Bioprospects of Coastal Ecosystem and Sustainable Resource Management

This book is the comprehensive collection of research-based data from the studies on coastal ecosystems of Malaysia (especially from the east coast of peninsular Malaysia). The book consists of nine chapters addressing the issues related to (but not limited to) the bio-prospect potential such as screening of actinomycetes from the coastal ecosystem, microbial bioprospecting using 'omics' approach, importance of integrated Multi-trophic Aquaculture, biotic diversity and shoreline erosion in coastal ecosystem. We are optimistic to say that the in-depth knowledge and scientific insights shared in this book will contribute towards sustainable development goals holistically and in particular on SDG 13,14 and 15.

Dr. Akbar John - Senior researcher at the Institute of Oceanography and Maritime Studies, Kulliyyah (Faculty) of Science (KOS), IIUM, Malaysia
Dr. Zaima Azira Zainal Abidin - Associate Professor at the Department of Biotechnology, KOS, IIUM.
Prof. Dr. Ahmed Jalal Khan Chowdhury - Professor at the Department of Marine Science, KOS, IIUM.

NOOR PUBLISHING

9 786202 791069

FOR AUTHOR USE ONLY

John, Zainal Abidin, Khan Chowdhury

NOOR PUBLISHING

Akbar John
Zaima Azira Zainal Abidin
Ahmed Jalal Khan Chowdhury

Bioprospects of Coastal Ecosystem and Sustainable Resource Management

Akbar John
Zaima Azira Zainal Abidin
Ahmed Jalal Khan Chowdhury

Bioprospects of Coastal Ecosystem and Sustainable Resource Management

FOR AUTHOR USE ONLY

FOR AUTHOR USE ONLY

Akbar John
Zaima Azira Zainal Abidin
Ahmed Jalal Khan Chowdhury

Bioprospects of Coastal Ecosystem and Sustainable Resource Management

FOR AUTHOR USE ONLY

Noor Publishing

Imprint
Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and are trademarks or registered trademarks of their respective holders. The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this work is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

Cover image: www.ingimage.com

Publisher:
Noor Publishing
is a trademark of
International Book Market Service Ltd., member of OmniScriptum Publishing Group
17 Meldrum Street, Beau Bassin 71504, Mauritius
Printed at: see last page
ISBN: 978-620-2-79106-9

Copyright © Akbar John, Zaima Azira Zainal Abidin, Ahmed Jalal Khan Chowdhury
Copyright © 2020 International Book Market Service Ltd., member of OmniScriptum Publishing Group

FOR AUTHOR USE ONLY

BIOPROSPECTS OF COASTAL ECOSYSTEM AND SUSTAINABLE RESOURCE MANAGEMENT

FOR AUTHOR USE ONLY

Akbar John
Zaima Azira Zainal Abidin
Ahmed Jalal Khan Chowdhury

TABLE OF CONTENT

FOR AUTHOR USE ONLY

PREFACE

As we are about to step into the post COVID-19 pandemic time, many challenges are to be addressed, especially on the economic recovery action plan (post-COVID-19) through the sustainable utilization of natural resources and implementation of appropriate measurement practices. In order to achieve the 'Agenda 2030' of the United Nations' sustainable development goals (SDGs), natural resources need to be wisely explored. Knowledge on the coastal ecosystem, its dynamics and bioprospecting potentials are well addressed on the global scale. However, at the regional frame, potentials of the coastal ecosystem are less explored due to the complexity of the resource partitioning system and intertwined nature of multi-stakeholder intervention in decision making. Malaysia has a total coastline length of about 4809 km (divided in to 1,972 km in Peninsular Malaysia and 2837 km in East Malaysia) that has special socio-economic significance. Many strategic action plans were implemented to protect the coastline from fragmentation and degradation due to natural and manmade causes.

Coastal ecosystems are the most productive and valuable landscape constantly changing due to various environmental pressures and urbanization, they are always addressed together as 'estuarine and coastal ecosystems' (ECEs) due to its intricacy in providing ecological services. In order to interconnect the coastal ecosystem dynamics and explore its bioprospecting potentials, this book was intended to address the holistic importance of the coastal ecosystem and its bio-prospect potentials. The book is the comprehensive collection of research-based data from the studies on coastal ecosystems of Malaysia (especially from the east coast of peninsular Malaysia). The book consists of nine chapters addressing the issues related to (but not limited to) the bio-prospect potential such as screening of actinomycetes from the coastal ecosystem, microbial bioprospecting using 'omics' approach, importance of integrated Multi-trophic Aquaculture, biotic diversity and shoreline erosion in coastal ecosystem. We are optimistic to say that the in-depth knowledge and scientific insights shared in this book will contribute towards sustainable development goals holistically and in particular on SDG 13,14 and 15.

