Nigerian Montane Forest Project

Montane Forest Conservation Initiative Nigeria

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Annual Report 2022

UNIVERSITY OF CANTERBURY
Biological Sciences
Pūtaiao Koiora

Cover image: Staff and students from the Project.

Take a virtual tour to the research station via our website **canterbury.ac.nz/afromontane**

Contents

Report design and production by Matt Walters, Univeristy of Canterbury.

Introduction

Anastasios (Tasso) Paul Leventis - Patron

Phil Hall (Chair)

John Adeyemi Adeleke

Danladi Umar

Hanaan Marwah

Jonathan Millard

Hazel Chapman

I am confident that as you read this report, you will be impressed by the remarkable achievements of the Nigerian Montane Forest Project (NMFP) throughout 2022. Despite operating within an extremely tight budget, our impact has been evident not only in the fields of science and forest conservation but also in education. We have had five PhD and two MSc student from three universities connected to the Project this year. Former interns, graduated postgraduate students and staff are now contributing to the global discourse on biodiversity loss and climate change; a testament to the NMFP's commitment to education and capacity building. Just as important, the children of the communities close to Ngel Nyaki are engaging directly with conservation, helping the Project to plant trees and learning about the value of the forest and its resources.

While this year has had its financial challenges, our dedicated team at Ngel Nyaki, led by Misa Zubairu and his management group have overcome them all. Moreover, we have a 'new' Landrover, thanks to Tasso Leventis, and a solar upgrade thanks to Chris Newsom and Creeds Energy. We also have a record number of followers on Facebook thanks to our Science Coordinator Elisha's consistent contribution of beautiful biodiversity images. The Project has gained considerable global recognition thanks to Laila Johnson-Salami and her exceptional Arise News / Go Wild documentary. Thank you all!

Talking about Elisha I am sad to say that he is leaving us, he has been a most valued Science Coordinator over the past few years, particularly in his contributions to our biodiversity database and in his interactions with the local communities. However, we are enthusiastic for his new role with Africa Nature Investors (ANI) in Gashaka Gumpti National Park. This presents an opportunity for strengthened collaboration between NMFP and ANI. We are also looking forward to the arrival of our new science coordinator, Dabo Atsen Gabriel from APLORI.

A personal highlight in 2022 was visiting Nigeria in July and reconnecting with Board members Jonathan Millard, Danladi Umar, and John Adeleke, as well as everyone at Ngel Nyaki. Danladi came with me to the field station and we worked non-stop to catch up on research and write grant proposals. Later, I had the pleasure of following up on meetings around prospective funders arranged by Jonathan in Lagos, and a meeting with former Deputy Minister of the Environment and staunch supporter of the Project, Mrs. Sharon Ikeazor, in Abuja, as well as discussions with Shawn Melbourne and Ben Llewelin Jones from the British High Commission. I was sad to miss meeting with our Taraba State Governor His Excellency Darius Ishaku and take this opportunity to thank him for all his support over the past few years. We shall miss him.

As always, we extend our heartfelt gratitude to our funders, without whom our work would not be possible. We also express our sincere appreciation to our excellent Board members for their unwavering support throughout the year. All of you make invaluable and unique contributions to the Project—thank you. Also thanks to my University of Canterbury for their continued support of the Project. Breeze Robertson from UC Communications did a great job of highlighting the Project to UC and the wider community. Thanks as always to Matt Walters for his exceptional skill in putting together our Annual Report. Also thank you to Stephen Goldson for detailed and careful edits.

The NMFP's achievements in 2022 are a testament to the dedication and hard work of everyone involved, and we look forward to building on our successes in the years to come.

Hazel Chapman
Executive *Director, Nigerian Montane Forest Project*

Our values

Mission Statement

To promote national and international commitment to the conservation of Nigeria's montane forests by inspiring excellence in research by postgraduate students and empowering local communities through employment and education.

Aims

1. To combine scientific research with education at both tertiary and local community level in order to develop long term sustainable management of Nigeria's montane forests.

2. To facilitate the involvement of national and international researchers in Nigerian montane forest research.

3. To involve the community in the management of montane forest ecosystems.

4. To work with the community in other ways, such as developing small businesses and working with schools to develop conservation awareness.

We are committed to biodiversity conservation through working hand in hand with local communities.

We actively pursue our four primary aims above, all of which can be linked to the United Nation's Sustainable Development Goals.

