



S.S.RESEARCH FOUNDATION

ACTIVITY REPORT - 2019-2020

Regd:

130/123, Veerappapuram Street
Kallidaikurichi – 627416
Tirunelveli District
Tamil Nadu – 627416

Lab:

8/169, Veerappapuram Street,
Kallidaikurichi,
Tirunelveli District,
Tamil Nadu - 627416.

Ph.No.04634-290369, 252369

Website: <http://ssresearch.org/>

Email: ssresearchfoundation@gmail.com

Guide Star Number (GSN) : 10091

Darpan (NITI Aayog, Government of India) ID : TN/2017/0164609

CONTENTS

Message from the Director

Areas of Activities

Programme 1

Ecology and Environmental Sciences & Plant Sciences

- 1.1 Participation in training programme
- 1.2 Biodiversity Survey
 - 1.2.1. Working Plan Assessment
 - 1.2.2. Aquatic Biodiversity Assessment
- 1.3. Wetland Survey
 - 1.3.1. Survey for Wetland Status
- 1.4. Environmental Awareness Programme
 - 1.4.1. School Education on Blue Beauty
 - 1.4.2. Wetland Conservation
 - 1.4.3 Aquatic ecosystem and its conservation
- 1.5. Wetland day celebration
- 1.6. Other Activities

Programme 2

Health Sciences

- 2.1. Survey and Community Assessment
- 2.2. National Nutrition week celebrations

Achievements

1. Plant Authentication Certification from Botanical Survey of India
2. International Collaboration

List of Projects

List of Publications

Message from the Director



Dear Friends

S.S.Research Foundation enters its third year with remarkable confidence. With the turn of this year, S.S. Research Foundation feels proud to present its Activity Report 2019-2020, which provides you a glimpse of what we did and achieved this year through our synergised effort. During 2019–20, our scientist, Dr. Gunasekaran, was the first person to discover the *Gnetum of. Contractum* Markgr.- **GNETACEAE Species.**

This year, our researchers made a significant international collaboration with the **Federal University of Mato Grosso do Sul (UFMS)**, Brazil, under the **CAPES -PRINT** Programme. As part of this, UFMS researchers visited our institution to discuss about the potential future partnerships in various research projects.

Our staff continue to gain recognition internationally, viz., Dr.M.Gunasekaran, Senior Scientist, was invited as a guest speaker to 1st International Online Conference on Ethnobiology and the 2nd Ethnobiology Workshop organised by the **Federal University of Paraíba**, Brazil. The last year had also been unique in the extent of staff engagement in planning future strategies, fund-raising and personnel development. I am very grateful to the associates, volunteers, and scholars for their engagement with this process and commitment to the goals of the Foundation. I also want to thank the founder who has been a source of support for me and my associates. Last but not least, I thank all our donors for their continued and generous investment in our activities. I express my appreciation and gratitude to all of them.

With my warmest wishes,

A handwritten signature in blue ink, appearing to be 'Chitra P', with a long horizontal line extending to the right.

Chitra P

ACTIVITY REPORT 2019-2020

The following activities were carried out during the period of 2019 to 2020

PROGRAMME 1 - Ecology and Environmental Sciences & Plant Sciences

1.1. Participation in Training Programme (Registration Fee, Travelling allowances, food & accommodation paid to Dr.G.Vanaraj & Dr.Srinivas by S.S.Research Foundation).

On behalf of SSRF, Dr.G.Vanaraj and Dr.Srinivas participated in the National Conference/ Workshop on April 11th & 12th, 2019 held at Bharathiyar University, Coimbatore, Tamil Nadu. The central theme of the workshop is on “Biodiversity and its Conservation: priorities and challenges”. Our associates Dr.Vanaraj, expert in primates and plants, Dr.Srinivas, Herpetologist (reptiles), gave training and presentation to the audience (students, scholars and staff) on the conservation importance of their areas of expertise.



Poster Presentation by our associate Dr.G.Vanaraj

1.2. Biodiversity Survey

1.2.1. Working Plan Assessment

This is a project entitled “Assessment of Field Vegetation Survey, Enumeration, Demarcation etc for Preparation of Working Plan of Erode Forest Division during 2019-2020”, sanctioned and financial support by the Coimbatore Working Plan Division, Tamil Nadu Forest Department under National Working Plan Code – 2014. This Project carried out during the period from 18 to 21-04-2019 & 09 to 12-05-2019.



1.2.2. Aquatic Biodiversity Assessment

Biodiversity status of aquatic organisms including macroinvertebrates, fish, aquatic plants etc. were assessed in Kumbakarai streams, Theni district, Velliangiri Forest streams, various parts of Nilgiri Biosphere Reserve (NBR), Nilgiri district from 25 to 28-07-2019. The whole expenditure for this survey programme was borne by the trust.



1.3. Wetland Survey

1.3.1. Survey for wetland status in Tirunelveli and Coimbatore districts, Tamil Nadu

Survey programme on wetlands and their biodiversity such as macroinvertebrates, fish and aquatic plants were done in Tirunelveli and Coimbatore districts from 26 to 28-10-2019. The researchers from S.S.Research Foundation Dr.Gunasekaran, Dr.Sundar and our associates Dr.Vanaraj, Prof.Muralidharan & Research Scholars from Manonmaniam Sundaranar University, have also taken part. This programme was financially supported by the trust. The outcome was shared with National Biodiversity Portals to access to and sharing of citizen science data is of crucial importance for conservation and management for sustainable development.



1.4. **Environmental Awareness Programme** The trust organised and sponsored financially for the below 3 programmes i.e. 1.4.1, 1.4.2. & 1.4.3.

1.4.1. School Education on Blue Beauty - As our oceans are experiencing the toxic effects of waste, plastic and chemicals, therefore they are being destroyed. Blue beauty is an important initiative to protect and preserve freshwater and biodiversity. Our Senior Scientist Dr. M. Gunasekaran conducted awareness programme regarding Blue Beauty to 7th standard school children at Govt. School in Coimbatore on 23-01-2020.



1.4.2. Wetland Conservation



On-field awareness programme on conservation of wetlands and their resources for school students has been organized by S.S.Research Foundation on 26/02/2020 in Coimbatore. About 40 students were benefitted out of this programme. Prof.M.Muralidharan, Manonmaniam Sundaranar University, Dr.Sundar and Dr.Gunasekaran of SSRF has participated to teach the students on the significance of wetlands.

1.4.3. Aquatic ecosystem and its conservation

The trust organised and sponsored financially for the Environmental awareness programme from 10/03/2020 to 12/03/2020 in Suruli Falls and its downstream areas in Theni District by clearing and removing the wastes like polythene bags, disposed clothes etc. (photo – our volunteer Dr.Muralidharan) for emphasising to remain the water bodies and the surrounding environment clean.



1.5. Wetland day celebration

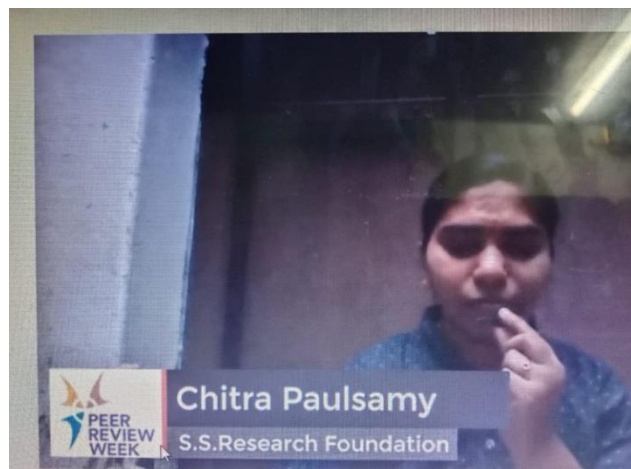
- **Wetland day celebration** on Feb 2nd 2020 – Our Senior Scientist **Dr.M.Gunasekaran** presented about History & Importance of Wetlands in Chinnavedampatti Lake, Coimbatore with special emphasis on water management and conservation for rural development.



1.6. Other Activities

Peer Review Week Celebration:

In celebration of Peer Review Week 2019 a wide range of individuals involved at every stage of the peer review process give their thoughts on what Quality Peer Review means to them. Learn more about our activities on the Peer Review Week website <https://peerreviewweek.wordpress.com/>. On Sep 17, 2019, Chitra Paulsamy from the S.S.Research Foundation gives Journal Wiley the top three reasons for why peer review is an important part of the scientific process. (For more details visit the website the link-<https://www.youtube.com/watch?v=mr3iPP9QD4w> Chitra Paulsamy - The Importance of Peer Review.



Botanical Survey of India (BSI) visit: As part of the research programme, our team members including BSI Scientists, Prof.Fabio and Prof.Rudi from Brazil University visited BSI in Coimbatore on 9th & 10th March 2020. For this visit, travel, food and accommodation for the members were supported by S.S.Research Foundation).



Dr. Sundar's Wiley Cochrane Library Story

Dr.Sundar's Wiley Cochrane Library Story - <https://healthforlifeapac.wileyresearch.com/dr-sundar-shunmuga.php>

A screenshot of the Wiley Cochrane Library website. The page features the Cochrane Library logo on the left, a navigation menu with links like 'SHARE YOUR STORY', 'READ THEIR STORIES', 'EVENTS IN ASIA PACIFIC', 'RESOURCES', 'CONTACT US', and 'ABOUT WILEY'. Below the menu are social media icons for Facebook, Twitter, and LinkedIn, and a 'SUBSCRIBE' button. The main content area is titled 'Dr Sundar Shunmuga Velayutham' and identifies him as a 'Scientist, S. S. Research Foundation'. It describes his research focus on aquatic invertebrates and includes two expandable sections: 'How has Cochrane Library helped you in the course of your work?' and 'What do you think is the value of Cochrane Library?'. Below these is a call to action 'Inspired by their #HealthforLifeAPAC story? Share yours today!' with a 'SHARE YOUR STORY' button and social media icons. On the right, there is a portrait of Dr. Sundar and a quote: 'I HAVE A PLAN TO DEEPLY STUDY A DISEASE BY USING INSECTS AS A MODEL. FOR THIS PROPOSED FUTURE PLAN, I STRONGLY BELIEVE THAT COCHRANE WILL BE A GREAT ASSET.' The footer contains the copyright notice 'Copyright © 2019 by John Wiley & Sons Inc., or related companies. All rights reserved.' and the WILEY logo.

Programme 2

Health Sciences

2.1. Survey and Community Assessment

2.2. National Nutrition week celebrations

The whole expenditure for above two programmes was borne by the trust including Survey Form, Stationeries, Anthropometric Assessment Kit, Field Assistant wages, Travel Allowance, Information Education and Communication (IEC) material and Prize distribution, etc.,

2.1. Survey and Community Assessment

Good nutrition is important for achieving normal growth and development. Nutritional assessment therefore should be an integral part of the care for every child. Malnutrition influences morbidity rate for various diseases. Components of a complete nutritional assessment include a medical history, nutritional history including dietary intake, physical examination, anthropometrics (weight, length or stature, head circumference, Chest circumference, mid upper arm circumference, and triceps skin fold thickness. Pediatric Survey conducted in Kallidaikurichi ward No. 2 by Mrs. Jasmine, Mrs. Karpagam and Mrs. Chitra from 27 to 30-05-2019 around 130 children were identified in the age group of 1-5 yrs. From 01 to 05-06-2019, Nutritional Assessment of 1-5 year was carried out in S.S.Research Foundation and Kallidaikurichi ICDS centre, Chinnapallivasal street, Kallidaikurichi. Identified 10 Children were malnourished and 15 were moderately malnourished and 12 children were in mild malnutrition status. Identified 15 children of mothers with under five of Normal and Healthy Baby given with prize, sweets were distributed to all the participants. Finally, Health education given regarding (PEM) Protein Energy Malnutrition in children among under five mothers and how to prevent malnutrition, Dietary Pattern, etc.



2.2. National Nutrition week: Poshan Abhiyan

S.S.Research Foundation organized “Poshan Abhiyan” at ICDS center, Chinnapallivasal Street in Kallidaikurichi, Tirunelveli district in the month of September celebrated as 'Rashtriya Poshan Maah'. On 01-09-2019, our Managing Director educated about balanced diet and importance of Nutrition ball among mothers of children with 3-5 yrs. A total of 10 mothers were participated in this Programme. The expenditure met for this programme by our organization.





