

# Rufford Small Grants Results Final Report

## **Conservation of a primate community in Cross River State, Nigeria through an integrated approach including research, patrols, and community involvement.**

**CERCOPAN** is an environmental conservation charity operating since 1995 in Cross River State, SE Nigeria, the location of the oldest and most biodiverse rainforest block in Africa – recently categorised by IUCN as Irreplaceable. Poor security, endemic corruption that deters funders and lack of infrastructure mean there are a tiny number of viable organisations working in-country to protect this globally critical conservation priority, with CERCOPAN in the vanguard.

***CERCOPAN's Mission:*** *To conserve Nigeria's primates through sustainable rainforest conservation, community partnerships, education, primate rehabilitation and research.*

*Medium-Term Goals 1. Ensure sustainable forest management practices are fully adopted in rainforest communities and destructive activities are reduced to zero to ensure longevity of the natural resource base for people and wildlife; 2. Consolidate and expand the area of protected rainforest to provide an effective buffer zone to Cross River National Park and extend protected primate habitat; 3. Continuously motivate, inspire and build capacity in Cross River for positive, tangible and effective environmental conservation action to generate sufficient local capability to conserve its environmental resources for ever*

Nigeria has the highest rate of rainforest destruction in the world – impacting on the most diverse rainforest anywhere. Estimates vary, but over 90% of Nigerian rainforest has been lost, with over 70% of that remaining being in Cross River State. This provides the last refuge for the most diverse range of primate species on the globe – 18 species occurring here. This includes Critically Endangered Gorilla & Chimpanzee, plus lesser known but equally rare Preuss' Red Colobus. Threatened Drills, and the many Guenons & Mangabeys that play a vital role in rainforest ecology through seed dispersal make up this unique primate assemblage.

CERCOPAN directly rescues monkeys from the hunting & pet trade, and has established rehabilitation & reintroduction programmes (we conducted the first IUCN primate reintroduction in Africa, 2007). We provide sanctuary for rescued monkeys of 6 species with over 180 individuals in captive care due to our successful rehabilitation programmes, and these animals are the basis of our planned reintroductions. We house the only captive breeding group of Sclater's guenons in the world. The organisation is a member of the Pan African Sanctuary Alliance (PASA) and as such abides by PASA's code of ethics and behaviour, including strict quarantine protocol.

We receive more than 30,000 visitors a year who come (for free) to see our work and hear our environmental conservation message. Our educational outreach programme covers 50 secondary schools, 20 primary schools, and 20 conservation clubs that we founded, culminating annually in the World Environment Day festival that brings the centre of the city to a standstill. We have established MOU's with the State Forestry Department and Cross River National Park, and we have provoked a 3-year state-wide moratorium on logging. CERCOPAN success has been the centre of gravity for the inception & implementation of UN REDD+ in Nigeria. Our community forest is one of two sites that will be the model for REDD+ roll out, offering the potential for long term economic sustainability of conserved rainforest.

## Working with the rainforest communities

Our reintroduction & research site in the rainforest is the basis of our interaction & engagement with the rainforest community, through direct employment & ecotourism. Our community projects & education outreach maintain our close partnership with the local community that has resulted in the unique success of not only halting deforestation in our area, but actually reversing it. We are now seeing restored rainforest being at a point to have primates returned to it, and the local people can see the practical benefits to them of sustainable behaviour. This is in obvious contrast to the surrounding communities who have removed or seriously degraded their forest resource.

## Project Area Description



CERCOPAN operates in Cross River State, SE Nigeria. We are headquartered in the State capital Calabar, with a field location at Rhoko - the remote community forest of Iko Esai - 90 km North and a 4hr drive by poor road requiring 4WD in the rainy season. Cross River State contains >70% of Nigeria's remaining tropical rainforest.

Rhoko lies at the Western edge of the moist evergreen Oban-Korup forest block straddling the border with Cameroon, itself forming the Eastern end of the Guinean Forests biodiversity hotspot.

Communities around the periphery rely on the forest for their livelihoods. Apart from at Iko Esai, exploitation is carried unsustainably. Farming in other communities occurs anywhere within the forest, and external interests chasing increasingly scarce resources (especially timber, NTFP's and bushmeat) are free to take access. Exploitation by a population beyond that of the communities themselves means the forest's rate of destruction is accelerating.

## Success in partnership with Iko Esai – supported by Rufford Foundation

We have established a lasting agreement with the community of Iko Esai that ensures protection of 20,000 ha of rainforest, incorporating a ban on logging and the hunting of primates. The number of regular hunters in Iko Esai has decreased from 400 to 15 between 2001 and 2013.

CERCOPAN's work has brought about change towards sustainable forest management practices in Iko Esai. But enforcement of the by-laws, especially for outsiders, is a matter for constant vigilance. Our Forest Patrols & Monitoring groups provide direct protection. We also train & support Community-led patrols, where local people are motivated & enabled to protect their own forest resources. The neighbouring communities of Agoi Ibami and Owai have been motivated by seeing the obvious benefits brought to Iko Esai through sustainable forest use, so that they are now partnering (since 2012) with CERCOPAN to double the area under effective protection to 40 000ha. This rainforest resource is now protected and is therefore available to realise benefits to the local people through approaches such as UN REDD+ - where the existing forest resource becomes a tangible asset that needs to be conserved to realise benefits. Where this forest has been lost to logging or degraded by hunting & extraction – as in the surrounding communities – this is no longer an option. This demonstrates the concrete success achieved in our project area – for people, for wildlife, and for Nigeria.

