MAROMIZAHA PROJECT

Protecting the singing lemur and its forest

THIRD INTERIM REPORT – MAY-JUNE 2022

FIRST SEMESTER – JAN-JUNE 2022

General information

The project

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).

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" will carry out conservation activities targeting the population of indri lemurs in Maromizaha during a one-year project, starting from January 1, 2022.

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

1) **Indri population monitoring**

The project will foster 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 supports local forest management by improving the existing community-based approach and by expanding the network of protected habitats in the Ankeniheny-Zahamena corridor.

Third bimonthly report

For the **"Maromizaha 2022 Conservation Project"** Dr. Rose Marie RANDRIANARISON, who is in charge of coordinating the activities in the Maromizaha NPA, carried out several missions in Maromizaha in the last bimester (May-June 2022). She met the team from the University of Turin, who is currently set at the Maromizaha Multipurpose Center and coordinated by the PhD students Teresa Raimondi and Walter Cristiano.

During this last bimester the coordinators:
1. regulated the payment of the salaries of all our staff for the third bimester;
2. assessed the needs of the Anevoka primary school and planned the green classes activities with the Director and the Teachers;
3. participated at the "Atelier sur la Conservation des *Indri indri* dans la Région d'Andasibe";
4. organized the stay from Clarissa Puccioni in Maromizaha;
5. organized a first Restoration Day in the forest;
6. organized the second training session to the guides.

Atelier sur la Conservation des *Indri indri* dans la Région d'Andasibe

On May 6th, 2022 a team from the University of Turin (UNITO) reached the Feon'y Ala Hotel, in Andasibe, to attend the first "Workshop on the Conservation of *Indri indri* in the Andasibe Region". The Workshop has been organized by Rio Heriniaina, a PhD student at the University of Antananarivo, funded by the University of Turin in the frame of his research on the indris of Mahatsara, Ihofa and Mantadia National Park (Andasibe Region). The Atelier was organized in partnership with ZSL and the Association Vinako for Madagascar.

The Atelier aimed at reuniting all the actors of indri management and conservation in the area, to discuss about the possible solutions to indri population decline.

Indri monitoring

The indri survey

In the Maromizaha NPA the 4 research guides follow and monitor a total of 12 indri family groups, whose composition and structure for 2022 is reported in the annexed table. 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. We reported the study protocol in the Attachment 1 and in the first interim report.

gruppo	individuo
1MZ	Jery; m*
	Bevolo; f*
	Filo; u
	Rio; u
2MZ	Max; m*
	Soa; f*
3MZ	Mahagaha; m*
	Mena; f*
	Nousnous; u
4MZ	Koto; m*
	Eva; f*
	Willy; u
	Mofo; u
5MZ	Graham; m*
	Bella; f*
6MZ	Hendry; m*
	Befotsy; f*
	Fanamby; f
8MZ	Jonah; m*
	Bemasoandro; f*
	Toky; u
9MZ	Emilio; m*
	Sissie; f*
10MZ	Tia; m*
	Fetra; f
	Pedro; u
11MZ	Karenji; m*
	Ferana; f*
	Colblanc; m
	Fetsy; u
12MZ	Roma; m*
	Zela; f*
	Nisa; u
7MZ	Lova; m*
	Gasy; m
	Onja; f
	Setra; u

Gilbert and Naivo registered the presence of a newborn in the family group 4MZ, that was called Mofo, meaning "bread". This is the only indri baby within the groups, at present.

The 4 research guides monitored once all the indri groups. From mid-June Setra and Zafison started to visit the territories of unhabituated groups to find 2 new suitable family groups to follow and habituate.

