seed madagascar
sustainable environment, education & development

End of Phase I Report for

PROJECT ALA

In situ conservation of *Microcebus tanosi*, *Avahi meridionalis*, and *Cheirogaleus thomasi* in the Sainte Luce littoral forest, southeast Madagascar

May - 2021

1 Summary

1.1 Context

Across Madagascar, 90% of original littoral forests have been lost due to human activities.[1] Between 1950 and 2005, the littoral forest of the southeast Anosy region declined by 50%, primarily because of local resource use.[2] The main threats to the remaining Sainte Luce Littoral Forest (SLLF) are human activities such as slash and burn agriculture, community dependence on natural resources, and the prospect of an industrial-scale mining operation. Fragmentation and degradation of the SLLF endangers the survival of numerous species.

The three nocturnal lemur species that occupy the SLLF – the Southern Woolly Lemur (*Avahi meridionalis*, EN), Anosy Mouse Lemur (*Microcebus tanosi*, EN), and Thomas' Dwarf Lemur (*Cheirogaleus thomasi*, EN) – cannot traverse open land between forest patches. Deforestation fragments their habitat, genetically isolates sub-populations, and contributes to increased mortality and risk of extinction.

1.2 Project Overview

SEED Madagascar (SEED) has helped to address these issues by planting four habitat corridors between the five forest remnants that make up fragment 'Sainte Luce 8' (S8), reconnecting viable lemur habitat and increasing connected forest habitat by 58ha (109%). Many other endemic flora and fauna, which are unable to disperse between isolated patches of habitat, will also benefit.

SEED has worked with the community by facilitating training workshops for and with key stakeholders and involving youth in conservation education sessions and nursery workshops. Over the past two years, SEED has collected data to evaluate corridor effectiveness, and will continue to do so in future phases of the Ala Programme. This will inform SEED's long-term aim to regenerate the SLLF and support sustainable, community-led natural resource management, and contributes to global understanding of corridor forestry as a conservation strategy.

1.3 Summary of End of Phase I Report

This report is being produced at the 24 month point of Project Ala, which marks the end of Phase I. This report will focus on activities that have taken place in the last six months of the project (October 2020 – March 2021) and will include a 'lessons learned' section, relevant to the entirety of the project. Over the last six months, SEED has continued to achieve milestones to attain project objectives. All four conservation corridors have been established with *Acacia* seedlings and native seedlings (2.1.2). Firebreaks around the S8 forest fragment and corridors have been constructed and maintained, and fire mitigation signs installed (2.1.3). Additional posters were designed to increase awareness of the main threats to the corridors and ways to mitigate them. The collection of scientific data from the corridors and surrounding forest remnants continues to be led by SEED's national team and has been completed for Phase I (2.2). While COVID-19 has delayed and postponed meetings, workshops and other engagement activities, work has continued where possible under the restrictions. The community and key stakeholders continue to be engaged following the end of the Phase I, creating a strong foundation to start Phase II and resume activities when it is safe to do so (2.3.1).

2 Activity Detail

Project Ala has completed all activities that could be safely carried out under COVID-19 restrictions, including seedling planting, firebreak construction, stakeholder capacity building workshops, school nursery workshops, research monitoring, and community education sessions. Activities that involve more than 30 people, such as youth education sessions and community meetings, have been postponed because it is difficult to maintain physical distance.

2.1 Corridor Establishment

2.1.1 Nursery Management

Seed collection has continued over the last six months with seeds being grown in the nursery for at least three months and monitored weekly by the Nursery Manager. Seed collection deviated slightly from the calendar due to changing weather conditions. Due to the repatriation of international staff and volunteers as a result of COVID-19, there was no capacity to continue to count individual seeds during the last six months of the project. However, this did not have an impact on broader project goals. Any seedlings not planted during Project Ala Phase I will be used during Phase II.

