwaensis*) (NT) and Bamenda Apalis (*Apalis bamendae*) (which may be VU) that are all considered near to strictly endemic to the country (Stattersfield *et al.*, 1998; and Bergl *et al.*, 2006)

Agriculture is the main activity carried out by the two main surrounding villages of the Njising-Tabenken forest (Binka and Tabenken). Agriculture is mainly subsistent, with the cultivation of crops like maize, beans, cassava, cocoyams, banana, Irish potatoes, yellow yams and plantain, and

extensive cattle rearing. Logging involves cutting down of trees for timber and fuel wood. Hunting is not a major activity of the people in the villages but is practiced by few people.

### **Study Design (Conception and layout)**

This study was carried out in the Northern part of the Bamenda Highlands between 2018 and 2019. Two villages (Tabenken and Binka) sharing the Njising-Tabenken forest were sampled for data collection. The sample area from which results were generalized was determined using stratified random sampling; a best-suited design for distinct habitats as was the case with the study area. In this type of sampling strategy, the area of interest is usually broken down into different sub-areas, known as strata, and more priority given to areas more likely to be occupied by the species under survey (Camacho *et al.*, 2010). This method was also adopted because randomly sampling across the whole area might quite by chance, have resulted in selecting a high proportion of samples in the area where the species is largely absent leading to an imprecise and inaccurate estimate of the species population. Due to ecological habitat preference of the species, typically found at high canopies of dense, primary forests, 50% preference was given to gallery forests, 25% to primary and 20% to farmlands (Camacho *et al.*, 2010). Sample units were selected using Google earth maps from where coordinates of these selected units were extracted and stored as waypoints in the GPS. Semi-permanent transects of 500 m each were established cutting across the various habitat types. Surveys were conducted after every 100m along individual transects. Habitat assessment to determine human activities within the forest were determined at survey points with indices canned within a radius of 50m. Questionnaires were administered to local forest users with more of the respondents in Binka and Tabenken villages.

Various kinds of ornithological field equipment were used to study the Bannerman's Turaco and the Banded Wattle Eye. These equipment included: A handheld GPS (Garmin 20 etrax), which was used to record geographical coordinates, elevation and the length of line transects. An MP3 sound recorder was used in recording the vocalizations of the birds' species. A pair of binoculars (75x35) was used in watching the duo via the vegetation to great heights and also at great distances. A Canon digital camera was used for taking photographic images of birds and other field activities. A Pro-wild hunting Laser Rangefinder was also used in identifying species along varied distances read on the rangefinder. A bird identification book dubbed "Birds of Western Africa" (Sound Edition) by Nik Borrow and Ron Demey (2014) was used in the identification of the species. This book also gave very important information about the ecology of the species. A pair of compass was used in the identification of direction along transects. Tags were used in indicating various distances 100 m apart along a 500-m transect. A refurbished tent was used for sleeping at the four camping stations during the field activities (see attached photos)



**Figure 2 a-f.** Materials used for field data collection. **a.** pair of rangefinders used for identification of species at varied distances. **b.** Refurbished tent used for lodging by the project team during field data collection. **c.** Garmin eTrex GPS and compass (for geographical coordinates and determining the North, respectively). **d.** MP3 Sound recorder (for recording bird sounds) during field activity. **e.** Canon digital camera for photos of birds and other features. **f.** Pair of binoculars for observing and identifying birds and other features at distances.

### Data collection

Point count transects differ from line transects in that the observer travels along a transect and stops at predefined spots, allows the bird time to settle, and then records all the birds seen or heard for a predefined time ranging at extremes from 2 to 20 minutes (William *et al.*, 1989). The point count transect method along transects was used as it increased probability of precision due to the

prolonged observation time per point. Given that one of the species (the Banded Wattle Eye) is a very shy and elusive species, collecting data at survey points also helped to prevent noise that would have resulted from collecting data along transects, given the hilly terrain. Census stations were positioned across the different habitat/vegetation types (sampling units) using a random stratified sampling technique (Bibby *et al.*, 2000). Distance sampling (Buckland *et al.*, 2001) covers a variety of sampling methods where the absolute density of a bird population is derived from measurements of distances either perpendicular to a line (line transects) or radially from a point to the object of interest (point counts).

Transects of 500-m length were established with bird survey points mounted after every 100 m. to avoid double counting. Each transect was at least 300 m away from the other; and to avoid edge effects, all transects were at least 100 m away from the forest edge. A total of 100 count stations were established along a total of 20 transects. Point counts were conducted in the mornings beginning with increased bird activity and lasted three hours, and in the afternoons beginning from 15:00. The time for bird sampling in each station was 15 minutes to avoid bird double counting (Buckland *et al.*, 1993). Avian mobility, cryptic behaviors and complex habitat structure can easily invalidate distance estimation of population densities. But, provided model assumptions are satisfied, unbiased density estimates are possible (Terry and Murray 2012). This was taken in consideration especially for a cryptic species like the Banded Wattle Eye.