The monitoring calendar is reported in the following Table.

gruppo	guides	week
1MZ	Gilbert/Naivo	28/02 - 04/03 ; 04/04-08/04; 16/05 - 20/05
2MZ	Gilbert/Naivo	07/03 - 11/03 ; 11/04-15/04; 23/05 - 27/05
3MZ	Gilbert/Naivo	14/03 - 18/03 ; 10/05 - 12/05
4MZ	Gilbert/Naivo	21/03 - 25/03 ; 26/04-29/04; 30/05 - 03/06
5MZ	Gilbert/Naivo	07/06 - 10/06
6MZ	Setra/Zafison	21/03 - 25/03 ; 02/05 - 06/05
8MZ	Setra/Zafison	04/04 - 06/04; 30/05 - 02/06
9MZ	Setra/Zafison	11/04 - 15/04; 07/06 - 08/06
10MZ	Setra/Zafison	28/02 - 04/03 ; 14/03 - 18/03; 18/04 - 22/04
11MZ	Setra/Zafison	09/03 - 11/03 ; 25/04 - 29/04
12MZ	Setra/Zafison	13/06 – 17/06
7MZ	Setra/Zafison	28/03 - 30/03; 23/05 - 26/05

The passive acoustic monitoring

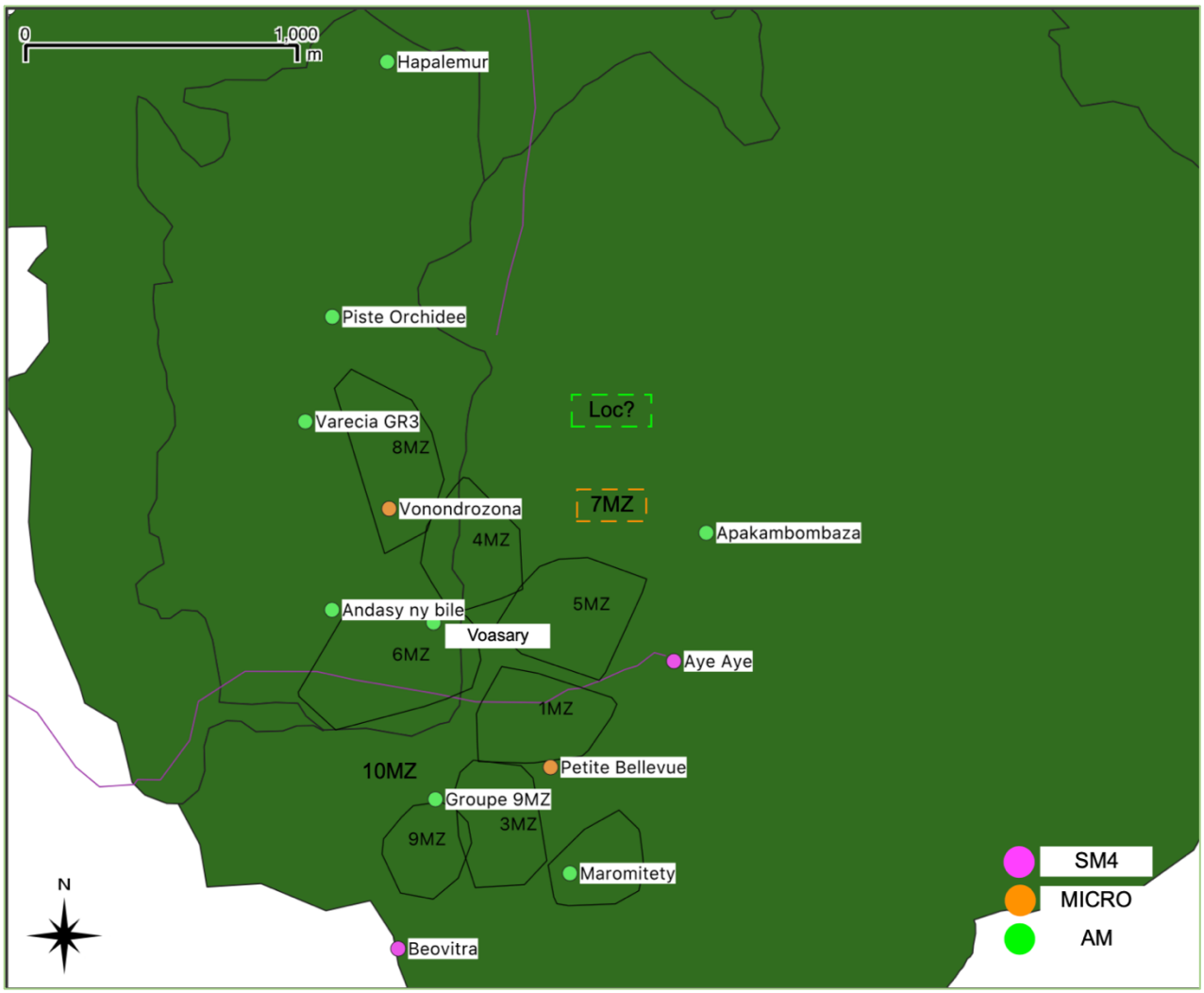
For the PAM we set 2 Wildlife Acoustic Song Meter (SM4) and 2 Wildlife Acoustic Micro recorders to equip 4 listening points in different areas of the NPA (2 sites in the research area, 1 site in the eco-touristic part of the NAP, 1 site in the pristine forest). The recording devices will stay in place for one month at a listening point. Both SM4 and Micro recorders are configured to record for 10 min every 30 min, with 16 bit recordings made at a frequency of 44,100 Hz and stored in .WAV file format.