Two types of natural pots were trialled in the nursery (starting mid-2020) using native species: one made from earth and one from weaved banana leaves. Native *mokarana* seedlings have been transplanted into both types of pots to monitor if seedlings would grow. A year later, seedlings are still growing in the earth pots, but the banana leaves were not found to be resistant to sunlight and water. To date, only wild germinated seedlings have been transplanted into these pots, with more trials required to grow from seeds and across other species.

Laza, Project Ala's Coordinator, overseeing native seed growth in SEED's nursery

2.1.2 Planting Corridors

The final location of all established project corridors is shown in the map in Appendix One. Since October 2020, 4,648 native seedlings have been replanted in Corridors 1, 2, 3, and 4 following the nine-month and one-year survival survey. A prolonged period of drought in Sainte Luce lasting from November 2020 to mid-March 2021 resulted in high mortality rates for *Acacia mangium* seedlings planted in November (71%). To increase chances of seedling survival, scheduled planting sessions have been delayed until favourable weather conditions resume. Following significant rainfall at the end of March 2021, an additional 811 *Acacia mangium* seedlings were planted to extend all four corridors to improve the resilience and effectiveness of the corridors in the long term.

To date, a total of 2,728 *Acacia* seedlings and 10,465 native pioneer and intermediate seedlings of 21 species have been planted in the four conservation corridors, including replants of deceased trees. The *Acacia* planting schedule has been completed for all four corridors. Native replants will continue during Phase II.

2.1.3 Firebreaks

The firebreak surrounding Corridor 3 was maintained by clearing in February 2021. Extra clearing has been required to maintain the firebreaks of some corridors (mainly Corridor 3) because the rapid regrowth of weeds potentially increases the threat of fires. There remains no need for a firebreak surrounding Corridor 1 because of the low threat of fire due to sparse vegetation.

2.2 Research

SEED's Conservation Research Programme (SCRP) activities have continued despite international SCRP staff returning to their home countries in April 2020 due to COVID-19. The capacity of national staff to independently conduct surveys has grown significantly over the last six months and provided the project team with vital data on the survival, growth, fauna, and flora of the conservation corridors. Invertebrate surveys were put on hold to redirect capacity towards the survival, growth, lemur, herpetological, and floral surveys, as the invertebrates were an additional research area not originally outlined in the project proposal. The instalment of camera traps as an additional technique for monitoring lemurs has also been postponed for Phase I because installation and set-up required technical oversight from the international Forestry Specialist. The postponement of these two activities has had little impact on the broader understanding of corridor development, as most surveys are collecting baseline data. Both activities are on track to resume during Phase II, when international team members have returned. There have been no other changes to data collection, with national staff ensuring consistency across the amount of people involved in data collection, research timings, and amount of time spent in Sainte Luce.

2.2.1 Data Collection within the Corridors

Two 10m x 10m quadrats were established in all four corridors for survival and growth monitoring and seedlings were tagged with an identifiable code using weatherproof tape.

Botanical surveys within the corridors were completed for Phase I and will continue during Phase II to monitor changes in plant diversity as the corridors establish. The 12-month botanical survey was completed for Corridor 4 in November 2020, and the 18-month survey completed for Corridor 1 in January 2021. Lemur and herpetological surveys were conducted on a rotational basis during four monitoring trips to Sainte Luce. The final two monitoring trips of Phase I were completed in January and April of 2021. Although originally scheduled for March, the last monitoring trip was slightly delayed due to logistical challenges with reduced capacity. However, this did not impact data collection.

2.2.2 Data Collection within the Remnants

SCRP continued to conduct surveys along transects in four remnant forest fragments on a rotational basis during the four monitoring trips to Sainte Luce (September/October 2020, November/December 2020, January and April 2021). Data was collected on population abundance and distribution of the three target lemur species, reptiles, and amphibians. Data collection goals for Ala Phase I were reached and surveys will continue during Ala Phase II. Between July 2019 and February 2021, a total of 111 herpetofauna visual encounter surveys were undertaken.