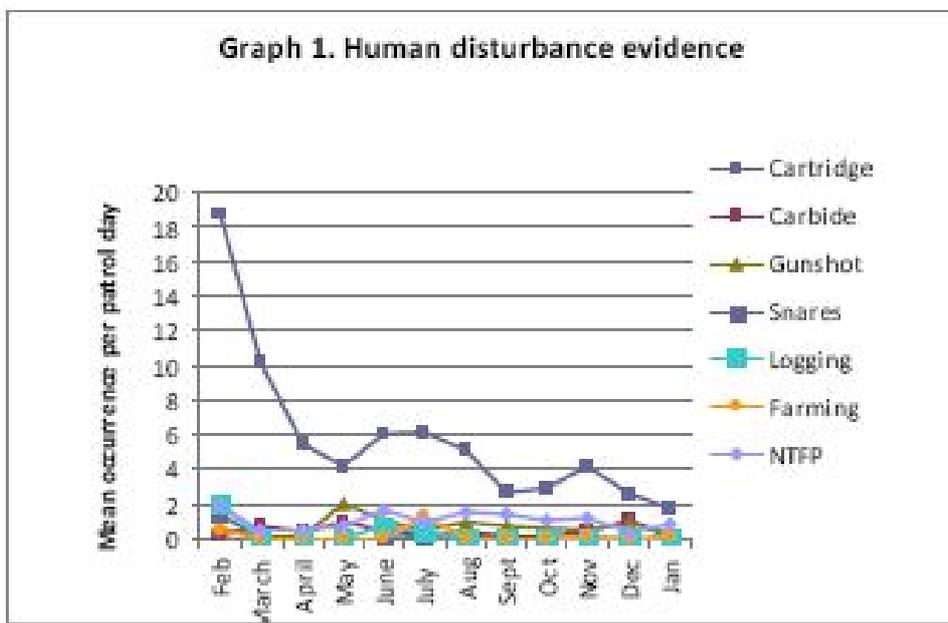
**Rufford Small Grant Project Outcomes:**

**Objective 1: Reduction in illegal practices in the community forests due to the deterrent effect of apprehension and prosecution by patrols.**

**CERCOPAN Core Area:** - there have been no recorded cases of illegal activity in primate hunting, snares, logging or farm clearance. There was a single incident where NTFPs (bushmangoes) were removed from the Core Area, which is prohibited by local by-laws in this area. This was reported to the Chiefs' Council and is awaiting a hearing.

**Wider Research Forest Area**

Data collected in the research area by the remote area patrol indicates an overall decrease in human disturbance. The most frequently encountered evidence for human disturbance in the forest is gun cartridges & gunshots heard - the prevalence of both of these has decreased during data collection:



**Primate Hunting**

Over the course of 2012 there were three cases of illegal primate hunting in the research and conservation area. Two of these were taken to Chief's Council and one was dealt with by large fine. The other incident involved a potto, which causes confusion among the community as it is not considered a primate. The perpetrator was given a warning. CERCOPAN has continued to address this confusion in its education outreach programme. In February 2012, the CCDC surveillance team found a red-capped mangabey carcass caught by hunters from Iko Ekperem village in a remote area of the forest. Iko Ekperem has not yet signed by-laws and as such CERCOPAN did not have the ability to take action, although we continue to try to engage with the community and encourage by-law adoption. Iko Esai chiefs were informed of the incursion, although they similarly do not have jurisdiction over Iko Ekperem community members.

Over 62 farm- and forest-shed checks revealed no evidence of primate hunting across the forest areas in 2013, with the exception of two cases in September 2013 (see table). These cases were attributed to hunters from a neighbouring rainforest community who have not signed up to conservation laws as our three partner communities have. They were hunting in a disputed area, and therefore action could not currently be taken.

## Community Forest Areas – Iko Esai, Owai & Agoi Ibami

No illegal logging or forest clearing has been found in the forest of Iko Esai community. However, illegal logging activity was identified close to the communities of Agoi Ibami & Owai. In Agoi Ibami, a 2-day farm/forest patrol from 29<sup>th</sup> August in Agoi Forest Reserve identified chainsaw activity close to Kurep River, a large tributary of Cross River. This information was reported to a Forestry Commission officer who subsequently arrested the operators. In Owai, a 4-day forest patrol from 3<sup>rd</sup> December 2012 identified chainsaw activity to the south east of the village, close to the national park, indicating a logging operation by people from outside the village. Subsequently, the state anti-deforestation taskforce are known to have apprehended the logging operators from this area. The loggers were from the village of Ojor, which is approximately 10km south of Owai. A total of 2 traps were identified across the forest areas and these were dismantled and confiscated. The low number of traps encountered is indicative of a changing culture away from trap hunting towards selective gun hunting across the Iko Esai, Agoi Ibami and Owai forest landscape.