Our networks

Project Partners / Collaborators

African Nature Investors Foundation (ANI), Nigeria
A.P. Leventis Ornithological Research Institute (APLORI), Jos, Nigeria
Federal University of Kashere, Gombe State, Nigeria
Gombe State University (GSU), Nigeria
Mayfield Community Ecology Laboratory, The University of Queensland, Australia
Nigerian Conservation Foundation (NCF), Nigeria
Nigerian Meteorological Institute (NIMET) Nigeria
Nigerian National Parks (NNP), Nigeria
Prof Pierre-Michel Forget, Natural History Museum, Paris, France
Royal Botanic Gardens, Kew, England
Smithsonian Tropical Research Institute-ForestGEO, USA
Taraba State University (TSU), Nigeria
University of Canterbury (UC), New Zealand
University of Exeter (United Kingdom)

Project Funders

Africa Financial Corporation (AFC) – *starting 2023*
A.G. Leventis Foundation
A.P. (Tasso) Leventis
Stanbic IBCT Bank
Retired General T.Y. Danjuma
Taraba State Government
University of Canterbury, NZ

Research

Two papers published by the Project this year focus on factors affecting tree recruitment in the Ngel Nyaki Forest. Understanding what influences recruitment and which species are recruiting best is important for us to know if, and how, the forest is changing in species composition.

We expect changes because the forest is expanding its edge at Ngel Nyaki (outside of our regeneration areas) because of burning and grazing. The forest edge habitat is significantly drier and more open than the core habitat. Hunting is changing the composition of animal seed dispersers, especially the large bodied dispersers such as chimpanzees and putty nosed monkeys.

Our research has documented how such changes are impacting on forest structure. Most noticeable is that seeds are limited—that is, insufficient seeds are dispersed into potential recruitment sites. This is most noticeable in large seeded tree species and illustrates how the loss of seed dispersers is affecting forest composition.

Seedling censuses have shown that vines are increasing in proportion relative to forest trees. Among other things, this reflects the increasing edge habitat.

Unless we get our animals back to disperse seeds, Ngel Nyaki forest will become less tree species diverse, with surviving species being understory trees with small seeds.

Long term data

The field team continue to do an impressive job with data collection. This year we have also had a focus on collating large data sets, such as the tree phenology (timing of flowering and fruiting) data, with weekly scores of 2000 individual trees going back to 2003. Having large, long term data sets is invaluable and a goal of 2023 is to analyses some of these data.

Seed bank studies

Jemima Amos Samuel (above), a volunteer with the Project is managing a seed bank trial. We are interested in the seed bank in regenerating grassland areas because they show what species are naturally present and thus are an indication of what natural regeneration will look like.

These data will complement a study looking at long-term succession in over-grazed *Sporobolus* grassland that has been fenced-off and protected from both grazing and burning.

DNA barcoding of plants

The identification of flowering plants using DNA barcoding proposed in recent decades has slowly gained ground in Africa, where it has been successfully used to elucidate the systematics and ecology of several plant groups, and to understand their evolutionary history. Existing inferences on the effectiveness of DNA barcoding to identify African trees are mostly based on lowland forests, whereas adjacent montane forests significantly differ from the latter floristically and structurally. In collaboration with Dr David Kenfak of the Smithsonian Institute we tested the efficiency of chloroplast DNA barcodes (rbcLa, matK, and trnH-psbA) to identify Afromontane forest tree species in our 20.28 hectare permanent plot in Ngel Nyaki. We collected, identified, and vouchered 274 individuals with diameter at breast height ≥ 1 cm belonging to 101 morphospecies, 92 genera, and 48 families. rbcLa and matK used alone or in combination performed better than in lowland forests, with the best species discrimination obtained with the two-locus combination of matK + rbcLa. The intragenic spacer trnH-psbA was too variable to align and could not be tested using the genetic distance method employed. Classic DNA barcodes can be a powerful tool to identify Afromontane tree species, mainly due to the non-prevalence in these communities of species—rich genera (low species-to-genus ratio) that constitute the biggest challenge of DNA barcoding of flowering plants.

DNA sequencing to identify amphibians

Success at last! Dr David Blackburn from University of Florida writes (abridged) "I have great news to share. We have finally been able to get the amphibian and reptile specimens collected during 2012 at Ngel Nyaki exported to the US. Lauren Scheinberg from the Californian Academy of Sciences will send at least one tissue of every species we identified to me here at the University of Florida. I'll then work with one or two undergrads and a postdoc to get DNA extractions done and then sequence at least one mitochondrial gene to facilitate species identifications".

Arthroleptis palava

UNIQUE NIGERIAN BIODIVERSITY RESEARCH STATION

Second ForestGEO plot census completed

The Nigerian Montane Forest Project has been a part of the Smithsonian Forest Global Earth Observatory (ForestGEO) since 2015. This is a network of forest sites across the globe, established under the same protocols, and monitored and analysed in the same ways by scientists in order to understand for example, how forests are responding to climate change and how much carbon forests store. Our 20.28 hectare Ngel Nyaki plot is one of 75 sites found across 28 countries. During 2022 we completed the re-census of this plot, a huge job which involved the re-assessment (diameter and height measurements) of 41,031 trees that had been sampled in the first 2015 census, while adding the new recruits and noting tree deaths. The data from this re census provides us with basic information on how much has changed in the tree demographics (growth, recruitment and mortality) in the past six years.