Between May 2019 and December 2020, a total of 68 lemur surveys were completed across all of the forest remnants and forest corridors. Between August and December 2019, 10 invertebrate visual encounter surveys were undertaken in Corridors 1, 3, and 4. Baseline survival and growth data was collected at initial planting, then again at months one, three, six, and after one year.

A chameleon found under Acacia saplings in Corridor 4.

2.3 Stakeholder Engagement and Capacity Building

2.3.1 Capacity Building and Forest Threat Meetings

During the last six months, one key stakeholder capacity building workshop was conducted in February 2021 on the topic of tree nurseries and using natural pots. Project stakeholders involved in these sessions included 23 members of the local forest management committees (FIMPIA and COBA), two representatives from the Miaro Committee (Sainte Luce's Natural Resource Management Committee), and local village leaders. This workshop was a practical session, as requested by stakeholders, teaching them how to build tree nurseries and to sustainably grow seedlings on their own land

To contribute to the Forest Threat Mitigation and Management strategy, meetings with key stakeholders were held in October and December of 2020 and January and February of 2021. Responses from the meetings revealed that increasing community awareness of prohibited activities, such as illegal logging, hunting and uncontrolled fires, is the most effective method to reduce their occurrence. In addition, community members highlighted that enforcement from the Local Forestry Police should increase, stating that they recognise the importance of forest protection.

"when the forest is protected, all of those [nearby] communities' benefit from that"

- Participating Stakeholder

2.3.2 Issues Management

Meetings with key stakeholders in each *fokontany* (hamlet/community) were held in February 2021 to address arising issues regarding main threats to and within the corridors, including the hunting of guinea fowl and lemurs, illegal logging, fire events, and zebu herding; all of which have the potential to impact seedling survival.

The result of these meetings was agreement that a large-scale mass mobilisation event on the corridor threats in each *fokontany* would be critical in increasing awareness of how to reduce impact on local reforestation efforts. Although it was hoped that this event would take place before the end of Phase I, COVID-19 restrictions deemed it unfeasible. However, the event is planned to occur during the initial months of Project Ala Phase II (see 'Next Steps').

In the interim, to raise awareness of the problems related to hunting, posters highlighting the role lemurs play to the forests, the negative impact of hunting them, and the impact of fire were designed and distributed in Sainte Luce and surrounding communities. In addition, signboards (see Appendix Three) were created to remind zebu herders to respect corridor boundaries. Whilst it was originally planned to build 30 signs on fire mitigation (Output 1.4), it was decided by the project team that it would be more effective to produce 26 posters and 4 large signs on fire mitigation. Project Ala had permission from the Inter-Regional Ministry of Environment and Sustainable Development (DIREDD) to install the signboards in the Protected Area (S8) of Sainte Luce (S8).

Fire mitigation sign in Corridor 4

2.3.3 Participatory Monitoring

Meetings to progress the ratification of the *dina* (local forest law) to protect Project Ala's conservation corridors and firebreaks have not yet occurred because discussion is required with the wider community. However, large community gatherings are not permitted under COVID-19 restrictions. They are instead expected to be completed during the early stages of Phase II.

2.3.4 Youth Education

SEED's after school club, Club Atsatsaky, and associated youth education sessions have not taken place over the last six months due to COVID-19 related school closures and restrictions. The postponement of Project Ala's education sessions provided an opportunity to review and improve their effectiveness. It was deemed ineffective

to continue youth education work under COVID-19 restrictions. Time and resources were instead directed towards other activities, such as intensive, small-scale community engagement events (see Section 2.3.5), to achieve maximum impact under the current situation.

2.3.5 Community Events

Large-scale community meetings, education sessions, and the mass mobilisation event planned for World Lemur Day were unable to occur due to COVID-19 restrictions. An alternative event was held for World Lemur Day, aligning with COVID-19 restrictions, focusing on youth engagement and key stakeholder representatives. A translated version of the David Attenborough documentary, 'Madagascar', was shown at two local schools (Ambandrika and Manafiafy), followed by a quiz covering topics from the documentary, the role of forests in Madagascar, and the work of Project Ala. The same event was held for key stakeholder representatives at the office of the Village Leader.

