

Final Evaluation Report

Your Details	
Full Name	Mehari Girmay
Project Title	Restoration Potential of Hirimi Forest: threats and possible mitigation mechanisms as inference for its conservation, in Northern Ethiopia
Application ID	28654-2
Grant Amount	£6,000
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Date of this Report	20 September, 2020

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Investigate the restoration potential of plant species in the study area through the soil seed bank				<p>A total of 2,244 individuals represented by 58 species, 51 genera and 22 families were recovered in the soil seed bank taken from all land-use types of the study area. 3,116.67/m² was the total soil seed bank density. The highest species compositions were found in forestland where the least seeds were recovered from the bare land.</p> <p>The overall diversity of woody species was low. This indicates, preventing human and livestock intervention accompanied by the growing of seedlings from seeds and planting them in the degraded area is critical to restoring woody species.</p>
Identify the major anthropogenic threats to the study vegetation				<p>Out of the identified threats, browsing, deforestation and expansion of agriculture were the most frequent and serious problems. Thus, species such as <i>Dodonaea angustifolia</i>, <i>Boswellia papyrifera</i> and <i>Gardenia ternifolia</i> are under alarming rate of extinction in the study area.</p> <p>On the other side, <i>Acacia nilotica</i>, <i>Clerodendrum myricoides</i>, <i>Cordia africana</i>, <i>Justicia schimperiana</i>, <i>Phoenix reclinata</i> and <i>Phytolacca dodecandra</i> had neither seedlings nor saplings. Hence urgent conservation action is required for those species that fall short in their seedling and sapling as for those under series threats.</p>
Assess the indigenous vegetation conservation mechanisms used by the local community; basis for future				<p>Home garden, replanting, education, enclosure/enclosure and use of alternative energy were among the leading experiences in the communities used and recommend conservation /management methods</p>

sustainable conservation.				for the study vegetation. However, these techniques were not efficient, since it does not overcome problems such as species with lack of seedlings, found rarely and under extinct.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

The main challenges while the project data collections were transportation difficulties and food supply. The study area was not reaching the regular transportation. Thus, we imposed to travel more than 25 km on foot. Furthermore, at the end of the final data collection periods, we were faced with food scarcity and some malnourishment.

3. Briefly describe the three most important outcomes of your project.

The assessment for Hirmi vegetation's soil seed bank (SSB) is an important component in the process of rehabilitating degraded lands and forecasting the future vegetation cover of a given area and to take a required conservation approach accordingly. Hence, the following outcomes were forwarded from the present project:

- ☞ The regeneration potential of the study vegetation was unknown. The project has a response for this based on the findings from the four land-use type's soil seed banks. Out of the sampled 128 soil seed banks, 82.75% he restored species were herbs and the remaining were woody species. As a result, woody species were at the poor regeneration potential. This was associated with existed human and livestock disturbances.
- ☞ The main threats for the study vegetation and recommended conservation methods were forwarded to encounter/mitigate for those challenges both using indigenous ways from the community and scientific ways. Overgrazing/browsing, deforestation, expansion of agriculture, over-harvesting, lack of knowledge on the utilisation and management of the plants and plant products, drought, firewood collection and charcoal production were among the revealed treats and causes to be poor regeneration potential outcome of the study vegetation. To overcome these challenges; home garden, selective fencing, ecological rehabilitation, awareness rising, efficient use of the plant and plant products as well as participatory forest management were among the leading experiences with positive outcomes in the study areas. However, those practices were not habituated in all communities or districts and not as efficient as it intends. Besides, Using alternative energy, enclosures, establish nursery sites to prevent local extinction by planting seedlings, particularly to those plants with no or very few seedlings/saplings and endangered specifically and the whole woody species generally are recommended from this findings.
- ☞ The local government should cooperate with the regional and federal governments, research centers, NGOs and other relevant conservation

stallholders to take part in the rehabilitation and restoration of the degraded vegetation of the study area as per the result of this study.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

The ultimate goal of this project was to set a proper conservation approach of the study forest after the regeneration potential and treat the status of the plant species are distinguished. In this project, about 120 peoples participated and requested to share their leading experiences and their indigenous knowledge on the scope of conservation and utilisation methods of the vegetation in their vicinity, the status of the forest, major threats to the forest, the most threatened species and its reason, etc. Accordingly, the result of the soil seed bank and field visit has somewhat compatibilities with information collected (especially the most treated species in the study area, status of woody species and endemic species) from the communities. □

The communities are also dot-down their best practices on how to overcome the existed deforestation and habitat degradations. After group discussions and experience sharing, it is anticipated to develop a good knowledge and skill on ecosystem conservations. Moreover, some members of the communities and local expertise were taken part in the 1-day workshop (deals with restoration potential and conservation status of Hirmi Forest) held in Shire Agriculture Research Center. These will have an important role in conservation and to get sustainable benefits from the existed forest ecosystem.