Starting from May 2022, we will set up also 2 additional Wildlife Acoustic Micro recorders inside the territory of 2 new indri groups. The relative groups will be then habituated to the human presence by the guides Setra and Zafison. Thanks to the WSO/Friend of the Earth funding we will be able to buy 2 additional SM4 Micro recorders to implement the area covered by our passive acoustic monitoring array.

All the recorders are placed on the tree canopy, at a height of approximately 2.5-4 meters. This would allow a better detection of the indri calls, that are used to sing from the top of the trees, to spread their loud cries farther.

At the beginning of May, Prof. Marco Gamba, from the University of Turin, came back with a backup of the PAM recordings from the field site. All the recording have been saved on the cloud storage of the Ethology and Biacoustics Lab and are currently under analysis. Teresa RAIMONDI will come back at the beginning of July, with a further backup.

After looking at the data, we planned with the guides the new setting of all the recorders in the area, as detailed in the following map. The aim is to cover all the Maromizaha ecotourism and research area with our PAM array and to monitor the unhabituated indri groups. The new protocol has been operational since mid-June 2022.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Rising awareness

Training sessions

On April 29, 2022, the UNITO research team organized the first quarterly training session at the Maromizaha Multipurpose Center. The training session targeted at improving capacities in the research guides (the 4 indri guides, the 2 bamboo and black and white ruffed lemur guides and the 2 diademed sifakas guides) of the Association of Local Guides (AGAM). All the local guides are already in the field, collecting behavioral data on the different lemur species. The training session improved the guides capacities around the following topics: data collection and storage (new protocol for field studies), new planning of the PAM array system (see map), how to use new equipment (new GPS models, cameras, handy recorders, etc.).

On June 23, 2022 the team from the University of Turin organized the second quarterly training session to train all the field guides on new methods in data collection. The PhD student Teresa RAIMONDI taught the guides to correctly setup and deploy acoustic devices (especially hand-held and passive acoustic recorders) and camera traps.

The theoretical framework illustrated the fundamentals of measurement technology and data acquisition. Practical exercises with the students helped the guides in manually practicing the use of the devices within the field site.

We did not use the allocated budget yet, cause only the 8 research guides, already settling at the Maromizaha Multipurpose Center, participated in the field session. We will allocate more money for the next meetings, that will be opened to all the AGAM research guides ad delivered at the Anevoka *tranompokonolona.*

Habitat restoration

Maromizaha Restoration

In order to support local forest management by improving the existing community-based approach and to expand the network of protected habitats in the Ankeniheny-Zahamena corridor the University of Turin supports reforestation actions in the Maromizaha NPA. In collaboration with GERP, the team currently manage 5 bamboo and endemic tree nurseries in the villages around the NPA and support the local population in the ecological restoration of target degraded areas of the forest. The project aims at increasing habitat connectivity for lemur populations and decreasing lemur disturbance by rural communities. The total budget will support the costs for seed collectors, tree nurseries, tree planters and materials to improve the extension of the restored area within the NPA.

