

Project Update: December 2019

1.0 Background Information

The quality of chimpanzee (*Pan troglodytes*) habitat, including the availability of chimpanzee plant food and nesting species, is critical to ensure the long-term survival of this endangered great ape. However, botanical composition is spatially variable and depends on soil characteristics, weather, topography, and numerous other biotic and abiotic factors including different anthropogenic activities that normally result to encroachment on wildlife habitat.

Anthropogenic activities in the Masito-Ugalla Ecosystem (MUE) in Western Tanzania are mainly driven by human poverty and increasing human population size, which when combined, result in over-dependence on nature, thus threatening chimpanzee and their critical resources for survival. Increasing human populations around MUE, has resulted to human encroachment on chimpanzee habitat, a situation inciting human-wildlife conflicts, habitat fragmentation and loss, biodiversity loss and declining chimpanzees' habitat quality.

This project aimed at identifying chimpanzee plant food and nesting species available in the MUE and at finding out how anthropogenic disturbance influence these critical resources and chimpanzee nest counts. We used chimpanzee nest counts as a proxy for chimpanzee abundance, even though this is potentially problematic.

2.0 Preliminary Results

Subsequent to field data collection which was carried out in the MUE at four sites (Issa Valley, Mfubasi, Mlofwesi and Mapalamane) during the wet season from February to May 2019, in June 2019 we started working on data entry, organisation, cleaning and analysis. Based on the project objectives, we aimed to understand the availability of chimpanzee critical resources (plant food species and nesting tree species) in the MUE and to investigate how human disturbance influences these critical resources and chimpanzee nest counts. To quantify anthropogenic disturbance, we used the frequency of anthropogenic evidence and the weighted impact scores of each sign of human activity. This assisted in categorizing study sites into four categories, i.e., least disturbed, mildly disturbed, moderately disturbed and highly disturbed sites. Hereunder are the preliminary results for the research objectives.

2.1 Chimpanzee plant food species

We identified a total of 102 chimpanzee plant food species that occurred within the MUE. Masito-Ugalla Ecosystem being an open-habitat, our findings of the number of chimpanzee plant food species are in consistence with other research, which revealed that chimpanzees living in open-habitat have narrower diets.

2.2 Influence of disturbance on chimpanzee plant food species richness and diversity

Our results indicate that chimpanzee plant food species richness and diversity increased with increasing human disturbance. However, both species richness and diversity declined at highest level of disturbance. The findings are consistent with the intermediate

disturbance theory, which suggests that species richness and diversity may increase with disturbance in a particular habitat provided that the disturbance is neither too low nor too severe. These results suggest that more individual plant species are lost in MUE especially in area with severe human disturbance than in areas of low severity of human disturbance.

2.3 Influence of disturbance on chimpanzee nest tree selection and nest counts

In total, we recorded 203 chimpanzee nests across the four study sites within MUE. The encounter rates of the number of chimpanzee nests (i.e., nests/km) differed significantly between sites with different disturbance levels. The least disturbed site had the highest encounter rate of chimpanzee nests and the encounter rate declined to the highly disturbed site. Our results suggest that, chimpanzees in MUE may have learned to avoid areas that are severely impacted by human activities and, consequently, this might have influenced their nesting behaviour.

We observed nests constructed on seventeen different tree species and most of these nesting tree species were also important food source for chimpanzees. Out of the 17 nesting tree species, two dominant tree species across MUE had the highest number of observations with chimpanzee nests and subsequently the highest number of nests, and thus the most used nesting tree species.

3.0 Results dissemination and publication

Dissemination of the findings being one of the activities in this project, we successfully attended and presented our findings in two scientific conferences. We also conducted a 1-hour radio talkshow for the same reason of results dissemination and awareness raising among people. For the purpose of publishing our results in peer reviewed journal, we have prepared one manuscript to be submitted to peer reviewed journal for publication.

3.1 Conferences attended

- a) The 5th scientific conference on environmental sustainability in Tanzania: Man and Biosphere Reserves- Arusha, 28th – 30th August 2019.
This conference was organized by the National Environment Management Council of Tanzania (NEMC). Since my study area is falling within the boundaries of the newest established biosphere reserve (The Gombe-Masito Ugalla Biosphere Reserve), our presentation fitted well under the conference theme.
- b) The 12th TAWIRI scientific conference, under the theme "A sustainable future for Tanzania's biodiversity conservation: The science behind priority, strategy and benefit" held in Arusha, 4th - 6th December 2019.