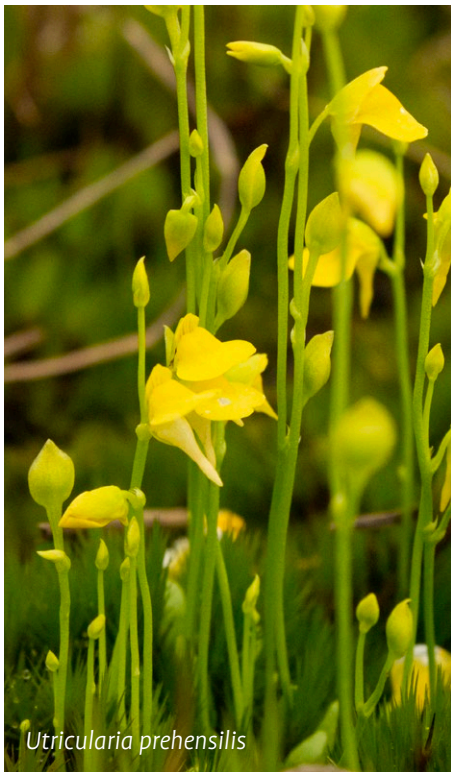
These data make it possible to predict Ngel Nyaki forest's vulnerability and resilience to change. Iveren Abiem, our plot manager is currently completing a project that uses these data to understand the patterns and mechanisms of spatial variation in Ngel Nyaki carbon pools.

Many thanks to Ret. General TY Danjuma, The British Ecological Society and ForestGeo for contributions to the funding of this second census.

Botanical surveys

Elisha and his botanical team of field assistants undertook several excursions around Ngel Nyaki Forest Reserve, both in the forest and surrounding grasslands, to update the NMFP plant check list . A total of 245 species of trees, shrubs, and lianas were collected, as well as 294 herbs, grasses and sedges. These species were identified and names provided/ confirmed by botanists based on the Flora of Tropical Africa Facebook page and from the iNaturalist online platform. During this work the following were recorded amongst others: *Thonningia sanguinea* (Balanophoraceae), *Riccinodendron heudelotii* (Euphorbaceae), *Microtylon* sp.(Papilionoideae), *Zantedeschia albomaculata* (Araceae), *Schrebera* sp.(Oleaceae) *Virectaria major*, *Impatiens* sp. (Balsaminaceae), *Microglossa pyrrhoppapa* (Asteraceae), and *Utricularia prehensilis* (Lentibulariaceae), a carnivorous plant.

View the Ngel Nyaki Forest Reserve online plant checklist:
canterbury.ac.nz/afromontane/flora/



Utricularia prehensilis

Students

PhD students

This year we hosted three PhD students for field work at Ngel Nyaki.

Awoku Gboyega

University of Canterbury, New Zealand

Year 2

The insect pollinators of Mambilla Plateau subsistence farmland

The aim of this research is to understand the role of insects in the pollination of key subsistence crops grown on the Mambila Plateau. The study investigates how common landscape features may serve as a repository of valuable insect pollinators; grassland, forest, stream sides, Eucalyptus plantations. Taking the study further, Gboyega and his field assistants are identifying the most efficient insect pollinator species of a key brassica crop-pac choi.

Julius Yani

Taraba State University

Year 2

Plant species diversity and carbon sequestration in three ecological zones in Nigeria.

Julius successfully completed his October field work at Ngel Nyaki. This involved setting up eight 50 x 50 metre plots across the forest and within each plot measuring tree species, tree height, tree diameter at breast height (DBH), litter cover. He also took core samples from the trees and collected soil samples. Currently the data are being analysed and the litter and twigs dried for chemical analysis.

Eric Bemuh Febnteh

University of Bamenda, Cameroon

Year 2

Diversity and regeneration status of *Pleurotus* species (Oyster mushrooms) and host trees for sustainable management at Etinde, Cameroon and Ngel-Nyaki montane forests

Eric has submitted a detailed report on his on-going work to the NMFP. Of note here is that he has recorded four *Pleurotus* species at Ngel Nyaki growing on three host tree species: *Pleurotus pulmonarius* on *Polyschias fulva*, *P. djamor* on *Anthonotha noldeae*, *P. ostreatus* on *Polyscias fulva* and *P. eryngii* on *Ficus lutea*. Identification of the oyster mushrooms is thanks to Prof. Tonjock Rosemary Kinge at the University of Bamenda and the use of identification keys.

Eric is continuing with the work, including documenting host and fungal phenology and fungal chemical properties. He is also working with the Ngel Nyaki communities on ethnobotanical properties of the oyster mushrooms.

Hammanjoda Salihu Abba

University Putra Malaysia

Year 1

Phytosociological and diversity studies of plants on the Mambilla Plateau

Project currently in development with discussion from the NMFP science team. To begin 2023.

Hammanjoda is from Ngarogi and a former IT student, doing his MSc and now his PhD in Malaysia.

*We remain commited to **high quality training** at tertiary level to build capacity.*

Schombi Obidah Schombi

Modibbo Adama University, Yola

Year 1

Use of camera traps to quantify mammal populations in Ngel Nyaki Forest Reserve

Schombi is currently finalising his research proposal on camera traps with input from the NMFP science team and will begin his field research in 2023.