The UNITO and U ONLUS team already engaged in restoration activities in different previous projects, one funded by the Rotary International (AROALA), by Chiesa Valdese (FIHAVANA) and one from a network of zoos in Italy (VOLOHASY). Thanks to those funded programs, 30.5 ha of degraded land were covered with 33,702 native trees and 3 ha were restored with endemic bamboo species, reaching an engraftment rate of 80%. Starting January 2022, GERP's has already grown and planted 7.000 trees in a restoration area of 62 ha inside the Maromizaha NPA. Thanks to the WSO/Friend of the Earth budget we will be 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 will be directly collected by women in the forest and/or obtained by the ongoing restoration project.

On May 9th, 2022 we transferred the total amount for the restoration activities (1.750 EUR) to GERP's bank account. Dr. RANDRIANANTENAINA, the GERP's restoration coordinator, has sent a revised detailed budget for the activities, attached in Annex II.
With the support of GERP's local coordinator, Mr. RANDRIAMIALISOA, the restoration activities started in May 2022, as foreseen.

The project intervention started with the restoration/building of two tree nurseries, that should reach the objective of producing 10,000 seedlings for 06 months. These two nurseries are in Anevoka; one is the old nursery which is rehabilitated, with RAVELOARISOA Hermano as nurseryman; and the other is a new nursery built and provided by RAJAONARIVELO Jean Flavien. Supplies and

materials were purchased for the start-up of the two nurseries. The filling of the 10,000 pots has already been carried out and ensured by the nurserymen with the help of local workers. So far, 2,206 pots have already been transplanted with young autochthonous plants from the Maromizaha Forest. The degraded area/areas to be restored will be selected by the local restoration agents.
A detailed restoration report is attached to the present document (in French, Annex III).

Restoration Day

On May 13, the team from the University of Turin and GERP organized a reforestation event in the NPA. The attendees were Mr. RANDRIAMIALISOA and M. ROVAHARILALA Solotiana Zoeline from GERP, Clarissa PUCCIONI, Dr. Rose Marie RANDRIANARISON, the Anevoka EPP Teachers, the research guides and the students from the University of Turin.

The Restoration Day started at 8 am, at the GERP's Pepinière Vitrine, the main tree nursery at the Anevoka village (within the Maromizaha buffer zone). All the participants started with visiting the tree nurseries. The planters and the restoration agents explained the methods and the aim of their work and showed the two main tree nursery in Anevoka (Pepinière Vitrine and OTAC), in which all the participant collected the trees to be allocated in the restoration area (18°57'52.9"S; 48°27'25.2"E). Around 300 plantules were put in the ground in the disturbed area by all the participants.

At the end of the restoration activity, refreshments were kindly offered to all the participants.

Education

Educational activities on indri conservation issues in local schools and study support will enhance in a short term the involvement and the awareness of the cultural and economic value of lemurs and their habitat by children and their families. In the long term, this enhanced awareness gained at a young age, will facilitate and encourage their involvement in conservation and the search for environmentally sustainable job opportunities. 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 will organize the first green class on July 8th. The teachers of the EPP Anevoka are currently involved in the final exams (CEG et CÈPE exams are scheduled starting from June 17th).

The team from the University of Turin is discussing the program with the teachers. The planned activities will foresee a morning promenade inside the Maromizaha NPA, with the guides showing the different floral and animal species to the schoolchildren. The kids and the staff will have lunch at the CRPM, after which the guides will teach the kinds on how to use the research equipment, how to follow the animals, etc. The green classes will end at around 16:00, for allowing them to come home at the village before sunset.

The Anevoka EPP school teachers participated in the May 13th restoration event and proposed to involve the schoolchildren in the restoration activities as well. We will organize a similar event in the framework of the Lemur Festival, that will take place on October 31st, 2022.