



Devika M Anilkumar
Madathil



Ecosystem level approach and habitat specific micro level understanding of species composition is essential for effective ecorestoration practise. The ongoing tree planting and ecorestoration activities are devoid of scientific planning for niche and ecosystem adaptability due to lack of ecological methodologies and studies. Bioclimatic prediction of potential habitat through niche modelling and niche profiling of the threatened species of different ecosystems proposed here to avoid invasion into other species niches while restoration.



MoU – Report

IUCN status assessment, Niche modelling and Niche profiling of endemic tree species for effective species recovery and ecorestoration

Funding Agency : Rufford Foundation, UK.

Type : International Fellowship

Grantee : Devika M Anilkumar

A. Rationale

This is an individual research grant obtained for IUCN assessment and conservation planning of selected threatened plants of the Western Ghats. This is international grant is contributing to the existing IUCN Red List assessment and conservation planning project of WGHF and MES 2021-23. The grant has been sanctioned through CED Thiruvananthapuram to Ms. Devika M. Anilkumar.



Centre for Ecology, Taxonomy Conservation and Climate Change (CEtC) Western Ghats Hornbill Foundation and Research Department of Botany MES Asmabi College P Vemballur.

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Supervisor
Dr. Amitha Bachan K.H.

Period
June 2022-June 23

AGENCY
Rufford Foundation UK

TYPE
INDIVIDUAL GRANT

Final Evaluation Report

Your Details	
Full Name	Devika M Anilkumar
Project Title	IUCN status assessment, Niche modelling and Niche profiling of endemic tree species for effective species recovery and ecorestoration.
Application ID	37165-1
Date of this Report	28 th July 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
Threatened status assessment using IUCN Red list criteria				Completed assessment for 12 targeted species. Ten submitted to IUCN red list using SIS tool kit. One already published, three scheduled for publication this month, four reviews completed and two are under review.
Niche modelling for prediction of potential habitat				Niche modelling completed for 12 targeted species using modified niche modelling standardised for the Western Ghats region.
Niche Profiling				Completed for the 12 targeted species which segregated into five different habitat profile of the Western Ghats forest.
Species recovery and ecorestoration plan				The potential habitats for ecorestoration and totally converted regions were predicted at each ecoregion level. Five incorporated into forest working plan of one ecoregion, biodiversity strategy action plan of two local bodies. Others will be submitted to forest department.

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

a) IUCN Threatened status assessment for the selected species:

Completed assessments for 12 targeted plant species endemics to the Western Ghats-Sri Lanka biodiversity hotspot using IUCN Red List criteria. Among these 10 are tree species from different evergreen forests, and two are epiphytic herbs from montane evergreen habitats. Ten were submitted to the IUCN Red List using the SIS toolkit, and one has already been published. Three species are scheduled for publication this month, review has been completed for four species, and two are under review by the IUCN review team.

Targeted species	Habit	IUCN assessment status	Previous status	Present status
<i>Diospyros crumenata</i>	Tree	Assessment completed, submitted to IUCN, Published in red list. https://www.iucnredlist.org/specie	EN	EN

		s/30864/9578063		
<i>Cryptocarya anamalayana</i>	Tree	Assessment completed, submitted to IUCN, Published in red list. https://www.iucnredlist.org/species/38783/138508350	NE	EN
<i>Cryptocarya sheikelmudiyana</i>	Tree	Assessment completed, submitted to IUCN, Published in red list. https://www.iucnredlist.org/species/187622842/187623277	NE	CR
<i>Elaeocarpus recurvatus</i>	Tree	Assessment completed, submitted to IUCN, Under publication. https://www.iucnredlist.org/species/33642/9800036	VU	EN
<i>Syzygium lanceolatum</i>	Tree	Assessment completed awaiting assignment form IUCN	NE	awaiting
<i>Ficus beddomei</i>	Tree	Assessment completed, submitted to IUCN, Published in red list	NE	EN
<i>Syzygium occidentale</i>	Tree	Assessment completed, submitted to IUCN, Published in red list. https://www.iucnredlist.org/species/31199/9608095	VU	EN
<i>Aporosa bourdillonii</i>	Tree	Assessment completed awaiting assignment form IUCN	EN	awaiting
<i>Ochna gamblei</i>	Tree	Assessment completed, submitted to IUCN, Published in red list	NE	EN
<i>Syzygium caryophyllatum</i>	Tree	Assessment completed, submitted to IUCN, Under publication. https://www.iucnredlist.org/species/38036/10094391	EN	NT
<i>Medinilla anamalaiana</i>	Epiphyte	Assessment completed, submitted to IUCN, Under review	NE	awaiting
<i>Impatiens parasitica</i>	Epiphyte	Assessment completed, submitted to IUCN, Under review	NE	awaiting

b). Niche specific potential habitat prediction from landscape to local ecoregion level:

All 12 targeted species were Niche modelled using modified niche modelling standardised for the Western Ghats region. 19 bioclimatic parameters from the WorldClim were used along with terrain, vegetation, land use, and elevation parameters for the prediction of potential habitat. This is again fine-tuned for representing landscape and ecoregion levels. The extent of actual distribution, niche-specific potential habitat for conservation, degraded areas suitable for ecological restoration, and non-recoverable converted habitats were identified and

estimated. Completed for the 12 targeted species, which segregated into five different habitat profiles of the Western Ghats Forest.

c). Species recovery and ecorestoration plan:

The population data estimated for the 12 targeted species from the field work, population density, and other population characteristics were enumerated from the field data using the methodology provided by IUCN. The Importance Value Index was used to find associated species in different vegetation strata of the representing ecosystem. This is again niche profiled using the three-dimensional model. Five different habitat models were produced as a result. The whole set of data, including population estimation, distribution pattern, niche specific potential habitats, and predicted conservation and ecorestoration areas at the ecoregion level, was used for the preparation of species recovery and restoration plans. This is developed for each ecoregion level for all targeted species. The associated species can be used for ecorestoration based on population estimation, and the niche profiles can be used as a model for practical restoration. The ecorestoration plan for five species and their habitat was incorporated into the working plan of Vazhachal Forest Division, Kerala Forest Department, Biodiversity Strategy Action Plan of Athirappilly, and Sree Narayana Puram Grama Panchayath.

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

There was a 5-month delay in obtaining permission for the field work for this particular study due to processing delays from the Kerala Forest and Wildlife Department (Permission No: KFDHQ/3646/2022-CWW/WL10 dated January 25, 2023, issued to Devika M. Anilkumar and Dr. KH Amitha Bachan). Already existing permission for some areas and species for the PhD programmes was used to fill the gap, and the field plan was modified accordingly.

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

Only local people from indigenous communities were employed throughout the field work and data collection. These include protected areas such as five tiger reserves, three national parks, five wildlife sanctuaries, 15 forest areas outside PAs, and a few communities conserved sacred groves within Kerala, Karnataka, and Tamil Nadu states. The forest department, local self-governments (LSGs), Biodiversity Management Committee (BMC) members of different LSGs, and members and officials of MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) were sensitised to the importance of niche specific local community conservation and ecological restoration of threatened tree species and their representing ecosystems.

5. Are there any plans to continue this work?

The IUCN global red list assessment team has assigned us a total of 57 tree species, and we would like to continue working on this for other species as well. The Kerala Forest Department imbibed the idea of niche specific local communities involved in

conservation and ecological restoration of threatened tree species and their ecosystems rather than going for wide propagation and planting of individual tree species. As a result, the Vazhachal Forest Division of the Kerala Forest Department incorporated niche specific ecorestoration plans for five species and their habitats. Discussion with the Kerala Forest Department is advancing for the incorporation of niche-specific ecorestoration plans for selected species (Item No. 5: Minutes of Kerala Forest Department, Planning and Development, No. P4-1537/2021, dated 16.06.2023). We plan to continue discussion with the Kerala Forest Department and Forest Departments of other states in the Western Ghats biodiversity hotspot through the IUCN Western Ghats Plant Specialist Group, of which Dr. KH Amitha Bachan is a member.

Kerala State Biodiversity Board and BMCs of Athirappilly and Sree Narayanapuram Grama Panchayath were also sensitised for niche specific ecorestoration plans and implementation involving local communities. The plans for respective species for the Athirappilly Vazhachal ecoregion were incorporated into the panchayath-level biodiversity strategy action plan of Athirappilly Grama Panchayath, and we were officially involved in the preparation. The same is under process for the Sree Narayanapuram Grama Panchayath. The BMC of the Sree Narayanapuram Grama Panchayath imbibed our plan and developed a coastal vegetation belt restoration involving local women through the MGNREGA scheme, for which we are consultants. The field trials of the coastal vegetation belt have already started. We plan to extend this model for the conservation and restoration of the targeted species and their habitat throughout its predicted areas through a similar consultation process.

