

## CENTRE FOR NURSERY DEVELOPMENT AND ERU PROPAGATION



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### Physiognomic Survey Report of the Nta'ayah Remnant Forest



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### Physiognomic Survey Report of the Nta'ayah Remnant Forest

BY:

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## BACKGROUND

The Nta'ayah Forest is composed of 8 different forest galleries ranging from 2 – 5 hectares in size. It falls along the chain of remnant tropical montane forest patches of the Bamenda Highlands region of Cameroon. This forest is located between 06 09'429"N and 06 8'5422"E and found in Njimuyah, Bafut sub-division. The flora and fauna is not very diverse but constitute a unique ecosystem with endangered species of birds (Bannermann's Turaco, Banded Wattle-eye) mammals (Chimpanzees, Drills and Mandrills, Monkeys, Buffalo, etc., reptiles, amphibians and insects as well as rare plants of conservation importance. No scientific work has been carried out to identify these species – this narrative is based on discussions with community members.

Long before the 1900s, these forest galleries were exploited for agriculture by the “Banjimuyah”<sup>5</sup> or simply Banji interpreted as people from Njimuyah (across the River Mezam). The early settlers of the Banji clan came from Widikum. The early separation of this clan about 180 years ago resulted to the formation of the Mughie people who settled down in an area called mughie (the land of bitter herbs), and the Adiemukong people who stayed in place. It is even purported that in the early 1960s an indigene of Adiemukong named Papa Moufenji built his house at Nta'ayah to make use of the fertile land as well as hunt for the abundant wildlife. Faced with tough competition from his clan members in the use of Nta'ayah for farming, he made advances and found a new fertile land at Ndong (mile 34). Ndong is a roadside village along the Bamenda – Wum ring road. He was followed by many other indigenes in his courtyard.

The “Fulani” clan also called the “Bororos”<sup>6</sup> originated from Mali, Sudan, and Senegal, and arrived Njimuyah in the early 1950s and settled in Nta'ayah. The traditional council of the Njimuyah gave them the right to settlement and carved out the hilly landscapes of Nta'ayah for their cattle to graze.

Traditional folklore claims that a great hunter in the name of Kekule also exploited the Nta'ayah forests and was killed and thrown into the gorge of Nta'ayah in the late 1970s. The forest galleries of Nta'ayah today just like other montane forest ecosystems of the Bamenda Highlands faces intense threats from human activities with bushfires, grazing, farming, abusive/illegal hunting and NTFP exploitation (Tanda et al, 2010). The forest galleries have great touristic and research potentials.

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<sup>5</sup> Banjimuyah is the name attributed to a clan in the Bafut fendom residing across the Mezam River who trace their origin from Widikum

<sup>6</sup> The Bororos are a group of cattle graziers who practice transhumance

## INTRODUCTION

The objective of this report is to inform stakeholders and practitioners in natural resource management of the importance in undertaking physiognomic studies in remnant forest patches in an effort to understanding their structure and function. This understanding will guide analog forestry practitioners in particular to implement relevant treatment procedures to degraded vegetation and landscapes in a manner that will mimic the natural vegetation or forest hence the name “analog forestry.”



Sensitizing local people on the importance of forests

CENDEP has been using the technology of analog forestry since 2008 in some 07 communities in Bui division of the North West region in order to restore degraded landscapes and ensure sustainable use of resources from community forests.

Analog forestry is a system of growing trees and plants that seek to establish a tree-dominated ecosystem that is analogous in architectural structure and ecological function to the original climax and sub-climax vegetation community

In order to satisfy the practical implementation of the Bafut watershed project using analog forestry technology, it is incumbent therefore to understand the structure and function of the original climax or remnant forest vegetation so as to mimic that architectural structure in the treatment and design of the degraded watershed and adjoining landscape in the target communities.

This study therefore conforms to the first principle of analog forestry which states thus: observe and record. We observed the architectural structure of the remnant forest (the way it is made; does it have trees, bamboos, lianas? etc.). Then we recorded its functions into a database.

## METHODOLOGY

The Nta-yaah remnant forest was the only site chosen for the study due to its closeness to the communities and considering the level of logistics at our disposal. We adopted a plot based survey (Periementah et al, 2009) method whereby 2 plots of 50 x100m in the forest were delineated for ease of data collection and plant enumeration.



▲ Project leader (extr. left) explaining plot based physiognomic survey method to field team.

In each plot, all trees with a diameter at breast height (dbh) of 10cm and above was identified and enumerated. The shrub and herb layers were assessed for species abundance and coverage following the practical example in the analog forestry handbook.

