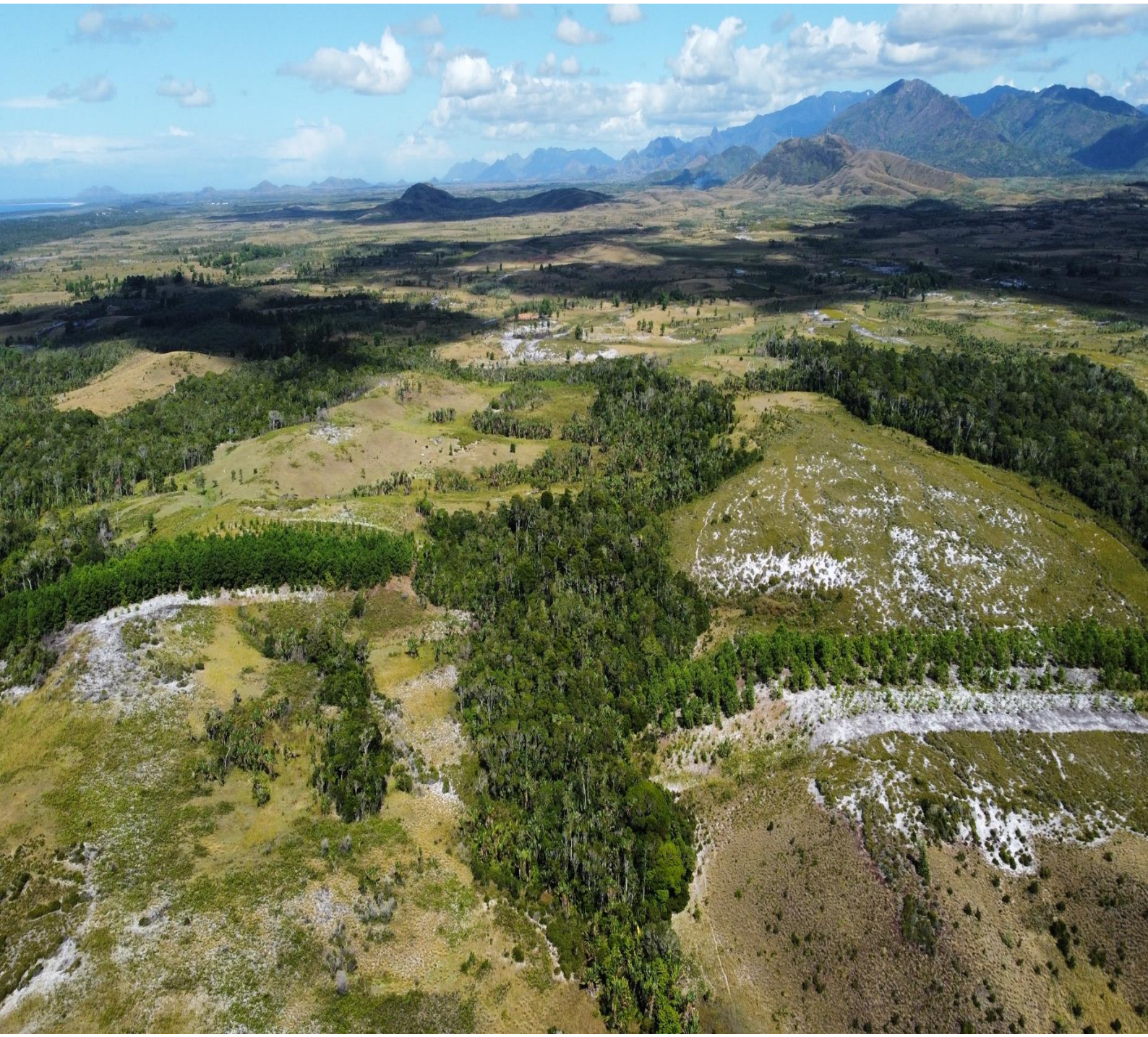
seed madagascar
sustainable environment, education & development