Community education sessions resumed in October 2020, with a maximum capacity of 30 community representatives per session. Topics covered included fire threats and implications, the importance of reforestation efforts, and the main findings of Project Ala Phase I. During the last six months of the project, no community meetings took place because they require the attendance of all community members to ensure community-wide acceptance and understanding of meeting topics (e.g., ratification of the *dina*). Since this would exceed COVID-19 gathering restrictions, community meetings were postponed and will resume in Phase II.

Despite restrictions, good communication with the community of Sainte Luce has been maintained over the last six months through engagement with the Project Coordinator, who spent one third of his working hours based in Sainte Luce to conduct project activities. This enabled the dissemination of project progress to the community and facilitated the opportunity for feedback.

Community activities, such as tree-planting, have continued safely under COVID-19 restrictions

2.3.6 Project Employment

Project Ala has continued to provide a valuable source of income to people in the community of Sainte Luce during the extremely difficult circumstances of COVID-19, when other prevalent livelihoods such as lobster fishing and *mahampy* reed weaving have become unviable due to reduced market prices and access. The project has adapted to COVID-19 by training national staff and local guides in data collection and recording protocols, enabling monitoring efforts to continue in the absence of international staff. With three full-time national staff working on Project Ala, the SCRP team supporting research efforts, and regularly hiring local labour from the communities, SEED has contributed to the financial security of local individuals throughout the last two years.

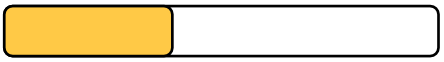
Throughout Phase I, over 300 members of the community have been provided with an alternative income source through supporting the clearing of land for corridors and firebreaks, digging holes, transporting seedlings from the nursery to the corridors, and planting seedlings. All work carried out since the start of the pandemic has been completed with appropriate safety measures in place, ensuring physical distancing and providing portable handwashing stations and face masks to all involved.

3 Progress Towards Outputs

Key:

- Complete or in progress and on track
- In progress with slight challenges
- In progress with serious challenges

Output 1.1 SCRP nursery expanded and renovated	Complete
Output 1.2 *Acacia* and native seeds collected from the forest and grown in nursery throughout PY1 and PY2	25,000+ seeds
Output 1.3 0.86ha of corridor cleared and 16.6km of firebreaks constructed around corridors and remnants	1.4ha corridor; 16.6km firebreak
Output 1.4 30 fire mitigation signs erected surrounding corridors, fragments, and remnants	26 small signs, 4 large signs + replacements
Output 1.5 Four corridors planted with 1,200 *Acacia* seedlings	Four corridors; 2,728 seedlings
Output 1.6 Four corridors planted with 2,400 fast growing native pioneer seedlings	Four corridors; 5,625 seedlings
Output 2.1 Two community meetings and two stakeholder meetings, on project activities and intention	Four meetings
Output 2.2 20 stakeholders have capacity to implement and manage the Forest Threat Mitigation and Management Strategy	Six meetings
Output 2.3 *Dina* (Local Community Law) is updated to include project requirements	Postponed due to COVID-19

Output 3.1 Six workshops on conservation and environmental threats for 200 community members	 Three workshops; postponed due to COVID-19
Output 3.2 Three participatory monitoring visits to corridor and firebreaks and on SCRP monitoring transects	 Three participatory monitoring visits
Output 3.3 12 youth conservation education sessions for 200 young people	 Six sessions completed; postponed due to COVID-19
Output 3.4 12 nursery planting workshops for 20 young people	 Three workshops completed; postponed due to COVID-19
Output 3.5 Four mass mobilisation events for 1,000 community members	 Three events completed; World Environment Day 2020 postponed due to COVID-19
Output 4.1 Monthly monitoring of population abundance and distribution of four lemur species, to indicate success of habitat corridors as a conservation method for lemurs	 23 months
Output 4.2 Monthly monitoring of fauna biodiversity within habitat corridors to assess potential movement of species through corridor sites to other forest fragments	 21 months
Output 4.3 Bi-annual botanical surveys to monitor forest structure, composition, succession, and floral biodiversity	 Four surveys

