

IMPACT OF CLIMATE CHANGE

BIODIVERSITY & ENVIRONMENT

Ajay Kumar Vashisht
Anila George



Impact of Climate Change Biodiversity and Environment

Ajay Kumar Vashisht

*Associate Professor, Department of Irrigation and Drainage Engineering,
College of Agricultural Engineering and Post-Harvest Technology,
Central Agricultural University, Ranipool, Gangtok, Sikkim*

Anila George

*Assistant Professor, Department of Environmental Sciences,
St. John's College, Anchal, Kerala*

2021

Associated Publishing Company®

A Division of

Astral International Pvt. Ltd.

New Delhi – 110 002

© 2021 EDITORS
ISBN : 978-93-89719-38-3

Publisher's Note:

Every possible effort has been made to ensure that the information contained in this book is accurate at the time of going to press, and the publisher and author cannot accept responsibility for any errors or omissions, however caused. No responsibility for loss or damage occasioned to any person acting, or refraining from action, as a result of the material in this publication can be accepted by the editor, the publisher or the author. The Publisher is not associated with any product or vendor mentioned in the book. The contents of this work are intended to further general scientific research, understanding and discussion only. Readers should consult with a specialist where appropriate.

Every effort has been made to trace the owners of copyright material used in this book, if any. The author and the publisher will be grateful for any omission brought to their notice for acknowledgement in the future editions of the book.

All Rights reserved under International Copyright Conventions. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written consent of the publisher and the copyright owner.

Published by : **Associated Publishing Company®**
A Division of
Astral International Pvt. Ltd.
– ISO 9001:2015 Certified Company –
4736/23, Ansari Road, Darya Ganj
New Delhi-110 002
Ph. 011-43549197, 23278134
E-mail: info@astralint.com
Website: www.astralint.com

Digitally Printed at : **Replika Press Pvt. Ltd.**

© 2021 EDITORS
ISBN : 978-93-89719-38-3

Publisher's Note:

Every possible effort has been made to ensure that the information contained in this book is accurate at the time of going to press, and the publisher and author cannot accept responsibility for any errors or omissions, however caused. No responsibility for loss or damage occasioned to any person acting, or refraining from action, as a result of the material in this publication can be accepted by the editor, the publisher or the author. The Publisher is not associated with any product or vendor mentioned in the book. The contents of this work are intended to further general scientific research, understanding and discussion only. Readers should consult with a specialist where appropriate.

Every effort has been made to trace the owners of copyright material used in this book, if any. The author and the publisher will be grateful for any omission brought to their notice for acknowledgement in the future editions of the book.

All Rights reserved under International Copyright Conventions. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written consent of the publisher and the copyright owner.

Published by : **Associated Publishing Company®**
A Division of
Astral International Pvt. Ltd.
– ISO 9001:2015 Certified Company –
4736/23, Ansari Road, Darya Ganj
New Delhi-110 002
Ph. 011-43549197, 23278134
E-mail: info@astralint.com
Website: www.astralint.com

Digitally Printed at : **Replika Press Pvt. Ltd.**

Contents

<i>Foreword</i>	<i>v</i>
<i>Preface</i>	<i>vii</i>
1. Environment and Climate Change: Kerala Scenario <i>Jude Emmanuel</i>	1
2. Current Status of Water Resources in Kerala <i>Anila George</i>	7
Impact on Groundwater	
3. Analysis of Physico-chemical Characteristics of Groundwater Samples of Pallikal Grama Panchayat, Thiruvananthapuram, Kerala <i>Jasmeya Beevi, M.V. Vincy and Brilliant Rajan</i>	19
4. Analysis on the Bacteriological Contamination in Groundwater Owing to Sewage Pollution: A Case Study <i>S.B. Swathy, V. Smitha Asok and V.S. Faseela</i>	25
5. Study on the Drinking Water Issues of a Coastal Locality of Purathur, Malapuram, Kerala <i>P.S. Sudina and Jainy Varghese</i>	29
6. Distribution of Heavy Metals in Sediment Samples of Aquifers in Chavara, Kollam <i>D. Meera and Sherly P. Anand</i>	35

7. **Impact of Climate Change on Recharge Pattern of Kinathukadavu Block of Walayar Sub Basin, Tamil Nadu** 39
A. Valliammai and B.J. Pandian
- Impact on River System**
8. **Water Quality Assessment of Selected Sites of Ithikkara River of Kollam District, Kerala with Special Reference to Bacteriology** 57
Anila George, P. Bindhu and S. Sreethi
9. **Water Level Fluctuations and Bacterial Distribution in Quaternary Aquifer along Pampa River** 71
G. Madhusoodanan Pillai, A.S. Pramodh Lal, M. Karthik, M. Aravind and Jeffy Selvan
10. **Study of Hydro-chemical Properties of Neyyar River, Kerala: An Attempt to Estimate Pollution Status** 79
M. Badusha and S. Santhosh
11. **Diversity and Distribution of Ephemeroptera Larvae in the Post-Monsoon Season from Achenkovil River, Kerala** 85
S. Sujitha, R. Sreejai, F. Jency Roshan, Beena S. Kurup and Dani Benchamin
12. **The Hydrochemistry and Planktonic Diversity of Gangayaar Stream with Special Reference to Different Pollution Sources** 91
A.S. Arya, V. Kaladevi and S.S. Preetha
13. **Systematics of Benthic Fauna in Achenkovil River: A Segmental Approach** 101
Beena S. Kurup, R. Sreejai, Dani Benchamin, F. Jency Roshan and S. Sujitha
14. **Fishery of Malabar Labeo, *Labeo dussumieri* (val) from the Major River Systems of Kerala, India** 105
C.R. Renjithkumar, K. Roshni, K. Ranjeet and B.M. Kurup
- Impact on Wetland System**
15. **Human Interferences in Wetland: A Case Study on Lake Veli** 111
J. Fouzia and G. Prasad
16. **Geophysical Quality of Selected Areas under Kuttanad Wetland Region** 115
T. Alexander
17. **Qualitative Analysis of Water Resources of a Selected Region** 125
Y.B. Sheeja