A 24-Month Progress Report for the

ALA PROGRAMME: PHASE II

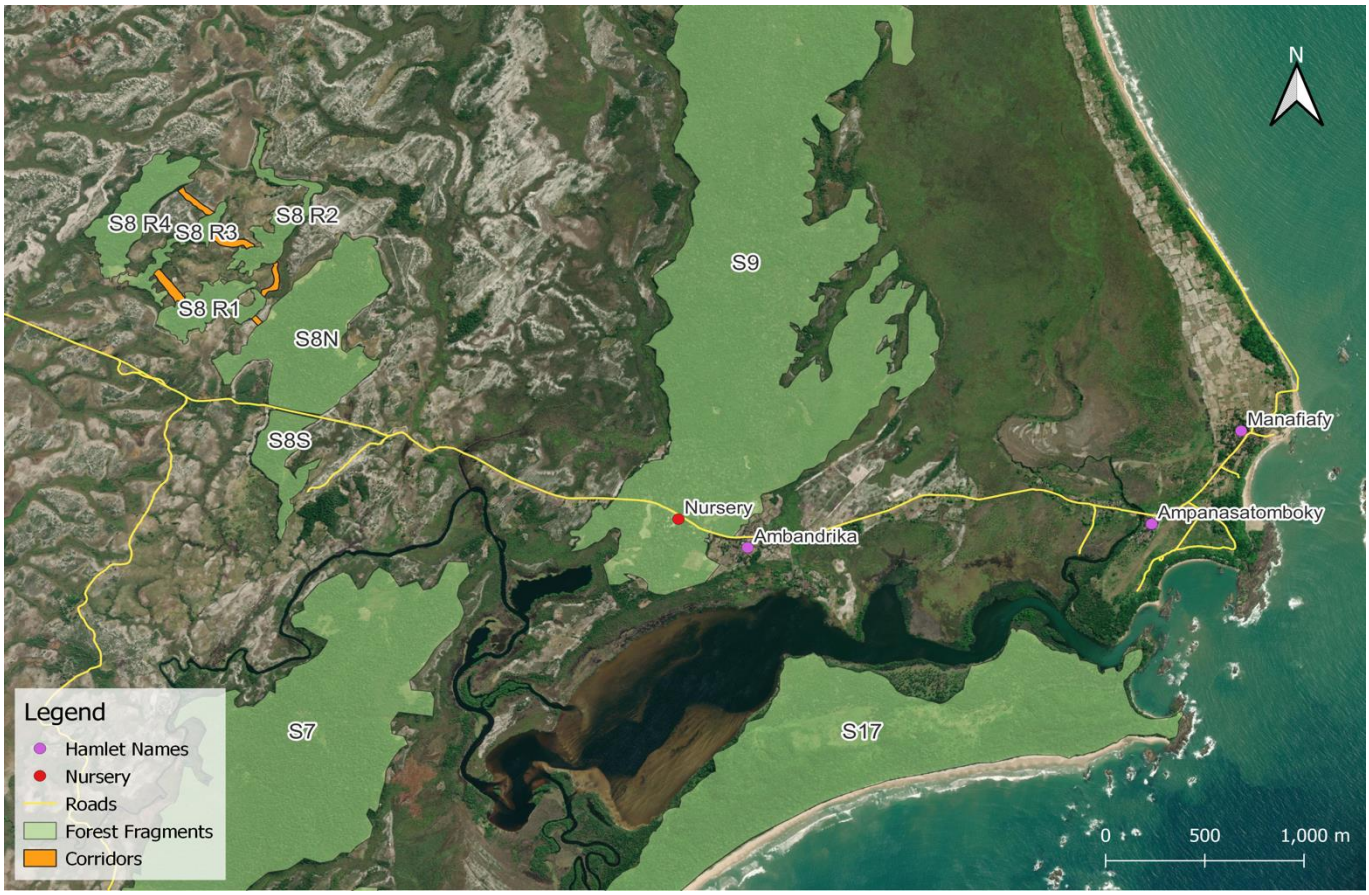
In-Situ Conservation of Endangered Lemurs through Reforestation in the Sainte Luce Littoral Forest

July 2023

1 Introduction

1.1 Context

Littoral forests are one of the most threatened ecosystems in Madagascar[1] and are considered a national conservation priority.[2] The Anosy region of southeast Madagascar contains some of the few remaining viable littoral forests in the country, including the Sainte Luce Littoral Forest (SLLF). Littoral forests are widely threatened by deforestation and habitat fragmentation. The main threats to the SLLF include industrial-scale mining operations, high community dependence on natural resources, logging, and *tavy* (the clearance of land with fire for agriculture). The SLLF supports disconnected populations of four Endangered lemur species, numerous amphibian and reptilian species, and a rich diversity of invertebrate and floral species. Degradation of the SLLF endangers these species survival, which is of particular concern, as many are endemic and locally endemic species. Three of the four lemur species that occupy the SLLF cannot traverse open land between forest patches. These three are the Southern Woolly Lemur (*Avahi meridionalis*, EN), Anosy Mouse Lemur (*Microcebus tanosi*, EN), and Thomas' Dwarf Lemur (*Cheirogaleus thomasi*, EN); the fourth being the Red Collared Brown Lemur (*Eulemur collaris,* EN*).* Deforestation fragments their habitat, genetically isolating sub-populations, and contributes to increased mortality and risk of extinction.



Map of Ala Programme Forest Corridors.

1.2 Ala Programme Overview

In response to the threats to the SLLF, SEED Madagascar (SEED) developed the Ala Programme (*ala* meaning forest in Malagasy). The Programme aims to improve habitat connectivity and species dispersal between SLLF fragment 8 (S8) and nearby littoral forest remnants (R1, R2, R3, and R4) through the creation of forest corridors, community engagement, and alternative resource provision. In Phase I of the Ala Programme (2019-2021), SEED and local stakeholders planted four forest corridors (C1, C2, C3, and C4) with both *Acacia mangium* seedlings (*Acacia*) and native seedlings (natives). In Phase II, habitat is being expanded through extending corridors and establishing a fifth forest corridor (C5). Fire mitigation and prevention activities are prioritised to minimise threats to the corridors. To meet resource needs, SEED is working to increase understanding of community forest

resource use and establish a community planting site. Locally led forest management structures are strengthened through training and knowledge sharing. Research in corridors and forest fragments is conducted to monitor Programme progress and enable adaptive learning.

