

Applied Environmental Science and Engineering for a Sustainable Future

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Sustainable Aquaculture

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Preface

Global human population will reach nine billion by 2050. The major food source to sustain such a large population is projected to be seafood. Aquaculture will be the prime source of seafood by 2030 according to the recent World Bank report. Fish farming can help provide livelihoods and feed the global population if practiced responsibly. For an aquaculture system to be truly sustainable, it must meet sustainability standard in three major areas including economic sustainability, environmental sustainability, and social and community sustainability.

We need to establish best aquaculture practice methods to avoid significant disruption to the ecosystem, the loss of biodiversity and substantial pollution impact to the environment. The system must be a viable business proposition with long-term prospects. Aquaculture system should contribute to community well-being and must be socially responsible.

Aquaculture can make an important contribution to global food security, but new investment is needed to meet the anticipated demand. Generally, small scale and organic growth of aquaculture has made it difficult to regulate and it contributes to the high level of risk to the new investors. The major risk factors in aquaculture are determined primarily by water management, production intensity, and closeness of fish farms to one another.

Life cycle assessment (LCA) defines sustainability in the broader sense by comparing food production systems in terms of impact on processes that govern global biogeochemical cycles. Thus concerted research should focus on development of a simplified biodiversity/water quality index of sustainability at the ecosystem level and adapt spatial planning to aquaculture zoning.

An effort has been made in this book to include important relevant recent research topics in sustainable aquaculture practices. This book contains chapters that cover socio-economic and environmental assessment for sustainable aquaculture production (Chaps. 1 and 2). Particularly, Chap. 8 presents an analysis of carbon footprint under an intensive aquaculture regime. Chapters 3 and 5 present sustainable fishing methods, while Chap. 4 critically assesses the aspect of sustainable aquaculture feed. Chapters 6 and 7 discuss aquaponics as a niche for sustainable modern aquaculture. The effect of use of pharmaceuticals to prevent fish

disease on the surrounding marine environment is an emerging area of concern, and a critical discussion on this aspect is included in Chap. 9. The spread of organic waste and nutrients released by fish farms to natural water bodies has raised considerable concerns. Therefore, the methods to prevent their dispersion and removal (treatment) are the focus of Chap. 10. We believe that the current book will be very helpful to academician, researchers, and policy-makers in the area of aquaculture.

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Last but not the least, the editors are indebted to their family members for their wholehearted cooperation.

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