Activity	2012		2013	
		Notes		Notes
<b>Primate Hunting</b>	<b>3</b>	1 fine; 1 warning; 1 external perpetrator	<b>2</b>	External perpetrators – unable to take action
<b>Logging</b>	<b>2</b>	Outside Iko Esai Forest - Logging Task Force informed	<b>0</b>	N/A
<b>Endangered Species Hunting</b>	<b>24</b>	Understanding of endangered species low	<b>11</b>	Awareness of endangered species increasing but still needs attention
<b>River Poisoning</b>	<b>1</b>	Unable to uncover culprits	<b>0</b>	N/A

### Sustainable Forest Use

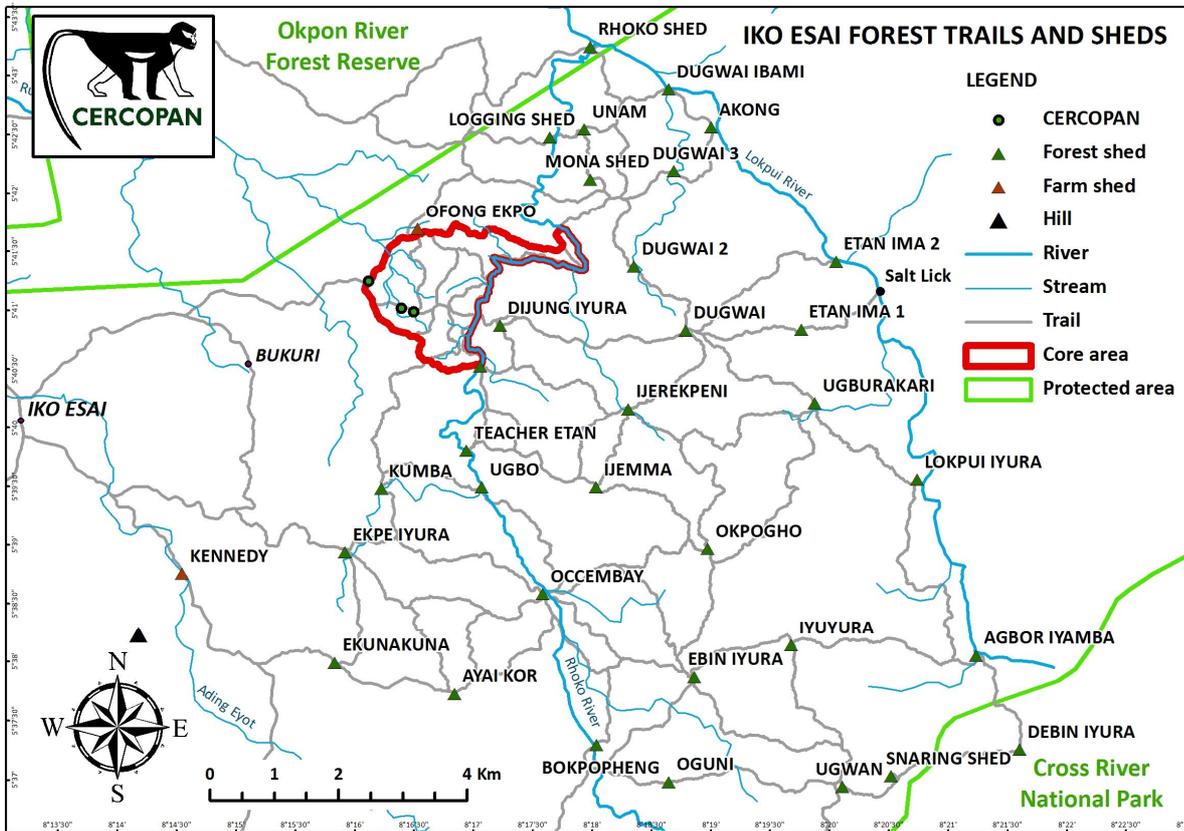
With only 81 fewer visits in 2012 than 2011, & equivalent visits in 2013, the number of NTFP users exiting the Iko Esai community forests has remained largely unchanged, indicating that the degree of community dependence on NTFPs in this locality is stable. Similar to previous years, bushmeat hunting and wild salad collection continue to represent the most commonly undertaken NTFP activities. The long-term trend is a clear decrease (number of incidences from 2,146 in 2007 to 562 in 2012).

**Objective 2: Distribution maps of primate species within the community forest, presence/absence counts and relative abundance estimates.**

**Methodology**

We have permanent staff at our rainforest Research station, and since 2007 we have conducted nightly patrols. Since 2011 fortnightly 4-day patrols have occurred within the Iko Esai Community forests adjacent to CERCOPAN’s Rhoko Camp operating site. These extended patrols look to assess forest use, deter illegal forest activities, and record wildlife sightings in the area. The Rufford grant generously funded the continuation of these activities with the development of additional training for our Research Patrol in order to improve accuracy of these records and develop a more formalised recording methodology, and including primate recognition. The data informs a number of activities, but was specifically targeted to establishing a primate distribution map as part of this project.

