

Final Evaluation Report

Your Details	
Full Name	Karim Omar
Project Title	Recovery and conservation of two Critically Endangered plant species in Egypt through Community Based Conservation Actions
Application ID	28446-D
Date of this Report	30/10/2023

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
Community-based management for the preparation of Recovery plan for targets species by using eco-geographical study (fieldwork) to extract the necessary information on the potential habitat to select the appropriate sites for the recovery program				In this work we present steps to conserve <i>Primula boveana</i> and <i>Rosa arabica</i> through in-situ practices from planning to implementation, respectively through: a) evaluating the current conservation status through IUCN Red List and determining the environmental factors controlling the distribution of the species that are necessary for establishing the recovery programme, b) determine the potential species habitat suitability under the current climate conditions using Maxent software, and c) based on the previous two steps, and in an experiment that is the first in this area, an attempt was done to cultivate dormant treated seeds directly in the suitable habitat for recovery. All of these steps aim to increase population size, Extent of Occurrence (EOO), and Area of Occupancy (AOO), which will contribute to minimise the impact of threats on the target species and reducing the risk of extinction. Environmental factors controlling the distribution of the target species and habitat suitability range were extracted in detail using IUCN Red List Assessment and Species Distribution Model (SDM).
On-site implementation of recovery plan by Increase the Extent of Occurrence (EOO), Area of Occupancy (AOO), and population size of target species through in situ conservation which include re/introduction, and enrichment planting				Despite the low survival rates of <i>P. boveana</i> seedlings, which reached 1% of the germinated seeds after months from germination, about 140 new individuals were obtained to be added to the current population as a result of this step with an increase of more than 25 %. Also, the geographical range (EOO) after adding the recovery sites has increased by 230 %. For <i>Rosa</i>

techniques				<p><i>arabica</i>, after 1 year of the simple layering process, 10 branches rooted and were translocated into three sites that had been previously identified to cover three habitat suitability ranges (high, moderate, and low suitability). After a year of translocation in the wild, the survival rate ranged from 66% to 100%, the geographical range increased by 65%, and the population size by 6.8%. which, if continued, could help reduce pressures on the species as well as the risk of extinction.</p>
Setting strategy, management, action plan, and follow up for the monitoring and evaluating the recovery process of the target species				<p>An irrigation and monitoring plan has been developed and implemented for these individuals based on Abdullah et al. (2012), and Ahmed & Al-Dousari (2017) so that the rate of irrigation is gradually reduced, leaving the plants to nature as adaptive as possible. In the 1st month, individuals were irrigated at a rate of 3 litres/day after day, followed by 3 litres/every 3 days for a month, followed by 3 litres / every 7 days for a month, followed by 3 litres/every 15 days for a month, followed by 3 litres/once a month, after that, we stopped the irrigation, and the individuals were left to nature. The irrigation process took place from November 2019 to February 2020.</p>
Ex situ conservation through seed collection and storage for future needs				<p>Carrying out ex-situ conservation practices has become urgent due to the difficulty in ensuring the success of the in-situ conservation process in the future. Collecting and storing seeds, along with cultivation in greenhouses and botanical gardens, will aid in the conservation of the plant if it is extinct in the wild. Seed were collected and stored and plan for storage and botanical garden are carrying on.</p>
Improve the capacity and knowledge of PAs rangers, researchers, community guards, etc.				<p>The team and researchers of nature reserves were trained on methods of monitoring, evaluation and analysis, and the idea of training is being developed to include other reserves.</p>
Building pheasant conservation education				<p>We did some awareness activities for the surrounding community</p>

and awareness among local community and different stakeholders				
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2. Describe the three most important outcomes of your project.

Environmental factors controlling the distribution of the *P. boveana* and habitat suitability range were extracted in detail using IUCN Red List Assessment and Species Distribution Model (SDM). Despite the low survival rates of seedlings, which reached 1% of the germinated seeds after 8 months from germination, about 140 new individuals were obtained to be added to the current population as a result of this step with an increase of more than 25 %. Also, the geographical range (EOO) after adding the recovery sites has increased by 230 %, which, if continued, could help reduce pressures on the species as well as the risk of extinction. During this study, we emphasised that the target species is marching toward extinction very quickly and needs rapid intervention to try to save it from the imminent extinction risk due to drought and climate change.