The following Underlying Assumptions were considered for the data collection:

- ✓ All birds or other objects of interest (such as burrows or nests) directly above or on the transect line or point are detected;
- ✓ Birds and other objects of interest do not move prior to detection during a count. A snapshot is usually obtained all birds are detected as if stationary.
- ✓ Distances from a transect line or point to birds or other objects of interest are accurately measured.
- ✓ Individuals or clusters of individuals are detected independently of other such units.
- ✓ Sample points or line transects are distributed over the area of interest according to a probability-based sampling design (simple random, systematic, stratified, etc.).
- ✓ The bird population remains constant throughout the survey period.
- ✓

A habitat recording form was used in the field for data collection. Habitat data was collected at bird survey points between 12:00 and 2:00 pm (interval between morning and afternoon data collection on bird population), during birds' inactivity Area was assessed within a 50-m radius at each census station.

Data collected as a result of human activities included deforestation and tree debarking, grazing, local traditional traps and bushfires. A total of one hundred and fifty (150) semi-structured questionnaires were administered to a sample population of about 15000 forest users of the two main surrounding villages of the Njising-Tabenken forest (Binka and Tabenken). The interviews and questionnaires were administered independently from forest activities in both the rainy and

the dry seasons between the months of July, August and September and December 2018 and in January 2019. The semi-structured questionnaires were designed to get information on the following: 1) The population dynamics of the Banded Wattle Eye and Bannerman's Turaco, 2) The perceptions of the local population towards bird conservation, and 3) The presence or absence of laws restricting bird conservation.

### **Data analysis**

Field data was collected and entered into field data sheets. This data was organized and stored in Microsoft Excel 2007 spreadsheets, which were then summarized in tabular form and transferred for analysis. From the data collected, population abundance was estimated for both species. A descriptive analysis of the population abundance equally was done using Statistical Package for Social Science (SPSS) version 20.0. The comparison of bird populations within the seasons, habitat types, bird conservation perceptions by within communities was done using the student T-test. Density was calculated using the formula provided by Edward *et al.* (2016). That is density ( $D$ ) =  $n/2Lw$  (or =  $n/k\pi r^2$ ) where  $n$ = number of animals counted,  $L$ =length of the transect ( $k$  = no. points counted),  $w$  = effective width ( $r$  = effective radius).

Data from questionnaires was also grouped and summed up by response categories representing the results as percentages and charts. The Chi-square goodness-of-fit test was again used to determine whether the distribution of respondents in a single categorized variable (gender, occupation, age) followed a hypothesized known distribution. The Chi-square test of independence was used to examine the relationship between variables. Here, a contingency or cross classification table was used to examine the nature of the relationship between variables. This included, for example, the relationship between gender, age and occupation on the perception of conserving the birds in the Njising-Tabenken forest. A significant level of ( $P \leq 0.05$ ) was used to examine the significance of the relationship between variables.

## **RESULTS AND INTERPRETATION**

### **Population abundance**

During the entire field work, a total number of 72 observations were made for both the Bannerman's Turaco and Banded Wattle Eye. Out of the 20 transects (100 point count stations sampled), records of positive identifications were made only in 72 point count stations, with no record of sightings at 28 stations for the two bird species. In order to ensure that there was no double counting of birds, the identified birds were spotted through calls or physical eye view and sometime allowed for the bird to settle, and then recorded as seen or heard for a predetermined time, ranging, at the extremes, from 2 to 20 minutes. Careful observation and common sense was employed with flying birds not recorded as well as non-record of likely the same individual birds detected from subsequent point counts sections.

Out of the 72 individual bird species recorded, the Bannerman's Turaco recorded the greatest number of individuals ( $n=49$ ) with an estimated density of  $5.4/\text{km}^2$ . The Banded Wattle Eye recorded a total number of 23 individuals spread across the two habitat types ( $n= 23$ ) with an estimated density of  $1.8/\text{km}^2$  (Table 1). Between the two villages sampled (Tabenken and Binka), Tabenken registered the highest number of individuals of both the Bannerman's Turaco and the Banded Wattle Eye ( $n=54$ ) as opposed to Binka that registered ( $n=18$ ). Tabenken registered the highest number of the Bannerman's Turaco ( $n=36$ ) and Banded Wattle Eye ( $n=13$ ) individual

species as opposed to Binka that registered (n=18) and (n=5) individuals species for Bannerman's Turaco and Banded Eye, respectively (Table 1).

**Table 1:** Population density estimate of the Banded Wattle Eye and the Bannerman's Turaco within the two main villages of Binka and Tabenken in Njising Tabenken Forest.