We also plan to have local nurseries and field trials for niche specific ecological restoration, at least in a few of the predicted habitats, with multi-stakeholder involvement.

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

All the IUCN Red List assessments will be available on the IUCN website (<https://www.iucnredlist.org/>). Also, we shared already published links through our organisation's website, exhibitions, and social media platforms. We had interaction with officials such as the Kerala Forest Department, Kerala State Biodiversity Board, and LSGs, also plan for more interactive workshops and consultations with officials of different states. The results were also presented at one national and four international conferences, of which three received best paper presentation awards. We are planning to have an interaction with the IUCN Western Ghats plant specialist group to disseminate the niche specific restoration plan to other states.

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

Sensitisation of different stakeholder groups through interaction, consultation, and workshops Incorporation into the management plans of different forest administrative units of each ecoregion unit. Incorporation into BSAP of different LSGs and BMCs. Development of local nurseries of saplings of targeted and associated species. Field trials for field-level eco-restoration and monitoring involving local

communities to improve the resilience of habitats and ecosystems Publications as a research paper in national and international journals. Ecorestoration manuals.

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?

I have made paper presentations at four international and one national-level conferences. Acknowledged the Rufford Grant support along with the logo in the presentations. used the logo in the regional-level workshops and also mentioned it on our website. The grant support was mentioned in the document shared with the Kerala Forest Department and Kerala State Biodiversity Board, which is reflected in the permission letter issued.

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

Dr. Amitha Bachan KH: Research supervisor and IUCN Co assessor, Dr. Babu Ambat:

Director CED, Dr. A. Biju: Principal MES Asmabi College, Dr. Maya Mohan: Western Ghats Hornbill Foundation. For permission and facilities provided in each institution.

Manikyaraj, Shenthil Kumar, Thankappan, Sudhi of Kadar indigenous community

Madhavan, Sudhakaran of Kattunaika indigenous community

Manikandan of Malasar indigenous community

Vishnu, Kamaraj, Manoj of Muthuvan indigenous community

For the support during field work and data collection.

10. Any other comments?

Paper presentation awards

<https://www.facebook.com/100054814542158/posts/pfbid0iUmKFyYitfP3ihf82oPFx71iz5x4wci7CtiDNQyjwtkfdVcYScSGfoVzqg1gSuMcl/?mibextid=YhNWyK>

<https://www.facebook.com/100054814542158/posts/pfbid02M1YpBTf4WRnGHusgyxuHzL6rk9iBrUS3yhVzVhAojxb8RqD9yQSdQqVJA6uEz9SI/?mibextid=YhNWyK>

Devika M Anilkumar
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Karuvannur
Thrissur
Kerela
India 680711

27th May 2022

Dear Devika

Offer Letter: 37165-1

We are delighted to let you know that, after careful consideration, the Trustees of The Rufford Foundation have approved a 1st Rufford Small Grant of £6000 to support IUCN Status Assessment, Niche Modelling and Niche Profiling of Endemic Tree Species for Effective Species Recovery and Ecorestoration (the **Project**). This Offer Letter sets out the terms and conditions of our proposed Grant Agreement.

The following are also included with this letter:

- a Banking Information Form; Please pass on to the organisation for completion.
- a template for information you need to provide us for our website;
- information about, and a copy of, the Final Project Evaluation Report template; and
- a copy of our logo in JPG format, together with conditions of use under point 4 Intellectual Property.

We must point out that once this Offer Letter is signed it will create a legally binding agreement between you and the Foundation. We urge you to raise any questions or concerns that you may have about it as quickly as possible. The main point is that by signing this Offer Letter, you agree that this Grant will only be used for the delivery of the Project and not for any other purpose.

Please note that this offer is valid for 120 days from the date of this letter. If we have not had a response from you by the end of this period, the offer will be formally withdrawn.

The Trustees of the Foundation will require you to complete a Final Project Evaluation Report (see point 2 below). In the event that the Grant exceeds the total cost of the Project, you will be required to reimburse us for any funding not used.

By accepting the Grant you agree that you will comply with the terms of the Grant as set out in this Offer Letter.

1. **Grant Payments and Use**

As you know, we will only pay the grant via an organisation. Please contact the relevant person at the organisation that will receive the funds to ensure the details provided on the Banking Information Form included with this Offer Letter are correct. To be clear, the organisation who holds funds on your behalf has no beneficial entitlement to the funds and will notify them of this separately. Whilst we hope that they will not charge any administration fees in respect of holding these funds, these will be deductible from the Grant should they consider it necessary to do so.