1.3 Report and Progress Summary

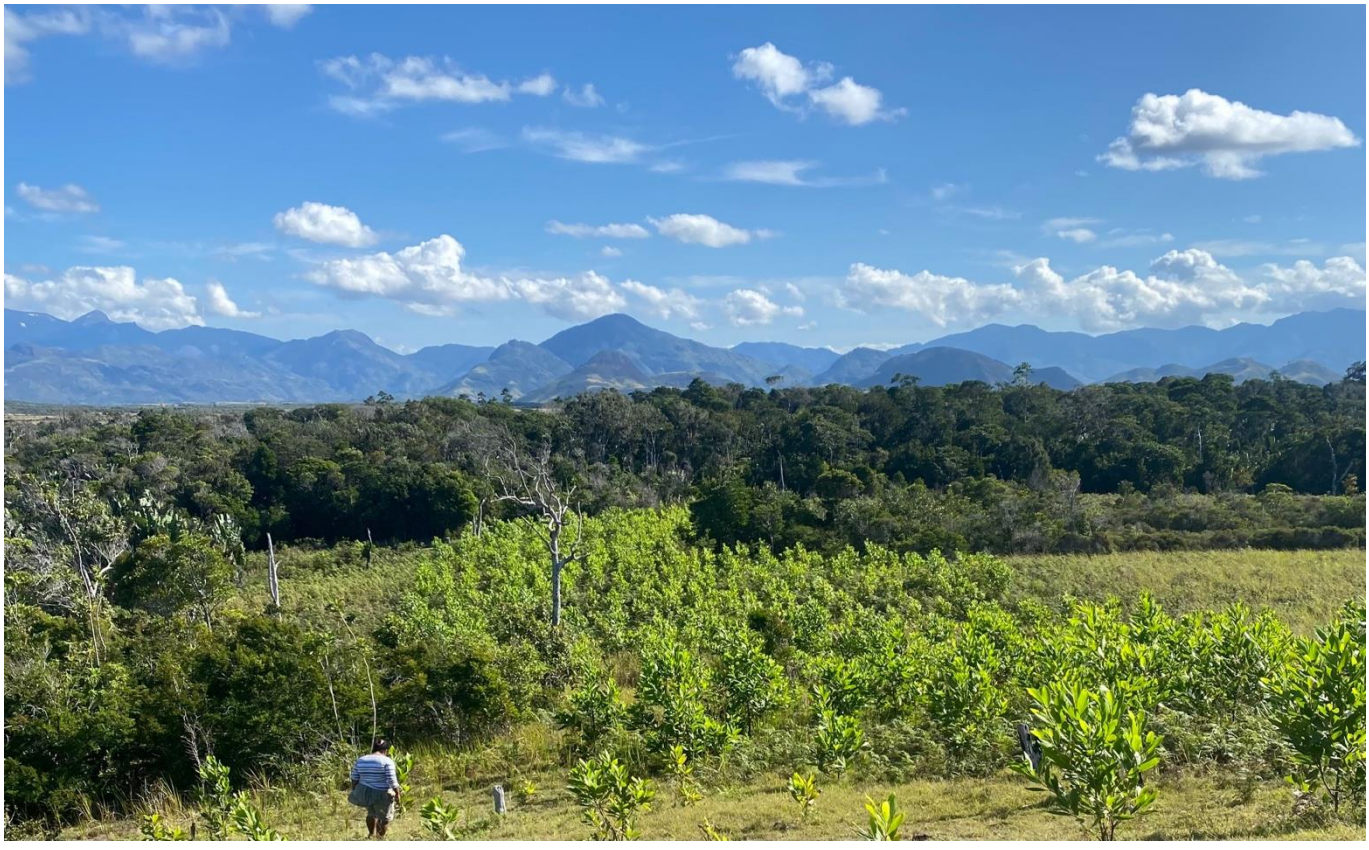
This report will discuss progress on activities conducted in Year 2 of the Ala Programme: Phase II, throughout the period June 2022 – May 2023. It will report on progress by outcome and by output, highlighting additional achievements where relevant. In summary, Programme activities remain largely on track. Increasing survival and growth rates of natives are enabling habitat expansion to progress at the expected rate, as is the continued growth of *Acacia.* Additionally, fire mitigation and prevention work continued in four communities to raise awareness, distribute materials, and reduce the risk of fire in areas surrounding the SLLF (Objective 1). Analysis of collected data increased the team's understanding of community resource needs, and is informing ongoing efforts to establish a community planting site (Objective 2). Regular training and knowledge sharing sessions regarding natural resource management were held with forest management bodies (Objective 3). Lastly, the survival rates of native seedlings increased significantly in comparison to the last Programme year, with the diversity of both floral and faunal species increasing as corridors became more established. Data collection within the corridors and surrounding forest remnants continues to promote adaptive learning within the Programme (Objective 4).

2 Activity Detail

2.1 Outcome 1: Habitat Expansion

2.1.1 Expansion of the Corridors

In July 2022, a total of 33 *Acacia* seedlings were replanted in C2 and C5. This was likely the last *Acacia* planting in the forest corridors, due to its high survival and growth rates. At the same time, 129 natives were replanted in C1-C4. In February and March 2023, 5,113 native seedlings were planted in C1-C4 and extensions to C1 and C3. The natives in these extensions were planted ahead of schedule, as a trial to increase native survival rates.



Acacia trees in C5 connecting to R3.