Achievements:

1. Survey: Plant Authentication Certification from Botanical Survey of India

Our Senior Scientist Dr. Gunasekaran has identified the plant specimen as *Gnetum* of. *Contractum* Markgr.- GNETACEAE after several decades. The specimen is confirmed by Botanical Survey of India (BSI) authority, Coimbatore. It is believed that species may have been extinct. Plant species (3 specimens) collected from Nilgiri Biosphere Reserve to authenticate the species on 30/01/2020. This survey and collection of specimens was financially supported by the trust.



भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA



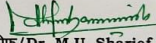
दक्षिणी क्षेत्रीय केन्द्र / Southern Regional Centre
टी.एन.ए. यू.केम्पस / T.N.A.U. Campus
लाउली रोड / Lawley Road
कोयंबटूर / Coimbatore - 641 003

टेलीफोन / Phone: 0422-2432788, 2432123, 2432487
टेलीफैक्स / Telefax: 0422- 2432835
ई-मेल / E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स.ट.क्ष.के./No.: BSI/SRC/S/23/2020/Tech/668 दिनांक/Date: 06th February 2020

पौधे प्रमाणीकरण प्रमाणपत्र / PLANT AUTHENTICATION CERTIFICATE

The plant specimen brought by you for authentication is identified as *Gnetum cf. contractum* Markgr. - GNETACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institution Herbarium.


डॉ. एम. यू. शरीफ / Dr. M.U. Sharief
वैज्ञानिक 'ई' एवं कार्यालय अध्यक्ष /
Scientist 'E' & Head of Office
वेदिकारु डी.एस.ए.के.के.के.के.
SCIENTIST 'E' & HEAD OF OFFICE
भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA
दक्षिणी क्षेत्रीय केन्द्र
SOUTHERN REGIONAL CENTRE
कोयंबटूर / COIMBATORE - 641 003

सेवा में / To

Dr. M. Gunasekaran
Senior Scientist
Department of Plant Sciences
S.S. Research Foundation
Coimbatore - 641 001

2. International Collaboration:

Our scientists Dr.S.Sundar & Dr.M.Gunasekaran are the team members in the CAPES-PRINT Internationalization Project (number 41/2017). It is a part of our institutional collaboration between Universidade Federal de Mato Grosso do Sul (Brazil) and S.S. Research Foundation (India). Prof. Fabio de Oliveira Roque, and his colleague Prof.Rudi Laps are the collaborative partners.



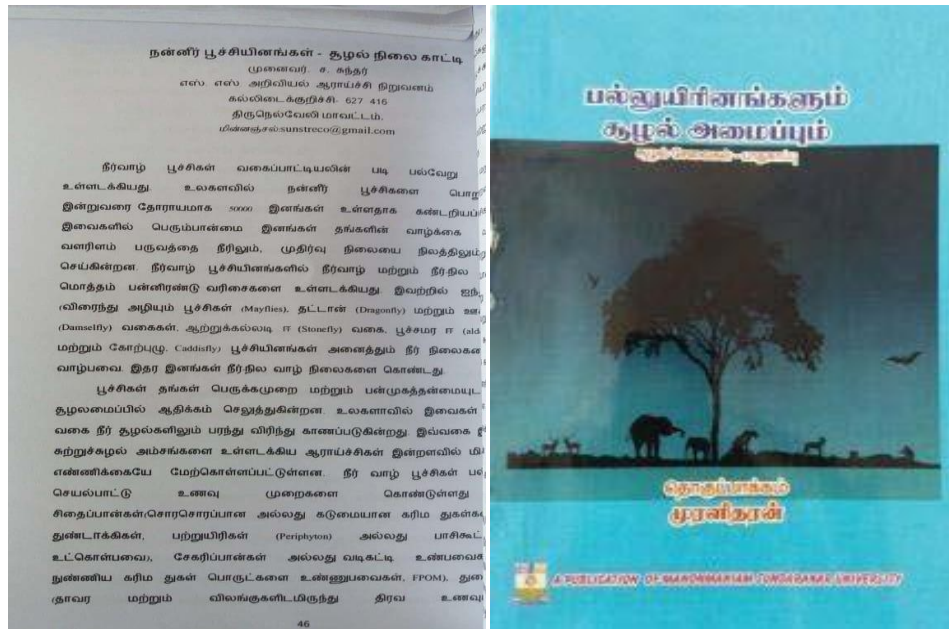
Prof.Fabio de Oliveira Roque & Prof. Rudi Ricardo Laps, Coordinators of Graduate Program in Ecology and Conservation from Federal University of Mato Grosso do Sul (UFMS), visited S.S.Research Foundation for discussing regarding potential collaborative opportunities and partnership projects between the two institutions.



UFMS Professors with our scientists (from left) Dr.Srinivas, Dr.Gunasekaran Brazilian Professors, Prof.Muralidharan (Manonmaniam Sundaranar University), Dr.Sundar, & Dr.Pattukumar who were also present during the discussion held at S.S.Research Foundation on 14th &15th March 2020.

LIST OF PUBLICATIONS:

1. **Dr. S. Sundar.** Chapter on book “Biological Diversity and Ecosystems” contributed Fresh water Insects (Tamil Version) published by Manonmanium Sundaranar University.



2. **Sundar S, Heino J, Roque FO, et al. 2020.** Conservation of freshwater macroinvertebrate biodiversity in tropical regions. *Aquatic Conserv: Mar Freshw Ecosyst.* 1–13. <https://doi.org/10.1002/aqc.3326>

Received: 21 May 2019 | Revised: 4 December 2019 | Accepted: 21 February 2020
DOI: 10.1002/aqc.3326

REVIEW ARTICLE

WILEY

Conservation of freshwater macroinvertebrate biodiversity in tropical regions

S. Sundar¹ | Jani Heino² | Fabio de Oliveira Roque^{3,4} | John P. Simaika^{5,6} | Adriano S. Melo⁷ | Jonathan D. Tonkin⁸ | Davidson Gomes Nogueira² | Daniel Paiva Silva⁹

¹Division of Ecology and Environmental Sciences, S. S. Research Foundation, Tamil Nadu, India
²Finnish Environment Institute, Freshwater Centre, Oulu, Finland
³Instituto de Biociências, Universidade Federal do Mato Grosso do Sul, Campo Grande, Mato Grosso do Sul, Brazil
⁴Centre for Tropical Environmental and Sustainability Science and College of Science and Engineering, James Cook University, Cairns, Australia
⁵Department of Water Resources and Ecosystems, IHE Delft Institute for Water Education, The Netherlands
⁶Department of Soil Science, University of Stellenbosch, Stellenbosch, South Africa
⁷Governo do Estado de Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil
⁸School of Biological Sciences, University of Canterbury, Christchurch, New Zealand
⁹Conservation Biogeography and Macroecology Lab, Departamento de Ciências Biológicas, Instituto Federal Goiano, Uruaçu, Goiás, Brazil

Correspondence
S. Sundar, Division of Ecology and Environmental Sciences, S. S. Research Foundation, 130/123, Veerapparam Street, Kallakurichi, Thrissur District, Tamil Nadu, 627416, India.
Email: sundarstreo@gmail.com

Abstract

1. Motivated by recent global initiatives for biodiversity conservation and restoration, this article reviews the gaps in our understanding of, and the challenges facing, freshwater macroinvertebrate biodiversity and conservation in tropical regions.
2. This study revealed a lack of adequate taxonomic, phylogenetic, and ecological information for most macroinvertebrate groups, and consequently there are large-scale knowledge gaps regarding the response of macroinvertebrate diversity to potential climate change and other human impacts in tropical regions.
3. We propose ideas to reduce the impact of key drivers of declines in macroinvertebrate biodiversity, including habitat degradation and loss, hydrological alteration, overexploitation, invasive species, pollution, and the multiple impacts of climate change.
4. The review also provides recommendations to enhance conservation planning in these systems (as well as providing clear management plans at local, regional, and national levels), integrated catchment management, the formulation of regulatory measures, the understanding of the determinants of macroinvertebrate diversity across multiple scales and taxonomic groups, and the collaboration between researchers and conservation professionals.
5. It is suggested that the integrated use of macroinvertebrate biodiversity information in biomonitoring can improve ecosystem management. This goal can be facilitated in part by conservation psychology, marketing, and the use of the media and the Internet.

KEYWORDS

Anthropocene, biodiversity, extinction, freshwater ecosystems, invertebrates

1 | INTRODUCTION

Owing to increasing human impacts worldwide, current species extinction rates may be 1000 times faster than background extinction rates, and are as high as those of past mass extinction events

(Barnosky et al., 2011; Ceballos, Ehrlich, & Dirzo, 2017; Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2019). Such pressures are increasingly threatening freshwater ecosystems with the potential extinctions of tens of thousands of aquatic species (Dudgeon, 2014; IUCN, 2010, 2016, 2017;



S.S.RESEARCH FOUNDATION

ACTIVITY REPORT

2020 - 2021

Contents

Message from the Director

Areas of Activities/ Projects

Programme 1

Ecology and Environmental Sciences & Plant Sciences

- 1.1. Survey and Assessment of Forest Resources: Salem Forest Division
- 1.2. Biodiversity Survey and Assessment: Kolli Hills, Namakkal District
- 1.3. Survey for Biodiversity Status: Various parts of Tamil Nadu
- 1.4. Top-cited article
- 1.5. Webinar Participation
- 1.6. Special News to Public – Puthiyathalaimurai TV
- 1.7. Butterfly Park Inauguration
- 1.8. Book Preface
- 1.9. Committee meeting
- 1.10. Continuous education programme -
Organized workshop, Participation in training Programme and Attended Conference

Programme 2

Health Sciences

- 2.1. Organized free week end classes for children
- 2.2. Mini Project - Importance of Antenatal care

Programme 3

Achievements:

- BRICS Project Participation
- International Collaboration

List of Projects

List of Publications

Message from the Director



Dear Friends

I am happy to present this Fourth Activity Report with details of the activities and achievements of SSRF in FY 2020–2021. The COVID-19 pandemic was a big challenge for all of us at SSRF. Initially, we focused on prevention aspects among our workers and educated the public regarding COVID-19. Our Founder Chairman, Dr.Sundar, published a paper in Aquatic Conservation: Marine and Freshwater Ecosystems, a Wiley Journal. It was recognised as a top-cited article (2020-2021) and awarded a certificate. He also wrote the preface for the book - The Evolutionary Biology of Extinct and Extant Organisms, written by Dr. Subir Ranjan Kundu. We thank for him research journey with us. Our scientists got the opportunity to participate in the 5th coordinated International BRICS Project. The achievements reported here came from the hard work and commitment of our scientists, volunteers and administrative staff. I express my appreciation and gratitude to all of them.

A handwritten signature in blue ink, appearing to read 'Chitra P', with a long horizontal line extending to the right.

Chitra P

Programme 1 Ecology and Environmental Sciences & Plant Sciences

1.1. Survey and Assessment of Forest Resources of Salem Forest Division (The whole expenditure for this survey programme was borne by the trust).

A preliminary survey was undertaken for aquatic biodiversity on August 2020 in water bodies include steep waterfalls, seepage, pools, streams, etc. in Salem Forest Division. During the survey, diversity of aquatic macroinvertebrates, fishes, aquatic plants were reported. The real causes and impacts can be concluded through conducting regular survey and observation in different phases as seasonally on the study areas. Data and information sources on biodiversity collected during the survey were shared with the forest department which gave us the permission and support to carry out the study.



1.2 Biodiversity Survey and Assessment in Kolli Hills, Namakkal District (This programme was financially supported by the trust)

Biodiversity survey was undertaken during October 2020 in Kolli Hills, Namakkal Forest Division. The status of biodiversity was assessed during the survey focuses on all aquatic organisms and its environment. Because, Kolli hills is an isolated hill range of the discontinuous Eastern Ghats situated in Namakkal District of Tamil Nadu. Due to various human activities, the biodiversity poses major threats. During this short-term survey, we have recorded 15 species of butterflies, 5 mammals, 23 species of birds, 7 reptiles, 62 plant

species, 33 species of aquatic invertebrates, and 17 species of fish. We felt it is essential to implement earnest conservation measures in Kolli Hills to protect the valuable ecosystems and sustainable biodiversity management. The expenses of this programme were borne by the trust including field, assistant daily wages, food, accommodation for the experts involved in the survey. The report has been shared with the Coimbatore Forest Division, Coimbatore, Tamil Nadu.



1.3. Survey for Biodiversity Status in different parts of Tamil Nadu (Financial support by S.S.Research Foundation)

Biodiversity survey conducted to report the status on the wetland and river ecosystems in some parts of Tamil Nadu. It is one of the regular activities of SSRF (one of the key visions) and also it is essential for reporting the status to maintain the health of the ecosystems.



