MAROMIZAHA PROJECT

Protecting the singing lemur and its forest

FINAL REPORT – NOVEMBER-DECEMBER 2022

SECOND SEMESTER – JULY-DECEMBER 2022

Summary of the project results

Background

The staff from the NGO U ONLUS (https://www.uonlus.it/), as part of the Ethology and Bioacoustics research group of the University of Turin, Department of Life Sciences and Systems Biology, is currently leading the first and only long-term indri population monitoring. Starting from 2008 we have habituated 12 family groups of *Indri indri* in the Maromizaha NPA. We currently have 4 research guides performing daily surveys on the animals, collecting behavioral and spatial data on each indri group, at individual and group level (no collars, each individual is recognizable thanks to natural marks on its pelage). In addition, a Passive Acoustic Monitoring of the indri population is ongoing, thanks to an array of 2 Wildlife Acoustics SM4 (https://www.wildlifeacoustics.com/) and 10 Audiomoth (https://www.openacousticdevices.info/audiomoth) recorders.

Threats for the species

The species *Indri indri* is a highly distinctive lemur, endemic to the island of Madagascar where it inhabits the eastern rainforest habitats.

Illegal hunting is a major problem for the indri in certain areas. Although long thought to be protected by local *fadys* (traditional taboos), these do not appear to be universal and the animals are now hunted even in places where such tribal taboos do exist. In 2018, for example, in the Commune of Lakato (Alaotra Mangoro Region), 9 indris were killed by poachers in the Antavolobe forest (Ratsimbazafy, pers. comm.). Recent studies of villages in the Makira Forest indicate that indri have also been hunted in the past for their skins (which were worn as clothing), that indri meat is prized and fetches a premium price, and that current levels of indri hunting are unsustainable (Golden 2005, 2009; Jenkins et al. 2011; R. Dolch pers. comm.). The principal threat to this species is habitat destruction for slash and burn agriculture, logging and fuelwood gathering, all of which take place even within protected areas. Increasing levels of illegal hunting is also a major problem for the indri (Jenkins et al. 2011). Fady against the hunting of indri are becoming less respected, and hunting has thus worryingly increased since the political crisis, now posing a serious threat to this species. The corridors between Mantadia and Zahamena are an important Conservation Site, where wide conservation education and capacity building actions should be implemented, to eliminate hunting, with the indri as the flagship species. This species has never successfully been kept in captivity and thus captive breeding programs are highly doubtful.

In the next years it will be of great importance to support local forest management by improving the existing community-based approach (Randrianarison et al. 2015). Actions should include expansion of protected habitats to increase population connectivity (e.g. the Ankeniheny-Zahamena corridor) and to decrease lemur disturbance by rural communities. Without external support, the last remaining forest habitats will be devastated within a few years resulting in the local extinction of most lemur populations (Schüßler et al. 2018).

Project achievements

Thanks to the collaboration between the WSO, Friend of The Earth, Friend of the Sea, U ONLUS, the University of Turin and GERP, the "Maromizaha 2022 Conservation Project" has carried out conservation activities targeting the population of indri lemurs in Maromizaha during a one-year project, starting from January 1, to December 31, 2022.

The **"Maromizaha 2022 Conservation Project"** thus aimed at protecting the indri lemurs, through two main activities:

1) Indri population monitoring

The project have fostered conservation by:

i. Implementing the number indri family group under the actual monitoring protocol;
ii. Implementing the Passive Acoustic Monitoring population survey;
iii. Building capacities among the local communities in the domain of biodiversity conservation and education;
iv. Increasing awareness, facilitating and encouraging people's involvement in conservation actions in the area.

2) Habitat Restoration

This action supported local forest management by improving the existing community-based approach and by expanding the network of protected habitats in the Ankeniheny-Zahamena corridor.