We extracted the environmental factors controlling the target species' distribution and habitat suitability range using the IUCN Red List assessment and Species Distribution Model (SDM). The most suitable habitat for *R. arabica* is predicted in the middle northern parts of SCPA, with the highest suitability in the high mountains. Precipitation of driest quarter, precipitation of wettest month, precipitation of coldest quarter, and aspect are the highest mean contributors determining the distribution of *R. arabica* in SCPA. *Rosa arabica* potential distribution covers 324.4 km² (7.46%) of the total SCPA area (4350 km²). This area is divided into 18.1 km² high probability, 124.3 km² moderate probability, and 182 km² low probability. After 1 year of the simple layering process, 10 branches rooted and were translocated into three sites that had been previously identified to cover three habitat suitability ranges (high, moderate, and low suitability). After a year of translocation in the wild, the survival rate ranged from 66% to 100%, the geographical range increased by 65%, and the population size by 6.8%. Therefore, if the new individuals continue to grow and adapt it may lead to the expansion of other environmental factors such as climatic and topographical factors that probably increase the resilience of the global population of the species to adverse events.

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

The project started at the end of 2019 and with the onset of the Covid-19 pandemic, which disrupted the implementation of all activities, especially the interactive activities for dealing with the community. However, we carried out field activities and rehabilitation programmes and tried to implement training and awareness activities from a distance.

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

This project aims to integrate local communities into conservation programmes. From the first step, they were involved in planning, selecting rehabilitation sites, and implementing them. Where members of the local community collected seeds, planted, transported seedlings to the field and planted them in the natural environment, as well as following up and irrigating them for a year. In addition to training and awareness programmes.

5. Are there any plans to continue this work?

Of course, there are plans to complete and expand the work on a number of endangered species. We have submitted an application for a grant from the Franklina Foundation for the conservation of *Rosa arabica* to complete the work in which The Rufford Foundation will be a partner with the remaining amount of the previous grant.

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

Actually, during the project period, we succeeded to publish two scientific articles in IF Journals:

Omar, K., & Elgamal, I. (2021a). Conservation of challenging endemic plant species at high risk of extinction in arid mountain ecosystems: a case study of *Rosa arabica* Crép. in Egypt. *Journal of Mountain Science* 18(10). <https://doi.org/10.1007/s11629-021-6750-2>

Omar, K., & Elgamal, I. (2021b). Can we save critically endangered relict endemic plant species? A case study of *Primula boveana* Decne ex Duby in Egypt. *Journal for Nature Conservation*, 61, 126005. <https://doi.org/10.1016/j.jnc.2021.126005>

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

Completing awareness and education activities, continuing monitoring programmes by the local community, and repeating the experiment with other plants.

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 did not use the logo, but we published two research papers in journals with an impact factor, and the role of The Rufford Foundation in supporting the project was mentioned, thanked and acknowledged.

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

Karim Eissa: Team leader and he had managed the project and participate in most of the activities; his work concentrates on the conservation of threatened species in arid ecosystem, GIS analysis, and IUCN Red List Assessment.

Ibrahim Elgamal: Taxonomist; helped in identifying the suitable habitat for the growth of the target species within the field and rehabilitation program.

Ahmed Abdallah: Botanist extensive experience in monitoring plant species in mountain ecosystem, he taken part in the public awareness and education.

Gamal Elgohary: Public awareness specialist in Southern Sinai protected areas from 2010 to date. English translator at many tourist sites in Cairo from 2007 to 2010 and he helped in public awareness.

Amir Shalouf: Ecologist and help in field work.

Sleim Mehan: Local community guide helped in fieldwork and seed collection.

10. Any other comments?

We regret that we were not able to implement all the activities, especially education and awareness, during the project period, and that we were delayed for 18 months after the project ended. But in the end, we formed partnerships with one of the projects affiliated with the Ministry of Environment to implement these activities on a larger scale and at a greater cost, so that the benefit and spread would be widespread, with the basic support of The Rufford Foundation. In the coming period, we will seek to provide great support to repeat such an experience on a larger scale, and we hope that they will support and guide us.