Top-cited Article 2020-2021

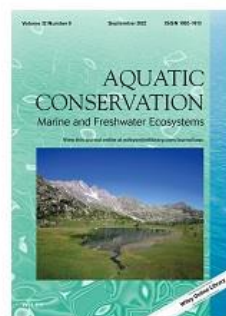
Our Scientist Dr. Sundar published a paper (reference below) in the *Aquatic Conservation: Marine and Freshwater Ecosystems*, a Wiley Journal. It was recognized as a top cited article (2020-2021).

(Sundar S, Heino J, Roque FO, et al. 2020. Conservation of freshwater macroinvertebrate biodiversity in tropical regions. *Aquatic Conserv: Mar Freshw Ecosyst*. 1–13. <https://doi.org/10.1002/aqc.3326>)



Your research makes a difference
Let's continue our journey together

Dear Dr. Sundar,



Thank you!

We'd like to thank you for your contribution to *Aquatic Conservation: Marine and Freshwater Ecosystems* over recent years. With your help, we've delivered quality research to advance the field.

Webinar Participation:

Our scientist Dr. S. Sundar has participated virtual webinar on “**Emerging Contaminants in River Water Quality: Issues and Measurements**”, organized by Puducherry ENVIS HUB on 18/09/2020.



Special News to Public – Puthiyathalaimurai TV

Our Scientist Dr. Gunasekaran was invited as a Guest Speaker by Puthiyathalaimurai TV on October 2020. He gave special news to the public related to things to be kept in mind, while planting the trees elsewhere.



>> (<http://www.puthiyathalaimurai.com/>) சிறப்புக் களம் ([http://www.puthiyathalaimurai.com/category/35/Special News](http://www.puthiyathalaimurai.com/category/35/Special%20News))

[X] Close

மரத்தை வேறு இடத்தில் நட்டும் நல்உள்ளங்களா நீங்கள்?: இதனை கவனத்தில் கொள்ளுங்கள்..!

Web Team

Published: 29, Oct 2020 03:22 PM

The-empathy-of-the-men-who-planted-the-tree-elsewhere--What-are-the-things-to-keep-in-mind-

சாலை விரிவாக்கப் பணிகளுக்காகவும், மனிதர்களின் தனிப்பட்ட தேவைக்காகவும் சாலையோரமாக நின்று கொண்டிருக்கும் மரங்கள் வெட்டப்பட்டு வருகின்றன. முன்பெல்லாம் கேட்பாற்று கிடக்கும் இது போன்ற மரங்கள் தற்போது சில நல் உள்ளங்களினால் அங்கிருந்து வேறொரு இடத்திற்கு மாற்றம் செய்யப்பட்டு மீண்டும் வளர்க்கப்படுகின்றன. ஆனால் இது போன்ற வேறு இடத்திற்கு மாற்றப்படும் மரங்கள் முன்பு இருந்த அதே வளர்ச்சியை பெறுகின்றனவா, அதன் நிலை எவ்வாறு இருக்கும் என்ற சந்தேகங்கள் எழுந்தன. அந்த சந்தேகங்களைத் தீர்த்துக்கொள்ள சுற்றுச்சூழல் ஆர்வலர்கள் சிலரிடம் பேசினோம்.

GO TO TOP

உருபக்கம் கோலி. மறுபக்கம் குரியகுமார். பரபரக்... க்ராம் சீரியல் பார்த்து தடயமில்லாமல் தந்தையை... (<http://www.puthiyathalaimurai.com/newsview/85123/Watch-...>)

www.puthiyathalaimurai.com/newsview/85129/The-empathy-of-the-men-who-planted-the-tree-elsewhere--What-are-the-things-to-keep-in-mind-

1/8

மோகன் - சுற்றுச்சூழல் ஆர்வலர்

இவ்வாறு வேறு இடத்திற்கு மாற்றப்படும் மரங்கள் முந்தைய அளவிலான அதே வளர்ச்சியை பெறுவதில்லை. பல வருடங்களாக பூமியில் இருக்கும் மரங்கள், தனக்கான சத்தை பெற வேர்களை மிக நீண்ட பாதையில் அமைத்திருக்கும். அதன் வழியாக தனக்கான முழுமையான சத்தை அது எடுத்துக்கொள்ளும்.

Advertisement

ஆனால் ஒரு இடத்தில் இருந்து மரத்தை வெட்டி எடுக்கும் நபர்கள் அதனது அனைத்து வேர்களை வெட்டிவிட்டு இன்னொரு இடத்தில் நடுகின்றனர். இதனால் அம்மரத்திற்கு தேவையான முழுமையான சத்தை மரத்தால் பெற முடியாமல் போகிறது. இதனால் மரங்கள் மிக எளிதில் பட்டுப்போய்விடுகின்றன.

அதே போல நீண்டகாலமாக பூமியில் இருக்கும் மரங்களில் இயல்பாகவே சில சத்துக்கள் இருக்கும். அதனால் மாற்று இடத்தில் நடப்படும் மரங்கள் சிறிது காலம் அந்த சத்துக்களை வைத்து உயிர்வாழும். அதைவைத்து சிலர் மரம் நன்றாக வளர ஆரம்பித்து விட்டது எனக் கருதுகின்றனர். ஆனால் அதன் உண்மையான வளர்ச்சி 6 மாதத்திற்கு பின்னரே தெரியும்.

Advertisement

அதேபோல இவ்வகையான மரங்கள் பலத்தக் காற்று வீசும்போது சரிந்து விழும் சாத்தியக்கூறுகளும் உள்ளது. மரங்கள் வெட்டப்படும் போது மரங்கள் மட்டும் அழிக்கப்படுவதில்லை. அதில் வாழ்ந்த பறவைகள், நுண்ணுயிரிகள் அழிக்கப்படுகிறது. இந்த நுண்ணுயிரிகள் அழிப்பானது தண்ணீர் உருவாக்க சங்கிலியில் பாதிப்பை ஏற்படுத்தும். ஆகையால் இங்கு மரங்களின் மீதான மனிதர்களின் பச்சாதாபம் வரவேற்கப்பட்டாலும், மரத்தை வெட்டுவதற்கான மாற்றுத் தீர்வாக இதனை அணுக முடியாது.

டாக்டர் எம். குணசேகரன்

மரத்தை வெட்டுவதற்கான மாற்றுத்தீர்வாக இதனை பார்க்க முடியாது. உலகில் பல இடங்களில் சாலை விரிவாக்கப் பணிக்கான சாலைகளை மரங்களுக்கு இடையூறு இல்லாமல் அமைக்கப்படுகின்றன. ஆனால் இங்கு, இது குறித்த விழிப்புணர்வு சுற்றுச்சூழல் ஆர்வலர்கள் தோடு மட்டுமல்லாமல் நடுவர்களுக்கும் கேட்பதில்லை. காரணம் சீரியல் பார்த்து தடயமில்லாமல் தந்தையை ...
(http://www.uthivathalaimurai.com/newsview/85123/Watch-
www.uthivathalaimurai.com/newsview/85128/The-empathy-of-the-men-who-planted-the-tree-elsewhere-What-are-the-things-to-keep-in-mind-
http://www.uthivathalaimurai.com/newsview/85129/17-
COMMENT

மரங்களை ஒரு இடத்தில் இருந்து மற்றொரு இடத்திற்கு மாற்றம் செய்யும்போது, மரத்தின் ஆரோக்கியம் பெருமளவில் பாதிப்படைவதோடு மட்டுமல்லாமல் அதில் வாழும் பறவைகள், பூச்சிகள், நுண்ணுயிரிகள் தனது வாழ்வாதாரத்தை இழக்கும். காரணம் அவைகளின் ஒட்டுமொத்த தேவைகளின் இருப்பிடமாக மரம் இருந்திருக்கும். ஆகையால் முடிந்த வரை மரத்தை வெட்டாமல் இருக்க வேண்டும்.

வேறு வழியில்லாமல் மரத்தை வெட்டி மாற்றம் செய்ய நேர்ந்தால் அவர்கள் கீழ்க்கண்ட விஷயங்களை கவனத்தில் கொள்ள வேண்டும்.

1. மரத்தின் வேர்களை முடிந்த வரையில் வெட்டாமல் எடுத்துக்கொள்வது.
2. மரத்தின் வேர்களில் இருக்கும் மண்ணை எக்காரணத்திற்கு கொண்டும் அகற்றக்கூடாது. அந்த மண் பூமியின் எல்லா திசைகளிலும் வேர்கள் படர உறுதுணையாக இருப்பவை.
3. மரத்தை நட்டும் போது வேர்களைச் சுற்றி வைக்கோல் வைக்கலாம்.
4. வேரில் உள்ள மணல் உருண்டையை சணல் பையால் போர்த்தி நடவேண்டும்.
5. குறைந்தது 2 வருடமாவது அதன் வேர்களில் ஈரத்தன்மை தொடர்ந்து இருக்குமாறு பார்த்துக்கொள்ள வேண்டும்.
6. மரம் தன் காலால் ஊன்றி நிற்கும் வரை, அவை மரத்தின் நிழலில் இருப்பது நல்லது.

-கல்யாணி பாண்டியன்

GO TO TOP

Butterfly Park Inauguration Ceremony



**Butterfly Park Inauguration Ceremony
& Awareness session**
@ Chinnevedampati Lake
Sunday 28th Feb 8.00 am-9.00 am

Wetland Biodiversity
Dr M.Gunesakaran, Ecologist
S.S Research Foundation / Vaanam Associate Scientist

Butterfly Conservation
P.Mohan Prasath
ACT 4 BUTTERFLIES

Wetlands for our Future Generation
P.K.Selvaraj
Kousika River Rejuvenating Activist

S.Sivaraja
Chinnevedampatti Lake Restoration Movement

Join with us for our little step towards Butterfly Conservation
Butterflies are nature's angels. They remind us what a gift it is to be alive.-Robyn Nola



Butterfly Park Inauguration Ceremony was held on 28th Feb 2021- Our senior scientist Dr.M.Gunasekaran delivered a presentation on importance of Wetland Biodiversity in Chinnevedampatti Lake, Coimbatore. Volunteers & College Students of KV Institute of Management & Information Studies, Coimbatore was participated. Our trust is one of the sponsors.

Book Preface: Our scientist Dr. Sundar wrote the preface for the book - **The Evolutionary Biology of Extinct and Extant Organisms** written by Dr. Subir Ranjan Kundu. This book published by Elsevier during the month of March 2021. This book is the ideal resource for any Researcher, Students in Evolutionary Studies and General Life Sciences.

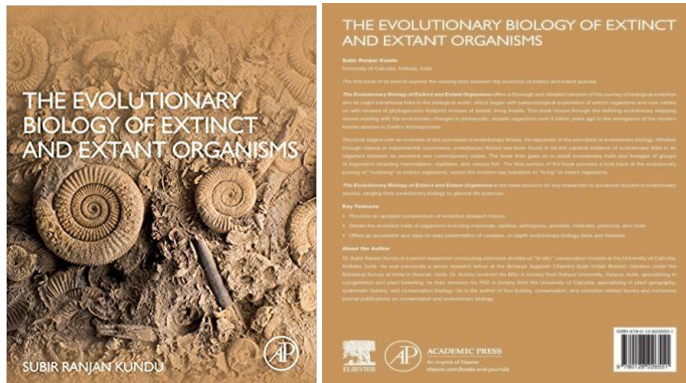
Preface

This book is the creation of a dedicated and determined effort by a single and experienced author on the topic of evolutionary links of living things. It primarily emphasizes the biological evolution of major groups of organisms in the backdrop of a diverse array of hypothetical examples to match with a distinct biological set of evidence that testifies to our understanding of major evolutionary developmental transitions, specifically over the last four decades. This book is an earnest attempt to present the critically reviewed unique progress of biological evolution via the advancement of genomics/molecular footprints that have made significant contributions in the past two decades and continue to play a key role in our better understanding of evolutionary progress in the current environmental scenario. The work of the author will advance our knowledge and provide a source of valuable information. I have no doubt that this is a significant contribution to research in the field that would be of substantial interest and relevance to a large proportion of the readership.

I had the opportunity to read the book written by Subir Ranjan Kundu with a great deal of interest. In the first part of the book, the author has critically reviewed and exclusively synthesized data with supporting shreds of evidence on the lack of information and how the recent significant fossil finds have also added greatly to our understanding of several major clades and transitions. At the end of this book, an earnest endeavor has been made to depict the evolutionary journey of microscopic organisms by highlighting the important points as a strong set of evidence, though key occurrences of evolutionary transitions are still puzzling. Readers would surely be enthralled to enjoy the remaining chapters in the middle, as those chapters would be equally interesting to hold their attention and walk them through the trail of evolutionary transitions.