Large Mammals are important ecological components for the proper functioning of an ecosystem as a result of their role in seed dispersal, seed predation, nutrient cycling, habitat modification, regulation of plant species populations, and mediation of forest composition and dynamics. Despite such importance, large mammals are threatened and at risk of extinction, with global declines driven by anthropogenic activities. Protected Areas might be the last hope to safeguard the remaining large mammals. However, the effective conservation of these animals in Nigerian Protected Areas is currently uncertain as many Protected Areas including Ngel Nyaki Forest Reserve (NNFR), lack baseline information on the current status of large mammals and the prevalent anthropogenic activities. Such information is vital in designing effective management strategies for threatened species and sustainable management strategies. This study aims to determine the status of large mammals' community in Ngel Nyaki Forest Reserve and identify the possible drivers of large mammal population dynamics.

MSc students

Ahmed Abdulrahamam

Abdul Azeez Babayo

Docas Lipani

Taraba State University .

Mammal diversity within Ngel Nyaki Reserve

Fred Danbaba

Taraba State University.

Tantalus feeding ecology along the forest edge

Due to ongoing strikes at Taraba State University details are on hold.

Abdul Azeez Babayo

Gombe State

Hydrobiology in Ngel Nyaki

Ahmed Abdulrahamam

University of Lagos

Multi temporal analysis of forest canopy cover in Ngel-Nyaki Forest Reserve

Ahmed has finished his MSc and passed his defense. Congratulations Ahmed.

During Hazel's July 2022 visit to the field station she was able to work with Gboyega and others in person to support their studies.

Intern students

This year the Project hosted four Industrial Work Experience Scheme (SIWES) Undergraduate Students from Gombe State University for a period of six months.

While at the field station each student undertakes a small individual research project:

Gombe State University intern students. L-R: Ishaya Hussaini, Sulaiman Umar, Usman Mohammed and Faizatu Mamman Ali.

Usman Mohammed

Usman investigated to what extent a seedlings leaves makes a species more or less more or less susceptible to the factors causing negative density dependence. Usman measured leaf chlorophyll content, leaf area and seedling height of four key tree species. He also measured the distance of each seedling to the nearest parent tree, as well as a canopy cover estimate and litter depth.

Hussaini Ishaya

Hussaini undertook an ethno-botanical survey of edible mushrooms on the Mambilla Plateau. For this, Hussaini visited five of the major towns/villages across the plateau - Gembu, Nguroje, Kusuku, Yelwa and Maisamari, to interview people from three ethnic groups (Kaka, Mambilla and Fulani). He asked which mushrooms were deemed edible by each groups, and what they were used for. As part of this project the mushrooms were identified taxonomically and another outcome of the project may be a check list of edible mushroom of the Mambilla Plateau.

Faizatu Mamman Ali

Faizatu investigated tree seedling herbivory both inside and outside the forest. Using experimental plots, she determined rates and extent of herbivory on six seedling of common tree species, these being: *Brucea antidysenterica*, *Rothmannia urcelliformis, Syzygium guineense, Symphonia globulifera, Eugenia gilgii,* and *Entandrophragma angolensis.*

Achievements

Triple success for Ivy

Dr Iveren Abiem, who carried out her PhD thesis work at Ngel Nyaki and who now manages the Ngel Nyaki ForestGeo Plot has been successful in securing both a British Ecological Society's Ecologists in Africa grant and a Smithsonian ForestGEO grant for her post-doc project "The effect of demographic processes and plant functional traits on the biomass carbon store of an Afromontane Forest ecosystem".

Iveren has also been successful in securing a L'Oréal-UNESCO for Women in Science sub-Saharan Africa Young Talents Awards for her Post-doc research. Each year, 20 African women researchers are rewarded for the excellence of their scientific work. These 15 doctoral students and 5 post-doctoral students embody the diversity and potential of science in Africa through their careers and research topics. They represent a source of hope for the future of our world. As part of this award Iveren is visiting UC to continue on with research and NMFP collaborations.

unesco

Read the article on the UNESCO website:

unesco.org/en/articles/winners-2022-loreal-unesco-women-science-sub-saharan-africa-young-talents-awards

PhD scholarship for Gboyega

Gboyega Awoku Stephen who is carrying out his PhD at Ngel Nyaki has been successful in securing an A. G. Leventis Education Scholarship for his project Investigating the role of insect pollinators on subsistence crops on the Mambilla Plateau.

Local women harvesting brassica, one of the crops the pollinators of which Gboyega is investigating to improve future seed production.

Elisha awarded a Rufford Grant

Elisha Emmanuel Barde, our science coordinator received a Rufford Small Grant for his project that seeks to improve Afromontane forest conservation through increasing awareness in forest-edge communities of the ecosystem services that montane forests provide. The project is community-based and will enhance the strong relationship between the Nigerian Montane Forest Project and forest edge communities with the aim of planting additional useful forest species on farms and in Fulani compounds. Both approaches will help to improve conservation of Afromontane forest on the Mambila Plateau through community interaction, awareness and afforestation.