Additional funding was secured for the establishment of C5, which was planted with *Acacia* at the end of Phase II, Year 1. C5 now provides another connection between remnants (R1-R3) and increases overall habitat availability. *Acacia* in C5 are growing well, with natives due to be planted in early 2024. Although landowners around C2 have since offered their land for corridor extension, it was decided not to extend due to the low soil fertility here, which has resulted in a slower growth rate of both *Acacia* and natives.

2.1.2 Increasing Species Richness

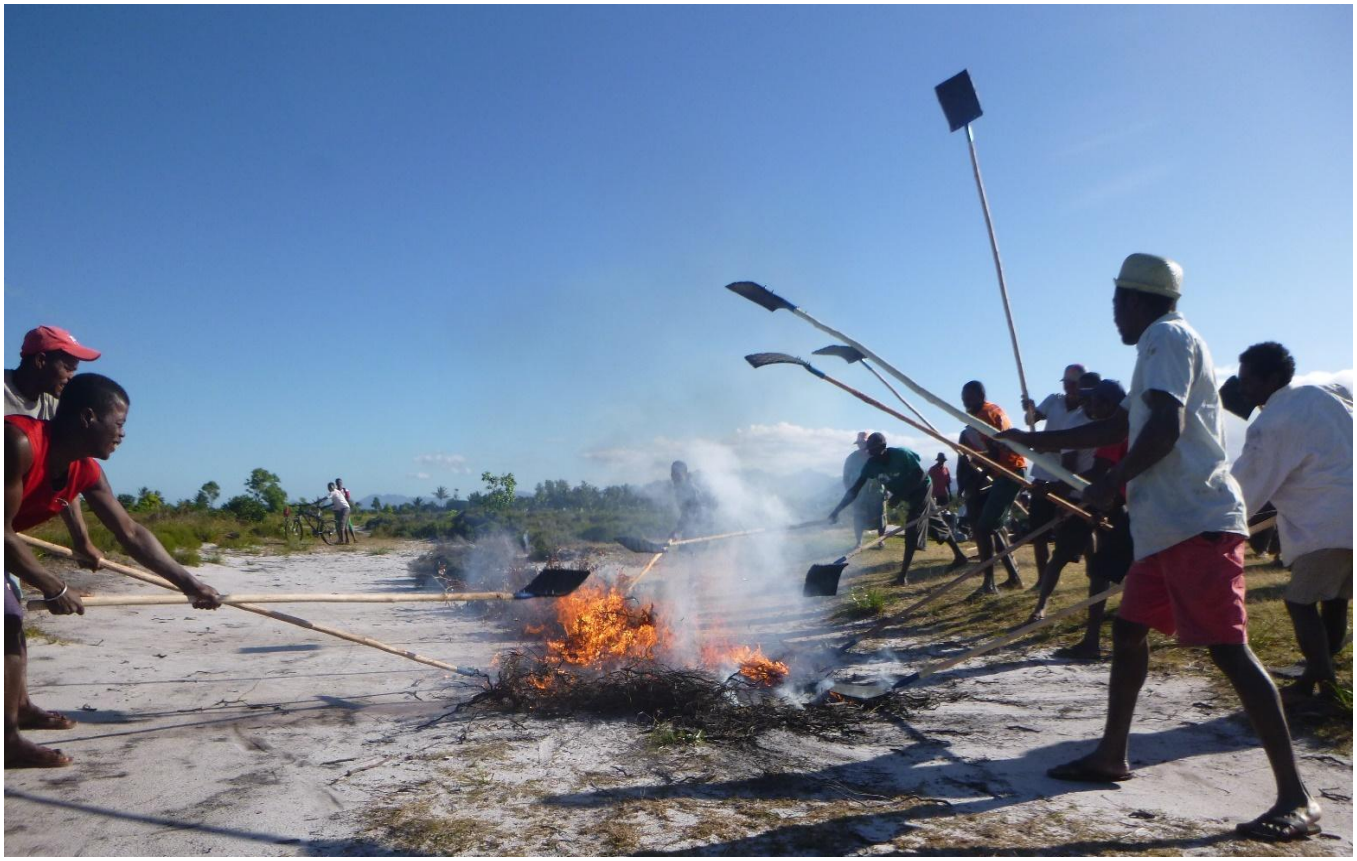
Throughout the year, landowners attended several corridor management training sessions, including sessions on reducing seedling mortality and *Acacia* branch pruning. Each of these sessions were implemented with the intention of promoting native species survival in the corridors. Invasive and competitive grass species were also removed from the corridors in July and August 2022. Weeding in this form is completed at least once a year to reduce competition with native tree species and reduce the risk of fire.

A new nursery data collection procedure was developed and implemented. This enables the team to better understand, and therefore plan, which native species are ready to be planted in the corridors and when. Using these and other data, a list of tree species adapted to each corridor is being developed. This details germination periods, height when ready to be planted, length of time to reach planting height, and corridors the species has survived in to date. It is hoped that this will enable the team to plant natives at the optimum time of year for their survival, as well as plant species in areas with microhabitat conditions they are most suited to, further increasing chances of survival.