This book is for all graduate and postgraduate students, researchers, and inquisitive heterogeneous readers who are interested in biological evolution, and I do believe that it might serve as a sourcebook for review and for understanding the scientific concepts of biological evolution in transition in a simplified manner for curious learners even from non-scientific communities. The book is written to help clearly understand and access either parts of or much of the whole of evolutionary theory as required by the reader.

I hope this book will give us the opportunity to address important knowledge gaps and research. I also believe that it will definitely provide evolutionary biologists with an alternative way to explore and decipher evolutionary mysteries of



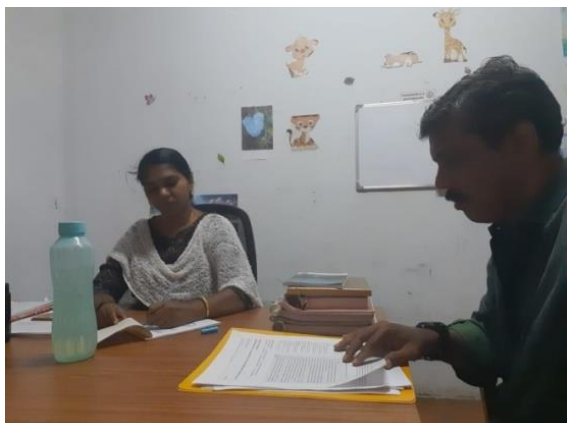
vii

large macroscopic, tiny microscopic, and transitional forms of prehistoric organisms in between with fascinating structural formation by undertaking phylogenomic investigations.

Dr. Sundar, S.
Scientist
S.S. Research Foundation
130/123 Veerappa Puram Street
Kallidaikurichi, Tamil Nadu
PIN-627416
India
Tel: 04634-252369
E-mail: sun76dar@yahoo.co.in

Organisation Meeting

For all the following meeting organised, the expenditure was met by the trust,



Board Meeting

1. Health division volunteers meeting held on 24/08/20 at S.S.Research Foundation. The agenda for this meeting was completing activities status report for the period of Jan 2020 - June 2020.
2. Board Meeting conducted once every 3 month regarding status of the each division activities, outcome and plan for the Continuous Education Programme.
3. Ecology and Environmental Sciences & Plant Sciences team members meeting held on 13/02/21. Agenda: Biodiversity Conservation characterized into three major headings, Biodiversity Conservation, Education and capacity building programme for conservation and sustainable utilization of biodiversity
4. Health Research department volunteers meeting held on 15/02/21. Nutritional Awareness programme discussed and developed. Balanced Diet Poster and also developed weight and height calculation chart and BMI chart.

Meeting on Ecosystem Restoration and Management:

The meeting on wetland restoration held on 15 & 16/03/2021 at Kavilipalayam village in Erode District, organised and sponsored by S.S.Research Foundation. Volunteers of SSRF and Vaanam Foundation, the local people and the stake holders were participated. During the two days meeting, field visit and discussions with the villagers and stakeholders for restoration of Kavilipalayam wetland were done. On behalf of SSRF, Dr.Gunasekaran, presided over the meeting, as the “Restoration Ecology” is one of his areas of expertise, to create awareness, to give field training on how to restore and manage the wetland ecosystems sustainably.



Continuous Education Programme:

1. Invited Speaker for International Conference

Dr. Gunasekaran, Senior Scientist, who was invited as guest speaker for the 1st International virtual conference on Ethnobiology/2nd Ethnobiology workshop conducted by the Federal University of Paraiba, Brazil on the topic “Phytolaty in India with special focus on Temple Trees of Tamil Nadu” on Sep 26, 2020.

**II WORKSHOP
DE ETNOBIOLOGIA DA UFPB**
21 a 25 de Setembro de 2020

CONHEÇA NOSSOS CONVIDADOS!
Palestra
Phytolaty in India with special focus
on Temple Trees of Tamil Nadu
Dr. Mariappan Gunasekaran
(S S Research Foundation - India)

I am an Ethnobotanist and botanical horticulturist, completed my doctoral research from Salim Ali Centre for Ornithology and Natural History, India. Before joining to S S Research Foundation I was associated with many Government and non Government institutions for establishing botanical gardens and public parks and I was headed many research teams for Vegetation surveys, Minor Forest Produces and Medicinal plants, Biodiversity and Conservation, Wildlife Conservation. Ethnobotany is my special subject and I tried to explore people's belief in conservation of plant diversity in Tamil Nadu, India.

Inscrição:
<https://forms.gle/Wsn2kpgkySSqZcDr6>

Logos: LECA, UFPB, sbee

2. Eco Project:

Eco Project Workshop organized by S.S. Research Foundation on 8th of Feb 2021. This programme was fully sponsored by our Trust. S.S. Research Foundation Associates/ Volunteers participated in the Eco project on “**Restoration of Temple Garden and Re Introduced Sthalavriksha**” in a 1500 years old ancient Pallavas reign Shiva Temple in Madurantakam, Chengalpattu District, Tamil Nadu. This Eco project – is an earth-friendly and not harmful to the environment. Activities include planting tree species i.e., Trees for Birds & Enriches Biodiversity by flowering Gardens.



3. Participation in Workshop (Travelling allowances and accommodation paid by S.S. Research Foundation.

Workshop: Sathyamangalam Tiger Reserve (STR) organised a two day workshop on 15th & 16th Feb 2021 to discuss with researchers, who already have experience working in Tiger reserve to understand the study from the point of management and also to evolve inputs to design new strategies for better management of Sathyamangalam Tiger Reserve. The Chief Conservator of Forests and Field Director headed the workshop. Dr.Gunasekaran along with his two assistants, on behalf of SSRF, has participated.

4. Brainstorming Programme: (S.S. Research Foundation is one of the Project Partners in this programme. Hence, we support financially for the programme)

Brainstorming Program

“Trees for Birds” on 18th March 2021

Our Scientist & Consultant of the project Dr. M. Gunesakaran shared thematic address with an excellent presentation to rejuvenate Life for Birds around us by suggesting Trees, based on specific need to birds for Trees. Brainstorming program & its project launch (still running) held at Kongunadu Arts & Science College, Coimbatore, Tamil Nadu.



A Park for Conservation of Environment and Tree for Birds has been created at the site of about 0.25 acre by Eco Club of Kongunadu Arts and Science College, Coimbatore at its campus. - Dr.M.Gunasekaran, Senior Scientist, S.S.Research Foundation, who has given complete technical guidance.



Project Coordinators

- Dr S. Raja, Eco Club, Kongunadu Arts & Science College.
- K.Raman, Founder RAK India Foundation.
- P.Mohanprasath, Founder Aeon Charitable Trust.
- S.Sivaraja, Chinnavedampatti Lake Restoration Movement.

Project Consultants

Dr. M. Gunasekaran, Ecologist

Mr. Ramsundar, NGO Management Consultant.

Project Partners

- Eco club, Kongunadu Arts & Science College
- [S.S Research Foundation, Kallidaikurichi, Tirunelveli District](#)
- Coimbatore Environmental Society
- RAK India Foundation
- Aeron Charitable Trust.
- Chinnavedampatti Lake Restoration Movement

5. Workshops & Training Programmes:

1. Program on Solar Analytics (5 days **workshop** on big data analytics and data science (ml/ai) in creating plant efficiency for solar system) program date: 3rd program: 24th feb - 28th feb, 2020. 4th program: 23rd march- 27th march, 2020 (tentative) venue: NISE Campus, Gurugram (Our scientist Dr. Gunasekaran attended this workshop, the whole expenditure spend by our organization)

2. **Workshops & Training Programmes** on Cultivation and Primary Processing of Economically Important Medicinal and Aromatic Plants organized by CSIR-National Chemical Laboratory (NCL), in Pune, Maharashtra (2020)

PROGRAMME 2

Health Activities:

2.1. Organized free week end classes for children by S.S Research Foundation

Week end free Student Activities like Reading, craft, healthy diet preparation method (millets laddu using kambu, thinai, solam, Peanuts- padam, pista, cashew maalaadu, Health mix - kolukattai and yoga taught by our volunteer Dr. Mercy and Mr. Raj Steephen during the month of August 2020 at Kallidaikurichi. 15 children were benefitted out of this programme. (The whole expenditure spent by our organization)





2.2. Mini Project - Importance of Antenatal care



As part of the Health Research in the topic on “Assess the knowledge of antenatal mothers on *Importance of Antenatal care*”, Our Health Division conducted Survey during the period from 05 - 10/12/2020 at Kallidaikurichi PHC and Sub centres, identified Antenatal mothers and taught them with importance of antenatal visits and care during that period, balanced diet and iron rich foods, etc, Around 30 mothers were benefitted out of this programme. (Financial Support by our Trust)

ACHIEVEMENTS:

1. BRICS Project Participation 2021



Title of the Research Project: HPC and BigData applied to co-designing cost-efficient automation for large scale wetland biomonitoring (Full Proposal under evaluation).

Our scientist **Dr.Sundar**, as Co-Principal Investigator, **Dr.Gunasekaran**, Senior Scientist, & **Dr.Reshma**, Research Scientist, as team members, participating in the BRICS STI Framework Programme 5th coordinated call.

2. International Collaboration:

International Collaboration and Partnership with Federal University of Mato Grosso do Sul (UFMS), Brazil under CAPES-PRINT Project.

List of Projects:

S. No.	Title	Principal Investigator (PI)/Co-Principal Investigator (Co-PI)	Funding Agency/Financial Support	Status
1.	Conservation initiative of a lesser known RET species <i>Eugenia megamalayana</i> (2021)	Dr.M.Gunasekaran (PI)	The Habitats Trust	Submitted
2	Conservation of aquatic biodiversity for achieving sustainable water quality (2021)	Dr. Sundar (PI) Dr.M.Gunasekaran (Co-PI)	Science and Engineering Research Board (SERB)	Submitted

Published Article:

1. M. Gunasekaran, B.Ramakrishnan, S. Sundar, M. Muralidharan and A.M.A. Nixon
2020. Status, Distribution and Conservation Significance of Reptile Diversity in Gudalur
Forest Division, Nilgiri Biosphere Reserve, Tamil Nadu, India. *J. Sci. Trans. Environ.
Technov.*, 13(4) : 163-166.

J. Sci. Trans. Environ. Technov. 2020, 13(4) : 163-166

Status, Distribution and Conservation Significance of Reptile Diversity in Gudalur Forest Division, Nilgiri Biosphere Reserve, Tamil Nadu, India

M. Gunasekaran¹, B. Ramakrishnan², S. Sundar³, M. Muralidharan⁴ and A.M.A. Nixon³

Article History

Received: 04-04-2019

Revised and Accepted: 08-05-2020

Published: 25-06-2020

Abstract

A specific Reptile survey was conducted at Gudalur Forest Division, part of Nilgiri Biosphere Reserve for conservation. A total of 31 species were recorded and species distribution, diversity and Western Ghats endemism of the recorded species are discussed. Species conservation recommendations are given.

Key words: conservation, Gudalur, Nilgiri Biosphere Reserve, Reptiles

INTRODUCTION

Knowledge on the herpetofauna of India is meagre, and mostly we know from the British researchers survey and collections over last 130 years. Currently, most of these materials are largely found at the National Museum (ZSI), Kolkata and Museum of the Bombay Natural History Society, Mumbai in India and in British Museum of Natural History, United Kingdom. It may be noted that ecological research on the Indian reptile fauna is still in initial stage. Recent advances in taxonomy, systematics and classification on the Indian reptiles are reviewed by Das (2003). Reptiles found in Gudalur forest division has not been studied so far and thus present study is significant.



Fig. 1. Gudalur Forest Division

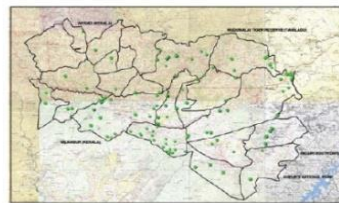


Fig 2. Locations of Quadrats Surveyed for Reptiles in Gudalur Forest Division



M. Gunasekaran¹

email: cycasguna@gmail.com

Division of Plant Sciences, S.S. Research Foundation, Tirunelveli - 627 416, Tamil Nadu, India.

²Department of Zoology and Wildlife Biology, Government Arts College, Udhamandalam, Tamil Nadu, India.