**Research Site showing hunting trails & sheds**



**Species identification – presence/absence**

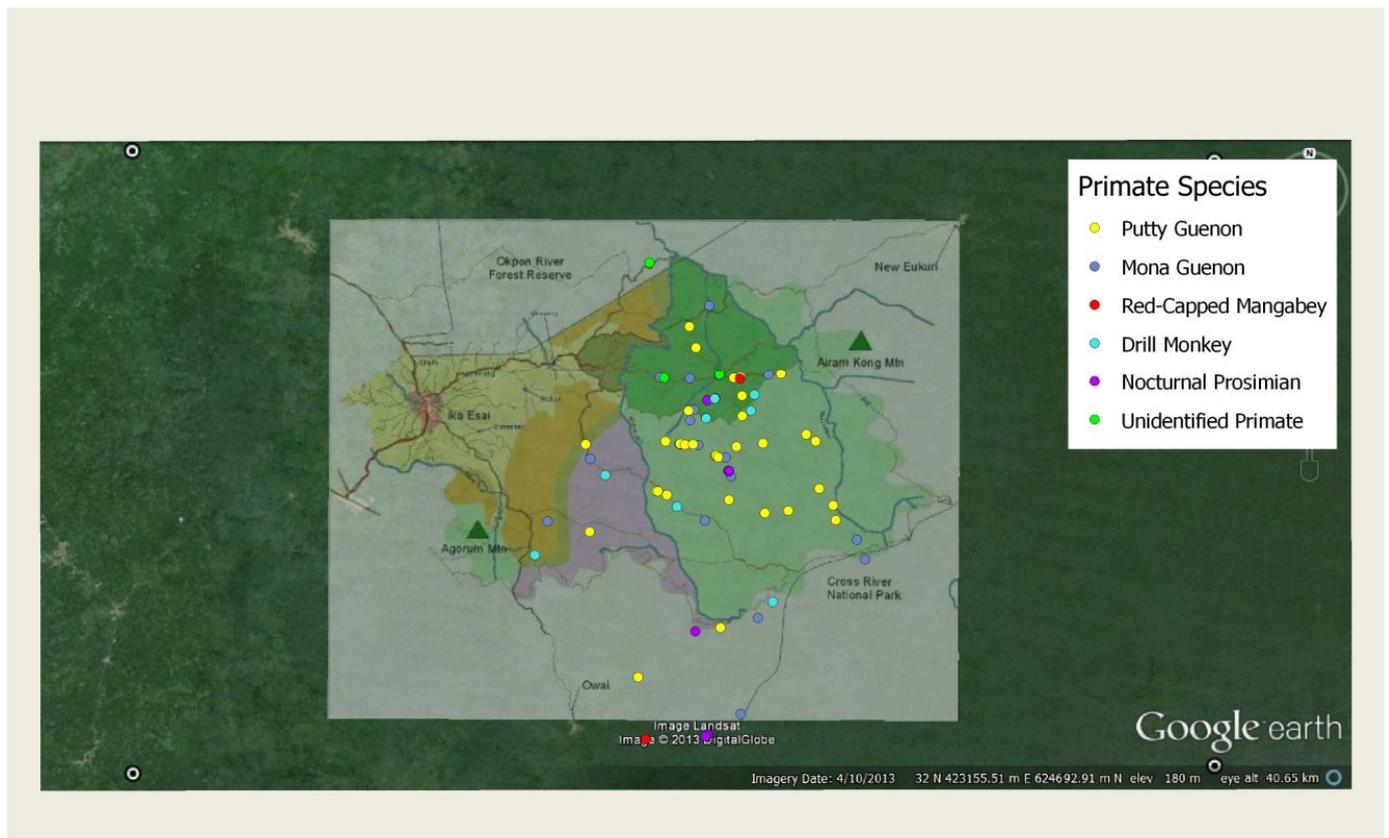
Training of Research and Patrol teams occurred at the beginning of this grant, whereby the staff were taught and assessed on their visual and vocal recognition of local primate species.

**Data collection**

Information collected by our nightly and four-night extended patrols, along with observations by our trained permanent staff on site have been used to compile this data

Primate Species in Rhoko 2012-2013		Presence/Absence
Common Name	Latin name	
Mona Guenon	<i>Cercopithecus mona</i>	Confirmed this study
Putty-Nosed Guenon	<i>Cercopithecus nitcivitans</i>	Confirmed this study
Red-Eared Guenon	<i>Cercopithecus erythrotis</i>	Previously confirmed
Red-Capped Mangabey	<i>Cercocebus torquatus</i>	Confirmed this study
Drill Monkey	<i>Mandrillus leucophaeus</i>	Confirmed this study
Potto	<i>Perodicticus potto edwardsi</i>	Confirmed this study
Allen's Galago	<i>Sciurcheirus alleni</i>	Confirmed this study
Thomas's Galago	<i>Galagoides thomasi</i>	Confirmed this study
Calabar Anwantibo	<i>Arctocebus calabarensis</i>	Previously confirmed
Demidoff's Galago	<i>Galagoides demidovii</i>	Confirmed this study
Pallid Needle-Clawed Galago	<i>Euticus pallidus</i>	Previously confirmed
Chimpanzee	<i>Pan troglodytes elliotti</i>	Previously confirmed
Crowned Guenon	<i>Cercopithecus pogonias</i>	Sightings Not yet confirmed
Pruess's Red Colobus	<i>Procolobus preussi</i>	Sightings Not yet confirmed

### Primate Distribution Map of Iko Esai Community Forest



### ***Objective 3: Update wildlife species lists***

Plants & animals are recorded for our species lists. Trees & other plants are recorded as part of our phenological studies (see below). Butterfly surveys have found this to be the most biodiverse site in Africa (554 spp recorded with 800 species predicted). The area is the most diverse for mammals in Nigeria (& the 3<sup>rd</sup> most diverse in West Africa). Notable sightings have been the Golden Cat, & evidence of Forest Elephant. We have reported a number of bird species new to the area (records to be confirmed), and are currently exploring two possible new subspecies observed in our area by our camp staff.