2.1.3. Management of Threats

The most significant threat to the corridors is the risk of fire. Throughout the fire season, the Ala team and the communities of Sainte Luce, Mahatalaky, Ebakika, and Tsiharoa, which surround the SLLF, worked together to raise awareness, distribute materials, and prevent and put out numerous fires. In June 2022, a prototype fire beater, made from locally sourced wooden poles and recycled rubber, was successfully trialled with local fire management bodies. Five Community Fire Wardens were appointed and trained to lead their community's bush fire response. Following this, 144 fire beaters and 85 pairs of gloves were distributed. Two training sessions were conducted with local forest management bodies and community members to inform the usage of distributed materials. Additionally, mass mobilisation events were held in each of the four communities to promote fire mitigation and prevention strategies. Successes were realised with the fire beaters when the communities in Ebakika and Sainte Luce effectively fought two large fires, as well as several smaller ones. Other fire mitigation techniques, such as fighting fires with water, sand, and tree branches, were trialled with stakeholders in September 2022 to assess the effectiveness of alternative methods, in case fire beaters are not available at time of a fire. However, none proved as effective and timely as the fire beater.

In January 2023, focus groups were conducted with stakeholders in all four communities, and a fire management endline survey was conducted in the communities of Sainte Luce, Mahatalaky, and Ebakika. The focus groups and survey evaluated the effectiveness of the mass mobilisation events and training delivered. They also assessed the use of fire beaters, reporting of fires, and application of fire prevention techniques. The survey revealed 90% of households had already used the fire beaters distributed for putting out fires.



Community members participating in fire beater training session.

2.2 Outcome 2: Community Resource Needs

2.2.1 Understanding Community Resource Needs

Between August 2021 and July 2022, a Road-Side Survey collected data on community resource use in and around the SLLF. In Phase II, Year 2, these data were analysed and presented in a Community Resource Use Report. The analysis highlighted that 58 different species of trees were collected from 19 different locations in the Sainte Luce area. On average, 54 resource collections occurred per day, by 35 different resource collectors. The most frequently collected tree species was *Fanola*, accounting for 15% of tree species collected. Firewood was the most common resource use, accounting for 68% of resource collection. The location most frequently collected from was SLLF fragment 7 (S7) (27%). Adult men collected resources most frequently and accounted for 63% of all resource collectors. Women (Young and Adult) accounted for 9% of resource collectors, while Loggers accounted for 6%. Findings, particularly those regarding species and usage of resources collected, will be used to inform the provision of resources in a community planting site.

During Phase II of the Ala Programme, 12 training sessions were conducted on logbook keeping. Sessions aimed to standardise logbook keeping practises between *Polisin'ala* in Mahatalaky, Sainte Luce, and Tsiharoa, to ensure data collected is relevant and useful. They also emphasised the importance of recording the number of logging permits given, amount of wood taken, and records of illegals incidences. Within the last six months, no logbook keeping trainings sessions have been held due to low levels of motivation amongst relevant participants, which has halted progress against this output. In response, four sessions have been scheduled in Phase II, Year 3 with the purpose of resolving difficulties in current practice. It is hoped this will encourage more standardised and regular recording keeping.

2.2.2 Re-establishing a Community Planting Site

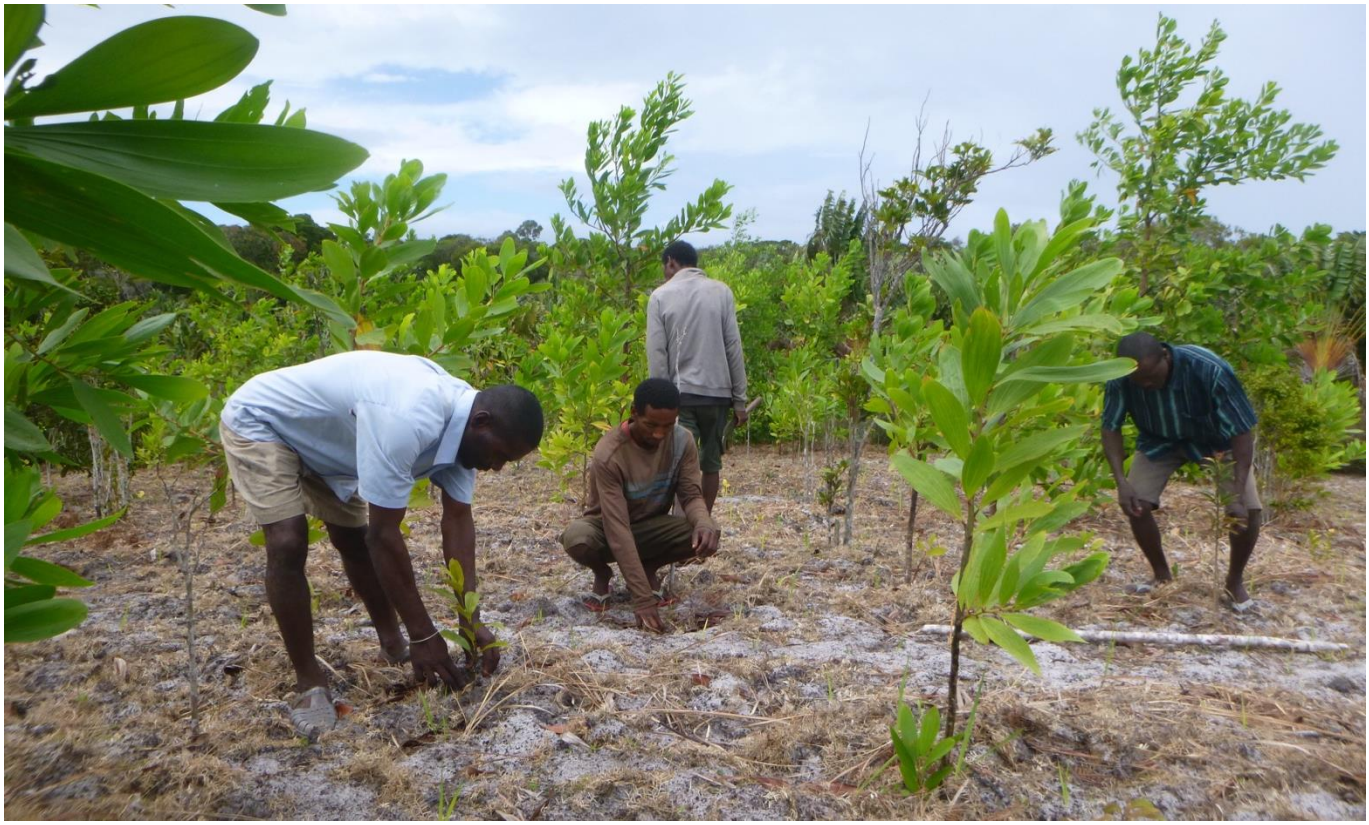
Throughout the last 12-months, discussions with stakeholders regarding the establishment of a community planting site have been ongoing. This is becoming an increasingly important part of the Ala Programme's activities, which will continue into Phase II, Year 3, as a planting site will remove some of the pressure on the remaining natural resources in SLLF fragments. Discussions with stakeholders have included responsibilities of