³Division of Ecology and Environmental Sciences, S.S. Research Foundation, Tirunelveli - 627416, Tamil Nadu, India.

STUDY AREA

The Gudalur Forest Division covers an area of 10551.202 and it is a North West part of the Nilgiri Biosphere Reserve (NBR). The area is situated between latitude 11° 23' and 11° 36' and longitude 76° 14' to 76° 33'. The terrain is undulating with an altitudinal range of 300 Mts. to 1870 Mts. The mean annual rainfall ranges from 850 mm in the foothills to about 2000 mm on the hills. The vegetation types vary from tropical thorn forest to evergreen forest, in association with terrain, altitude and rainfall. Humidity of the area is as high as 80-90% during the southwest monsoon.

2. Albuquerque L, Roque F, Valente Neto F, Koroiva R, Buss D, Baptista D, Hepp L, Kuhlmann M, Sundar S, Covich A, Pinto J (2021) Large-scale prediction of tropical stream water quality using rough sets theory. *Ecol Inform* 1:101226. <https://doi.org/10.1016/j.ecoinf.2021.101226>

Ecological Informatics 61 (2021) 101226



Contents lists available at ScienceDirect

Ecological Informatics

journal homepage: www.elsevier.com/locate/ecoinf



Large-scale prediction of tropical stream water quality using Rough Sets Theory

Laysson Guillen Albuquerque^{a,*}, Fabio de Oliveira Roque^{a,b}, Francisco Valente-Neto^a, Ricardo Koroiva^a, Daniel Forsin Buss^c, Darcílio Fernandes Baptista^c, Luiz Ubiratan Hepp^d, Mônica Luisa Kuhlmann^e, S. Sundar^f, Alan P. Covich^g, João Onofre Pereira Pinto^{a,h}

^a Federal University of Mato Grosso do Sul, Campo Grande, MS, Brazil

^b Centre for Tropical Environmental and Sustainability Science (TESS), James Cook University, Cairns, Australia

^c Oswaldo Cruz Foundation (FIOCRUZ), Rio de Janeiro, RJ, Brazil

^d Integrated Regional University of the Alto Uruguai and Missões (URI), Erechim, RS, Brazil

^e Environmental Company of São Paulo State (CETESB), São Paulo, SP, Brazil

^f Division of Ecology and Environmental Sciences, S. S. Research Foundation, Tamil Nadu, India

^g Odum School of Ecology, University of Georgia, Athens, GA, USA

^h Department of Electrical Engineering and Computer Science, University of Tennessee, Knoxville, TN, USA

ARTICLE INFO

Keywords:

Rough Sets Theory
Artificial intelligence
water quality
Bioindicators
EPT index

ABSTRACT

Assessing water quality in streams is usually measured at the local scale and often it is spatially restricted. To scale-up water-condition assessment, there is a need to use new tools that enable prediction of large-scale changes in water quality by expanding the analysis to landscape-levels and bioclimatic predictors. In addition, the traditional use of linear models in biomonitoring can be inappropriate in detecting complex relationships, such as changing patterns of aquatic community structure and complex environmental gradients. In this context, Artificial Intelligence (AI) techniques such as Rough Sets Theory (RST) can be particularly useful for dealing with vague, imprecise, inconsistent and uncertain knowledge involving biotic and abiotic data to enable the classification and prediction of changes in stream water. Here, we applied RST to estimate the water quality in streams of the Brazilian Atlantic Forest by analyzing connections between landscape and climate data with the inclusion of up to 15 families of aquatic insect groups from the orders Ephemeroptera, Plecoptera and Trichoptera (usually known as EPT taxa). First, we developed different decision sets which were the arrangements of the response variable (EPT index) and the predictor classifications. Then, we applied the best decision sets to monitor the condition of stream water in the Atlantic Forest on a large-scale. Our results showed the best decision rules were 61% accurate. Depending on the initial stream condition, this approach on a large-scale led to variable accuracy. By combining the development of different decision sets, the application of the best one on a large-scale, and the use of open-access data (landscape and climate predictors), our study approach demonstrated the potential applicability to evaluate streams in an objective with low-cost manner. This method can complement the environmental assessment of streams based only on local variables. Our framework also creates new perspectives in the analysis of water quality to generate scenarios of changes in streams based on landscape measurements to optimize monitoring networks.

1. Introduction

Freshwater ecosystems are exposed to extreme landscape-level modifications worldwide, leading to major changes in biological communities, loss of species functional relationships, and reduction of essential species-based ecosystem services (Harrison et al., 2014; Heal

et al., 2005). These freshwater ecosystems require innovative efforts to conserve, monitor, and restore them (Dudgeon et al., 2006; Vörösmarty et al., 2010). Both water security for human needs and biodiversity are highly threatened by anthropogenic activities (Buss et al., 2015; Muralidharan et al., 2010). These threats raise serious concerns about the status of aquatic biodiversity (from microbes to invertebrates and

* Corresponding author.

E-mail address: laysson@live.com (L.G. Albuquerque).

<https://doi.org/10.1016/j.ecoinf.2021.101226>

Received 16 July 2020; Received in revised form 29 December 2020; Accepted 3 January 2021

Available online 20 January 2021

1574-9541/© 2021 Elsevier B.V. All rights reserved.

3. Sundar, S., Silva, D.P., de Oliveira Roque, F. et al. Predicting climate effects on aquatic true bugs in a tropical biodiversity hotspot. *J Insect Conserv* 25, 229–241 (2021). <https://doi.org/10.1007/s10841-021-00298-8>

Journal of Insect Conservation
<https://doi.org/10.1007/s10841-021-00298-8>

ORIGINAL PAPER



Predicting climate effects on aquatic true bugs in a tropical biodiversity hotspot

S. Sundar^{1,2} · Daniel Paiva Silva³ · Fabio de Oliveira Roque^{4,5} · Juliana Simião-Ferreira⁶ · Jani Heino⁷

Received: 23 September 2020 / Accepted: 27 January 2021
© The Author(s), under exclusive licence to Springer Nature Switzerland AG part of Springer Nature 2021

Abstract

Abstract Climate change is a matter of worldwide concern with severe predicted impacts on biodiversity. Here, we analysed the potential impacts of current and future climates on aquatic true bugs (Heteroptera) in relation to their distribution patterns and ecological preferences (based on a database generated from existing literature references and field collections). We considered the traits as ‘species thermal range’ and ‘emergence period’ to evaluate the future climate change impacts on the distributions of aquatic true bugs in the riverine regions of a tropical biodiversity hotspot, the Western Ghats of India. We used Species Distribution Models (SDMs) to evaluate the potential impacts of climate change on the distributions of aquatic true bugs. We modelled the distributions of twenty-six species of aquatic true bugs using different modelling tools through a carefully examined set of occurrence records to generate potential present distributions and to project these distributions into future scenarios of climate change. We observed increasing/decreasing range sizes of the species in the current and future scenarios. We found losses and increases of species’ ranges in some regions, but not much variation in species richness. Similarly, no significant effect was observed in the distribution ranges for species with different duration of emergence period and thermal range in current and future climatic scenarios. Losses and gains in species richness would be concentrated in the mountainous area of the Western Ghats, whereas loss of species and the bigger difference between current and future richness will occur in the adjacent lowlands and towards central regions, including the network of protected areas of the Western Ghats. These areas are critical to buffer regional species loss in the future.

Implications for insect conservation Given the importance of aquatic true bugs as bioindicators and biological control agents, monitoring their range shifts should be routinely addressed in the conservation contexts of the Western Ghats.

Keywords Freshwaters · Rivers · Aquatic true bugs · Hemiptera · Climate change · Vulnerability · Western Ghats

Introduction

Climate change is projected to become one of the most predominant drivers of biodiversity change by the end of this century (IPCC 2013). In particular, freshwater

biodiversity is increasingly threatened by human activities, resulting in rapid and major declines in the diversity of aquatic ecosystems, habitats, and species over a wide range of scales from global to local (e.g., Dudgeon et al. 2006; Reid et al. 2019; Albert et al. 2020). Climate

✉ S. Sundar
sundarstrec@gmail.com

¹ Present Address: Division of Ecology and Environmental Sciences, S. S. Research Foundation, Kallidaikurichi, Tirunelveli District, Tamil Nadu 627416, India

² Department of Ecology and Environmental Sciences, School of Life Sciences, Pondicherry University, Kalapet, Puducherry 605014, India

³ COBIMA Lab, Departamento de Ciências Biológicas, Instituto Federal Goiano, Urutai, Goiás, Brasil

⁴ Instituto de Biociências, Universidade Federal de Mato Grosso do Sul, Campo Grande, Mato Grosso do Sul, Brasil

⁵ Centre for Tropical Environmental and Sustainability Science and College of Science and Engineering, James Cook University, Cairns, Australia

⁶ Laboratório de Pesquisas Ecológicas E Educação Científica, Campus Central, Universidade Estadual de Goiás, Anápolis, Goiás, Brasil

⁷ Finnish Environment Institute, Freshwater Centre, Oulu, Finland

Published online: 12 February 2021

Springer

Content courtesy of Springer Nature, terms of use apply. Rights reserved.



S.S.RESEARCH FOUNDATION

ACTIVITY REPORT

2021 - 2022

Contents

Message from the Director

Areas of Activities/ Projects

Programme 1 Ecology and Environmental Sciences & Plant Sciences

- 1.1. Field Work
- 1.2. Project Re-launch: Tree for Birds
- 1.3. Wild Life Week
- 1.4. Tree for Birds - Pasumai and Plastic Free
- 1.5. Participation in National Webinar
- 1.6. Forest Day Celebration
- 1.7. Reviewer Certificate
- 1.8. Committee Meeting

Programme 2 Health Sciences

- 2.1 Organized World Book Day Celebration
- 2.2 Growth monitoring of Under Five Children
- 2.3 Health Exhibition

Programme 3

- 3.1. GuideStar India Transparency key
- 3.2. BGCI Membership

Programme 4

Achievements: International Collaboration

- 4.1. BRICS Project Participation
- 4.2. CNPq Collaboration

List of Projects

List of Publications

Message from the Director



Dear Friends

I am so glad to present our Fifth Activity Report with details of the activities and achievements in FY 2021–2022. We, S.S.Research Foundation and Vaanam Foundation, planted “**Rare, Endangered & Threatened**” (RET) trees specifically for Birds' Shelter, Nest & Perch in Farmland at Seeliyur, Karamadai, Tamil Nadu.

Our Senior Scientist Dr.M.Gunasekaran has been invited as a Chief Guest for the Wildlife Week Celebration, which was organised by Eco Club, St.Joseph's College for Women, Tiruppur and as Co-Chairperson for the National Webinar on “Urban Forest Ecosystem, Role, and Conservation Challenge” through Google Meet, organized by Govt. M.S.Golwalkar College, Madhya Pradesh, India.

Our health department conducted a health education exhibition in our centre for underfive mothers. Our organisation got the transparency key from Guide Star India. Collaboration between the S.S. Research Foundation, India, and the Federal University of Mato Grosso do Sul (UFMS), Brazil. Our scientist got the opportunity to participate in the **International BRICS Project and the CNPq Project**. I wholeheartedly thank all the members and volunteers for supporting and extending the services in all our programmes.

A handwritten signature in blue ink, appearing to be 'Chitra', with a long horizontal line extending to the right.

Chitra

1.1. Field Work: Field visits for aquatic biodiversity survey in some parts of Western Ghats especially Kurangani, Megamalai forest region, Theni District, and KMTR sites, Tirunelveli District from 08 to 12-04-2021, and the follow-up from 03 to 07-10-2021. Freshwater insects, fish and aquatic plants covering marginal vegetation are the target diversity. The report has been shared with the Theni Forest Division and Kalakad Mundunthurai Tiger Reserve, Tirunelveli. (The whole expenditure for this survey programme was borne by the trust.)