Elisha meeting with communities leaders of the Ngel Nyaki stakeholders

From Yelwa to the world

Mijinyawa Bashir, an indigin of Yelwa village—who attended the Esso-NMFP nursery school and who has volunteered in NMFP tree planting—is currently awaiting the outcome of his application for a UK Chevening scholarship. Bashir has been offered a place in the highly competitive and popular MSc Ecology and Conservation course at the University of Aberdeen. Keep your fingers crossed that Bashir is successful in his scholarship application. Regardless, Bashir will be doing his MSc field work based at Ngel Nyaki, with a project investigating seedling fate of key tree species in the forest.

Read the Smithsonian ForestGEO article about Helen on their website:

forestgeo.si.edu/blog/forestgeo-celebrates-international-women-girls-science-day-2022

International Women & Girls in Science Day recognition

Helen Andrews, a highly valued team member of our ForestGeo permanent forest plot field team received recognition from the Smithsonian Institute ForestGEO in its celebration of International Women & Girls in Science Day 2022.

Helen has also been accepted into the Botany Programme at Taraba State University- Congratulations Helen and all the best from your NMFP friends!

Helen Andrew
Ngel Nyaki, Nigeria FDP

WHAT DO YOU LOVE ABOUT SCIENCE?

"What I love about science is that it deals with fact finding and so can be applied to solve many of life's problems."

Helen Andrew joined the ForestGEO team in 2015 during the 1st census of the Ngel Nyaki FDP. She is currently part of the team conducting the 2nd census & is the only woman on the team. Working in the Ngel Nyaki FDP & with the Nigerian Montane Forest Project has developed Helen's interests in botany & ecology. She is planning to pursue a Bachelor's degree this year in botany.

Ridwan completes an MSc in Germany

In 2022, Ridwan Jafar, a former intern student of NMFP from Bauchi State University, achieved a significant milestone by completing his MSc traineeship with the German Centre for Integrative Biodiversity Research (iDiv) in Leipzig. The program was conducted under the framework of Erasmus+ Graduate Traineeship

During his traineeship, Ridwan focused on studying how different pollen from terrestrial plants impact aquatic ecosystems and the interactions of phytoplankton in these systems. He notes that the experience has been an incredible learning opportunity.

Following the completion of his MSc traineeship, Ridwan was accepted into the PhD program within the Functional Ecology of Plants and Ecosystems Group at Vrije Universiteit Brussels. His traineeship supervisor, Professor Harry Olde Venterink, will continue to supervise his research.

As a NMFP Research Associate, Ridwan's success is a source of pride for us all.

Tertiary study acceptance

Ali Dabo, a member of our first census field team and a loyal contributor to the second census has been accepted into the Federal University of Kashere BSc BEd Agricultural Science program.

Tantalus monkeys are being studied along the forest edge and into the grassland.

Community initiatives

Elisha and our herbarium manager Hammasumo, talking with the villagers at Dujure about the use they make of different tree species in the forest.

Rufford conservation project

Elisha Barde Emmanuel has been successful in his application for a Rufford Small Grant *'How Ngel Nyaki Forest Reserve and its associated ecosystem services are perceived by the local communities bordering the reserve'*. As part of this ongoing project, Elisha and his team first invited community leaders from the neighbouring villages of Dujure, Dombo Geshi, Mayo Yembe, Panso, Gidan Musa, as well as two Fulani leaders, to a meeting held at the NMFP field station. One outcome from this meeting was a willingness by the leaders to host Elisha and his team in their villages to learn more about Ngel Nyaki from the NMFP perspective and for the NMFP to learn from the villagers which tree species they found most useful to their daily lives. Another outcome was an increased awareness by the leaders of the importance of Ngel Nyaki Forest Reserve to their livelihoods.

After visiting the villages and talking with community members, Elisha and his team learnt more about non-timber forest products collected from Ngel Nyaki forest. Interestingly, the villagers pointed out that several tree species in the reserve were planted by their forebears and are still valued today for medicine, food, sources of livelihood and cultural heritage. Products harvested from the forest include lichens, honey, tree bark and leaves for medicine. Seeds of *Beilschmiedia mannii* (Konkoli), *Parkia filicoidea*, *Coffea mannii* are harvested and sold to generate income.

Thanks to funding from the Rufford Grant, the team were able to collect the seeds of the following key species: (*Beilschmiedia mannii* (Konkoli), *Entandrophragma angolense* (Sapele mahogany), *Pterocarpus erinaceus* (African rose wood) and *Bridelia speciosa*). These were identified by the communities for propagation at the NMFP plant nursery. Once grown, these seedlings will be distributed to each of the villages. The communities were further trained on how to collect wild seeds and propagate them for local planting.

The project is on-going and future work includes follow-up monitoring of donated seeds and propagation of more tree seedlings to be handed back to the communities.

10 REDUCED INEQUALITIES

Our activies encourage participation by all.

Nursery school children learning how to propagate carrots.

