

Final Evaluation Report

| Your Details | |
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| Project Title | Local Community's Awareness and Perception of Bee-Plant Interaction and The Contribution of Beekeeping to Ecosystem Conservation and Livelihood Improvement in Northern Tanzania. |
| Application ID | 42007-2 |
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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 |
|---|--------------|--------------------|----------------|---|
| To assess the local communities' perception and awareness of the bee-plant interaction. | | | ✓ | The data for this objective were successfully collected and analysed accordingly. From this objective, it was observed that most people from the study areas know and understand the plants available in their areas and plants that honeybees visit for foraging. Most people mentioned different plant species visited by bees and what exactly bees collect from such plants; people had an idea of the plant sources, which are nectar and pollen, and their potential for bees and their products. Most of the plant species mentioned by local communities have also been reported in our previous study, Rikohe et al. 2023 b, as bee-preferred plants from the Northern Zone of Tanzania. For example, different plants, such as <i>Acacia mellifera</i> , <i>Hoslundia opposita</i> , <i>Grewia bicolor</i> , <i>Terminalia brownii</i> , <i>Cordia monoica</i> , and <i>Ziziphus mucronata</i> , So local people are aware of plants for bees in their areas. |
| To determine the local communities' perception and awareness of the | | | ✓ | From this objective, it has been observed that most people understand and strongly agree that bees are essential in |

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| contribution of beekeeping to conservation and livelihood improvement. | | | | ecology. Many of them managed to mention how bees and beekeeping are crucial to conservation and ecosystem management at large, where they mentioned different ways, including pollination of plants and crops, aiding in the conservation of plants, avoiding inversion of wild animals, and avoiding interaction and human activities in areas where beekeeping is conducted. Regardless of how people know the potential of beekeeping in improving their livelihood, most are still experiencing many challenges that hinder the potential contribution of keeping bees to income generation. It was observed that most people depend on other sources of income, and the amount earned by individual beekeepers per season remained very low. |
| To conduct training on modern beekeeping practices | | | ✓ | From this objective, local communities were trained and informed on modern beekeeping practices. Here, participants attended class (theory) and practical sessions where they were involved in hands-on modern hive-making, hive preparation for siting and general colony management practices. Participants were equipped with knowledge and skills on how to turn beekeeping activities into a profitable and commercial way. |

2. Describe the three most important outcomes of your project.

- a). We claim that the local communities are aware of the bee-plant interaction, the impact of compromising this interaction on both bees and the plant species, and the contribution of beekeeping to ecosystem management.
- b). We highlighted the local community participation in beekeeping activity and the contribution of beekeeping to their livelihood improvement.
- c). We conducted modern beekeeping practices training, which successfully equipped the local communities with the knowledge and skills to maximize the productivity and commercialization of their activities.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Most challenges, especially regarding working with the communities, were successfully solved. However, the rain was among the challenges we faced, as we started data collection in February, which is the time of the long rainy season in the project areas. So, reaching people in remote areas with limited road access became challenging but manageable.

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

The local communities from the study areas were fully involved in the current project. The communities participated in data collection; both beekeepers and non-beekeepers participated and gave their views on bee-plant interaction and the contribution of beekeeping to conservation and livelihood improvement. Nonetheless, the local communities fully participated in training; participants from the project areas participated in modern beekeeping practices training, where they were involved in theory and practical sessions during modern hive-making and general apiary and colony management practices. Among the benefits of the local communities from this current study was the knowledge of contemporary beekeeping technology and bee conservation provided to them during the theory session of the training. Also, the local communities were provided with materials for hive making, which they remained with the made hives after training and used for establishing beekeeping activities. All participants, especially during training sessions, were provided with T-shirts and bee hives with the Rufford logo.