1. 2. Project Re-launch (S.S. Research Foundation is one of the projects and funding partners in this programme)

Vaanam Pleased to Invite you



For
Project Relaunch
“Trees for Birds”

On
2nd Oct Saturday 2021, 10.30 am

@
Seeliyur Farmland
Karamadai



Let us all join hands to present
“Trees for Birds”
For their life basic needs
“Food, Nest & Perch”

Tree Planting Event
Specified Trees for Birds which include Rarely Endangered & Threatened Trees

Awareness Programs

Importance on Trees for Birds
Dr.M.Gunasekaran, Ecologist.
SS Research Foundation

Transforming Food Forest
K R Balathandapani, Researcher,
Well known as Aatral Bala

We cordially welcome

NGO's, Nature Clubs, Eco Clubs of Schools, Colleges,
Universities and other Industries to Support

“Trees for Birds”



Our Contacts
K.Jagannathan :9894377785

*Chirping of birds early in the morning, is not less than any
Euphonious Music – Chetan Patel*

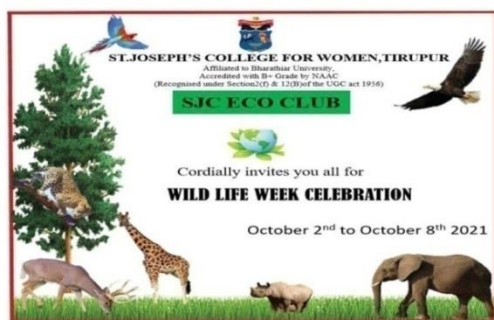
Importance on Tree for birds

We, S.S.Research Foundation & Vaanam Foundation, as Gandhi Jayanthi special on 2nd October 2021, planted "Trees for Birds" in farmland at Seeliyur, Karamadai, Tamil Nadu. Our scientist & consultant of the project Dr. M. Gunesakaran shared thematic address with an excellent presentation on **“Importance of Tree for Birds”**. SSRF is one of the funding and projects partners. The enthusiasm for planting trees by our volunteers and children were amazing. We with our expertise, resource persons shared timely needed Nature awareness. We planted ***Rare, Endangered & Threatened*** (RET) Trees specifically for Birds' Shelter, Nest & Perch.



1. 3. Wildlife Week Celebration

Wildlife Week Celebration was organised by Eco Club, St.Joseph's College for Women, Tiruppur from 2nd – 8th October. Dr.M.Gunasekaran has been invited as a Chief Guest on 8/10/2021. He delivered a presentation on “Nature Conservation”.



WILD LIFE WEEK CELEBRATION

DAY 5
OCT 8th -
Friday

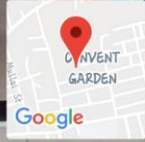
Wild Life Week Valedictory Function

Session 1 :
Chief Guest :
 Dr.M.Gunasekaran
 Senior Scientist,
 S S Research Foundation,
 Kallidaikuruchi.

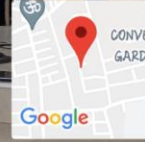
Session 2:
Chief Guest :
 Mrs.N.Mrithala Natarajan
 Environmental and Social Activist,
 Director,Women Empowerment Wing,
 Vanam India Foundation
 Tirupur

"IF WE SAVE OUR WILD PLACES,
WE WILL ULTIMATELY SAVE
OURSELVES"

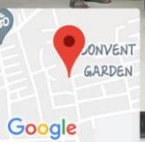
-STEVE IRWIN



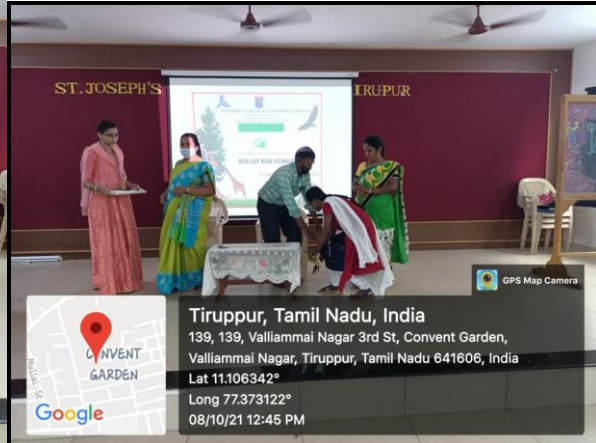
Tiruppur, Tamil Nadu, India
 139, 139, Valliammai Nagar 3rd St, Convent Garden,
 Valliammai Nagar, Tiruppur, Tamil Nadu 641606, India
 Lat 11.106328°
 Long 77.373154°
 08/10/21 12:46 PM



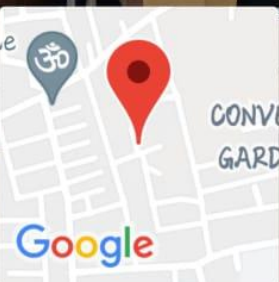
Tiruppur, Tamil Nadu, India
 4B, 4B, Mullai St, Sathyamurthy Nagar, Bavani Nagar,
 Tiruppur, Tamil Nadu 641606, India
 Lat 11.105574°
 Long 77.371774°
 08/10/21 12:32 PM



Tiruppur, Tamil Nadu, India
 87, Valliammai Nagar 4th St, Convent Garden, Valliammai
 Nagar, Tiruppur, Tamil Nadu 641604, India
 Lat 11.105764°
 Long 77.372413°
 08/10/21 01:00 PM



Tiruppur, Tamil Nadu, India
 139, 139, Valliammai Nagar 3rd St, Convent Garden,
 Valliammai Nagar, Tiruppur, Tamil Nadu 641606, India
 Lat 11.106342°
 Long 77.373122°
 08/10/21 12:45 PM



Tiruppur, Tamil Nadu, India
 12, 12, Mullai St, Sathyamurthy Nagar, Bavani Nagar, Tiruppur,
 Tamil Nadu 641606, India
 Lat 11.106196°
 Long 77.371574°
 08/10/21 12:31 PM

1. 4. Tree for Birds-Pasumai and Plastic Free

Programme on "Trees for Birds" on 24th October 2021 organised by Vaanam Foundation at Ponnuthu Hills (Gururishi Hills), part of Western Ghats. S.S.Research Foundation is one of the funding and project partners in this programme. Experts from various colleges, NGOs & volunteers have taken part and shared their experience and knowledge on Western Ghats Flora and Fauna to the participants including students and public.

Vaanam Pleased to Invite you



for
Tree Planting Event
Specified Trees for Birds which include Rarely Endangered & Threatened Native Trees
"Trees for Birds"
(Pasumai & Plastic Free Ponnuthu hills)
On
24th Oct Sunday 2021, 9.30 am -1.00 pm
@
Ponnuthu Hills
Coimbatore



Let us all join hands to present
"Trees for Birds"
For their life basic needs
"Food, Nest & Perch"

Awareness Programs

Birds of Tamil Nadu
Dr.S.Raja, Department of Zoology,
Kongunadu Arts & Science College.

Western Ghats Flora & Fauna
Dr.M.Gunasekaran, Ecologist,
SS Research Foundation

மணல் ஸ்ரீ
S.Sivaraja, Chinnavedampatti Lake Restoration Movement

We cordially welcome
NGO's, Nature Clubs, Eco Clubs of Schools, Colleges, Universities and other
Industries to Support
"Trees for Birds"



Our Project Partners

Ponnuthu Amman Kovil Thirupanikulu
S.S Research Foundation
Eco Club Kongunadu Arts & Science college,
Chinnavedampatti Lake Restoration Movement
Nesam Trust, RAK India Foundation & Aanandham Trust

Our Contacts
K.Jagannathan :9894377785
www.vaanamlive.com

Chirping of birds early in the morning, is not less than any Euphonious Music - Chetan Patel







1.5. National Webinar @ Govt. M.S.Golwalkar College

Dr. M.Gunasekaran was invited as Co-Chairperson for the National Webinar on “Urban Forest Ecosystem, Role and Conservation Challenge” through Google Meet from 27th October to 3rd November 2021 organized by Govt. M.S.Golwalkar College, Madhya Pradesh, India.

Govt. M.S. Golwalkar College Rewa (M.P.)

Affiliated to APS University Rewa, Madhya Pradesh

National Webinar (Third Series) 27 October to 03 November 2021

Theme: National Parks, Tiger Reserves, WLS & Botanical Gardens, Zoological Parks of India: Identification, Conservation and Management. (Through Google meet)

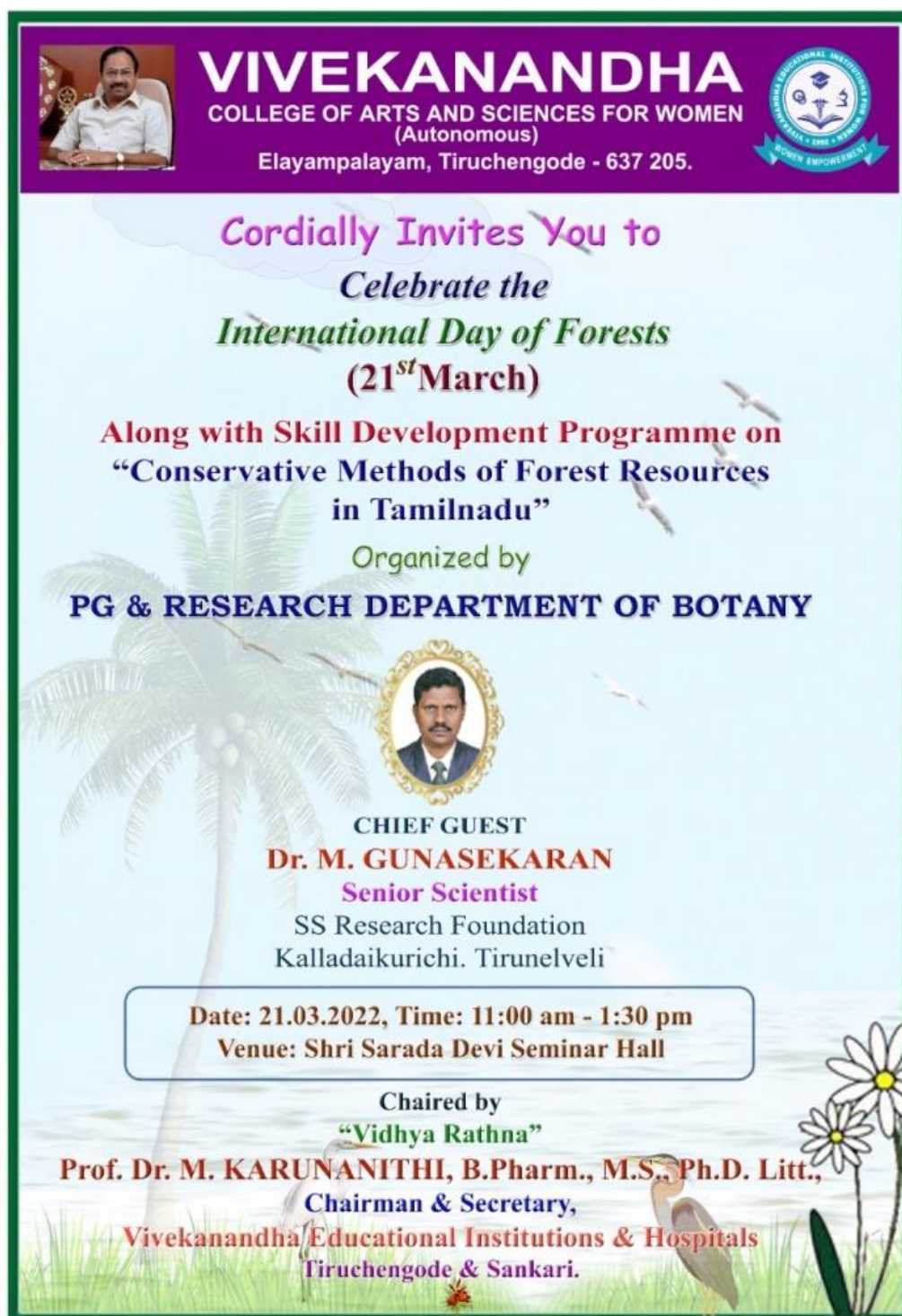
Final Programme Schedule

Session	Date&Time	Chairperson	Co-Chairperson	Eminent Speaker	Title of the Talk
1 Inaugural Session	27.10.2021 11.20 to 12.20 PM (Wednesday)	Shri H.S. Pabla, IFS Former PCCF& CWLW Madhya Pradesh	Dr. Kumaraguru Arumugam Conservation Scientist & Research Director Biodiversity Conservation Foundation India	Dr. B.S. Corrie (IFS) Former PCCF & Head of Forest Force Kerala Former Director KFRI Kerala	A Strategic vision for addressing Human Wildlife conflict in India.
2	27.10.2021 12.20 to 01.10 PM	Shri Ajai Mishra (IFS) Former PCCF (WL) & CWLW Karnataka	Dr. K. Baranidharan Associate Professor in Forestry & Wildlife, Forest College & Research Institute Mettupalayan Coimbatore (TN)	Shri Nitin Kakodkar (IFS) Formerly PCCF Wildlife Maharashtra	Wildlife Management in Maharashtra.
3	27.10.2021 01.10 to 01.55 PM	Prof. Dinesh Chandra Bhatt Emeritus Professor Zoology Gurukul Kangri University Haridwar, Uttakhand	Dr. PGS Sathy Scientist C Museum and Taxidermy Section Zoological Survey of India Kolkata.	Mr. A. Shankaran (IFS) Retd. DCF Wildlife Telangana	Importance of Protected Areas Network in Telangana.
4	27.10.2021 01.55 to 02.40 PM	Dr. Yash Veer Bhatnagar Senior Scientist Nature Conservation Foundation Mysuru, Karnataka	Dr. Utkarsha Manish Chavan Assistant Professor in Zoology Bhavans Hazarmal Somani College Mumbai	Dr. S.Sathyakumar Scientist G. Wildlife Institute of India Dehradun	Wildlife of the Himalaya Conservation through Science.
5	27.10.2021 02.40 to 03.20 PM	Dr. S.Sathyakumar Scientist G. Wildlife Institute of India Dehradun	Dr. A. Manimozhi Biologist, Arignar Anna Zoological Park, Vandalur, Chennai	Dr. Rajkumar V. Jadhav Director Rajiv Gandhi Zoological Park Pune	Rajeev Gandhi Zoological Park- A Pioneer in the ex-situ breeding program of Indian Giant Squirrel.
6	27.10.2021 03.20 to 04.00 PM	Prof. (Dr.) Jai Krishna Panigrahi Secretary Orrisa Environmental Society Bhubaneswar	Dr. P. Balakrishnan Scientist Wildlife Division KFRI Kerala	Shri S. Jones Justin (IFS) Deputy Field Director Sunderban Tiger Reserve WB	Sunderbans: A Dynamic Ecosystem.