Interactions with primary and secondary schools

Elisha Emmanuel with the undergraduate interns, have continued on the NMFP tradition of visiting the Esso–NMFP nursery school in Yelwa to create awareness among the young pupils of conservation issues. This programme is now officially named ***"Catch them young"***. As well as teaching, the team demonstrated to the pupils and teachers how to propagate carrot seeds and encourages them to become part of our tree planting effort at the NMFP forest regeneration sites. In addition to nursery school children, volunteers in our tree planting program include students from Yelwa and Maisamari primary and secondary schools.

The Science Coordinator and the intern students regularly teach math and biology in the local secondary school.

Collaborations and linkages

Bamenda apalis (Apalis bamendae) *photographed by Charles Nsor in 2016.*

Ngel Nyaki – in collaboration with APLORI, now part of the Nigeria Constant Effort Sites (CES) Scheme

The Constant Effort Sites (CES) scheme, developed in the 1980s by the British Trust for Ornithology, records catches across a network of standardised mist netting sites to determine changes in abundance of bird populations over time. In Nigeria, this format has been pioneered at APLORI, and is being taken to different sites across Nigeria.

This year we had two visits to Ngel Nyaki by APLORI ornithologists Joy Ishong (team leader), Iniunam Iniunam and Azi Bazani Isha. The first visit in March was to establish four areas to use for CES and undertake an initial survey.

Ngel Nyaki sites are at: i) the field station, ii) the old camp site, iii) the Smithsonian Plot and iv) Fragment C. Birds were captured using 12 mist-nets—amounting to 162 meters of mist net—in each site. Nets were checked in the morning

Read the APLORI article in The Conversation about why tracking birds matters:

theconversation.com/weve-been-tracking-birds-in-a-small-nigerian-forest-for-18-years-what-we-found-and-why-it-matters-189116

APLORI Team and Staff of NMFP. L-R: Azi Bazani Isha, Joy A. Ishong, Misa Zubairu (Site Manager) Elisha B. Emmanuel (Science Coordinator) and Iniunam Iniunam

Table: Species abundance and richness across different sites within the forest habitat.

Sites	Species abundance	Species richness
Camp site	74	30
Old camp site	68	23
Smithsonian plots	10	8
Fragment C	19	15
Grassland	16	10
Total	**187**	

NMFP field assistants and intern students helping the APLORI team with their bird survey.

17 PARTNERSHIPS FOR THE GOALS

We continue to ***strengthen and grow our partnerships****, locally, nationally and globally.*

between 6:00–10:00 am and again in the evening between 4:00–6:00 pm. All birds were identified and ringed with a unique ring from SAFRING. For both ringed and re-trapped birds body mass (± 0.1 g) and wing length (mm) were recorded along with brood patch (0-5). The brood patch is a bare area of skin that develops on birds during the breeding season to help keep eggs and chicks warm.

A total of 187 individuals from 49 species (ringed and re-trapped) were caught in the nets. Site 1 (field station) had the highest and site 3 (the Smithsonian plot) the lowest, species abundance and richness. The most abundant Palearctic species was the garden warbler (*Sylvia borin*) the most abundant resident species Vieillot's black weaver (*Ploceus nigerrimus*) and the little greenbul (*Eurillas virens*). 25% were montane species, 11% forest species and one endemic threatened species were recorded during this field session.

Of note is that the team trapped and ringed a breeding female Bamenda apalis (*Apalis bamendae*), first noted by Charles Nsor in 2016 (see photograph) but the range of which now officially extends from the Bamenda Highlands in Cameroon. Other noteworthy observations can be found in the APLORI/NMFP report accompanying this visit.

A second visit also occured in August was to work with NMFP field staff to undertake bird surveys, Ishong focussed on ringing diurnal birds while Iniunam used a recorder to identify nocturnal bird species.

Taraba State University students visit

Professor Delphine David visited the Project with her MSc Biology Students from Taraba University. This is an annual event where the students spend time learning about Afromontane forests, conservation biology and the hands-on conservation work we do at Ngel Nyaki. Some of them may end up doing their research work with the Project.

Joining an African meteorological network

Collaborating with the Nigerian Meteorology Institute (NiMet) on weather data collection has come about as a result of talks with Professor Balogun, an applied meteorologist from the Federal University of Akure. This has led to the NMFP becoming part of The Trans-African HydroMeteorological Observatory (TAHMO) network.

"The idea behind this project is to develop a dense network of hydro-meteorological monitoring stations in sub-Saharan Africa – one every 30 km. This entails the installation of 20,000 stations across the continent. By applying innovative sensor technology and ICT, TAHMO stations are both inexpensive and robust." tahmo.org

Our intern Jemima Amos has visited from NIMET Yola Airport and will greatly facilitate this collaboration.

Supporting African Nature Investors (ANI) by completing a shea butter field survey

ANI is investigating the potential for integrating shea butter, extracted from the seeds of *Vitellaria paradoxica* trees, into cropping and agroforestry systems for the communities living in the savanna woodlands or parklands, surrounding the southern boundary of the Gashaka Gumpti National Park (GGNP).