5. Are there any plans to continue this work?

Yes! Based on the findings from the current study, we plan to continue with this work in various ways and activities. We plan to continue with the provision of knowledge and extend the awareness of the local communities on the importance of keeping bees to nature conservation and livelihood improvement. This will stimulate and

trigger local community involvement in the activity while assimilating individual/community income generation and environmental conservation. Secondly, we are focusing on modernizing and commercializing beekeeping activities; from the study findings, it seems that most people are traditionally keeping bees, which is reported to be destructive to the environment by cutting down trees for log hives and the bees themselves as it involves destruction of the colonies during harvesting and no management practices are undertaken for the bee colonies. Moreover, most people with traditional beekeeping responded that they have not seen an income change due to beekeeping except for a few people who conduct both traditional and modern beekeeping, which could be due to poor production and production of low-quality products incompatible with local and international markets. Local communities expressed the high demand for plant and bee conservation due to reported cases of environmental destruction through massive deforestation and bushfires; this problem necessitates conservation initiatives, including the provision of awareness to people on conservation and its importance to human life but also establishment of tree planting campaign. Moreover, based on the study findings, beekeepers in the study areas primarily focus on keeping stinging bees (*Apis mellifera*), overlooking the potential benefits of stingless bees. Therefore, to improve beekeeping practices, local communities should be provided with sufficient knowledge about both stinging and stingless bees. This would encourage greater involvement, particularly among people who fear bee stings by having another option. Additionally, incorporating both types of bees (stinging and stingless) into beekeeping systems would significantly contribute to income generation and, as a result, enhance the livelihoods of local communities as stingless bees are known for their highly demanded products with higher prices.

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

The findings from this study have been shared through village and district council meetings with the help of district council and conferences. We had an opportunity to present the study findings and give study feedback to local communities during the prepared training session conducted in all project areas. We have prepared the manuscript titled "Local Community's Awareness and Perception of Bee-Plant Interaction and The Contribution of Beekeeping to Ecosystem Conservation and Livelihood Improvement in Northern Tanzania", which has been submitted for possible publication. The project findings will be further presented through different seminar presentations and scientific conferences to share and inform the community on the perception and awareness of the local community regarding the subject.

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

Here are some next steps concerning the study's findings and the current project's output. Firstly, the extension and provision of knowledge and awareness on bees, plant conservation, and modern beekeeping practices to the local communities to assimilate their understanding and enthusiasm to engage in the conservation campaign highly. Secondly, we aim to establish and commercialize beekeeping activities in the project areas, by incorporating both stingless and stinging bees. Lastly, we strive to develop conservation campaigns, including community fire management, nursery establishment, and tree planting.

8. 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?

We used the Rufford logo in data collection and training sessions. During data collection, the experts dressed T-shirts and caps with the Rufford logo; during the training sessions theory and practical sessions, all participants and trainers dressed in T-shirts with the Rufford logo, and the same T-shirts were also provided to district and other villages and ward leaders as the way of strengthening the memory of our project and the project funder. We further used the Rufford on the bee hives that were made during the practical sessions, and the hives were provided to the participants for sitting in their apiaries; the Rufford logo was used on training slides, which were all provided to the participants as well and on other printed stationaries including notebooks.

9. Provide a full list of all the members of your team and their role in the project.

I had the following supervisors: Prof. Anna Treydte, Associate Professor in Natural and Environment Management, focused on sustainable development at the Department of Physical Geography Stockholm University. Prof. Linus Munishi, Associate Professor of Landscape and Conservation Ecology at the Department of Sustainable Agriculture and Biodiversity Conservation (SABE), The Nelson Mandela-African Institution of Science and Technology (NM-AIST), Arusha, Tanzania. Dr Issakwisa Ngondya is a senior lecturer and post-doctorate student at The Nelson Mandela African Institution of Science and Technology.

Project team members: Mr. Isack Frank Rikohe, Assistant Lecturer at the Department of Crop Sciences and Beekeeping Technology at the University of Dar es Salaam Tanzania; in the project, I was a project leader and beekeeping/nature conservation expert. They were involved in both data collection and training sessions. Mr. Mtani Makaya, a beekeeping expert, is involved in data collection and training sessions. Ms. Prisca Sima, a wildlife conservation and forest expert, works in the natural resources section at the Same district council; she is involved in data collection and training sessions. Mr Andrea was involved in training our drivers during both data collection and training sessions. During data collection sessions, Mr Ibrahim and Mr Elisante were engaged in a project as field assistants. As carpenters guided hive-making activities, Mr Hashim and Mr Musa were involved in the project.

10. Any other comments?

I extend my gratitude to the Rufford Foundation for fully supporting and facilitating this current project. The communities from the study areas and the district council highly appreciate this paramount support. From this current project, we have paved the way for further activities and programmes regarding bee and plant conservation and the role of beekeeping in conservation and livelihood improvement.