18. **Diversity Indices for Pollution Assessment: A Case Study from Vembanad Wetland Adjacent to the Seafood Processing Facilities** 129
V. Vidya, G. Prasad and Meera

19. **Phytoplankton Diversity of Kottakayal Wetland of South Kerala** 147
F. Jency Roshan, R. Sreejai, Dani Benchamin and S. Sujitha

Impact on Soil Health

20. **Effects of Organic Amendments Inoculated with Trichoderma Fungal Microbial Consortium on Reclamation of Clay** 157
V. Kaladevi, L. Soumya and S.S. Preetha

21. **Spatio-temporal Dynamics of Land Use/Land Cover Pattern in Greater Cochin Region: A Geospatial Approach** 167
Naveen S. Lal, John Richard Thomas, Sumith Satheendran, Abin Varghese, Usha K. Aravind and C.T. Aravindakumar

22. **Physio-chemical Parameters of Soil during Various Seasons in Grassland Habitat of Southern Kerala** 173
Nisha Thomas and M.G. Sanal Kumar

23. **A Preliminary Study on the Importance of Physical Characteristics of Soil Samples Collected from Different Ecosystems** 179
C.P. Sreelekshmi and R. Sreejai

24. **Ecotoxicological Effects of an Herbicide (Glyphosate) and Fungicide (Fytran) on *Philoscia javanensis* (Isopoda)** 185
B. Bini and M.G. Sanal Kumar

25. **A Comparative Study on the Mineral Analysis of Environment Friendly Seaweed and Seagrass Liquid Fertilizers** 193
Y.B. Sheeja

Impact on Natural Habitat

26. **A Study on Health Issues of a Population around a Cashew Factory** 199
Renju Raju and R. Sreejai

27. **A Comparison of Health Benefits of Native and Exotic Fruits** 203
Ayona Jayadev and Jincy Rose

28. **Impact of Human Intervention on Butterfly Diversity in Natural Habitats** 213
P. Pournami and G.P. Mathen

29. Identification of Native Earthworms and its Effect on Plant Growth	221
<i>Anupriya Samuel, S.S. Saranya, S. Abhijith, R. Abhijith, J.S. Ajinu, T.R. Dhanya, E. Haleema and M. Vishnu</i>	
30. Development of Cloud-GIS Based Veterinary Information System for the Selected Regions of Kannur District	237
<i>A.K. Abdul Murshid, G. Anusha, P.T. Fathah, Roshiny Stanly, S. Sumith Satheendran and Abin Varghese</i>	
31. Monitoring Ecological Changes with the Help of Butterflies	241
<i>R. Sreejai, Kripa Susan Babu, Dani Benchamin, F. Jency Roshan, S. Sujitha and Beena S. Kurup</i>	
32. Histopathological Impact of Organochlorine Pesticide (DDT) on the Ovary of Freshwater Fish	247
<i>G.S. Remya Devi</i>	
33. A Review on the Applications of Environment Friendly Drug Delivery Systems in Medicine with Special Reference to Nanopatches	251
<i>J.K. Reshma, N. Najula Nazeer, S.L. Aleesha Fathima and Anju V. Jalaj</i>	
<i>Literature Cited</i>	255
<i>Annexures</i>	283
<i>Index</i>	301
<i>Color Plates</i>	305

Chapter 22

Physio-chemical Parameters of Soil during Various Seasons in Grassland Habitat of Southern Kerala

Nisha Thomas¹ and M.G. Sanal Kumar²

*¹Department of Zoology, St. John's College, Anchal
e-mail: nishathomas09@gmail.com*

*²Department of Zoology, N.S.S. College, Pandalam
e-mail: mgsanalkumar@gmail.com*

This study was conducted in Grassland area in Pachakanam (9°27'49.41" N 77°08'43.94" E), Ranni forest division, Pathanamthitta, Kerala. Soil samples were collected from grassland to study the physio-chemical parameters in various seasons. Soil texture, mineral composition, fertility, and consistency can vary from place to place. Soil texture is often used to indicate how resilient the soil is to structural damage. The soil of the tropical grasslands is deep and dark, with fertile upper layers. It is nutrient-rich from the growth and decay of deep, many-branched grass roots. The rotted roots hold the soil together and provide a food source for living plants. Various physio-chemical parameters such as temperature, pH, moisture, organic carbon, sand, silt, clay, exchangeable acids and bases, nitrogen, phosphorous, potassium, calcium, and magnesium were studied in the present study. The monthly data were pooled to seasonal data taking into consideration June-August as Monsoon season; September-November as post-monsoon season; December-February as summer season and March-May as pre-monsoon season. Physio-chemical parameters like temperature, pH, clay, exchangeable acids and bases, calcium, and nitrogen were high during pre-monsoon season. Moisture, organic carbon, and phosphorous content were high during monsoon season. Magnesium content in grassland habitat is highest during summer season. Potassium content in grassland habitat is highest during post-monsoon season and least during monsoon.