The survey team was composed of 2 analog forestry trainers, 1 botanist, 2 community facilitators and 4 community members.

## RESULTS AND ANALYSIS

In both survey plots 2 keystone species (*Ficus spp.* and *Arungana madagascariensis*) were identified and recorded. 24 different plant species were identified and recorded. Traces of animal species were identified and noted in both plots. Appendices 1 and 2 presents a database of the plant species identified and recorded as well as their uses in the forest ecosystem and the community.

**Table 1: Physiognomic formula for plot 1**

| <b>SYMBOL</b>               | <b>DESCRIPTION</b>  |
|-----------------------------|---|
| Bh8c                        | Upper evergreen broadleaved canopy layer with hard leaves occurring at heights above 35m with a continuous coverage.              |
| Bh7c                        | Middle evergreen broadleaved canopy layer with hard leaves occurring at heights of between 20 and 35m with a continuous coverage. |
| Bw6c                        | Lower evergreen broadleaved canopy layer with soft leaves occurring at heights of between 10 and 20m with a continuous coverage.  |
| C1-8p                       | Climbers and lianas occurring at heights of between 0.1m and above 35m with a patchy coverage.                                    |
| <b>Physiognomic Formula</b> |   |
| Bh8c, Bh7c, Bw6c, C1-8p     |   |

**Table 2: Physiognomic formula for plot 2**

| <b>SYMBOL</b>                                   | <b>DESCRIPTION</b>  |
|---|---|
| Bh8c  | Upper evergreen broadleaved canopy layer with hard leaves occurring at heights above 35m with a continuous coverage.              |
| Bh7c  | Middle evergreen broadleaved canopy layer with hard leaves occurring at heights of between 20 and 35m with a continuous coverage. |
| Bw6c  | Lower evergreen broadleaved canopy layer with soft leaves occurring at heights of between 10 and 20m with a continuous coverage.  |
| Vh5a  | Bamboos occurring at heights of between 5 and 10m and almost absent.  |
| Hh3b  | Ferns occurring at heights of between 0.5 and 2m with a sporadic coverage level.  |
| L1-8i   | Lichens and mosses occurring in all the height classes (0.1m - >35m) with an interrupted coverage level.                          |
| Uh4p  | Shrubs of between 2 and 5m in height with a patchy coverage.  |
| Ph2a  | Small erect palms (saplings) occurring at heights of between 0.1 and 0.5m and almost absent.                                      |
| <b>Physiognomic Formula</b>                     |   |
| Bh8c, Bh7c, Bw6c, Vh5a, Hh3b, L1-8i, Uh4p, Ph2a |   |

**Table 3: Description key**

| GROWTH FORMS                | SYMBOL        | HEIGHT CLASS          | SYMBOL        |
|-----------------------------|---------------|-----------------------|---------------|
| <b>TREES</b>                |               | Higher than 35m       | 8             |
| Broadleaf evergreen         | B             | >20-35m               | 7             |
| Broadleaf deciduous         | D             | >10-20m               | 6             |
| Needle leaf evergreen       | E             | >5-10m                | 5             |
| Needle leaf deciduous       | N             | >2-5m                 | 4             |
| Semi deciduous (B+D)        | S             | >0.5-2m               | 3             |
| Mixed (D+E)                 | M             | <0.1-0.5m             | 2             |
| <b>HERBACEOUS PLANTS</b>    |               | <0.1m                 | 1             |
| Graminoids                  | G             |                       |               |
| Forbs (Ferns)               | H             |                       |               |
| Lichens and mosses          | L             |                       |               |
| <b>SPECIAL GROWTH FORMS</b> | <b>SYMBOL</b> | <b>COVERAGE CLASS</b> | <b>SYMBOL</b> |
| Climbers and Lianas         | C             | Continuous (>75%)     | c             |
| Stem succulents             | O             | Interrupted (50-75%)  | i             |
| Rhizomatous                 | K             | Patchy (25-50%)       | p             |
| Bamboos                     | V             | Rare (6-25%)          | r             |
| Epiphytes                   | X             | Sporadic (1-6%)       | b             |
| Erect palms                 | P             | Almost absent (<1%)   | a             |
| Rattans                     | R             |                       |               |
| Shrubs                      | U             |                       |               |

## OTHER PLOT DESCRIPTION

### Plot 1

This forest is a montane tropical humid forest. Canopy layers are at heights of 30 - 40 metres, 20 - 35 metres, 10 - 20 metres. Mosses and Lichens occur between 0.1 - 40 metres.