37	31.10.2021 03.20 to 04.00 PM	Dr. R. Nagarajan Principal and Head Zoology and Wildlife Biology AVC College Mayiladuthurai, Tamil Nadu.	Dr. Susmita Srivastav Associate. Prof. Zoology SK PG College Basti (U.P.)	Dr. T. Brinda President Biodiversity Conservation Foundation Trichirapalli (TN)	Birds and Climate Change.
38	31.10.2021 04.00 to 04.40 PM	Dr. Sapu Changkija Retd. Professor, Depatt. of Genetics and Plant Breeding SASRD, Medziphema, Nagaland University, India	Dr. M. Gunasekaran Senior Scientist S.S. Research Foundation Coimbatore	Dr. V. Sai Saraswathi Asstt. Prof. (sr.) School of Advanced Sciences VIT University Vellore (TN)	Urban Forest Ecosystem Role and Conservation Challenges.
39	01.11.2021 11.20 to 12.00 PM (Monday)	Dr. Hem Singh Gehlot Director Wildlife Conservation Research JN Vyasa University Jodhpur	Dr. K. Sankaraiyah Associate Prof. Zoology PG Studies & Research KM Govt. Institute Pondicherry	Prof. K.K. Sharma Head Zoology Department, MDS University Ajmer Rajasthan	Bioacoustics based identification and monitoring wildlife in dense Canopy
40	01.11.2021 12.00 to 12.40 PM (Monday)	Shri Anup Kumar Nayak (IFS) Former ADG (Project Tiger) & MS (NTCA) MOEF & CC, Govt. of India	Dr. Shivesh Pratap Singh Prof. Zoology Dept. Govt. P.G. College Satna, M.P.	Shri Sunil Kumar Singh (IFS) CCF & Field Director Kanha Tiger Reserve of Madhya Pradesh	Wildlife of Kanha Tiger Reserve of Madhya Pradesh.
41	01.11.2021 12.40 to 01.20 PM	Shri Nitin Kakodkar Formerly PCCF (IFS) Wildlife Maharashtra	Dr. G. Bupesh Asstt. Prof. Department of forest Science Nagaland University Lumami Nagaland	Mr. Pankaj Sharma DFO Western Assam Wildlife Division Tezpur Assam	Protection and Management of Nameri Tiger Reserve of Assam
42	01.11.2021 01.20 to 02.00 PM	Prof. K.K. Sharma Head Zoology Department, MDS University Ajmer Rajasthan	Dr. Hima Sailaja Curator SV Zoological Park Tirupati	Dr. Sanjay Kumar Mahato , Curator Tata steel Zoological Park Jamshedpur Jharkhand	Scientific Management of wild animals in an ex-situ set up with special reference to Tata Steel Zoological Park Jamshedpur.
43	01.11.2021 02.00 to 02.40 PM (Tuesday)	Dr. Pradeep Sarmokadam Member Secretary State Biodiversity Board Goa	Dr. K. Elumalai Associate Professor in Zoology Department Govt. Arts College Nandanam Tamilnadu	Dr. Manoj Borkar Associate Professor & Head Zoology Carmel College for Women Goa.	Protected areas network of Goa State and Wildlife Conservation Challenges.
44	01.11.2021 02.40 to 03.20 PM	Shri SR Natesha (IFS) CF & Field Director Bandipur Tiger Reserve(Karnataka)	Dr. Kale Mahadev Kisan Rao Prof. Zoology Deptt. VP College Patoda Distic Beed Maharashtra	Mr. D. Venkatesh (IFS) CF & Field Director Mudumalai Tiger Reserve Tamilnadu	Securing the Elephant Corridor in Mudumalai Tiger Reserve.

1. 6. International Forest Day Celebration

Post Graduate & Research Department of Botany, Vivekanandha Arts and Science College, Thiruchengode, Tamil Nadu, celebrates International day of forests on 21/03/ 2022. Our Senior Scientist Dr.Gunasekaran has been invited as chief guest in the celebration.




VIVEKANANDHA
COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(Autonomous)
Elayampalayam, Tiruchengode - 637 205.

Cordially Invites You to
Celebrate the
International Day of Forests
(21st March)

Along with Skill Development Programme on
“Conservative Methods of Forest Resources
in Tamilnadu”

Organized by
PG & RESEARCH DEPARTMENT OF BOTANY

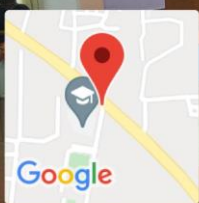

CHIEF GUEST
Dr. M. GUNASEKARAN
Senior Scientist
SS Research Foundation
Kalladaikurichi. Tirunelveli

Date: 21.03.2022, Time: 11:00 am - 1:30 pm
Venue: Shri Sarada Devi Seminar Hall

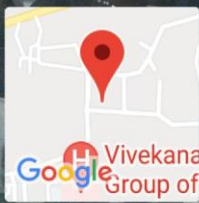
Chaired by
“Vidhya Rathna”
Prof. Dr. M. KARUNANITHI, B.Pharm., M.S., Ph.D. Litt.,
Chairman & Secretary,
Vivekanandha Educational Institutions & Hospitals
Tiruchengode & Sankari.



Elaiyampalayam, Tamil Nadu, India
9W9X+HQ9, Elaiyampalayam, Tamil Nadu 637205, India
Lat 11.36737°
Long 77.948344°
03/21/22



Kavundampalayam, Tamil Nadu, India
9W6W+VGH, Kavundampalayam, Tamil Nadu 637205, India
Lat 11.362465°
Long 77.946066°
03/21/22



Elaiyampalayam, Tamil Nadu, India
9W9X+HQ9, Elaiyampalayam, Tamil Nadu 637205, India
Lat 11.36737°
Long 77.948344°
03/21/22



Kavundampalayam, Tamil Nadu, India
9W6W+VGH, Kavundampalayam, Tamil Nadu 637205, India
Lat 11.362465°
Long 77.946066°
03/21/22

1.7. Reviewer Certificate:

Dr.Sundar has been awarded a reviewer certificate for serving as a reviewer for *Aquatic Conservation: Marine and Freshwater Ecosystems* Wiley International Journal.



This certificate is awarded to

SHUNMUGA VELAYUTHAM SUNDAR

for serving as a reviewer for

***Aquatic Conservation: Marine and Freshwater
Ecosystems***



Thank you for reviewing 1 manuscript in 2021

26 March 2022
Date

Professor Philip J. Boon and
Professor John M. Baxter
Chief Editors

1.8 Committee Meeting

1. Health department volunteers meeting held on 12/04/21 at S.S.Research Foundation. The agenda for this meeting was activities completed - status report for the period of Jan 2021-March 2021 and discussed regarding How to Organize World Book Day Celebration by April 23.
2. Board Meeting conducted once in every 3 months regarding status of the each department activities, outcome and plan for the Continuous Education Programme.
3. Ecology and Environmental Sciences & Plant Sciences Team Members meeting held on 22/06/21. Agenda: Survey for Biodiversity Status in various parts of Tamil Nadu.
4. Health Research department volunteers meeting held on 18/09/21. Discussed regarding Organization of Health Exhibition topic, target people, IEC material and prepared list of health topics, etc.

PROGRAMME: 2 Health Activities

2.1. Organized World Book Day Celebration

2.2. Growth monitoring of Under Five Children

2.3. Health Exhibition

The whole expenditure for above three programmes was borne by the trust including Survey Form, Stationeries, Anthropometric Assessment Kit, Field Assistant wages, Information Education and Communication (IEC) material and Prize distribution, etc.,

2.1. Organized World Book Day Celebration:

On 23rd April, the World Book Day is being observed as to highlight the power of books to promote the vision of knowledge through reading and publishing. This programme was organised by our trust at Branch Library, Kallidaikurichi on 23rd April, 2021 with the aim to build knowledge of all citizens. Many of the students were participated in the competition like drawing, speech presentation and quiz etc. Total participants were 17 children and 10 adults. Our volunteers evaluated the programme and prize distributed to winners and all participants. The expenditure for this programme was met by our Trust.



2.2. Growth monitoring of Under Five Children



Height Measurement

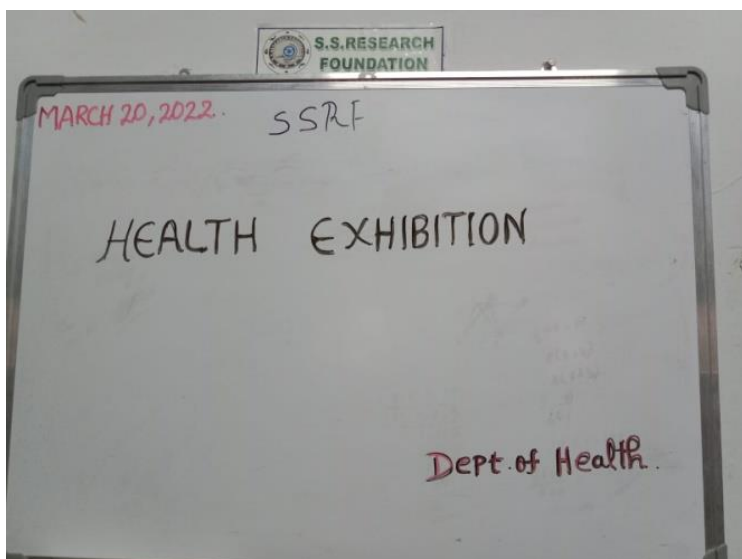


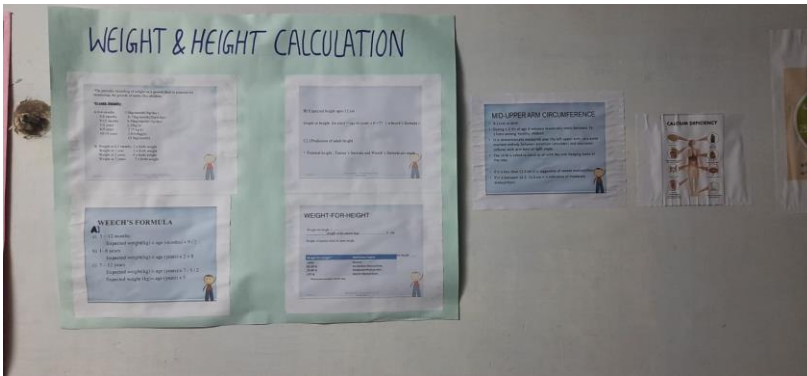
Weight Measurement

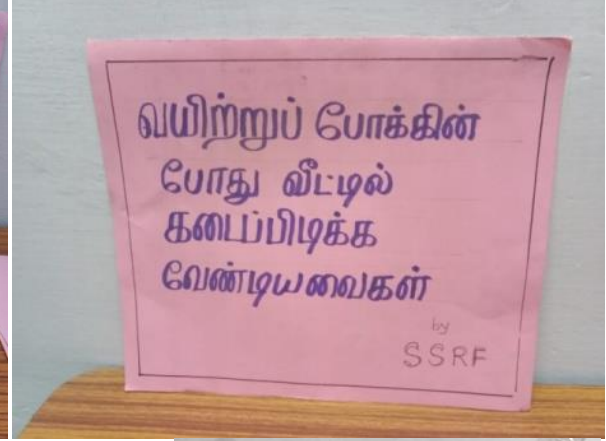
Our Health department focuses on prevention aspects and growth monitoring of under five children on 10/03/22 in ICDS Centre, Chinnapallivasal Street, Kallidaikurichi. Once in every month on the same date, nutritional assessment (Height and Weight Measurement, MAC and BMI calculation) performs for the children attending regularly. Findings are being recorded in individual growth chart and progress report that shares with their mothers. About 17 under five children benefitted out of this programme so far every month.