Final report

For the **"Maromizaha 2022 Conservation Project"** the team from the University of Turin, set at the Maromizaha Multipurpose Center and coordinated by Prof. Cristina Giacoma and Dr. Valeria Torti, was composed by the PhD students Teresa Raimondi, Walter Cristiano, Valeria Ferrario and Filippo Carugati, and by the Researcher Daria Valente. Several students from the University of Turin and the University of Antananarivo collaborated to the project during their fieldwork in Maromizaha.

Within the frame of the **"Maromizaha 2022 Conservation Project"** we carried out the following activities:

1. monitoring of the indri groups through direct observations, camera traps and passive acoustic monitoring;
2. habituation of 2 additional social groups of indris;
3. organization of training sessions for the research guides and green classes for the schoolchildren from the Anevoka Primary School (EPP).

Indri monitoring

The indri survey

In the Maromizaha NPA the 4 research guides now follow and monitor a total of 12 indri family groups, whose composition and structure for 2022 has been updated by the local guides under the supervision of the UniTO research team. The research guides are able to identify each individual in each group, thanks to the color of the pelage and to the fur's natural marks.

Within this birth seasons, Gilbert and Naivo registered the presence of 5 newborns in the indri population monitored.
The newborns are called Mofo (4MZ), Bruno (9MZ), Rano (10MZ), Vintsy (14MZ) and Yhandry (13MZ).
The guides, in collaboration with the students, annotated all the specific intra- and inter-group dynamics and are collecting spatial and behavioral data. They also recorded a total of 120 songs, that are emitted by the indris on a daily basis.

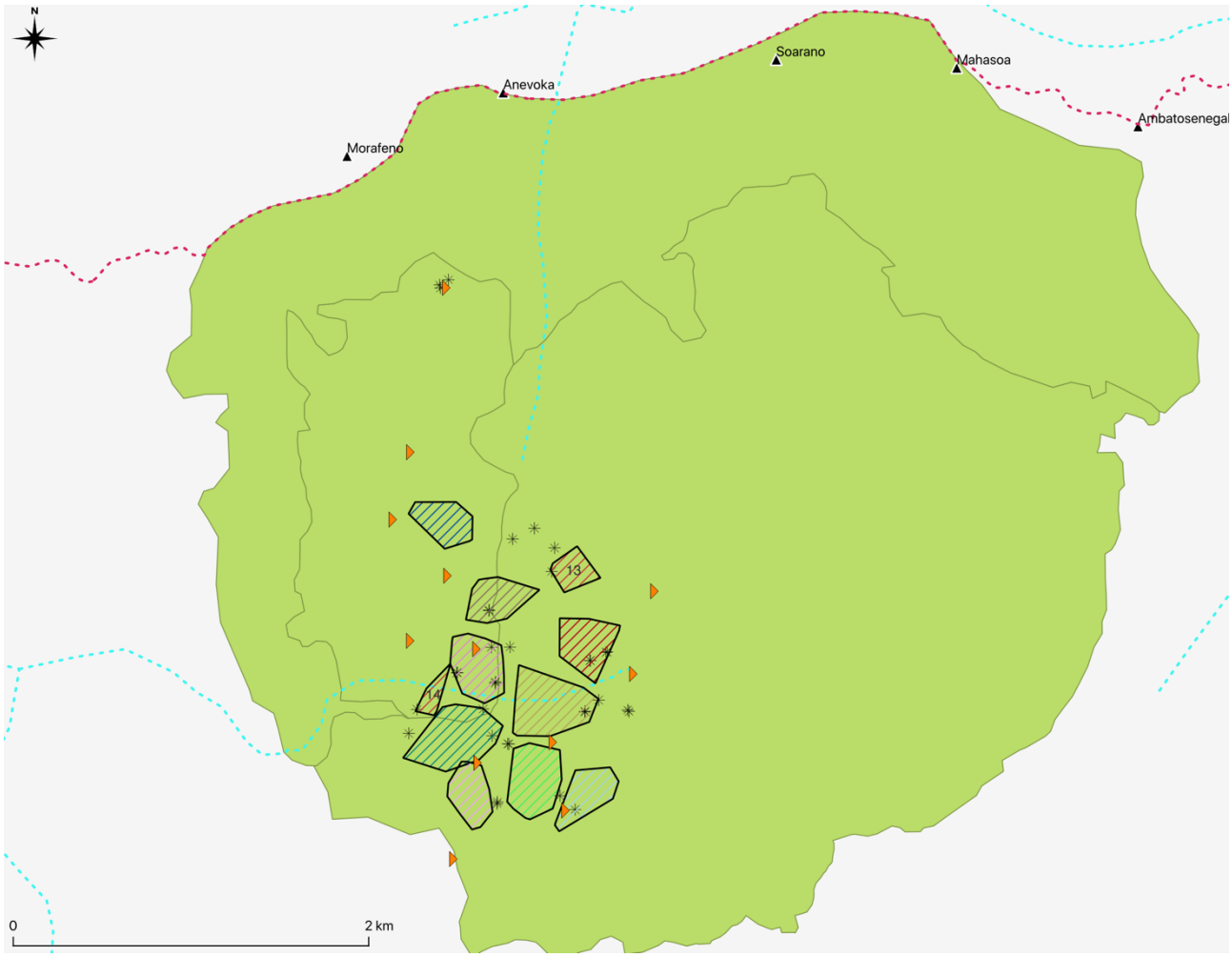
From mid-June Setra and Zafison followed and habituated the following family units.