The forest comprises of many ecological niches namely, terrestrial, aquatic and rocky formations. There are traces of monkeys, snakes, birds, squirrels, giant rats etc. The landscape is very undulating. The canopy has a continuous coverage (50 - 75 %) and this explains the near or complete absence of grasses on the forest floor. Climbers are abundant and ranges from 0.5 - 40 metre and occur in patches. There are equally patches of herbs and orchids are rare. This is an old growth forest with patches of ferns.



▲  
Nta-ayah Forest viewed from the ground

## **Plot 2**

It has two ecosystems, terrestrial and aquatic. Traces of monkeys, squirrels, birds, giant rats among other animals could be found. Climbers have a continuous coverage and ranged from 0.5 - 40 metres. Canopy cover is continuous (50 - 75%). Ferns occur in patches (25 - 50 %). Herbs have a rare occurrence (6 - 25 %), and date palms are almost absent. The forest plot also has features representing an old growth forest with clumped ferns.

## **CONCLUSION**

Physiognomic studies are very necessary in understanding the composition, structure and function of any ecosystem type in order to inform and ameliorate any type of vegetation restoration effort. We hope that this study will act as a guide in the design and follow-up of the Bafut watershed ecosystem restoration and protection effort.

## **BIBLIOGRAPHY**

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## Appendix 1: Database for plot 1

Coordinates: Lat. 06 8'5422"E ; Long. 06 09'429"N; Altitude. = 1678m

Recorders: Ambe Isidor Che and Lawir Felix:

Local plant identifiers: Ngwa Christopher, Zaccheus Ayonji, Ngwa Anthony Ngongjo, Che Talah (animal identifier)

Botanist: Tanda Godwin Ade;

Analog forestry trainers: Youndjie Koleoko Gabriel and Periemintah Ndzefemmegho

| S/N | Taxonomy                         |                   |                  | Value Aspects  |   |  |
|-----|----------------------------------|-------------------|------------------|--|---|--|
|     | Scientific name                  | Common name       | Local name       | Ecological   | Economic  | Cultural   |
| 1   | <i>Macaranga sp</i>              | Paper leaf tree   | Baah             | Provide extensive canopy coverage and thus helps in catchment protection | Intense trade on leaf                             | Medicinal (sap rubbed helps to remove foreign particles from body, leaves serve as rapping material) |
| 2   | <i>Piptadeniastrum africanum</i> | Small leaf        | Baa              |  | Timber  | Sap from crushed bark helps to relief eye itches   |
| 3   |                                  | Sambi             | Gahngang         |  | Fuel wood, seeds are edible                       |  |
| 4   |                                  | Bush Eucalyptus   | Ngangn□□r□       |  | Timber, fire wood                                 | Leaves are boiled for cough treatment, bark is also used to treat ringworm in cows                   |
| 5   | <i>Ficus sp</i>                  |                   | lieū             | Keystone spp. (watershed protection via broad canopy)                    |   | Sap used for treatment of foot cracks  |
| 6   | <i>Croton macrostycus</i>        |                   | □tsaa            | Soil conservation  | Fire wood,  | Beekeeping, sap from bark is used to treat bleeding gums   |
| 7   | <i>Irvingia sp</i>               | Bush mango family | Fena-ahfeko      |  |   | Walking stick  |
| 8   | <i>Arungana madagascariensis</i> |                   | Banghe           | Keystone spp., catchment protection                                      | Fire wood   | Bark is used for treatment of skin rashes, beekeeping, fencing, local musical instruments            |
| 9   | <i>Entarda</i>                   |                   | Lunghe/mangwa-ah | Soil conservation  |   | Live fencing, medicinal, food for giant rats   |
| 10  |                                  |                   | Eseuh            |  | Poles, fencing                                    | Treatment of lungs   |
| 11  | <i>Bridelia stenocarpa</i>       |                   | Elow             | Ke   | Firewood, fencing, building of bridges and houses | Seeds are food to birds  |
| 12  |                                  | Wild cypress      | Lemkwonkwo       |  |   | Roots are used as traditional tisane   |

|    |                          |  |            |                   |                         |  |
|----|--------------------------|--|------------|-------------------|-------------------------|--|
| 13 | <i>Albizia sp</i>        |  | Nelare     |                   | Timber, firewood,       | Bark is taken for treatment of stomach aches, beekeeping |
| 14 |                          |  | Kekho      |                   |                         | Fencing, stem used for trapping                          |
| 15 |                          |  | Fenseghe   |                   |                         | Fencing, trapping  |
| 16 |                          |  | Kandihi    |                   |                         | Fencing, medicinal value                                 |
| 17 | <i>Albizia gummefera</i> |  | Bar ndzare |                   | Firewood, craft, timber |  |
| 18 | <i>Polysiafulva</i>      |  | Akekweh    | Soil conservation |                         | Craft, musical instruments,                              |