### ***Objective 4: Continued collection and analysis of Core Area phenological cycles.***

#### **Introduction**

The climatic conditions in south eastern Nigeria are defined as “tropical monsoon climate” - falling within the Köppen climate classification of “Am” - defined by at least two intense wet and dry seasons. This climate is influenced by monsoons originating in the South Atlantic Ocean, which are transferred to the area by the “maritime tropical” airmass that, with its high temperature and humidity, produces frequent profuse rainfall events. Average annual rainfall for Cross River National Park, has been recorded at 2,447mm. Average monthly temperature ranges from a low of 24°C in August to a high of 29°C in February and March.

The area experiences two annual rainfall peaks, with a very short dry season and a long dry season falling between and after each peak. The first wet season lasts from March to the end of July with a peak in June. This is followed by a 1 - 3 week dry break in August. Then there is another short wet season between early September and mid to late October. The ending of the short wet season is followed by a long dry season, from late October till March with peak dry conditions between early December and late February.

Seasonal and interannual variations in climatic conditions have considerable periodic influence over the ecology of plants and the timing of fruiting and leafing events (phenology). This has impacts on plant product availability and probably the local abundance of frugivorous animals. This in turn influences the degree to which forest users draw on and utilise plant-based NTFPs during a particular year.

#### **Dataset**

The phenology data collection is a long term project that CERCOPAN began in 2007. Data was collected prior to this date, but a rigorous methodology was established to maximise the value of data collected and analysed. The Rufford small grant has generously enabled this project to continue for the grant period.

The value of the phenology records will accumulate as records are kept over time, providing essential knowledge of the patterns and trends in plant and food species within the study area. Therefore we provide here indicative analysis of the available data, which indicates areas of interest that will be further revealed as the dataset is given rigour through extra years of collection.

Data has been comprehensively analysed for each year and 2013 will receive a similar analysis when the full year records are made. Monthly updates on the phenology are supplied to the Governor of Cross River State, and to the Cross River Forestry Commission. Therefore the data plays an important role in maintaining awareness for key policy makers; as well as informing on NFTP value; impact on frugivorous species (esp. primates); and the long term understanding of the ecology of the forest.

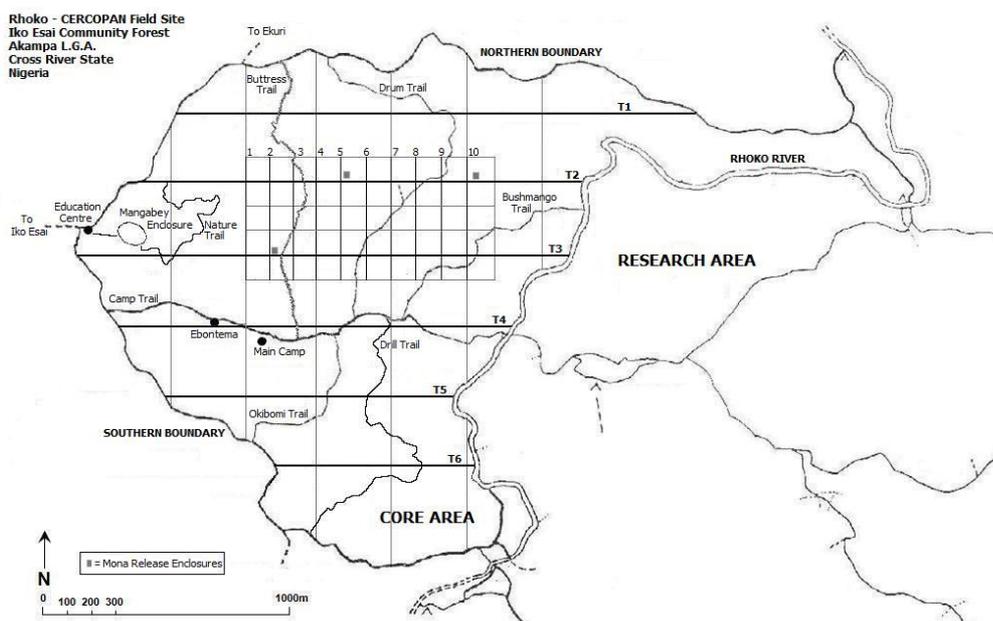
#### **Methodology**

Continuously since February 2007, a monthly phenology study has been undertaken in Rhoko Core Area along the grid system located in the centre of the northern part (grid 1 to 10). The objectives of this study are to:

- assess temporal and spatial patterns of production of fruits, flowers and leaves of woody plants present in the Core Area
- establish the relationship between fruit and flower production and diurnal primate dietary habits
- assess the carrying capacity of the Core Area in view of future monkey reintroductions and to build up a complete inventory of plant species present in the area

## Research Site

The central grid system consists of 10 grids measuring 500m each. Each grid is marked every 25m from South to North. The grids are separated from one another by 100m and are numbered from West to East (Grid 1 being the further West and Grid 10 furthest East). The beginning of each grid is located 100m South of Transect 3 and the last point of each grid 100m North of Transect 2.



**Map of Rhoko Core Area with phenology grid system**

## Sampling

Sampling takes place on the first week of each month and is generally completed in 5 days. A maximum of two grids are sampled per day as the concentration of researchers and assistants generally begins to decline with additional grids. The grids are walked slowly by a minimum of 3 people, one on the grid and one on each side of the grid, about 5m aside. The area sampled covers 10m each side of the grid maximum. Since each grid is 500m long, the area sampled per grid is  $500 \times 20 = 10\,000 \text{ m}^2 = 1 \text{ ha}$ . The total sampled area thus corresponds to  $10 \times 1 \text{ ha} = 10 \text{ ha}$ .