To be clear, the Grant must be used exclusively for the Project as outlined above and not for any other programme, project or for any other purpose. The Grant is not transferrable to another individual.

If you wish to make significant changes to your original budget allocations or to fund items that were not originally budgeted for, you **MUST** request permission from the Foundation in advance. Failure to do so may breach the conditions of the Grant and lead to a request for the return of the funds in full.

Should any portion of the Grant remain unused at the end of the Project, please notify the Foundation of this in writing and we will arrange for these funds to be returned to us.

2. **Monitoring and Evaluation**

We need to monitor the impact that our grants are having. Therefore, we require you to fill in a Final Project Evaluation Report at the end of the Project using the template included with this Offer Letter which will:

- contain enough information for us to be able to monitor and track the funds we have granted;
- let us know about the Project's progress or any difficulties that arose; and
- provide full information on expenditure of the Grant. It is important that you retain the management accounts and all paid invoices relating to the Project for at least 2 years after completion of the Project as these may be required for inspection at our discretion.

You also agree to provide us with updates and photographs of the Project for use on the Foundation's website and social media. You grant us permission to use the photographs for these purposes. If you don't own the photographs you will ensure that the owner grants us permission to use them for these purposes.

If you fail to provide sufficient information, or fail to take reasonable steps to provide sufficient information as outlined above, we reserve the right to obtain a reimbursement of the Grant in full.

3. **Limitation of Liability and Indemnity**

To the extent permitted by law, the Foundation shall have no liability under this Grant Agreement (whether to you or any third party).

You agree to indemnify the Foundation against all claims, losses, liabilities or costs (including legal costs) that the Foundation suffers as a result of any alleged or actual

failure by you to comply with or to perform any obligations imposed on you under this Grant Agreement.

4. **Intellectual Property**

For the avoidance of doubt, other than the limited permission we grant to use The Rufford Foundation Logo set out below, this Grant Agreement does not give you the right to use the Foundation's name, marks, logos, trademarks, artwork, images or branding. Should you wish to do so you must seek our prior written consent.

The Rufford Foundation grants to you a non-exclusive, royalty free, limited permission to use the name and the logo included with this Offer Letter (the **Logo**) solely in connection with the Project and subject to the following terms. Your use of the Logo is conditional upon, and amounts to acceptance of, the terms set out immediately below. You agree:

- a. to display the Logo in a prominent position on all of your publications, materials (including any marketing materials) relating to the Project but for no other purpose;
- b. not alter the Logo in any way nor do or permit anything to be done in connection with your use of the Logo that could jeopardise our goodwill in the Logo;
- c. not to grant to any third parties the right to use or display the Logo without our prior written consent;
- d. that your use of the Logo following this permission does not give you any right, title, interest in or to the Logo, nor any goodwill arising out of use of the Logo;
- e. that your right to use the Logo shall, unless otherwise terminated by us on notice to you in writing, automatically terminate following completion of the Project; and
- f. that the Rufford Foundation reserves the right on demand, and as it in its absolute discretion thinks fit, to revoke this permission at any time, following which you shall remove the Logo from all your publications and materials.

You are encouraged to use the Logo as extensively as possible on all materials and publications relating to the Project, subject to the terms above.

5. **Default of Agreement**

Things don't always go to plan and we encourage you to communicate with us if you are ever unsure about whether or not you are in breach of this Grant Agreement. We will always try to find an appropriate remedy for any breach, but if we consider the breach to be serious and/or we cannot agree a way forward with you, the Foundation reserves the right to terminate this Grant Agreement.

The terms of this Grant Agreement shall be governed and construed by English law and the exclusive jurisdiction of the English Courts.


To accept the terms of this Grant Agreement, please return one signed copy that includes **all 4 pages** of this Offer Letter by e-mail to jane@rufford.org

We look forward to working with you,

The Rufford Foundation

By signing this Offer Letter below:

- you acknowledge that you have read and understood all the information contained in this Offer Letter;
- you commit to meet the requirements of this Offer Letter; and
- you agree to carry out the activities set out in your original funding application and to use reasonable endeavours to establish, develop and run the Project in order to achieve the objectives within the time-frames specified.

Signed on behalf of THE RUFFORD FOUNDATION	Signed by THE RECIPIENT
Full name: Jane Raymond	Full name: <i>Devika M Anilkumar</i>
Role: Trust Administrator	Role: <i>Grant Recipient</i>
Signature: Jane Raymond	Signature: 
Date: As per Offer Letter	Date: <i>4th June 2022</i>