management and maintenance, the feasibility of a community nursery, location, and species. A potentially suitable location has been identified. The area is in close proximity to SLLF fragment 9 (S9) and an existing usage zone. Further conversations are still required to assess and define the practicalities of management.

2.3 Outcome 3: Building Sustainable, Locally-Led Forest Management Structures

2.3.1 Stakeholder Engagement

During the last 12 months, landowners supported the Ala team to collect survival and growth data of *Acacia* and natives in corridors. On every occasion, landowners were actively involved in data collection and assisted in the recording of information, such as vegetation plot code, seedling identification number, species, and abiotic factors.



Landowners monitoring survival and growth in C2.

Landowners have also attended corridor management training sessions throughout Phase II (see section 2.1.2). In April 2023, a corridor management brainstorm session was facilitated by SEED. Following this, the nature of landowner involvement shifted, and they now play a more active role in future planning and physical corridor maintenance. For example, the landowners' suggestion to clear excessive leaf litter from around natives will now be carried out by them on a regular basis to promote native growth rates. In addition, in May 2023, the Forest Management Committee (FMC) visited the corridors to discuss Programme progress and suggestions for improvement. They also provided feedback on the management of *Acacia* that will be adopted as the corridors mature.

Two meetings were held with local zebu herders in December 2022, one in Sainte Luce and one in Ebakika. Meetings were conducted to facilitate discussion and identify solutions on how to reduce disturbance from zebu inside the corridors. The sessions proved successful, as zebu herders claimed responsibility for mitigating fire within the corridors. The importance of the *dina* (local law) was noted, as was the importance of reporting fires to Community Fire Wardens.

The team met with QIT Madagascar Minerals (QMM)[1] three times throughout the year (June 2022, November 2022, and May 2023) and with Nature Solutions (NbS) once (April 2023). Meetings with both organisations enabled knowledge to be shared regarding nursery maintenance, planting strategies, and corridor management strategies. Native and non-native species survival and growth in the Sainte Luce area was also discussed. On each occasion, SEED shared the lessons learnt from the Ala Programme, future plans devised from past learnings, and relevant information regarding community involvement in the Ala Programme. QMM and NbS shared similar information about their ecological restoration work in Anosy.

2.3.2 Community Engagement

A community mass mobilisation day was held for World Environment Day in June 2022. The event was successful in engaging the wider community through presenting environmental education videos and facilitating discussions around the protection of the environment. The Ala team also gave speeches, facilitated games, and held a quiz relating to the environment to encourage wider community involvement in SEED's work.

World Environment Day Celebration, June 2022.

In Phase II, Year 2, two community meetings were held, one in November 2022 and one in May 2023. These meetings discussed the Ala Programme as a whole, provided Programme updates to the community, and provided space for the community to provide feedback on successes and challenges of the Programme. In addition, two community feedback sessions were also held this year. In September 2022, a feedback session on fire mitigation and prevention was conducted, and in May 2023, findings from the Road-Side Survey were shared.

2.4 Outcome 4: Scientific Research

2.4.1 Monitoring of Fauna

In October 2022, the Ala Programme started using camera traps to monitor lemur activity within the corridors, replacing Visual Encounter Surveys (VES) of nocturnal lemur species. Camera traps enable continuous monitoring of the corridors while reducing anthropogenic disturbance, and thus are expected to increase the likelihood of

[1] QMM is a mining company jointly owned by Rio Tinto (80%) and the government of Madagascar (20%). QMM has a Mining Exploration Permit for Ilmenite in three sites in the Anosy region of Madagascar, of which Sainte Luce is one. Currently, the proposed mining path would destroy SLLF fragments S6 and S7, making the work of the Ala Programme, to reconnect disconnected fragments of S8, even more vital.

lemur observations. Initially, a trial was completed to identify optimal camera position and settings, the results of which are detailed in the Ala Programme's Phase II, Year 2 Technical Report. Findings from the trial were evaluated in March 2023 and from April there was a phased increase in coverage of camera traps in C1-4, as well as standardisation of settings used to collect data. Once installed, cameras were left for three weeks after which the footage was downloaded and reviewed, and then camera traps re-installed. In November 2022, there was one observation of Thomas' Dwarf Lemur on the edge of C3. In addition, a group of four Red Collared Brown Lemurs were observed in C1 in April 2023, whilst collecting survival and growth data.