Every fruit and flower found in the sampled area (either on the ground or on the plant) is sampled. Each sample is given a unique number, and the following recorded:

- Type of sample (Fruit or Flower)
- Stage of sample (Ripe RP, unripe URP, immature IM fruit; bud BD, mature MAT, flower FL)
- Species number/name
- Plant type (Tree DBH > 10cm; Shrub DBH < 10cm; Climber). This information requires identification of the precise plant producing a sample; if not found, an "Unknown" plant type is recorded).
- Plant height (approximated using the categories "understory", 15-25m, 25-35m, 35-45m, >45m)
- Diameter at breast height (1.3m) DBH for trees. DBH is related to crown size and can be used to give an idea of the abundance of fruits\flowers produced by one individual.

- Location on the grid (approximate for shrubs and climbers; accurate using measuring tape for trees).
- Quantity of sample on the ground and on the crown of the plant, using a relative scale: 0-none; 1-<25% of the maximum possible crop; 2-26 to 50% of the maximum possible crop; 3-51 to 75% of the maximum possible crop; 4-76 to 100% of the maximum possible crop.
- Habitat (Forest, liana forest, river bank\swamp, hill slope)

### **Species identification**

To calculate indices of diversity and abundance per species, it is important to identify each species sampled. Since September 2007, every sample collected has been given a species number, and where possible, the species name has been determined using identification books. Those samples found to be consumed by Mona guenon have been numbered first because of their importance for the reintroduction project, but items not eaten by the Mona guenon have also been numbered.

A pictorial catalogue of “monkey food” and “non-monkey food” species has been created and is updated. This guide comprises laminated sheets with photographs, a brief description and information about the parts eaten by the monkeys. This guide is used throughout sampling to allocate the correct species number for each sample.

When a sample is not recognised, it is collected in a plastic bag and labelled with the next consecutive sample number. The sample is then photographed and offered to the Mona guenons and mangabeys to assess whether it can be categorized as “monkey food”. When possible we test the same species during various stages of ripeness as the monkeys prefer some items when unripe and others when ripe. When a sample is photographed, a scale of 5cm is placed adjacent to the sample so that relative size can be determined from the photograph alone.

### **Fruit trail**

Since September 2007, 5 - 10 individuals each of 29 species of trees and shrubs known to be “monkey food” have been selected and labelled in the grid system. Metal tags and marking tape have been used to mark each of the selected trees. On the metal tag, the species number is carved using Latin numbers (except for species numbers above 40), followed by the individual number in Arabic numbers. These trees are checked every month for the presence and abundance of fruits, flowers, senescent leaves, mature leaves and new leaves. If fruit and/or flowers are found in these trees, they are included in the general phenology sampling. The number of individuals per species and the number of species to be followed is regularly increased. Ideally, a minimum of 10 individuals per species is necessary, but some species are not as abundant as others in the grid system, so less than 10 individuals are followed. By following specific individuals it is possible to investigate the inter-individual variations among a species in terms of production of fruits and flowers (example: some species produce fruits every year but not necessarily every individual), as well as the seasonal variation in the production of phenophases (some species of plants produce every year, some every two years, some several times per year or all year round).

### **Opportunistic data**

Storms are used to get opportunistic data on e.g. canopy height (as described in White and Edwards (2000)) and to take samples.

### **Data analysis**

Every month, the data collected from phenology sampling and fruit trail is entered into a database. The following descriptive statistics are then calculated:

- Total number of sampled items
- Proportion of samples from trees, shrubs, climbers
- Proportion of samples eaten by the Mona monkeys (and mangabey for mangabey research)
- Proportion of fruits; proportion of flowers
- Proportion of the total fruits eaten by the Mona monkeys

- Proportion of flowers eaten by the Monas
- Percentage of fruits in the Mona diet
- Percentage of flowers in the Mona diet
- Density of Mona food items available in sampling area
- Index of diversity for all samples (eaten and not eaten species)

### Phenology skills development among CERCOPAN staff

The level of detail recorded, the necessary rigour of data recording, plus the identification of species necessitates extensive training to ensure results are of comparable value year to year. This training is given to both volunteers coming to work with CERCOPAN and to the established staff at the Rhoko site.

### Influencing Policy makers

#### EXAMPLE OF PHENOLOGY RESULTS SUBMITTED TO GOVERNOR: JANUARY 2013 SAMPLING

370 items sampled: 88 % of fruits; 12 % of flowers

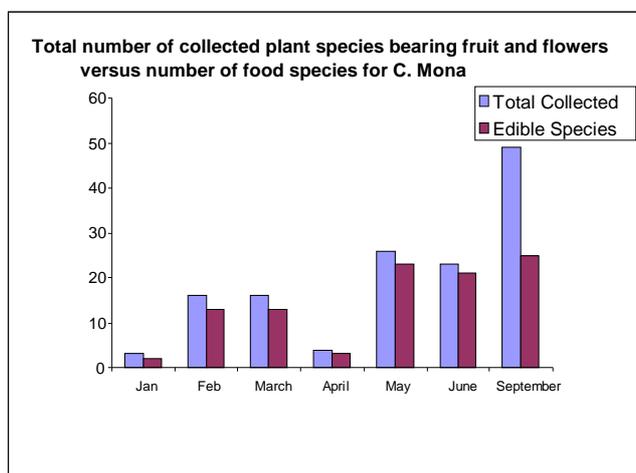
Plant type: 83 % shrubs; 6.2 % climbers; 8.3 % trees; 3.5 % unknown plant type.