Fig. 1. Dr. Jane Goodall giving remarks on the newest establishment biosphere reserve (i.e. Gombe-Masito-Ugalla Biosphere Reserve) during NEMC conference, Arusha, Tanzania



Fig. 2. A photo with Dr. Jane Goodall after her presentation at the NEMC scientific conference in Arusha, Tanzania



Fig. 3. A photo with a colleague while on excursion. The excursion was a part of the NEMC scientific conference activities.



Fig. 4. Poster presentation during NEMC scientific conference with displays of the 12th TAWIRI scientific conference which was to be held later in December 2019



Fig. 5. A photo taken during the 12th TAWIRI scientific conference in Arusha, December 2019



Fig. 6. A photo with a colleague during the 12th TAWIRI scientific conference, Arusha

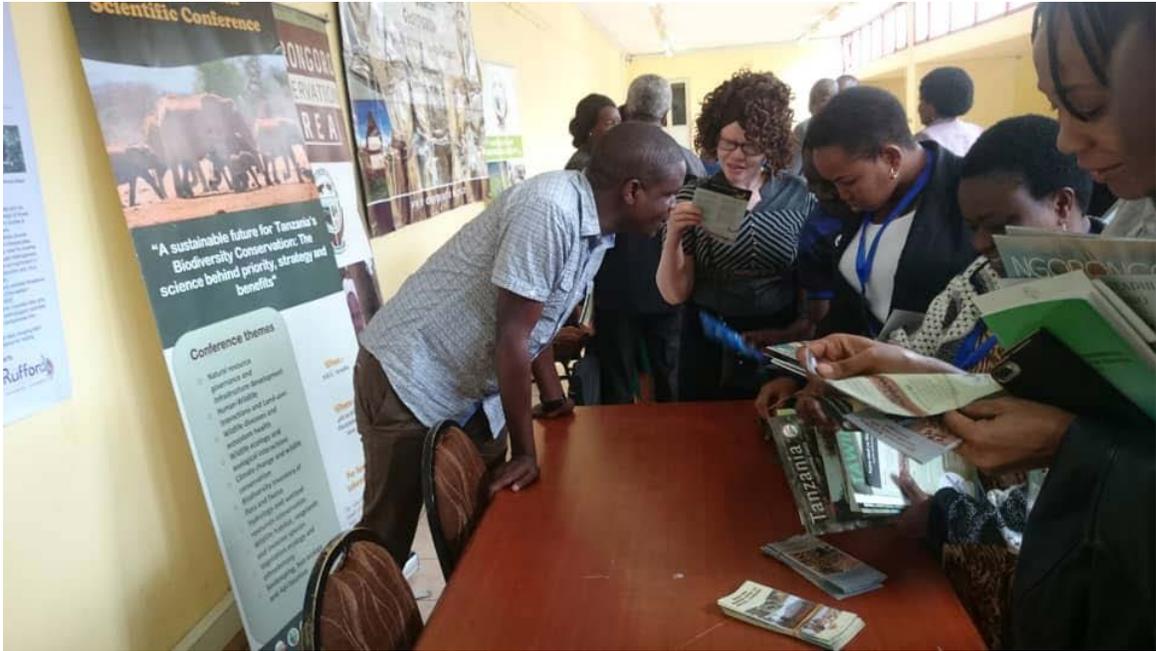


Fig. 7. Conversation with people who were interested to know more about my research work

3.2 Radio talk conducted

We conducted a 1-hour radio talkshow which was aired via Tanzania Broadcasting Corporation (TBC), Arusha on Thursday 12th September, 2019 from 15:00 to 16:00 PM. We shared information on chimpanzees' behaviour and their emerging threats to their long-term survival, especially chimpanzees living outside national parks in Tanzania.



Fig. 8. A photo taken at TBC, Arusha on Thursday 12th September 2019 during 1-hour radio talkshow which was on chimpanzees, their behaviour and the emerging threats to their survival with reference to my research findings.

3.3. Manuscript for publication

We have already prepared one manuscript "Chimpanzee (*Pan troglodytes schweinfurthii*) plant food and nesting species availability in the Masito-Ugalla Ecosystem, Tanzania" which is at the final stage for submission to peer reviewed journal.

Acknowledgement

We are grateful to the Greater Mahale Ecosystem Research and Conservation (GMERC) and the Rufford Foundation for funding this project.