Furthermore, most of the field workers and daily laborers were from the local communities. The payment on a daily basis was one of the direct benefits for some member of the local communities.

5. Are there any plans to continue this work?

Yes, the two projects have been identified the ecological baselines (regeneration status, restoration potential, the main threats, the rare and endangered species and forwarded mitigation measures) of the forest. The entire forest and the forest habitat are under series degradations. As a result, some species were under serious threats and alarming extinction status with no seedlings and saplings. Furthermore, based on the IUCN criteria of threat level; some endemic species in the study area were recorded as endangered (e.g. *Acacia venosa*) and vulnerable (e.g. *Combretum hartmannianum* and *Combretum rochetianum*). Side by side to what the community recommends on the conservation approaches, establishing of a nursery (by giving priority to these species with no/few seeds in the soil seed bank, endangered and endemic species) and plantation by involving the local community in collaboration with local administrators and experts are exhaustively required. Side by side to this, local communities and stakeholders should get pieces of training on the conservation status and sustainable utilisation of the Hirmi forest to develop a sense of belongings. Therefore, the next project will be applying the restoration and rehabilitation techniques for the degraded habitats of Hirmi forests (also for specific species) by developing nursery sites and through community-based forest management.

6. How do you plan to share the results of your work with others?

I am intending to share the findings through two ways:

- a. The first one is by publishing the findings in articles. I have published the former work in springer nature which is available online at <http://www.springer.com/-/7/AXRrw3FCDFxnVVbza6qS>. The remaining parts of the studies will also publish in such internationally standard journals. The summary of the activities and pictures are also shared through Facebook.
- b. Since most of the local communities have no access to the internet, the second way to disseminate the finding will be through conducting integrated and inclusive training or workshops for all communities and local expertise. The results of the project will also be presented in national and international conferences.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

This project was intended to accomplish at the end of June 2020. However, it was accomplished 2 months late because of the following reasons.

- ✘ The pandemic (Covid-19) was hampered from some activities. As a result, data was not collected based on the time scheduled.
- ✘ After the soil seed bank was sowed in the greenhouse most of the species seeds were distinguished at the early stage, however, some woody species were difficult to identify at the seedling stage. Thus, we were proceeding growing of these species by transferring in other trays and growing them until the sapling or distinguishable stages.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount £	Actual Amount £	Difference £	Comments
Field Work Equipments expense	1500	1520	+20	The cost of some items such as plastic trays and core sampler were inflated from the previous costs
Transport expense	1150	1150		There was no cost difference
Per diem and accommodation co	1500	1500		There was no cost difference

Greenhouse establishing and monitoring expense	1400	1400		There was cost difference
Stationary cost	450	450		There was cost difference
Total	6000	6020	+20	

9. Looking ahead, what do you feel are the important next steps?

The next important steps will be to:

- ✎ These two projects are part of my PhD works. Currently, I am working on finalising the dissertation and publication. I plan to disseminating/defense the entire project works to a wider audience and professionals.
- ✎ Creating a platform and workshop which involves the local communities and relevant experts to raise technical awareness on how to sustainably use, rehabilitate and restore the forest ecosystem of the study area.
- ✎ Establishing a nursery by prioritising the species with few/no seedlings as well as endemic, endanger and rare indigenous species. The rehabilitation and replantation will be conducted in collaboration with local communities and local leaders/experts. This will be the basis for future forest conservation and ecological rehabilitation.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, I always use the notebook of The Rufford Foundation in every activity of the project (while data collections and presentations). Moreover, during the data collection, I inform the local leader and researchers that I am researching with a grant from Rufford conservation and I do encourage them to identify the researchable area and apply for it. In social media (Facebook) I have shared different projects of the foundation and my work as well. In every conference (e.g. in Shire agricultural research center workshop and in RSG conference in Ethiopia) I have acknowledged The Rufford Foundation. I will also do more to promote the foundation in a well manner.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Team	Role
Mehari Girmay (PhD candidate)	principal investigator
Yirga Gebretsadik (Botanist)	Botanical data collector
Sebsebe Demissew (Professor)	Supervisor
Tamrat Bekele (Assoc Professor)	Supervisor
Nayzgi Fissaha (Analytical chemistry)	Soil data collector and laboratory analysis
Dejen Abrha	Field guide
Mulaw Hadush	Guard

Debes Zegeye	GIS expert
Adhanom Abadi	Daily labourer
Shugut Weldu	Daily labourer
Sihel Tsehaye	Daily labourer
Dejen Girmay	Daily labourer

12. Any other comments?

I sincerely appreciate the financial support of RF to carry out this project. I also hope that to get the next grant to apply the restoration and rehabilitation techniques for the degraded habitats of Hirmi forests by developing nursery sites and through community-based forest management for the future conservation and sustainable use of the forest.