



## Research Topics at Colobus Conservation, Kenya

Colobus, Sykes's, Vervets, Baboons, Galagos

### MSc Projects

Colobus Conservation is located in Diani, Kenya, on the South East coast of Kenya. Diani is an ideal location for research due to its high density of habituated primates, amazing white sand beaches of the Indian Ocean, and its accessibility by air and by road.

The office of Colobus Conservation including the student/volunteer housing is at the southern end of Diani on a forested property with wild primates as well as caged primates that are undergoing rehabilitation and release back to the wild. Diani's primates are well habituated and students can study feeding or social behaviours within a few meters of their subjects for all species – colobus, Sykes's, vervets, baboons. Because of this, little time is required to start collecting data, especially important if your time is limited.

The white sand beaches, palm trees and crystal clear water of the Indian Ocean, gives Diani a Trip Advisor rating of one of the top 25 beaches in the world and it is only a few meters away from the Colobus Conservation property. Diani also has all the facilities expected of an international beach destination including hospitals, golf course, beach bars etc. Access to Diani is a flight from Nairobi directly into Ukunda, only a 10 minute drive from Colobus Conservation.

Diani is known for its high primate biodiversity. With four monkey species, there are approximately 1,400 individuals (counted annually!) in the 7 km<sup>2</sup> town. Two species of galagos have been recorded as well. Diani's vegetation includes patches and remnants of the East African coastal forest ecosystem, one of the top global biodiversity hotspots.

Colobus Conservation works in partnership with local communities to address the human – primate conflicts in the area and to preserve the Vulnerable colobus monkey including the conservation of the unique coastal forest habitat on which they depend. Colobus Conservation programs focus on innovative mitigation strategies for:

- Deforestation;
- Vehicle-Primate Collisions;
- Electrocutation of Primates;
- Poaching of Primates (pets, snares, dog attacks)
- Primate 'pests'.

We also focus on:

- Conservation Education
- Animal Welfare (rehabilitation & release).

This document outlines a variety of primate and forest projects related to these programs and that have a direct conservation benefit. Please note, that all students will need to apply and pay for research permits from Kenya Wildlife Service and NACOSTI, the National Commission on Science Technology and Innovation. Costs of room and board at Colobus Conservation are available on request. Your budget should also include costs associated with the research.

If you have any other question, please contact the Conservation Programme Manager for further information at [enquiries@colobusconservation.org](mailto:enquiries@colobusconservation.org).

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# 1. Conservation Issue: Deforestation

## 1a. Distribution of the exotic invasive neem tree in Diani

**Degree:** Masters

**Background:** Biological invasion has become one of the major causes of economic and environmental damage in most of the countries across the world and its impacts have been predicted to increase even further under future climatic conditions. The neem tree (*Azadirachta indica*) is invasive in Diani but we do not understand what that means for the future of Diani's indigenous forest.

**Research:** Map the distribution of the neem tree in Diani to understand its occurrence in relation to geographical and ecological variables including anthropogenic disturbance. This will be done in different areas at varying levels of invasiveness for comparison.

**Data:** Collect distribution data of neem seedlings, saplings and trees to characterize the current population structure of the species. In addition, collect various ecological variables related to their distribution including the richness of indigenous tree species in proximity to neem. This will have a considerable GIS component.

**Purpose:** To understand aspects of the invasion of neem trees for management purposes and ultimately, for the conservation of Diani's indigenous forests.

**References:** <https://www.cabi.org/isc/datasheet/8112#tosummaryOfInvasiveness>

Pysek, P. et al., 2012. *A global assessment of invasive plant impacts on resident species, communities and ecosystems: the interaction of impact measures, invading species' traits and environment*. *Global Change Biology*. 18: 1725-1737.

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## 1b. Measuring tree growth of indigenous trees

**Degree:** Masters

**Background:** Diani's forest is part of the East Africa, Coastal Forest Mosaic, a Global Diversity Hotspot. Reforesting with rare and endemic tree species is important especially as exotics and invasive trees are being planted at an increasing rate. Colobus Conservation has planted thousands of indigenous trees in order to maintain a Colobus Corridor in Diani.

**Research:** The research is to further understand tree growth of rare and restricted range species for forest restoration.

**Data:** Measure a cross-section of indigenous tree species to determine tree growth rates of those individuals planted through the Colobus Conservation tree growing program. Analyse statistically growth rates of indigenous tree species and measure this against various habitat and microhabitat variables.

**Purpose:** Growth rates of indigenous trees is unknown. This study will help develop enrichment planting protocols for the various species in terms of appropriate habitats and microhabitats.

**References:**

McPherson, E.G. and Peper, P.J., 2012. Urban tree growth modelling. *Arboriculture & Urban Forestry*, 38(5):172-180.

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## 2. Conservation Issue: Vehicle-Primate Collisions

### 2a. Colobridge use by colobus, Sykes's and vervet monkeys

**Degree:** Masters

**Background:** Colobridges are aerial canopy bridges that go over Diani's Beach Road to reduce the risk of injury and death from passing vehicles. However, we do not understand *how* colobridges are used as groups move around the environment.