## Appendix 2: Database for plot 2

| S/N | Taxonomy                         |                            |              | Value Aspects                         |                           |   |
|-----|----------------------------------|----------------------------|--------------|---------------------------------------|---------------------------|---|
|     | Scientific name                  | Common name                | Local name   | Ecological                            | Economic                  | Cultural  |
| 1   | <i>Rauvolfia vomitoria</i>       |                            | Lahbesi□ng   |                                       |                           |   |
| 2   | <i>Ficus sp</i>                  |                            | Akarr        | Keystone, water and soil conservation |                           | Fruits are eaten by birds, bats, and some small rodents     |
| 3   | <i>Spathodea campunalata</i>     | Flame tree (African tulip) | Dzenseh      |                                       | Timber, firewood          | Craft,/carving, bark used for the treatment of spleen       |
| 4   |                                  | Montane tulip              | □ewhare      |                                       | Timber, firewood          | Trapping  |
| 5   | <i>Astonia bonnii</i>            | Shade tree                 | Nebhmbi      | Soil/water conservation               | Fruits are sold for money | Bark used for malaria treatment and stomach aches,          |
| 6   |                                  |                            | Kekho        |                                       |                           |   |
| 7   |                                  |                            | Etsaa        |                                       |                           |   |
| 8   |                                  |                            | Baah         |                                       |                           |   |
| 9   |                                  |                            | Lieü         |                                       |                           |   |
| 10  |                                  |                            | Eseauh       |                                       |                           |   |
| 11  | <i>Arungana madagascariensis</i> |                            | Banghe       |                                       |                           |   |
| 12  |                                  |                            | Yier-ndeng   | Water conservation                    |                           | Roots used for cleansing of bowels                          |
| 13  | <i>Kaya sp</i>                   | Red mahogany               | Nkong        |                                       | Timber, furniture         | Treatment of cough in animals                               |
| 14  | <i>Lophira sp</i>                | North West Mangosy         | Ngor□        |                                       | Timber                    | Used for traditional swearing                               |
| 15  |                                  |                            | Mangwi-ngang |                                       | Firewood, timber          | Leaf concoction used for the treatment of venereal diseases |
| 16  | <i>Persia Americana</i>          | Pear                       | Biyaa        |                                       | Firewood, food, timber    |   |
| 17  | <i>Fagara sp</i>                 | Spine tree/stamp tree      | lumjang      |                                       | Timber, stamp making      |   |
| 18  | <i>Trema guinensis</i>           |                            | djhinangur□  | Soil conservation                     | Timber, firewood          | Food for birds  |

**Appendix 3: Combined animal data base for plots 1 & 2.**

| S/N | Scientific Name                | Common Name               | Local Name  | Traces           |
|-----|--------------------------------|---------------------------|-------------|------------------|
| 1   | <i>Tragelaphus scriptus</i>    | Antelope                  | tswe        | footprint        |
| 2   | <i>Rattus rattus</i>           | Black rat                 | foroo       | hole             |
| 3   | <i>Criceptomys gambianus</i>   | Giant rat                 | Mbando'o    | faeces           |
| 4   | <i>Viverra civetta</i>         | Civet cat (Bush dog)      | atchou      | footprint        |
| 5   | <i>Thryonomys swinderianus</i> | Cane rat                  | n□□r□       | food remains     |
| 6   | <i>Cercopithecus spp</i>       | Monkey                    | Nkaa        | food remains     |
| 7   | <i>Procavia ruficeps</i>       | Stone hyrax               | kou         | tracks           |
| 8   |                                | Drills & Mandrills        | ankiabang   | sighting         |
| 9   |                                | Chimpanzee                | Boo'uh      | call             |
| 10  | <i>Atherurus africanus</i>     | Brushed-tail<br>porcupine | ngoo        | body spikes      |
| 11  | <i>Xerus erthopus</i>          | Ground Squirrel           | neehbangang | sighting         |
| 12  |                                | Buffalo                   | nfong       | folklore         |
| 13  |                                | Tree squirrel             | toore       | sightings, calls |