56.5 % edible Mona food (*Cercopithecus mona*).

The density of samples consumed by mona monkeys was 20.9 plants per hectare, while the global density, (total number of plants per hectare) was 37.

Above is an example of the use to which we put our data. The Cross River State Governor & Forestry Commission receives a monthly report on CERCOPAN activity & progress. This assists in building understanding amongst policy makers of the scientific aspects & value of the rainforest & associated species, beyond traditional concerns of timber value. These reports are valued & commented on, and referred to in policy documents.

### Sample data analysis 2007-2012



### The value of long-term data collection

Our knowledge of the ecology of West African Rain Forests is significantly limited. When considering longer term trends in e.g. fruiting, and individual variations amongst long lived individual tree specimens, our understanding is very poor indeed. Our data collection is beginning to address this, and will therefore be valuable in the face of changes to habitats e.g. due to Climate Change, and to extensive human impacts. Our dataset is very large, and comprehensive analysis is specialist, time consuming, and is an ongoing process. Following are indicative brief analyses of the current data set (incorporating data supported by Rufford Small

Grants), as an indication of the value of the material collected. Further analysis and scientific publication will be continued in the near future.

For the Fruit Trail data, approximately 100 individual trees of 29 species have been visited monthly since 2007.

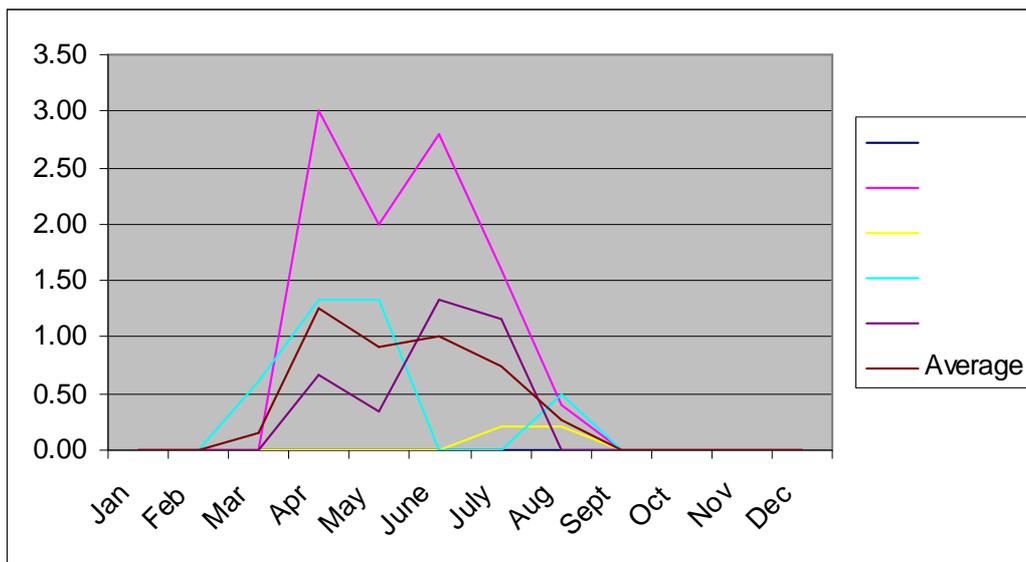
Records are taken of:

- New Leaves
- Mature Leaves
- Senescent Leaves
- Fruit (on tree)
- Fruit (on ground)
- Flowers (on tree)
- Flowers (on ground)

Using the presence of fruit on the tree as an example (as this represents an obvious food resource), some interesting explorations can be made of monthly and yearly variation in fruit production. Following is some initial analysis of the long term dataset:

