



# **Aquaculture and the Environment**

## **Present Status and Future Challenges**

**Mohammad Mustafizur Rahman**

*Editor*

**IIUM PRESS**

**INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**



# **Aquaculture and the Environment**

## **Present Status and Future Challenges**

**Editor**  
**Mohammad Mustafizur Rahman**



**IJUM Press**

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
©IIUM Press, IIUM

All rights reserved. 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 any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Mohammad Mustafizur Rahman  
Aquaculture and the Environment: Present Status and Future Challenges  
Mohammad Mustafizur Rahman  
Include index  
Bibliography: p.  
ISBN

ISBN: 978-967-418-197-0

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM  
(Malaysian Scholarly Publishing Council)

Printed by :  
**IIUM PRINTING SDN.BHD.**  
No. 1, Jalan Industri Batu Caves 1/3  
Taman Perindustrian Batu Caves  
Batu Caves Centre Point  
68100 Batu Caves  
Selangor Darul Ehsan

## CONTENT

	Page no.
Preface	09
Chapter 1 : CURRENT STATUS OF GLOBAL AQUACULTURE AND THE ENVIRONMENT	10
Chapter 2 : EFFECTS OF CHINESE AQUACULTURE ON GLOBAL FOOD SECURITY	20
Chapter 3 : AQUACULTURE IN CHINA: A FOCUS ON MAJOR CONTRIBUTING SPECIES	25
Chapter 4 : FUTURE PROSPECTS OF MARINE FISH FARMING IN INDONESIA	32
Chapter 5 : POTENTIALITY OF INDIAN FRESHWATER AQUACULTURE TO WORLD FISH SUPPLY	41
Chapter 6 : COASTAL AQUACULTURE IN INDIA: PRESENT STATUS AND FUTURE PROSPECTS	50
Chapter 7 : CATFISH: A MAJOR CONTRIBUTOR IN THE AQUACULTURE PRODUCTION OF VIETNAM	57
Chapter 8 : AQUACULTURE PRACTICES IN PHILIPPINES UNDER VARIOUS ENVIRONMENTS AND CULTURE SYSTEMS	63
Chapter 9 : SHRIMP AQUACULTURE DEVELOPMENT IN THAILANDS: A CHALLENGE FOR SUSTAIBABILITY	70
Chapter 10 : MARICULTURE IN SOUTH KOREA: THE OPPORTUNITY FOR GROWTH	77
Chapter 11 : SEAWEED AQUACULTURE IN JAPAN: PRESENT STATUS AND FUTURE PROSPECTS	82
Chapter 12 : FUTURE PROSPECTS OF AQUACULTURE IN BANGLADESH: A HALLENGE OF MINIMIZING THE ENVIRONMENTAL EFFECTS	89

*CONTENT (continued)*

Chapter 13 : A SUCCESS STORY OF THE ATLANTIC SALMON AND TROUT AQUACULTURE IN NORWAY	99
Chapter 14 : THE SUCCESS OF SALMON AND TROUT FARMING IN CHILE	105
Chapter 15 : AQUACULTURE IN MYANMAR: A HIGH FUTURE PROSPECT	112
Chapter 16 : CHANNEL CATFISH CULTURE IN USA: AN ORGANIZED AQUACULTURE INDUSTRY	118
Chapter 17 : CURRENT STATUS OF AQUACULTURE IN MALAYSIA	124
Chapter 18 : BRAZIL: A FUTURE LEADER OF THE AQUACULTURE SECTOR	129
Chapter 19 : PROSPECTS OF COBIA AQUACULTURE IN TAIWAN	134
Chapter 20 : AQUACULTURE IN SPAIN: A SPECIAL EMPHASIS ON SHELLFISH QUACULTURE	141
Chapter 21 : CULTURE OF <i>Macrobrachium Rosenbergii</i> USING SOY BEAN MEAL IN HATCHERY REARED CONDITIONS	146
Chapter 22 : STATUS OF HILSA ( <i>Tenualosa ilisha</i> ) FISHERY IN BANGLADESH	154
Chapter 23 : COMMUNITY BASED AQUACULTURE IN BANGLADESH: IMPACTS OF SEASONAL FLOODPLAIN AQUACULTURE ON THE LIVELIHOOD OF BENEFICIARIES	178
Chapter 24 : EFFECTS OF NITRIFYING BACTERIA AND PROBIOTIC BACTERIA ON THE JUVENILE REARING OF PATIN ( <i>Pangasius hypophthalmus</i> )	205
Chapter 25 : COMMERCIAL SPECIES OF SEA CUCUMBER ( <i>ECHINODERMATA: HOLOTHUROIDEA</i> ) FROM FAMILY STICHOPODIDAE	218
Chapter 26 : PHYTOPLANKTON COMMUNITIES IN AQUACULTURE POTENTIAL PENOR RIVER PAHANG MALAYSIA	225

*CONTENTS (continued)*

Chapter 27 : FOOD SAFETY IN SHRIMP AQUACULTURE INDUSTRIES OF BANGLADESH: TOWARDS MICROBIOLOGY AND BIOCHEMICAL APPROACH	238
Chapter 28 : MICROBIAL COMMUNITIES AND WATER QUALITY OF AQUACULTURE POTENTIAL PENOR RIVER, PAHANG, MALAYSIA	250
Chapter 29 : FISH DISEASES IN SMALL INDIGENOUS FRESHWATER FISHES OF BANGLADESH	262
Chapter 30 : ENVIRONMENTAL IMPACT ON THE COASTAL AQUACULTURE IN BANGLADESH: A REVIEW	276

**FOOD SAFETY IN SHRIMP AQUACULTURE INDUSTRIES  
OF BANGLADESH: TOWARDS MICROBIOLOGY AND  
BIOCHEMICAL APPROACH**

<sup>1</sup> Sheikh Shafiqur Rahman, <sup>1</sup> Md, Rafiqul Islam and

<sup>2</sup> Ahmed Jalal Khan Chowdhury

*<sup>1</sup> Department of Fisheries, Ministry of Fisheries and Livestock,  
Bangladesh.*

*<sup>2</sup> Department of Biotechnology, Kulliyah of Science, International  
Islamic University Malaysia, Jalan Sultan Ahmad Shah, Bandar Indera  
Mahkota, Kuantan Pahang, Malaysia*

*\*Corresponding author: [jkchowdhury@ium.edu.my](mailto:jkchowdhury@ium.edu.my)*

**INTRODUCTION**

Shrimp farming and export activities in Bangladesh have been undergoing expansion during the last two decades. The volume of shrimp and prawn cultivated inland and brackish water aquaculture has increased more than 10 times. Not only does the shrimp