4 Monitoring and Evaluation

The survival rates of *Acacia* planted in Corridors 1, 3, and 4 have been considerably higher than expected. Surveys of the whole corridor found that survival rates for *Acacia* after one year was 96.7% (42 replants out of 1,273 seedlings), compared to the 50% expected. In the research plots, 51 out of 87 (59%) seedlings initially planted survived to one year without replants, with Corridor 3 having the most success with 82% survival at one year, compared to 52% in Corridors 1 and 4. Mortality rates for Corridors 1, 3, and 4 were lower than the predicted 50% at each replanting interval at months one, three, six and one year after initial planting, indicating the success of planting *Acacia* for corridor reforestation in Sainte Luce. Corridor 2 was excluded from these analyses because it saw poor survival within the first six months and, therefore, an inadequate amount of data was available for analysis within and between corridors.

For native seedlings, the average survival rate after one year was 81.6% across all corridors. This is greater than the predicted rate of 40% but did include extensive replants. When looking at research plots, only three out of 88 (3.4%) seedlings of three different species planted in January 2020 survived to one year without replants. Almost all seedlings needed replanting throughout the first year (average of 2.3 additional replants per seedling), with an increase in the number of replants required per seedling during the peak dry season (after six months, in July).

Corridor 2, initially planted with *Acacia* in July 2020 saw a high mortality rate of 84% in the first month. Mortality remained high at reassessment at six months, with a 52% mortality rate. Native seedlings were not planted in Corridor 2 until January 2021, resulting in a high mortality of around 96%. The corridor extensions for Corridors 1, 3 and 4 also saw high mortality of both *Acacia* planted in July 2020 (71%) and for native seedlings planted in January 2021 (96%). These high rates can be attributed to a prolonged drought period that lasted from November 2020 until March 2021. At the time of planting, weather conditions were very dry, and seedlings were older, which may have caused greater transplant shock. This provides learning to inform future planting events so that the high survival rates observed in the core corridor areas can be maintained (see section 5).

With such high mortality, replants for both *Acacia* and native seedlings were delayed until at least five consecutive days of rain was observed. This weather pattern occurred at the end of March 2021, resuming and the collection of survival data at the end of April 2021.

A compilation and analysis of all research findings from Phase I can be found in the Project Ala Technical Reports.

5 Lessons Learned

SEED's rigorous monitoring and learning throughout the project revealed unexpected findings from Phase I and have provided further insights into problems limiting the conservation of the SLLF. These learnings have heavily influenced the planning for Phase II. For example, SEED identified zebu herding as a key barrier to seedling growth and will work closely with zebu herders in Phase II to find a solution that protects the corridors, whilst not impacting their livelihoods. Increasing levels of drought in the region has proven to be increasing fire occurrences, putting the corridors and fragments further at risk. As fire will only become more frequent as periods of drought increase, SEED is developing drought mitigation strategies to be trialled during Ala Phase II. These strategies include replanting after five consecutive days of rainfall; inspecting seedling root systems to investigate how the relationship between root growth and age could affect chances of survival when planted in the corridors; and including education on fire mitigation in the mass mobilisation event now scheduled for Phase II. Working closely with the community throughout Phase I has identified the need for more effective youth engagement and a greater understanding of the community resources needs required to reduce pressure on forest resources. SEED will, therefore, complete a comprehensive needs assessment across Sainte Luce during Phase II to inform future work under the Ala Programme and to guide community members towards more sustainable behaviours.