	Species	Density/km <sup>2</sup>	Count
Species	Bannerman's Turaco	5.4	49
	Banded Wattle Eye	1.8	23
	<b>Total</b>	<b>7.2</b>	<b>72</b>
Village/species	Tabenken/Bannerman's Turaco		36
	Binka/Bannerman's Turaco		18
	<b>Total</b>		<b>54</b>
	Tabenken/Banded Wattle Eye		13
	Binka/ Banded Wattle Eye		5
	<b>Total</b>		<b>18</b>

*More details of the project results available on request*

### Other Project outputs

- A final report of this project was submitted to the local authorities of the villages, Divisional and Regional Delegations of the Ministry of Forestry and Wildlife for Donga Mantung and North West respectively.
- The analyzed results were submitted and defended in partial fulfillment of the requirement for a Professional Master of science Degree in Biodiversity Conservation in the department of Biological Sciences, Faculty of Science of the University of Bamenda.
- A manuscript has been accepted by the international Journal of Biodiversity and Conservation coauthored by Kari Jackson and Prof. Tamungang Simon Awfor

- Awareness campaigns were carried out alongside the project through focus group discussions and workshops. Talks were given using supportive materials (posters, T-shirts, fliers) on the threats to the fauna and associated ecosystems during conservation education campaigns. This is a very crucial target group, as the site may be placed in a Community-based Natural Resources Management (CNRM) framework for more effective conservation process. 100 T-shirts bearing the ABC logo and picture of the aforementioned two birds as promotional material will be designed, produced and distributed to meritorious students during the lectures. Some of the T-shirts will also be given out to our able field guides during the survey.

### **Conservation impact**

- By providing information about the population status as well as its distribution of the species, the results obtained were first of its kind and will bring more evidence about the site's importance made available to the authority in charge of Forestry and Wildlife in Cameroon (Ministry of Forestry and Wildlife, MINFOF), and most especially, the local authorities on which basis, they can make informed decision on whether to designate the forest as a Protected Area; a sanctuary, an eco-touristic site or attributed some traditional significance.
- Also the results are a baseline in designing a management plan for the site but more importantly, implementing immediate actions.
- Research results contribute to the update of Cameroon's National Biodiversity Strategy Action Plan (NBSAP) and the global biodiversity conservation priority areas.
- Recommendations drawn from this work will act as an instrumental tool not only to highlight the biodiversity importance of *the* Njinsing forest, but also (with the intervention of stakeholders), protect the entire habitat.
- Internationally, the study will contribute in the updating of the available information on the species in the data based developed by IUCN and Birdlife.

### **Referees**

s/n	Name	Institution	Contact
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4.	Dr Rosemary Tonjock	UBa	Email: rosemary32us@yahoo.com

**Budget:** Total project budget in Euros = **2,600** Amount requested from ABC = **2,271.86**

The project budget was strictly used as follows:

Item description	Qty	Unit cost (FCFA)	Total cost (FCFA)	Cost (£)	Donor(s)
Hand-held GARMIN 60® GPS	1	200.000	200.000	285.71	Personal income
MP3 stereo audio recorder & speaker	1	30.000	30.000	42.86	
Digital Camera with 20X Zoom	1	250.000	250.000	357.14	
Binoculars	1	250.000	250.000	357.14	

Tent, sleeping mat & sleeping bag	1	100.000	100.000	142.86	African Bird Club (ABC)
Field guide/research assistants	60days	3000/day	180.000	257.14	
Feeding allowance	60days	2000/day	120.000	171.43	
posters	100	2.000	200.000	285.71	
T-shirts as promotional materials	50	2500	125.000	178.57	
Transportation	1	15000	150.000	214.29	
Laser rangefinder	1	150.000	150.000	214.29	
Sensitization/school lectures	5	10.000	50.000	71.43	
Report preparation	10 copies	1.500	15.000	21.43	
<b>Total cost</b>			1,820.000	2,600	

1 EUR =655.957 approximated at 700 for convenience





# SUSTAINABLE RURAL DEVELOPMENT (SURUDEV)

“ Sealing the deal with sustainable development ”

## Njising-Tabenken Montane Forest Conservation Initiative

The Njising-Tabenken montane forest is located west of the road between Kumbo and Nkambe, North-East of Mount Oku (Gm012). It has a remaining total land surface area of an approximated 2,500ha with a current degraded form in some patches closer to human settlements. This strand of montane forest is very rich in fauna and flora. Despite this, it is under serious threat from the surrounding communities. Key sight species include: the Endemic and Endemic Bannerman's Turaco and related taxa like the Banded Wattle Eye, Other primates, Mushroom.

Plants diversity present etc.

1. Research On Antelope And Primate Species; 2. Bee Keeping And Value Chain Development;  
3. Reforestation Of Degraded Forest Patches; 4. Mushroom and its value chain;  
5. Eco-Tourism Development; 6. Coffee cultivation;  
7. Sustainable Agriculture And Agroforestry; 8. Bird watching and ornithological clubs creation

**phoenixzoo**  
Wildlife Conservation Institute

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