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Science, Technology and Innovation in Achieving Sustainable Development Goals

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Foreword by Jon Samseth

It is a privilege for me to present this volume titled—*Science, Technology and Innovation in Achieving Sustainable Development Goals*—at a time when the global community is intensifying its efforts toward implementing the 2030 Agenda for Sustainable Development.

Science, Technology and Innovation (STI) plays crucial roles in the implementation of the 17 Sustainable Development Goals (SDGs) which collectively have the objectives of eradicating poverty, protecting the planet, and ensuring prosperity for all by 2030. STI serves as a critical enabler by driving transformative solutions across economic, social and environmental dimensions.

Today's world is confronted with complex challenges—biodiversity loss, climate change, food insecurity, access to clean water, pressure on natural resources and growing socio-economic inequalities. In this context, the role of Science, Technology and Innovation (STI) is more critical than ever. STI is not only a supporting element; it forms the foundation of Sustainable Development by providing the scientific evidence, technological innovations and strategic approaches needed to design effective policies, strengthen systems and deliver practical solutions for a more resilient, inclusive and sustainable future.

By fostering efficient resource use, inclusive growth and climate resilience, STI accelerates achievement of the entire UN's 2030 Agenda for Sustainable Development. However, its full potential depends on strong science-policy interfaces, equitable access to technology and sustained investment, ensuring innovations benefit everyone and leave no one behind.

This book containing 19 chapters contributed by experts from various countries, offer multidisciplinary insights into how STI can accelerate progress on the SDGs. The chapters collectively focus on four broad areas: meeting basic human needs, fostering sustainable and inclusive societies, ensuring the responsible use of natural resources and strengthening global partnerships and institutional frameworks. Together, these contributions provide a holistic understanding of the complexities of Sustainable Development and the critical role of STI-driven transformations.

Taken together, the book offers a timely, insightful and solution-oriented contribution to global discourse. I hope that the book will be an invaluable resource material

for policymakers, researchers, practitioners and development institutions. I commend the contributors and editorial team for their dedication in bringing together such a comprehensive volume.

I also take this opportunity to congratulate Dr. Amitava Bandopadhyay, Director General, NAM S&T Centre, for conceptualizing and bringing out a volume of such high relevance to the Global South. At a time when developing countries are striving to strengthen their scientific capacities, enhance innovative ecosystems and accelerate progress towards the SDGs, this book serves as an important knowledge resource.

As we approach the final stretch toward 2030, it is essential that we harness the full potential of Science, Technology and Innovation. Coordinated efforts and effective collaboration across various sectors will be essential to accelerate progress. I am confident that this volume will advance our knowledge and understanding of our shared global goals for Sustainable Development.

Delft, The Netherlands

Jon Samseth
President
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Preface

The global commitment to the 2030 Agenda for Sustainable Development has placed unprecedented emphasis on the role of Science, Technology and Innovation (STI) as critical enablers of progress. From ensuring food security, clean water and health for all, to advancing sustainable energy, protecting ecosystems and fostering inclusive growth, STI offers the tools and pathways needed to translate aspirations into reality. The complexity and interconnectedness of the Sustainable Development Goals (SDGs) require integrated solutions, and it is here that scientific knowledge, technological advancement and innovative practices become indispensable.

This book, *Science, Technology and Innovation in Achieving Sustainable Development Goals*, has been conceived with the objective of providing a perspective on how STI can accelerate the realization of the SDGs, particularly in developing countries. With contributions from scholars, practitioners and experts across nine countries, namely Bangladesh, Ghana, India, Iraq, Malaysia, Mauritius, Nepal, Sri Lanka and Somalia, the volume brings together diverse experiences, case studies and policy insights that highlight the transformative potential of STI in different socio-economic and environmental contexts.

The book comprises nineteen chapters organized into four thematic sections, each addressing a critical dimension of the SDG agenda. The first section of this book focuses on the application of STI in meeting fundamental human needs related to food, health and water, thereby aligning with SDGs 2, 3 and 6. This section consists of five chapters covering the related topics. The second section of this book examines the role of STI in promoting sustainable living and social inclusion, with chapters on quality education, women's empowerment and urban and community development. This section consists of five chapters. The third section of this book consists of five chapters and emphasizes the sustainable management of natural resources, particularly aquifers, oceans and coastal systems, and demonstrates the significance of STI in conserving these resources. The final section of this book addresses institutional frameworks and global partnerships, underscoring the importance of cooperation among governments, civil society, the private sector and international organizations to achieve the SDGs.

We hope that this book will serve as a valuable reference for policymakers, researchers, academics, development practitioners and international organizations. It aims not only to document best practices and success stories, but also to stimulate further dialogue and collaboration across disciplines and borders. By presenting evidence-based perspectives, policy insights, and case studies, the volume aims to inform decision-making processes and stimulate further research and collaboration on the role of STI in achieving the SDGs. It is our sincere hope that this book will contribute meaningfully to the global discourse on sustainable development, and support stakeholders in identifying practical strategies for aligning innovation with the SDGs.

As editors, we wish to express our sincere appreciation to the authors for their scholarly contributions. We extend our sincere thanks and acknowledge the initiative and coordination of the Director General, Dr. Amitava Bandopadhyay from the Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi, in facilitating this collaborative endeavour. Special thanks are due to Ms. Jasmeet Kaur Baweja, Senior Programme Officer, NAM S&T Centre for her initiative and willingness to provide support, without which this book would never have been possible.