To help with this, in May 2022 the NMFP carried out a field survey of *Vitellaria* densities in the savanna woodlands of four communities on the GGNP boundary in Taraba State.

Publicity and new partnerships

NMFP Staff and team Arise TV: *Danladi, Ivy, Ayo Adekoya, Jonathan Millard, Laila Johnson -Salami , Abasam Onyia, Elisha*

Our Board Member and Finance Manager, Jonathan Millard has worked extremely hard to publicise the Project and attract new funders.

In March 2022 Jonathan, with support from documentary maker and TV anchor Laila Johnson-Salami, with Nahel Jarmakani, Danladi Umar and Hazel Chapman, organised a visit to Ngel Nyaki to make an 'Arise News' feature for their Morning Show 'Go Wild', about the NMFP, 'Restoring Ngel Nyaki Forest Reserve'

Following this, jointly sponsored by Arise News and the African Financial Corporation (AFC), the team organised a fundraising event at the Capital Club in Lagos. The event, funded by ARISE News and AFC, was held on April 23rd and hosted by the NMFP, ARISE Global Media and Wild Aid featured a premier of the Ngel Nyaki documentary. Hazel Chapman joined in via a video link from New Zealand. The short documentary highlighted the importance of preserving Nigeria's carbon absorbing forests.
The event was very well attended, with particular interest shown by the African Financial Corporation (AFC). ***The CEO Samaila Zubairu committed to funding the NMFP. As a result of this AFC has also committed to funding for the Project from 2023.***

Further the NMFP has now successfully partnered with STANBIC ITBC Bank Lagos as part of their Sustainability Strategy.

We are in the process of drawing up an MOU agreement between the NMFP, Africa Nature Investors (ANI), A. P. Leventis Ornithological Institute (APLORI). Such an agreement will see increasing interaction between the three organizations. In particular the NMFP will share science expertise with ANI in Gashaka and collaborate with APLORI in birding initiatives (see Collaborations and linkages section).

ARISE NEWS

YouTube

Watch ARISE Environmental Correspondent, Laila Johnson-Salami's news segment on her trip to the Project **youtube.com/watch?v=dl3sVFeoxqs**

Solar power installation by Creed

Our old solar system, which provided about 12 hours of power on a sunny day but considerably less in the rains, was cobbled together and extremely inefficient. We were often dependent on our ancient (probably 1930's) single cylinder diesel generator.

Now, thanks to an All On investee, Creeds Energy LTD, organised by Hannah Kabir and Chris Newsom we now have an updated system providing us with 24 hour power. The solar panels are provided by Auxano Solar and are extremely efficient, having been developed to cope with stressful conditions such as the high winds and Harmattan dust we experience at Ngel Nyaki.

The deployment and installation was full of challenges. The Creeds team had to first transport all the equipment from Lagos to Jalingo- which took four days by road. Then the whole lot had to be transported to Ngel Nyaki by public transport. All arrived safely and Chris Newsom along wiht his team were able to successfully install the equipment. The three days this took included a day of staff training on how use the new system.

Our new solar has significantly improved life and productivity at the field station and helped the wider community.

Read the full article about the solar install on the All On website:

all-on.com/impact-stories-from-inside-all-on/solar-to-the-rescue-at-the-nigerian-montane-forest-project

All ON Energy innovations. Powerful collaborations.

Conservation and restoration

We continue to work alongside the forestry patrollers to deter bush meat hunters. However this is a difficult task, the patrollers receive very little financial incentive. Despite this however, animal traps are regularly collected from the forest.

Our camera traps and visual observations confirm the presence of chimpanzees, putty nose, patas and tantalus monkeys, bush buck, duiker, golden cat, pangolin, monitor lizards, potto potto and other rarely seen animals. There is far more other species present, and we are hoping that Schombi Obidah's PhD research will help us learn more.

The team also undertook their annual fire break burns, a big job but incredibly important to prevent fires spreading from the grassland into the forest. Care was also taken to remove the tall grass from around planted seedlings- while this is not ideal as it opens up the canopy and reduces shade, it is well worth the trade-off with regard to reduced fire risk. Fires do occur and we have to be vigilant at all times. A big thank you to all the community members who come out, whatever time of day and night, to help us fight fires if necessary.

Thousands of seeds of forest tree species were collected and grown in the nursery, before being planted out into grassland along the forest edge. Nursery and secondary school children, members of the football team and the forestry patrollers all helped with the planting.

A major, new issue has been the grasscutter rats *Thryonomys swinderianus*. These large rats are impacting on our restoration efforts by destroying seedlings of many of the species we plant. Elisha and the field assistants have carried out a massive program to try and trap the rats, but to no avail, they are very smart. At the time of writing we are not sure exactly what to do—Hazel is investigating New Zealand technology, as New Zealand leads the world in small mammal trapping.