Group 13MZ: it's made of a reproductive couple, Ravalo, the male and Hery, the female. There is a 2022 baby, Yhandry, and a juvenile female, Xsa.

Group 14MZ: made by a reproductive couple, Avana (male) and Sara (female) and their baby, Vintsy.

The sex of the individuals, except for the babies, has been assigned thanks to the recording of songs, that allowed the guides and the students to identify the sex of the callers (see Giacoma et al. 2010). The guides will continue to follow the animals in the next months, paying much attention of both the development of the two babies and the relationship with the neighboring indri groups.

The following map provides information about the location of the indri groups, in which territories are reported for 11 of the 12 habituated indri groups (MCP 100% represents the location of each indri territory). The orange triangles indicate the locations of the PAM recording devices, while the black asterisks represent the camera traps' locations. The target areas fall inside the eco-touristic, the research and the pristine area of the forest.



The research team capitalized the results of the PAM through the elaboration of an unsupervised classification methodology, targeting indris and their singing behavior. The work has been published on the "Animals" journal, at the end of 2022. The paper is available here: https://www.mdpi.com/2060070

From the beginning of July a set of 20 camera traps has been installed in the NPA, with the precise aim to monitor geophagy sites (where several lemur species feed on soil and clay), to target wild indri groups, to detect the predators' presence and to collect information about the Maromizaha fauna in general. Dr. Valeria Torti and the PhD student Valeria Ferrario started a preliminary screening on the Camera Traps' data and found an incredible variety of species detected. We observed 10 lemur species (out of 12 present in the area), all the 5 carnivore species, a huge variety of birds, rodents, insectivores.

Some of the species detected though the camera traps monitoring (*Hapalemur griseus*, *Lepilemur mustelinus* and *Coua caerulea*).

A complete HOBO weather station has also been installed in the forest, in order to collect ecological data (temperature, humidity, rainfall, soil pH, wind speed and direction), to be used to monitor the quality of air, water and soil in the NPA. Climate data will be useful inputs also for GERP, to monitor the effect of climatic variation and to plan more effective management strategies for compensating negative effects on the Maromizaha faunistic and floristic communities.

The Phd and Master students setting the HOBO weather station at the Maromizaha Multipurpose Center, with the help pf the research guides Zafison and Setra.