6 Next Steps

Having completed the implementation of Project Ala Phase I, SEED is well informed on the ongoing challenges in the Sainte Luce area and has a unique opportunity to continue to address it. SEED will use novel techniques and the learnings from Phase I to increase the effectiveness of firebreaks, raise awareness in key communities, and increase the chance of seed survival in difficult conditions.

SEED is currently fundraising for Project Ala Phase II, the second phase of the long-term Ala Programme. The Ala Programme was developed during Project Ala Phase I, and outlines SEED's reforestation goals for the next 10 to 15 years. Following Ala Phase I, funding will be sought for consecutive project phases until the Ala Programme is complete and the protection of littoral forest biodiversity in Sainte Luce can reliably continue in the absence of external funding or intervention from SEED. All future phases will work towards obtaining the overarching aims of conserving the biodiversity of the SLLF and building local management structures to ensure the sustainable governance of protected forests and forest resources in Sainte Luce.

7 Conclusion

Despite the turbulent nature of the pandemic, several achievements have been made during the last six-months of the project. All four corridors are now established, providing a strong foundation to double the area and increase the coverage of all four corridors in Project Ala Phase II. Despite the absence of international staff, SCRP activities continued, building the capacity of national staff significantly. National staff have adapted to the ever-changing situation with essential knowledge of the nuances of the local context; providing increased cultural sensitivity and awareness to project implementation over the last year, during a time of worsening food and economic insecurity.

Data collection within the corridors and remnants was completed for Phase I, enabling preliminary analysis of results and the production of two detailed research reports. The continuation of Project Ala's activities has maintained and further solidified relationships with stakeholders and the community of Sainte Luce. Project Ala has brought additional income to those employed by the project, serving as an alternative livelihood for many during COVID-19, when other livelihoods are no longer viable. The high level of involvement and engagement of the community and key stakeholders has created a strong foundation for Ala Phase II, informing project development and an effective response to local conditions.

Project Ala Phase I has completed all activities that could be safely carried out under COVID-19 restrictions, including seedling planting, firebreak construction, stakeholder capacity building workshops, school nursery workshops, research monitoring, and community education sessions. Activities from Phase I that were unable to be delivered within the COVID-19 restrictions, particularly those reliant on large gatherings, were adapted to safely and successfully achieve project outcomes. SEED remains vigilant to national and regional restrictions.