Image of Cheirogaleus thomasi from camera trap in C3.

During this reporting period, a total of 27 Herpetofauna VES and 18 Invertebrate Catch and Release Surveys were conducted. 78 observations of nine herpetofauna species were made, with the highest number of observations occurring in C3. Invertebrate species richness is higher in C1 and C4 than it is in the other two corridors, which show similar increases in the total number of species observed. This can be expected as C2 and C3 were more recently planted. New species of herpetofauna and invertebrate continue to be observed in each of the four corridors on regular basis.

2.4.2 Monitoring of Flora

Four *Acacia* and 12 native survival and growth surveys were conducted in C1-C5 throughout Phase II, Year 2. The height of *Acacia* in research plots in the original corridors after three years are 3.13m, 5.03m, and 3.87m for Corridors 1, 3, and 4 respectively. *Acacia* in the research plots in C2 have an average height of 1.19m two years after planting. Lastly, *Acacia* in the research plots in C5 had an average height of 0.76m six months after planting.

This time last year, native seedlings had an average survival rate of 12% across all corridors. The team attributed this to the drought on-going in the region at the time. As a result, it was a decided a complete replant of native seedlings would be carried out in May 2022. One year on from this planting, average native seedling survival rates have drastically increased. Data from March 2023, reveals survival rates are highest in C1 (65%), followed by C3 (57%) and C2 (53%), and are lowest in C4 (33%).

Full details of the Ala Programme's faunal and floral monitoring can be found in the Ala Programme's Phase II, Year 2 Technical Report.

3 Progress of Outputs[2]

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

Output 1.1.1 Identification of landowners willing and motivated	Completed in Phase II, Year 1
Output 1.1.2 Build motivation with other landowners to allow for expansion of other corridors	Completed in Phase II, Year 1
Output 1.1.3 Acquisition of *Acacia* and native seeds	3,000 *Acacia* and 6,500 native seeds collected
Output 1.1.4 Growth of *Acacia* and native seedlings in the nursery	3,000 *Acacia* and 6,500 native seedlings grown in nursery
Output 1.1.5 Monitoring of nursery seedlings	On track for Phase II
Output 1.1.6 Planting of corridor extensions with *Acacia* and natives	On track for Phase II
Output 1.1.7 Replanting corridor extensions with *Acacia* and natives	On track for Phase II
Output 1.1.8 Weed clearance in all corridors	On track for Phase II
Output 1.1.9 Firebreak construction, expansion, and maintenance	On track for Phase II
Output 1.1.10 S8 Firebreak construction	On track for Phase II
Output 1.2.1 Landowner training sessions for *Acacia* management	3 of 8 sessions completed
Output 1.2.2 Update adapted tree species list	On track but further work required
Output 1.3.1 Identification of vulnerable corridor areas to fire (Firebreak Assessment)	Completed in Phase II, Year 1

[2] Some outputs are omitted from this list because they were merged with other outputs. Outputs were merged because of their similarity, which allowed activities to be conducted together for reasons of practicality.

Output 1.3.2. Meeting with FIMPIA to discuss fire risks	 Completed in Phase II, Year 1
Output 1.3.3 Provision of fire mitigation materials	 On track for Phase II
Output 2.1.1 Needs assessment completed for community take zone (side of road surveys)	 Completed in Phase II, Year 1
Output 2.1.2 Community needs assessment social survey	 Completed in Phase II, Year 1
Output 2.1.3 Assessment, training and monitoring of FIMPIA/COBA/ *Polisin'ala* on logbook keeping	 12 of 16 sessions completed. However, motivation of stakeholders is low
Output 2.1.4 Attendance at Miaro committee meetings	 3 of 9 meetings completed
Output 2.1.5 Landowner meetings	 6 of 7 sessions completed
Output 2.2.1 Research study into mature acacia trees in planting site	 Completed in Phase II, Year 1
Output 2.2.2 Informal assessment of trees in community planting site	 Existing planting sites assessed
Output 2.2.3 Training and meetings of management committee in planting site management	 Scheduled to start in Phase II, Year 3
Output 2.2.4 Establish joint management of community planting site	 Management Committee still to be confirmed
Output 2.2.5 Assessment of existing community planting sites in the Sainte Luce area	 Completed in Phase II, Year 1
Output 3.1.1 Meetings of key bodies (e.g. FIMPIA, FMC, COBA).	 Target of 12 exceeded. Regular meetings to continue
Output 3.1.5 Training sessions of key stakeholders and landowners	 11 of 12 sessions completed
Output 3.1.6 Knowledge exchanges with external organisations	 Target of 1 exceeded. Knowledge exchanges to be held when relevant
Output 3.2.1 Meetings with zebu herders to identify solutions to zebu disturbance	 5 of 6 sessions completed