Habitat restoration

Maromizaha Restoration

Thanks to the WSO/Friend of the Earth budget we have been able to contribute to extend the restored area, by enrolling two additional agents who will be in charge of both the tree nursery and the tree planting. The seeds of native species have been directly collected by women in the forest and/or obtained by the ongoing restoration project.

From December 17 to 23, 2022 ©, the GERP's restoration coordinator, went to Maromizaha in order to monitor the advances of the restauration project.
He has sent his report for the activities, attached in Annex X. With the support of GERP's local coordinator, Mr. RANDRIAMIALISOA, the restoration activities have developed successfully.

Two nurseries are functional for the production of 10,000 seedlings for the forest restoration project funded by U-ONLUS / WSO.
After the restoration with the 1,000 seedlings last September, the 9,000 seedlings in pots from the two nurseries were ready to be planted in the restoration area.
For the finalization of this restoration, several local collaborators have been hired: 40H/D for clearing, 10H/D for team leaders on surveillance and framing on restoration techniques (with the help of the two nurserymen), and 194 man/day for the holes, the transport of the seedlings and the planting.
The finalization of the restoration was done in mid-December with the presence of the manager and the technical coordinator of the Maromizaha NPA. The person in charge of restoration activities,

that will be Mr. RANDRIAMIALISOA in 2023, will continue to monitor the restored plot to know and arrange the various activities to be done soon.

In summary, 10,000 seedlings have been produced in two nurseries for 6 months (from June to November). The 10,000 seedlings are all planted in September (1,000) and December (9,000). 284 man/day provided by the local populations have been necessary for developing and carrying out the various stages of the restoration activity (clearing, transport of seedlings, borings, planting, assistance/surveillance). Detailed restoration report is attached to the present document, with the complete list of all species grown and relocated in the forest (in French, Annex XI).

Education

The educational program in the Anevoka EPP started thanks to the collaboration of several international actors, like Fondazione ARCA, LVDI International, Green Teen Team Foundation, Chiesa Valdese, Rotary International and is now in synergy with Our Kids, Our Future Madagascar.

The team has organized the last green class on December 19th. Rovaharilala Zoeline Solotiana (GERP's Coordinator of the Education program), Ranaivomanana Jean (President of the Association of the Guides in Maromizaha, AGAM) the research guides and the UniTO students participated in the daily activities organized for a total of 12 schoolchildren (6-13 years old) attending the primary school of the village of Anevoka (EPP Anevoka) and being awarded as the best performing students of the year. During the celebration, the students were gifted with raincoats, donated by Prof. Giacoma.

The green class started with a general introduction from Rova, explaining the rules to respect within a Protected Area, and from the guides Naivo and Zafison, about the forest environment, the characteristics of a rainforest and the reasons making Maromizaha a Protected Area. The goal of the green class was to raise awareness among the most promising students of the villages about the biodiversity inhabiting the rainforest and the pressures to which it is subjected.

Then, the guide walked the group through the forest, showing spotted animals and introducing the most important and special trees in the area. The group visited a group of indris, a group of red-bellied lemurs and spotted several animal species.

The two research guides helped the PhD student Filippo Carugati, from the UNITO team, to teach the kids about the species, their behavior and the meaning and function of the amazing indri song. After a training on how to use devices in the forest (like recorders, cameras and camera traps), the group moved to the Multipurpose Center (CRPM).

Once at the CRPM Filippo and the UNITO students reunited the schoolchildren to talk more about doing research on lemurs and about the importance of studying animals and plants to collect information aiming at protecting the forest.

The kids and the staff had lunch at the CRPM, after which the guides taught the kids on how to use the research equipment, how to follow the animals, etc.

At the end of the practical training, the UniTO students organized a small session of photo exhibition, in order to talk about the amazing biodiversity hosted in Maromizaha.

The green class ended at around 15:00, allowing Rova, the families and the kids to come home at the village before sunset.

Additional reports from Rova are attached to this report (Annex XII).

The different moments of the green class on December 19th, 2022.

MISAOTRA BETSAKA!