Do anthropogenic activities impact chimpanzee foraging plant species and nesting tree selection in the Masito-Ugalla ecosystem, Tanzania

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INTRODUCTION

Anthropogenic activities in the Masito-Ugalla ecosystem (MUE) in Western Tanzania include expansion of human settlements and farms and increasing livestock numbers, resulting in human encroachment on chimpanzee habitat. Little is known about chimpanzee foraging plant species available in the MUE and how forage plant species and nesting trees are influenced by human activities. We compared the availability of chimpanzee forage plant species across areas of varying intensities of human disturbances and across different vegetation types. We predicted that chimpanzees prefer nesting in areas of low human disturbances and areas with abundant food resources.



Fig. 1: The eastern chimpanzee (*Pan troglodytes schweinfurthii*) - photo by Camille Guilano



Fig. 3: Different human activities encountered during the field survey in the Masito-Ugalla ecosystem - photo by Simula Majo

MATERIAL AND METHODS

Data collection

- Eight 2 km long transects
- Data collected:
 - Chimpanzee foraging plant species
 - Human activities based on the visible signs
 - Chimpanzee nests per tree species, vegetation types and study sites



Fig. 2: Sampling sites for chimpanzee foraging plant species and nesting plant species

RESULTS

Anthropogenic signs

Table 1. Encounter rates of different signs of human activities along eight 2 km long transects laid out in each study site during data collection

Human activities	MUE sites	Mafakasi	Mafakasi	Mafakasi
Settlement	12	12	12	12
Open agricultural fields	12	12	12	12
Forest	12	12	12	12
Logging	12	12	12	12
De-barking	12	12	12	12

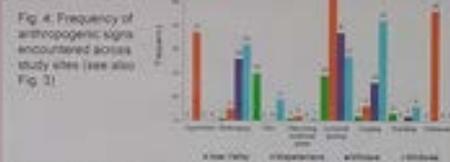


Fig. 4: Frequency of anthropogenic signs encountered across study sites (see also Fig. 3)



Fig. 5: Foraging plant species richness differed across sites (Fig. 5a) and vegetation types (Fig. 5b). Foraging plant species diversity was slightly higher in Mafakasi and Mafakasi (Fig. 5c). Foraging plant species abundance differed across vegetation types (Fig. 5d).

- ### Damage on foraging plant species
- Forage species were logged for timber, debarked for beehives, burnt and marked by poachers and livestock keepers
 - Pterocarpus angolensis* and *Pterocarpus sictorius* - logging
 - Jubermelia globifera* and *Brachystegia speciosa* - debarking

Chimpanzee nesting tree selection

- In total, 293 chimpanzee nests were observed across study sites. Issa Valley, the least disturbed site, had higher number of nests compared to sites with high human disturbance levels (Fig. 9a)
- We found 92 nests (45%) in riverine forests, 85 nests (42%) in miombo woodland, and 25 nests (13%) in forest patches (Fig. 9b)
- Masito-Ugalla chimpanzees used 17 tree species for nesting, with *Brachystegia boehmi* and *Jubermelia unguata* being highly preferred
- Considering the proportional cover of different vegetation types in the MUE, riverine forests were significantly preferred for nesting

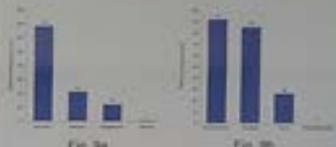


Fig. 10: Chimpanzee nests - photo by Simula Majo

CONCLUSION

- Chimpanzees living in open-habitat such as MUE have narrower diets than those of forest-dwelling chimpanzees such as in Gombe & Mahale Mountains National Parks
- Riverine forests and forest patches provide important foraging grounds for chimpanzees, highlighting the chimpanzees' need for diverse vegetation types and landscape heterogeneity
- An increasing rate of human encroachment in MUE influences habitat destruction and, thus, diminishes habitat suitability
- The growing trend of human activities threatens the continued existence of the eastern chimpanzee across the MUE
- We conclude that severely impacted sites and vegetation types from anthropogenic activities are less preferred by chimpanzees than undisturbed areas
- Areas that contained many foraging plant resources were preferred for nesting

ACKNOWLEDGMENTS



Fig. 9. A poster presentation. This poster was presented mentioned above scientific conferences. Poster presentation was supplementary of oral presentations.