Output 3.3.2 Engage the wider network in information sharing sessions organised by forest management bodies	 1 out of 6 sessions completed
Output 3.3.3 Community feedback sessions	 4 of 6 sessions completed
Output 4.1.1 VES surveys of herpetofauna species	 12 of 18 surveys completed
Output 4.1.2 Biodiversity assessments of invertebrates in corridors and edges	 11 of 18 surveys completed
Output 4.2.1 Research on survival and growth in corridors	 16 of 18 surveys completed

4 Monitoring, Evaluation, and Learning

Now that *Acacia* is well established in all corridors and native survival rates have improved, the Ala Programme is shifting focus towards monitoring, evaluation, and redefining its seedling planting and corridor management strategies. Throughout this Programme year, monitoring of native seedlings in the corridors was conducted regularly, in June 2022, August 2022, February 2023, and June 2023. Monitoring involved visually observing the number of dead natives within a corridor and recording morality rate per corridor. The number of dead individuals would then be replanted in the corridor within the same month. These replants were done to return each corridor to the intended number of native plants. Replants of natives have now been concluded as per the original planting schedule, however, the Ala team believe it is important that replants continue to take place when necessary to promote species diversity. As such, native survival and growth will continue to be monitored and replants will be scheduled if required.

The planting strategy has been revised to increase water retention and reduce drainage rates. From June 2023 onwards, holes in which native seedlings are planted will be dug to $20cm^3$. It is also expected that planting seedlings in a larger hole will help them to establish and grow roots more easily, due to the soil being loosened.

Throughout April and May 2023, the team gathered information to inform a new strategy for corridor management. It is hoped managing the growth of *Acacia* and natives will promote native species richness. As such, in Phase II, Year 3, native seedlings will be watered once a month throughout the dry season. It is anticipated watering will be necessary for approximately six months (July-December), however watering schedules will be adjusted depending on the rain. Manure will be applied to seedlings once every two months throughout the dry season, and once a month throughout the rainy season. Application will be increased during the rainy season to account for increased decomposition and runoff rates. Lastly, mulch will be added to seedlings in corridor areas where leaf litter coverage is low. Mulch application is intended to reduce evaporation rates after seedlings have been watered, so it will be particularly focused on areas where levels of sunlight reaching the ground are high (areas of C1, C2, and C4, and C5 when it is planted with natives). Mulch will be applied to native seedlings after the initial watering, and again at regular intervals as it decomposes.

Acacia will also be monitored monthly to check for self-seeding and any signs it is impeding native growth. In Phase II, Year 3, it is expected that *Acacia* will need thinning to a small extent in some areas. The team anticipate removing whole trees from the centre of corridors will have the best impact on native growth by allowing low levels of sunlight in. However, *Acacia* will be thinned conservatively, as they are still providing benefits in the corridors such as shade, leaf litter coverage, nitrogen fixation, and reduction in wind velocity.

5 Next Steps

During the final year of the Ala Programme: Phase II (June 2023-May 2024), SEED will continue to work towards achieving the four outcomes of habitat expansion, understanding, and responding to community resource needs, building sustainable, locally led forest management structures, and conducting scientific research. Next steps include:

- Facilitating and celebrating World Environment Day in June 2023. Activities will be based in Sainte Luce and will aim to promote environmental education and wider community engagement in the protection of the environment.
- Implementation of the new planting method from June 2023 onwards.
- Preparations for the 2023 fire season from July. Activities will include annual clearing of the S8 firebreak, clearing corridor firebreaks, provision of fire mitigation materials, appointing five Community Fire Wardens, and facilitating five fire mass mobilisation events.
- Implementation of the new corridor management strategy in July 2023.
- A greater focus on meetings and trainings required to establish a community planting site. The planting area, species list, and planting schedule will be defined. Additionally, the management committee will be confirmed and trained.

6 Conclusion

The Ala Programme: Phase II is on track to achieve its objectives. The Ala Programme has continued work to establish forest corridors between forest fragments, to support populations of Endangered lemur species in the SLLF of Anosy, Madagascar. Native seedling survival rates have increased dramatically compared to last year, and the growth of *Acacia* remains strong in all corridors. The assessment of local resource needs is almost complete, and the Programme continues to strengthen capacity of stakeholder to sustainably manage forest resources. To mitigate the threat of fire, fire mitigation and prevention activities have continued and expanded into new areas. Data from ongoing faunal and floral monitoring has revealed lemurs are already utilising the corridors to move between forest fragments. It has also revealed the presence of a diverse array of herpetofauna and invertebrate species. A new corridor management strategy has been developed to promote the survival and growth of native floral species, and will be implemented in the upcoming Programme year.

7 References

[1] Ganzhorn, J. U., Lowry, P. P., Schatz, G. E., & Sommer, S. (2001). The biodiversity of Madagascar: one of the world's hottest hotspots on its way out. *Oryx*, *35*. https://doi.org/10.1046/j.1365-3008.2001.00201.x

[2] Watson, J. E., Joseph, L. N., Fuller, R. A., James Watson, C. E., & Ana Rodrigues, E. (2010). Mining and conservation: implications for Madagascar's littoral forests. *Conservation Letters*, *3*(4), 286–287. https://doi.org/10.1111/J.1755-263X.2010.00124.X