Finally, Jonah G. Febuins, The Permanent Secretary from the Taraba State Ministry of the Environment visited the Project in January, accompanied by the Forest Management Officer for Gembu, Hamma Galadema. The visit was a success and the Perm. Sec. is extremely supportive of the Project.

22,000

seedlings grown

for replanting in the grassland.

Field assistants and patrolers planting the seeds of Anthonotha noldii *directly into the grassland.* Anthonotha *is unusual in that seeds germinate and establish well in the grassland although it now seems that the cutty grass rats have learnt that we are planting them and they now have an easy source of food—we have gone from 95% establishment to near zero!*

Misa working with the intern students to plant tree seedlings of forest trees grown in the nursery into the grassland surrounding the forest reserve.

The Ministry of Environment, Taraba State Government, through the Forest Management Officer (FMO) requested that the NMFP field assistants help the forestry patrollers in tree planting within the Nguroje forest reserve. As a result nineteen patrollers were at Nguroje for two days assisting in planting *Eucalyptus* seedlings at the State Forest site.

Our people at work

*We provide **long-term employment with training opportunities** for local communities.*

Outputs

Our work helps us understand and better ***protect Nigeria's unique montane biodiversity.***

Research papers

Papers published

- Chapman, H., & Abiem, I. (2022). **Factors limiting plant recruitment in a Tropical Afromontane Forest**. *Biotropica*. doi:10.1111/btp.13179
- Abiem, I., Kenfack, D., & Chapman, H. M. (2023). **Assessing the impact of abiotic and biotic factors on seedling survival in an African montane forest.** *Frontiers in Forests and Global Change*, 6. doi:10.3389/ffgc.2023.1108257
- Hacket-Pain, A., Foest, J. J., Pearse, I. S., LaMontagne, J. M., Koenig, W. D., Vacchiano, G., . . . Ascoli, D. (2022). **MASTREE+: Time-series of plant reproductive effort from six continents.** *Global Change Biology*, 28(9), 3066-3082. doi:10.1111/gcb.16130
- Kenfack, D., Abiem, I., & Chapman, H. (2022). **The Efficiency of DNA Barcoding in the Identification of Afromontane Forest Tree Species.** *Diversity*, 14(4). doi:10.3390/d14040233
- Tela M and Abdullahi F (2021)) **Papilionoideae Species Abundance and Diversity in Forest and Outside a Forest Reserve in Taraba State, Nigeria**. *Asian Journal of Research in Botany* 7(1): 9-15, 2022; Article no.AJRIB.82739
- RONALD WIA and WALSON F (2021) **Species Richness and Diversity of Land Snails in Ngel Nyaki Forest Reserve, Mambilla Plateau, Taraba State Nigeria.** *International Journal of Scientific and Management Research* 4 (7) 88-102 http://doi.org/10.37502/IJSMR.2021.4709
- Buba T and Jaafar R (2021) **Impacts of trees species and functional traits on birds visitation in a Nigerian montane forest: Implications for conservation: Trees Functional Traits and Birds Visitation (2021)** *Scientific African* 12 https://doi.org/10.1016/j.sciaf.2021.e00783
- Emmanuel B. Elisha, Nanchin Winifred Kazeha, Usman Bashiru, Yakubu Vugeh, Iniunam I. Aniefiok, Bello A. Danmallam, Samson A. Da'an, Adams A. Chaskda. **African Stonechat *Saxicola torquatus* and a breeding Hartlaub's Marsh Widowbird *Euplectus hartlaubi* with abbrreant plumage** Recent Report in *Bulletin of the African Bird Club* (ABC) 29(2):250 published.

Papers in press

- Elisha E.B., Bolade, I. A. , Kazeh, N. W, Mohammed, A., Mafenne, A. N. Dahiru S. **First description of the eggs and nestlings of petit's cuckoo-shrike *Campephaga petiti*,and first records of its breeding in Nigeria.** In press Malimbus.

Papers submitted

- Emmanuel Barde Elisha, Usman Bashiru, Yakubu Vugeh, Iniunam I, Aniefiok, Bello A. Danmallam, Samson A. Da'an, Adams A. Chaskda. **First record of Red-footed falcon *Falco vespertinus* within a tropical montane forest, Mambilla plateau, Nigeria.** Submitted to Malimbus

Additional outputs

Talks

- Hazel gave a virtual talk to the Virtual Coffee Tropical Forest group- Seed to seedling transition dynamics in an Afromontane forest fragment in Nigeria.

She also gave a number of in person talks around Canterbury about the Project:

- Hallswell Rotary
- Cashmere Rotary
- Christchurch Press
- Continuing Education Christchurch

Press

World Biodivesity Day UC story

www.canterbury.ac.nz/news/2022/academics-20-year-quest-to-restore-rare-african-forest

Photos

- Elisha's photos of Ngel Nyaki Mushrooms are to be added to the Chicago Field Museum of Natural History's database of field mushrooms. This ensure the specimens are named and become publicly available- akin to iNaturalist.

Social media

Our social media following continues to grow.

1,186 Twitter followers

1,827 Facebook members

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