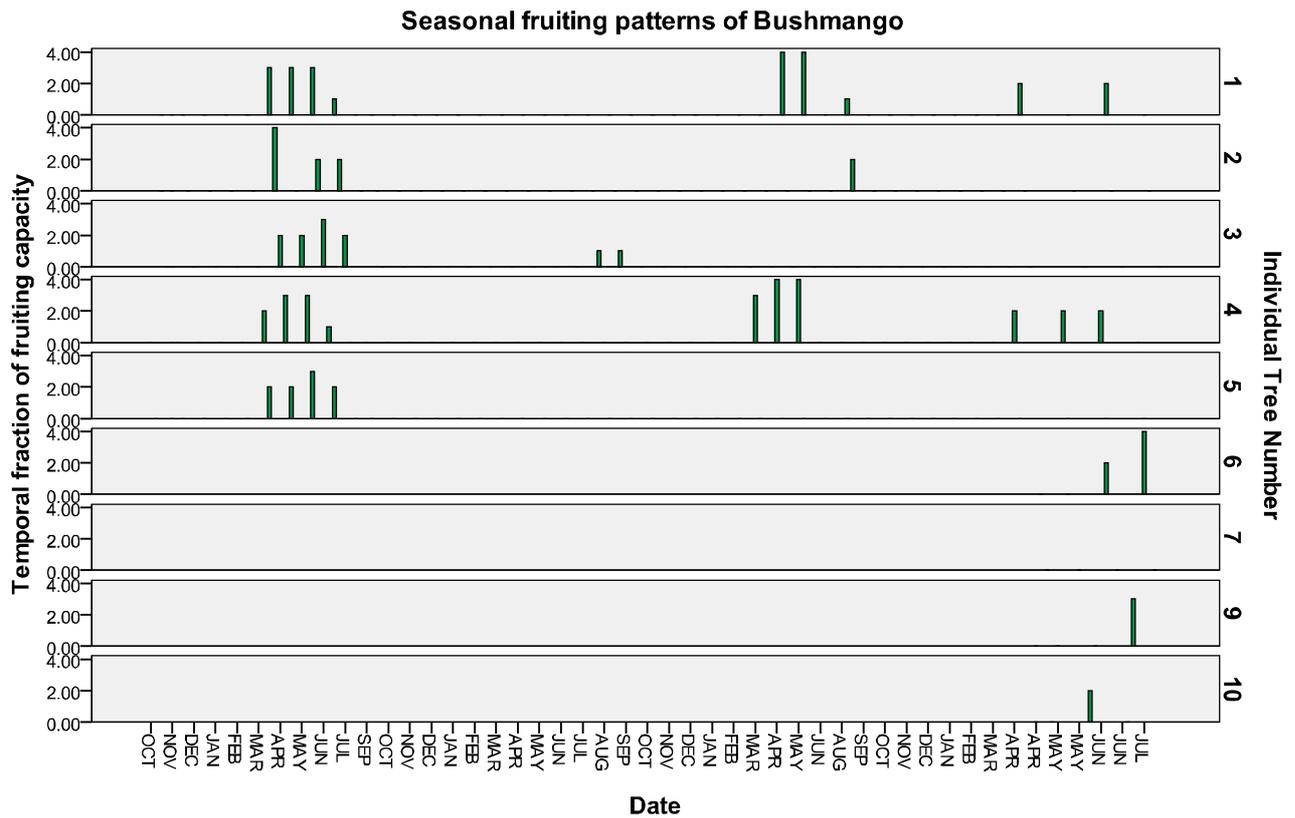
Bush Mango (*Irvingia gabonensis*) is a useful example, as it is an important resource for both wild animals and humans in the study area.

#### Annual variation in Bush Mango production in Rhoko



The chart above clearly demonstrates major differences year on year in fruit production. Not only are some years significantly more or less productive than average, but there are also major variations in the peak of the season –from main production being at the start of the year, to being at the end of the season.

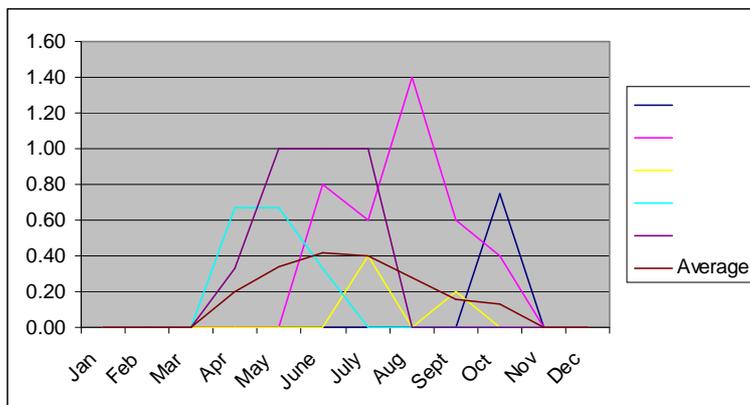
When this data is interrogated, it can be seen that individual trees exhibit even greater variation across multiple years, and a very highly variable from one individual to another. This distribution of food in time and space has very obvious potential impacts on the survival of groups of frugivores dependent on the source.



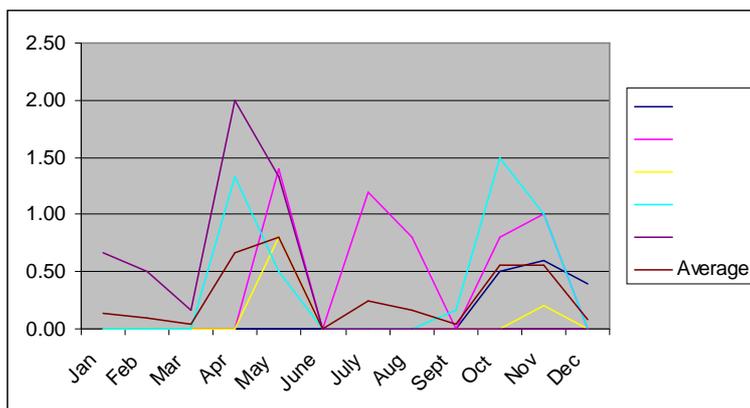
As can be seen, individual trees show a highly significant variation in when they fruit in a given year, and in which years they fruit. Such variation in such an important rainforest food producer has major implications for the long term carrying capacity of a forest area. A single season survey can clearly not give an adequate picture of the available food – and will result in significant under- or over- estimates. This data is critical for such work as our planned monkey reintroductions.

The purpose of this report is not to provide ecological analysis, but a few further examples are included to further illustrate that this phenomenon can be seen in many important food tree species, and to emphasize the value of the dataset gathered:

*Enantia Chlorantha*



*Petersianthus macrocarpus*



*Grewia corinacea*