**Research:** Follow groups of colobus, Sykes's and vervet monkeys collecting behavioural data to understand how colobridge use is integrated into their foraging strategies.

**Data:** Behavioural data is analysed statistically to understand the reasons for colobridge use and how they approach and cross the colobridges.

**Purpose:** To understand how the colobridges are used to further identify locations where colobridges should be placed to be more effective.

**Reference:** Teixeira, F. Z. et al., 2013. *Canopy bridges as road overpasses for wildlife in urban fragmented landscapes*. *Biota Neotropica* 13:1

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### 2b. Road crossing behaviours for four primate species

**Degree:** Masters

**Background:** A two lane tarmac road runs the length of Diani for 10 km. Primates cross the road to reach foraging and sleeping sites but results in individuals getting injured or killed by vehicles.

**Research:** To compare and contrast how the four species of monkeys (colobus, Sykes's, vervets, baboons) cross the road in Diani in terms of individual and group behaviour and road characteristics.

**Data:** The student would wait for monkeys to cross the road and record crossing behaviours (i.e. vigilance, group cohesion) by species, age and sex categories as well as noting variables such as presence and absence of forest, time of day, noise level, vehicle volume, intersections, and road bends.

**Purpose:** To better explain why different species of primates have different rates of injuries and deaths due to vehicles. This information will help further develop mitigations to reduce the incidences of these types of animal welfare cases.

**Related research:** Hockings, K.J., 2011. *Behavioural flexibility and division of roles in chimpanzee road-crossing*. In: Matsuzawa, T., and Sugiyama, Y. (eds), *The Chimpanzees of Bossou and Nimba*, Tokyo, Springer, pp. 85-96, ISBN 978-4-431-53920-9; E-ISBN 978-4-431-53921-6.

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### 3. Conservation Issue: Primate Electrocutions

Currently no projects in this area of study

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### 4. Conservation Issue: Poaching of Primates

Currently no projects in this area of study

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### 5. Conservation Issue: Primate Pest Behaviour

#### 5a. Primate competition for human-provided foods

**Degree:** Masters

**Background:** Literature shows that human-provided food for monkeys is an important resource in the suburban environment and this increases populations by reducing age of sexual maturity and inter-birth intervals.

**Research:** Compare the use of human-provided food between three primate species– Sykes’s, vervets and baboons.

**Data:** The data will examine time budgets and behaviour of the three species of monkey as they use the human provided food.

**Purpose:** To understand competition between species for the limited human-provided food so mitigations can be put into place.

**Related research:** <https://baboons.org.za/index.php/baboon-proofing-waste>

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#### 5b. Quantifying opportunities for primate food resources from rubbish pits

**Degree:** Masters

**Background:** Literature shows that rubbish pits are an important resource in suburban environment and this increases monkey populations by reducing age of sexual maturity and inter-birth intervals.

**Research:** Identify locations and measure the rubbish pits as they pertain to primate use as food resources and compare to the location of primate groups in Diani.

**Data:** With GIS, visualize the locations of the rubbish pits correlate these to the primate census data.

**Purpose:** To test if the rubbish pits are a major influencer of primate density.

**Related research:** Muruthi et al., 1991. *Resource base, parity, and reproductive condition affect females' feeding time and nutrient intake within and between groups of a baboon population.* Oecologia 87:467-472.

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## 6. Conservation Education

### 6a. Monitoring and evaluating a long term environmental education program

**Degree:** Masters

**Background:** Colobus Conservation has been working with schools for almost 20 years. Each week a school attends an on-site day observing primates and walking in the forest.

**Research:** To evaluate the school education program by carrying out an examination at the schools to determine the extent of the knowledge base retained by the children and teachers and if the schools in the program are environmentally more aware than those schools that have not been on our program.

**Data:** Analyse the correlation between the number of school visits and environment variables at the school.

**Purpose:** The research will be used to direct changes to the education program to make it more effective.

**Related research:** Kuhar, CW. Bettinger, TL. Lehnhardt, K. Tracy, O. Cox, D. (2010). Evaluating for long term impact of an environmental education program at the Kalinzu forest reserve, Uganda. *American journal of primatology*. 72. 407-413.

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## 7. Diani's Primate Community

### 7a. Adult male colobus relationships in an infanticidal species

**Degree:** Masters

**Background:** This subspecies of colobus was thought to have uni-male, multi-female groups, however, a number of studies have shown that though one adult male groups are common, two and three adult male groups are also present.

**Research:** Behavioural studies of various colobus groups with different number of males.

**Data:** Collect data on adult males in groups with one, two and three males.

**Purpose:** The results should give us a greater understanding of the social complexities especially within the context of infanticide and related immigration and emigration patterns by both males and females.

**Related research:** Kappeler, P.M. 2000. *Primate Males: Causes and Consequences of Variation in Group Composition*. Cambridge University Press.

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