FOR AUTHOR USE ONLY

The nine chapters addressed in the present book titled '*Bioprospects of coastal ecosystem and sustainable resource management*' is authored by more than 30 researchers from various disciplines indicating the transdisciplinary knowledge offered in this book. Readers will get exposed to new knowledge in each chapter and the arrangements of all nine chapters flows with the core subject of the book. The chapters addressed in this book are 1) Seasonal variations of fish diversity and species richness at the coastal water, Pekan, Pahang, Malaysia, 2) Study of glucose-6-phosphate dehydrogenase activity assay in mangrove streptomyces for actinohordin and undercylprodigiosin production, 3) Cultivation vs the 'Omics' approach for microbial bioprospecting In The 21st Century: coastal environment in Malaysia, 4) Open water integrated multi-trophic aquaculture (IMTA) in coastal ecosystem: the status and prospects in Malaysia, 5) Antioxidant properties Of (*Nerita articulata*) drom estuarine mangrove Kuantan, Pahang Malaysia, 6) Heavy metal resistant bacteria from marine sediment of pantai Balok, Pahang, Malaysia, 7) Salinity tolerance and growth performance of Asian seabass (*Lates calcarifer*) juveniles, 8) Review: actinomycetes diversity and biosynthetic capabilities of east coast of peninsular Malaysia coastal water and, 9) Climate change and coastal defenses in Malaysia: A review. The full-color figures have been included in this research book to better illustrate the features of some of the complex discussion parts. We strongly believe that this book is an added value to unveil the unexplored hidden treasures of the dynamic coastal ecosystem from Malaysia. We also foresee that the data presented in this book will act as a baseline to further explore research and improve management practices in the coastal ecosystem in Malaysia.

Editors
Akbar John
Zaima Azira Zainal Abidin
Ahmed Jalal Khan Chowdhury

FOREWORD

Malaysia is located in South East Asia comprising two regions namely, Peninsular Malaysia and the States of Sabah and Sarawak. The total land area covers 329,293 km^2 while the total coastline length is about 4,809 km. Additionally, there are about 1,000 islands and coral reefs belonging to Malaysia. The coastal zone is linked to both socio-economic and environmental significance. Majority of the populations occupy this area and it is also a center of economic activities encompassing aquaculture, oil and gas exploitation, agriculture, transportation and others. Mangrove areas are one of the most productive ecosystems on Earth. Mangroves as nursery and breeding ground for many fish and crustacean, and habitats for many wildlife species.

Progressive development in the coastal areas for urbanization and economic purposes has negatively impacted the environmental ecosystem. Thus, the need to establish sustainable development to ensure a balance between development and protection of the environment. Malaysia has expressed commitment to support and implement the 2030 Agenda and Sustainable Development Goals (SDGs) and sets out an ambitious plan of action for people, planet, prosperity, peace and partnership with the objective of leaving no one behind. Hence, implementation of sustainable development practices and holistic approaches in coastal areas is the key in achieving this objective.

I am delighted that the researchers from Kulliyyah of Science, IIUM prepared this book in its current form with the title on '*Bioprospects of coastal ecosystem and sustainable resource management*'. The book addressed various issues and bioprospecting potential of coastal ecosystems in a broader scale that open up opportunities for intellectual discussion in the near future. The advent of modern technology provides an insight on the coastal water potential and emphasized in this book. Therefore, I am optimistic that the findings in this publication will provide meaningful and impactful inputs to readers in upgrading their knowledge on coastal waters in Malaysia.

FOR AUTHOR USE ONLY

Prof. Dr. Kamaruzzaman Yunus
Campus Director
International Islamic University Malaysia,
Kuantan Campus
Pahang, Malaysia

FOREWORD

The holistic and integrated approaches for the sustainable development and utilization of coastal ecosystems is well discussed among the scientific community and policy makers and in recent years. In this regard, the importance of the ocean ecosystem and utilization of its resources is one of the main agenda of the United Nations sustainable development goal (SDG) in particular on SDG -14 'Live below water'. As the ocean covers a substantial portion of the earth's surface, it is estimated that over 3 billion people depend on marine and coastal resources for their livelihoods. Nowadays, the coastal ecosystem is increasingly degraded or destroyed by many human activities and eventually reduced its ability to support crucial ecosystem services. Eventually, the deterioration of the coastal ecosystem negatively impacted human well-being globally.

Having said this, the biological resources from the coastal ecosystem are less explored especially on the bioactive potential resource availability and its sustainable utilization. The present book on 'Bioprospecting coastal ecosystem towards sustainable resource management' is a timely effort by the researchers from International Islamic University Malaysia (IIUM) to compile the current threats impacting the coastal ecosystem management and exploring possible bioprospecting potential for human sustainable living. Considering the fact that Malaysia is one of the mega biodiversity nation and always prioritize the biodiversity as a key factor in research road map, I am confident that the scientific information shared by the researchers from Malaysia will act as a reference for further utilization of coastal resources in an effective manner and open up doors for the further research.

Although the book is primarily addressing the scientific findings, I observe the content and the intention of the editors and authors with the help of IIUM vision that insist to develop holistic individuals who can act as a 'Khalifa' (*ie*., leader) and 'Rahmathal lil Alameen' (*ie*., mercy to all the worlds) truly guided by the divine principles of '*Maqasid al-Shari'ah'***.** I congratulate the contributors for their sincere and timely effort. In line with the vision and mission of the IIUM and the focus to achieve SDG 2030, I am confident that this book is an added value and informative to the broad-spectrum readers including academicians, researchers, policy makers, non-governmental organizations (NGOs) and students.

FOR AUTHOR USE ONLY

Prof. Dr. Ahmad Hafiz Bin Zulkifly

Deputy Rector (Responsible Research & Innovation)

International Islamic University Malaysia