2.3. Health Exhibition

Health Exhibition kept for the period of one week from March 20-27, 2022 between 10 am and 5 pm in our Centre for the public people to gain knowledge regarding Hand Washing Techniques, Height and Weight Measurement, MAC, BMI calculation, Growth chart, growth and development for the children in appropriate ages, Balanced diet, Diarrhoea management and Environmental Pollution and steps to prevent pollution. Total of 41 female and 12 male were benefitted out of this programme.







Programme 3

3.1. Guide Star India Transparency key: S.S. Research Foundation got a transparency key from the Guide Star India. Our Guide Star Number: 10091



GuideStar India Foundation Level- GuideStar India Transparency Key Certified NGOs					
Pre-vetted by us to help you make smarter and faster NGO Partnerships!					
Certifications valid till date as specified in the Validity column. NGOs apply for annual renewal.					
Rows shaded grey are ones where validity has expired.					
Name of Organisation	GSN	Click this link to know current certification validity status and to read more about the organisation and to access its key documents	Key Geographies Covered	Year of Registration	Certification Valid till
Quality Medical Knowledge Foundation	3316	https://guidestarindia.org/Summary.aspx?CCReg=3316	Maharashtra	2007	30-Sep-22
R. K. Foundation	831	https://guidestarindia.org/Summary.aspx?CCReg=831	All India	2003	31-Dec-22
RAAH Foundation	4415	https://guidestarindia.org/Summary.aspx?CCReg=4415	Maharashtra	2011	31-Dec-22
RAILWAY CHILDREN INDIA	10600	https://guidestarindia.org/Summary.aspx?CCReg=10600	All India	2013	31-Dec-22
Rajasthan Samgrah Kalyan Sansthan	1951	https://guidestarindia.org/Summary.aspx?CCReg=1951	Rajasthan	1992	31-Dec-22
Rakshak Foundation	12807	https://guidestarindia.org/Summary.aspx?CCReg=12807	Haryana	2020	31-Dec-22
Ramakrishna Sarada Samiti	11450	https://guidestarindia.org/Summary.aspx?CCReg=11450	Maharashtra	1968	30-Sep-22
Raphael Ryder Cheshire International Centre for the Relief of Suffering	2561	https://guidestarindia.org/Summary.aspx?CCReg=2561	Uttarakhand	1962	31-Dec-22
Radhriya Jan Hr Sewa Sansthan	9556	https://guidestarindia.org/Summary.aspx?CCReg=9556	All India	2003	31-Dec-22
Ratna Nidhi Charitable Trust	869	https://guidestarindia.org/Summary.aspx?CCReg=869	All India	1967	31-Dec-22
Rays - Aasha ki ek kiran	1513	https://guidestarindia.org/Summary.aspx?CCReg=1513	Rajasthan	2010	31-Dec-22
REAP BENEFIT FOUNDATION	11439	https://guidestarindia.org/Summary.aspx?CCReg=11439	All India	2013	30-Sep-22
RED DOT FOUNDATION	6388	https://guidestarindia.org/Summary.aspx?CCReg=6388	International	2014	31-Dec-22
REDDIWAR FOUNDATION	12696	https://guidestarindia.org/Summary.aspx?CCReg=12696	All India	2016	31-Dec-22
Redemption Research for Health and Educational Development Society	1088	https://guidestarindia.org/Summary.aspx?CCReg=1088	Andhra Pradesh	2003	31-Dec-22
REGENBOOG INDIA FOUNDATION	2780	https://guidestarindia.org/Summary.aspx?CCReg=2780	Tamil Nadu	2006	31-Dec-22
Rein India Foundation Trust	12090	https://guidestarindia.org/Summary.aspx?CCReg=12090	Karnataka	2016	30-Sep-22
Reeti Foundation for Museums Galleries and Heritage Sites	7319	https://guidestarindia.org/Summary.aspx?CCReg=7319	Karnataka	2015	30-Sep-22
RESCUE FOUNDATION	2776	https://guidestarindia.org/Summary.aspx?CCReg=2776	All India	2001	31-Dec-22
Resource Foundation	781	https://guidestarindia.org/Summary.aspx?CCReg=781	Tamil Nadu	2000	31-Dec-22
RESTORING DREAMS FOUNDATION	12174	https://guidestarindia.org/Summary.aspx?CCReg=12174	All India	2019	31-Dec-22
Right Track	1149	https://guidestarindia.org/Summary.aspx?CCReg=1149	West Bengal	1991	31-Dec-22
Rise Against Hunger India	7509	https://guidestarindia.org/Summary.aspx?CCReg=7509	Karnataka	2014	31-Dec-22
RISING SUN FOUNDATION	13553	https://guidestarindia.org/Summary.aspx?CCReg=13553	Bihar	2015	31-Dec-22
Riham Charitable Trust	1274	https://guidestarindia.org/Summary.aspx?CCReg=1274	Tamil Nadu	2005	31-Dec-22
Root Institute for Wisdom Culture Charitable Trust	6909	https://guidestarindia.org/Summary.aspx?CCReg=6909	Bihar	1984	31-Dec-22
ROSHNI NILAYA	10274	https://guidestarindia.org/Summary.aspx?CCReg=10274	Tamil Nadu	2017	31-Dec-22
RRR EDUCATIONAL SOCIETY	6846	https://guidestarindia.org/Summary.aspx?CCReg=6846	Andhra Pradesh	1990	31-Dec-22
RUGNA SEVA PRAKALP	3514	https://guidestarindia.org/Summary.aspx?CCReg=3514	Maharashtra	1991	31-Dec-22
RUPRANI FOUNDATION	7681	https://guidestarindia.org/Summary.aspx?CCReg=7681	Uttar Pradesh	2015	31-Dec-22
Rural Educational Activities for Development	7234	https://guidestarindia.org/Summary.aspx?CCReg=7234	Odisha	1993	30-Sep-22
Rural Health Care Foundation	1258	https://guidestarindia.org/Summary.aspx?CCReg=1258	West Bengal	2009	31-Dec-22
RURAL INSTITUTE OF CENTRE FOR EXCELLENCE (RICE)	7104	https://guidestarindia.org/Summary.aspx?CCReg=7104	Andhra Pradesh	2009	31-Dec-22
Rural Reconstruction Organisation	1106	https://guidestarindia.org/Summary.aspx?CCReg=1106	Odisha	1992	31-Dec-22
RURAL RECONSTRUCTION SOCIETY	11707	https://guidestarindia.org/Summary.aspx?CCReg=11707	Andhra Pradesh	1983	31-Dec-22
S M Sehgal Foundation	1560	https://guidestarindia.org/Summary.aspx?CCReg=1560	Andhra Pradesh Bihar Haryana Karnataka Madhya Pradesh Maharashtra Rajasthan Telangana	1999	31-Dec-22
S.S.RESEARCH FOUNDATION	10091	https://guidestarindia.org/Summary.aspx?CCReg=10091	Tamil Nadu	2017	31-Dec-22
Sabuj Sangha	1226	https://guidestarindia.org/Summary.aspx?CCReg=1226	West Bengal	1975	31-Dec-22
Sadayonodai Baignar Nargani Mandram	1609	https://guidestarindia.org/Summary.aspx?CCReg=1609	Tamil Nadu	1986	31-Dec-22
Sadhana Society for the Mentally Handicapped	999	https://guidestarindia.org/Summary.aspx?CCReg=999	All India	1996	31-Dec-22
SAFE (Social Association for Everyone)	10081	https://guidestarindia.org/Summary.aspx?CCReg=10081	Odisha	2016	31-Dec-22
SAGARPUTRA SHIKSHAN PRASARAK MANDAL	7720	https://guidestarindia.org/Summary.aspx?CCReg=7720	Maharashtra	1992	31-Dec-22
SAHAYOG	10357	https://guidestarindia.org/Summary.aspx?CCReg=10357	Odisha	2012	31-Dec-22
Sahyadri Nisarga Mitra	2623	https://guidestarindia.org/Summary.aspx?CCReg=2623	Maharashtra	1992	31-Dec-22
Sai Educational Rural & Urban Development Society	464	https://guidestarindia.org/Summary.aspx?CCReg=464	Andhra Pradesh	2003	31-Dec-22
Sai Kripa	444	https://guidestarindia.org/Summary.aspx?CCReg=444	Uttar Pradesh	1989	31-Dec-22
SAKSHI	12119	https://guidestarindia.org/Summary.aspx?CCReg=12119	All India	1992	31-Dec-22
Salaam Bombay Foundation	1190	https://guidestarindia.org/Summary.aspx?CCReg=1190	Gujarat Karnataka Madhya Pradesh Maharashtra Rajasthan	2002	31-Dec-22
Samajik Arthik Vikas Mahamandal	4396	https://guidestarindia.org/Summary.aspx?CCReg=4396	Madhya Pradesh Maharashtra Tamil Nadu Uttar Pradesh	1976	31-Dec-22
Samarthanam	447	https://guidestarindia.org/Summary.aspx?CCReg=447	Karnataka	1997	31-Dec-22
Samarthya	11074	https://guidestarindia.org/Summary.aspx?CCReg=11074	Karnataka	2013	31-Dec-22

3.2. BGCI Membership: Our organisation has been an annual institutional member in Botanic Gardens Conservation International (BGCI) since 16th January 2022.



Programme 4

Achievements:

International Collaboration

- BRICS Project Participation

Our Scientist, **Dr.Sundar**, as Co-Principal Investigator, **Dr.Gunasekaran**, Senior Scientist, & **Dr.Reshma**, Research Scientist, as team members, participating in the **BRICS STI Framework Programme 5th coordinated call**.

- CNPq Collaboration

Our Scientist, **Dr.Sundar**, as a foreign team member, participating in the CNPq Collaborative Programme on “**Artificial Intelligence applied to monitoring impacts caused by extreme droughts and floods in the Pantanal**”.

List of Projects:

S. No.	Title	Role	Funding Agency	Status
1	Documenting and exploring the science behind the 'Living Heritage' Sthalavriksha (Temple Tree) worship in Temples of Tamil Nadu (2022)	Dr.M.Gunasekaran (PI)	Department of Science and Technology (DST)	Submitted
2	Potential biogeographical changes to plant communities in the extreme aquatic environments(2022)	Dr.M.Gunasekaran (PI)	Science and Engineering Research Board	Under evaluation
3	A non-conventional and cost-effective conservation method for Rare, Endemic and Threatened (RET) plant species in Tamil Nadu (2022)	Dr. M.Gunasekaran (PI)	Science and Engineering Research Board	Under evaluation
4	Prioritizing the conservation of aquatic macroinvertebrate biodiversity for achieving sustainable river water quality (2022)	Dr. S. Sundar (PI)	Science and Engineering Research Board	Under evaluation

List of Publications:

Book Chapter - under preparation

1. Lucas Silveira Lecci , Fabio de Oliveira Roque and **Sundar Shunmuga Velayutham** 2022. Multiple facets of aquatic insect diversity in extreme environments. - Entomovariety: Diversity perspectives on the little organisms running the world - Approved Book Publisher - Elsevier
2. Muralidharan, M. **Sundar, S,** & Ram Prabhakar, 2022. Species composition and diversity of aquatic insects of the Srivilliputhur - Megamalai Tiger Reserve in India.
3. Gunasekaran, M & **Sundar, S.** 2022. Potential impacts of climate change on aquatic flora in Wetland Ecosystems. Aquatic Botany
4. Davidson Gomes Nogueira, Rudi Ricardo Laps, Fabio Roque, **Sundar, Gunasekaran,** 2022. The biases and gaps on studies about the importance of fruits: a comparison between aquatic and terrestrial environment. Journal of Biotropica