8 References

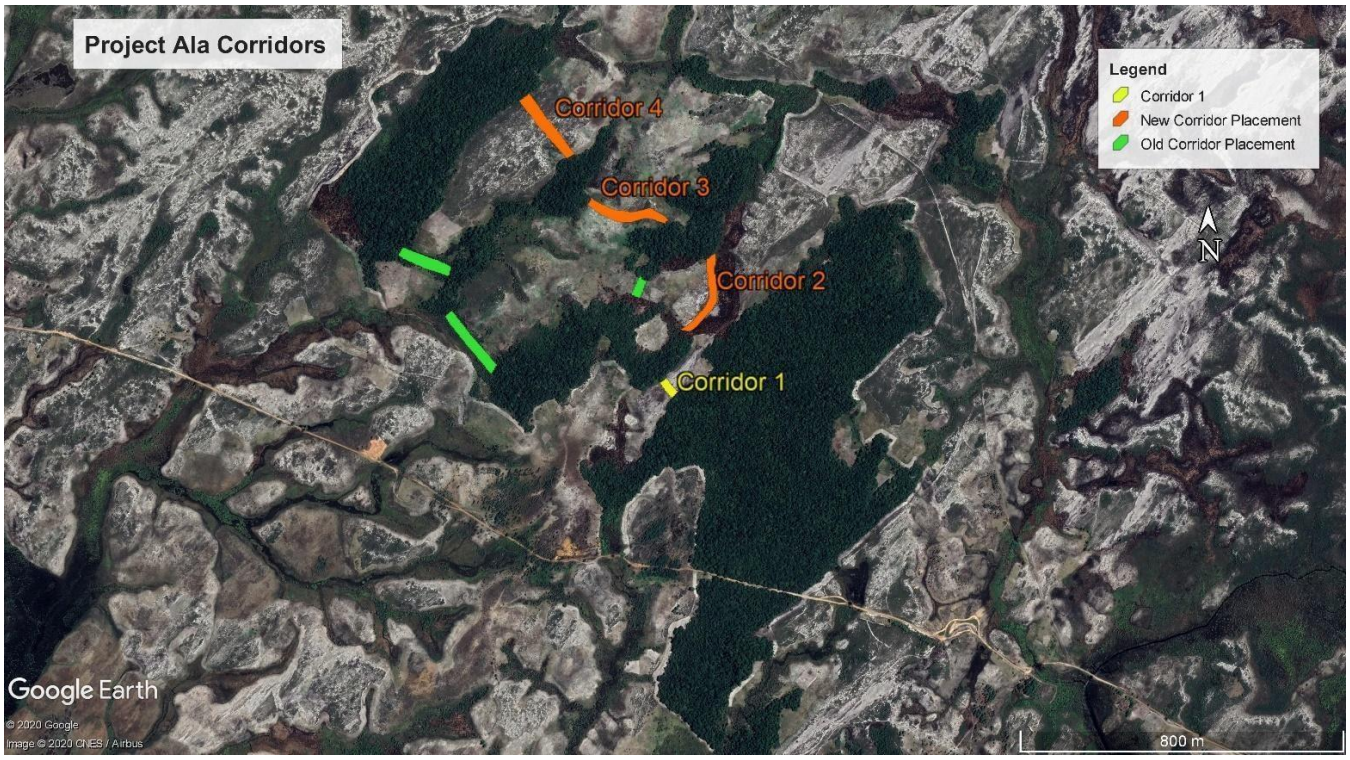
Vincelette, M., Dean, L., & Ganzhorn, J. U. (2007). The QMM/Rio Tinto project history in Tolagnaro and its social and environmental concepts. *Biodiversity, Ecology, and Conservation of Littoral Ecosystems in Southeastern Madagascar, Tolagnaro (Fort Dauphin). JU Ganzhorn, SM Goodman and M. Vincelette (eds.) pp*, 1-8

[2] Krishnan, S., Ranker, T.A., Davis, A.P. and Rakotomalala, J.J., (2013). The study of genetic diversity patterns of Coffea commersoniana, an endangered coffee species from Madagascar: a model for conservation of other littoral forest species. *Tree genetics & genomes*, pp.1-9.

9 Appendix

Appendix One: Map of Corridors

In the map below, the green delineation shows corridor locations agreed prior to the project start in 2019 and have since moved; the new locations are shown in orange. Yellow delineation shows the corridor that has not changed location.



Appendix Two: Hunting Prevention Posters

Two posters were designed, one for the Project Ala main target community of Sainte Luce, and one for non-target communities. Posters were translated into Malagasy, but English versions are shown below.



We help disperse the seeds to grow the trees you need

Lemurs and Bats of Sainte Luce

We help regrow the forest and pollinate your crops

Importance of Bats and Lemurs: They are seed dispersers which help to regrow the forest, spread tree and flower/crop pollen

NO HUNTING

NO TREE CUTTING

Disturbance effect: Lemurs and bats are **VERY SENSITIVE** to disturbance from humans. Impacted by both the sound of cutting and the removal of trees in the forest.

YOU CAN help protect us: No hunting in or around protected areas to keep ALL populations thriving. No tree cutting in protected areas and exclusion zones. Mainly S8, S9, S17 and S6.

IN PROTECTED AREAS

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Your protection saves my life

NO TREE CUTTING

NO HUNTING

The forest is my **ONLY** home

Thank you for saving my home by not cutting it down

IN PROTECTED AREAS

seed madagascar
sustainable environment, education & development

Appendix Three: Zebu Signboard

Signboard developed to zebu herders to support efforts to reduce disturbance from zebu trampling.