We also extend our thanks to the Mauritius Research and Innovation Council (MRIC), the Nepal Academy of Science and Technology (NAST), and the Department of Science and Innovation, South Africa, for their institutional support. Their commitment to advancing Science, Technology and Innovation for sustainable development has been invaluable in the preparation of this book.

Finally, the supports from the publisher (Springer Nature Singapore Pte Ltd.), especially from Dr. Loyola D'Silva, Executive Editor and his entire team is greatly acknowledged for providing the platform to disseminate this collective work to a wider global audience of scholars, practitioners and policymakers.

Ebene, Mauritius — Poonam Veer Ramjeawon
New Delhi, India — Madhusudan Bandyopadhyay
Lalitpur, Nepal — Rabindra Prasad Dhakal
Pretoria, South Africa — Dumisani Mthembu

Introduction

Science, Technology and Innovation (STI) are vital for achieving the Sustainable Development Goals (SDGs), particularly in areas such as food security, health, clean energy, climate resilience, clean water and sanitation, innovation and entrepreneurship and economic growth. For developing countries, STI serves as a key driver of economic transformation, entrepreneurship and job creation, enabling them to leapfrog into emerging economies. Advances in digital technologies, including Artificial Intelligence (AI), biotechnology and renewable energy further expand opportunities for inclusive growth. Building robust STI ecosystems requires close collaboration among governments, academia, industry and civil society, supported by investments in education, skill development and infrastructure. Overall, STI serves as a strategic driver for sustainable and inclusive development in both the developed and developing world.

Furthermore, strengthening international cooperation and knowledge sharing is essential to bridge technological divides between developed and developing nations. Access to finance, global research networks and technology transfer can empower developing countries to accelerate progress towards achieving the SDGs. By ensuring innovation is inclusive and accessible, STI can reduce inequalities and deliver solutions that benefit all segments of society.

Considering the importance of the subject, the *Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi*, India [an Inter-governmental Organization], has published this book titled *Science, Technology and Innovation in Achieving Sustainable Development Goals* with contributions from experts and researchers from developing countries, viz., Bangladesh, Ghana, India, Iraq, Malaysia, Mauritius, Nepal, Sri Lanka and Somalia. The book contains 19 chapters organized into four thematic sections. First section: Meeting Basic Human Needs—Food, Health and Water with five chapters explores the application of STI in addressing fundamental human needs such as food security, clean water and public health. Second section: Sustainable Living and Social Inclusion includes five chapters which address issues of sustainable living and social development, including quality education, socio-economic empowerment of rural women and the livelihoods of tribal communities. Third section: Sustainable Use of Natural

Resources—Aquifers, Oceans and Seas comprising five chapters focuses on the sustainable management of natural resources while highlighting the pivotal role of STI in their conservation and management. Finally, Fourth section: Institutions and Global Partnerships with four chapters emphasizes the importance of global partnerships involving governments, civil society, the private sector and international organizations to mobilize resources, share knowledge and collectively address the global developmental challenges.

The leading international research and academic publisher—Springer Nature, Singapore has published this Book. We are thankful to Dr. Loyola D'Silva, Executive Editor, Springer Nature, Singapore for his encouragement and kind support. We also extend our appreciation to Mr. Samuvel Sampath, Production Editor, and Mr. Umamagesh A P, Project Manager,Straive, Chennai, India, for handling all technical and administrative matters related to this publication.

We express our sincere gratitude to our editorial team: Dr. Poonam Veer Ramjeawon, Research Coordinator, Mauritius Research and Innovation Council (MRIC), Ebène, Mauritius; Mr. Madhusudan Bandyopadhyay, Senior Adviser, Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi, India; Dr. Rabindra Prasad Dhakal, Secretary, Nepal Academy of Science and Technology (NAST), Lalitpur, Nepal; and Dr. Dumisani Mthembu, Acting Director: Multilateral Cooperation, Department of Science and Innovation, CSIR Campus, Pretoria, South Africa, for sparing their valuable time for technical editing of the papers published in this book.

I also express my deep gratitude to Prof. Jon Samseth, President, Scientific Committee of the Problems of the Environment (SCOPE) and Professor, Oslo Metropolitan University (OsloMet), Oslo, Norway, for graciously contributing the "Foreword" to this publication.

I will take this moment to express my sincere thanks to Mr. Madhusudan Bandyopadhyay, Senior Adviser, NAM S&T Centre, who also served as one of the Editors, for his kind advice and guidance in various stages of planning and execution of this book project. Further, I am also thankful to Ms. Jasmeet Kaur Baweja, Senior Programme Officer, NAM S&T Centre for her significant contributions in coordinating this book project.

I also acknowledge the support received from the entire team of the NAM S&T Centre, particularly Mr. Pankaj Buttan, Data Processing Manager; Mr. Rahul Kumra, Assistant Administrative Officer; Mr. Sunil Kumar, Accounts Manager and Mr. Jayakumaran, Public Relations Manager for their support in bringing out this publication.

I am confident that the book will be a useful source of information and knowledge for the scientists, researchers, policymakers and other stakeholders interested in the

issues related to the application of Science, Technology and Innovation for realizing the Sustainable Development Goals in the Global South.

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