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The project was conceptualized and led by Shanti Jagannathan, Senior Education Specialist at the ADB. In addition to enabling research and analysis on the prospects and challenges of building dynamic skills development systems for a "greening" Asia, the project established the ADB International Skills Development Forum series, which has become a flagship knowledge sharing event in education and skills in ADB, by financing 4 of the 6 annual International Skills Development Forums held so far.

Prof. Rupert Maclean (who at the time was at the Education University of Hong Kong) was the overall team leader for the project. In addition to leading the research in collaboration with international and national consultants, he led the development of a series of publications that include the book 'Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific' and a special edition of Prospects 'Skills for Inclusive and Sustainable Development – Perspectives from the Asia Pacific Region and Beyond'. Special thanks are owed to Prof Maclean for enabling extensive knowledge partnerships and publications arising from this project.

This book draws on a wide range of primary and secondary source materials, as listed in the bibliography at the end of the publication. The authors drew heavily on the outputs from the above mentioned research project. Four country reports and a regional report were prepared by Prof. Maclean in close collaboration with Mr. Saurabh Johri (TVET Consultant, New Delhi) and Mr. Will Douglas (Education University of Hong Kong).

The research team for the project '***Education and Skills for Inclusive Growth and Green Jobs'*** comprised of Prof. Rupert Maclean (Team Leader), Dr. Margarita Pavlova (TVET Providers Specialist) and Ms. Belinda Smith (Private Sector Skills Specialist) who were members of the international team and the following national consultants:

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PREFACE

The rapidly growing attention to growth models that are environmentally sustainable and reduce carbon footprint cannot be disputed. Developed and developing countries alike have attributed high priority to accelerating a transition to a cleaner, greener growth. If anything, the vital connections between climate change, sustainable economic growth, energy security, innovation and new occupations has become even more obvious. There are some levers that can make this transition faster and more enduring and education, skills and talent development is one such area. The levels of knowledge, training, expertise, R&D and innovation will determine the depth and pace of change.

This book is the outcome of a regional research project that explored the links between research, policy, and practice to enhance quality and relevance of skills development systems particularly in industries with potential for high employment, growth, and greening. The book reinforced the mutual benefit of greening and moving up the global value chain for more inclusive growth.

There is an urgent need to retool the process of education, skills development and tertiary education for building foundational knowledge, workforce training and expanding research and innovation in green economy-related fields. In the past decade there has been considerable work in schools to promote education for sustainable development by integrating environmental concerns in school curriculum. There is also progress in terms of research and courses at university level on environmental sustainability and climate change areas. However, there is need to expand TVET for greening economies. While the importance of skills for greening economies is acknowledged by both public and private sector representatives, TVET institutions have been slow to incorporate 'skills that facilitate 'greening' of various occupations and support the development of new occupations.

On the one hand the transition to greener economies requires higher order talent such as architects, engineers, planners, scientists, business managers, financial experts, lawyers, entrepreneurs, resource managers, environment auditors and so on. However, equally there is a need to develop an extensive green manufacturing workforce and trained mechanics, technicians, electricians, construction workers, equipment installers and so on. Environmental protection, resource efficiency, adoption of renewable energies are areas that need to be integrated into the curricula for vocational training. TVET also needs to address the application and enforcement of environmental and energy policy guidelines, standards and regulations. On the one hand, education and training are required to help meet the standards, laws and regulations that are consistently being enhanced in many countries; on the other hand, the availability of adequate talent, particularly for innovation, research and development will foster further new and innovative solutions and more cost efficient and effective technical solutions, financial models and implementation capacities.

There are now various forms of financing and incentives to boost green and climate resilient growth, the green climate fund being one of the recent examples. The time is now opportune to provide the requisite backing to education and skills development. Countries need to consider new departures to build up the knowledge base such as setting up national level education initiatives for green and climate resilient development and possibly a national climate education centre or institution to become a clearing house of knowledge in this area. Comprehensive green skills development programs are crucial to this transition. An example of how this can be done effectively is the Australian Green Skills Agreement which seeks to

build the capacity of the vocational education and training (VET) sector to deliver the skills for sustainability and required in the workplace.

There is great potential is strengthening the intersections of Environment, Energy and Employment in a greening environment which will help to bring sustainable and inclusive growth. At ADB, I hope that while continuing to support large scale projects in clean energy, sustainable transport, climate change as well as in education, we will also explore and invest to strengthen the interlinkages and to enable the reaping of benefits from such holistic development approaches that optimize the role of education and skills development.

Series Editor's Introduction

This book reports on a major research project funded by the Asian Development Bank (ADB) in Manila, and undertaken by the Education University of Hong Kong. It examines a topic that is of great importance not only to countries and communities in the rapidly developing Asia and Pacific region, but also to countries worldwide as they seek to achieve balanced economic growth that benefits all sectors of the community, is sustainable, and minimizes the adverse impact of such development on the environment.

The growing prominence of Asian economies and corporations, together with globalization and technological innovation, are leading to long-term changes in trade, business, and labor markets. Asia's economies have achieved remarkable growth rates, particularly over the past 2 decades. If Asia continues to grow on its recent trajectory, it could, by 2050, account for 51% of world gross domestic product (compared with 27% in 2010), with a sixfold increase in per capita income (Asian Development Bank [ADB], 2011). With these long-term changes in trade, business, and labor markets there is a rebalancing of power and influence in the region, and between the region and other parts of the world.

Within Asia and the Pacific, policy frameworks are being prepared to ensure that these growing economic benefits are inclusive by improving the quality and outreach of skills development employability and sustainable livelihoods. Countries are also taking action to ensure that economic growth in Asian and Pacific countries is "green," which minimizes adverse impacts on the environment. The transition to green growth is currently focusing on such matters as efficient use of energy; greater use of renewable energy and the associated investment in technology development; waste reduction leading to lower pollutant emissions; production processes that conserve; the recycling and reuse of natural resources; and, an understanding that environmental regulations, standards, and economic instruments are not a hindrance to production, but are essential for achieving inclusive, sustainable, and environmentally friendly growth.

The adoption of green growth policies in support of green jobs and the greening of existing occupations are likely to require new skills to react to the needs of the labor market. In this study, green jobs are defined as

> *Jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable, are called green jobs. This comprises work in agriculture, industry, services, and administration that contributes to preserving or restoring the quality of the environment while also meeting the requirements of decent work, involving adequate wages, safe conditions, workers' rights, social dialogue, and social protection.*

This definition is consistent with the one used by the International Labour Organization and relevant others (ILO/UNEP/IOE/ITUC, 2008).

The major Springer book series in which this book is published examines issues, concerns, and prospects regarding education for the changing world of work. It seeks to provide research; evidence-based information about a diverse range of key, cutting edge aspects of technical and vocational education and training (TVET); and applied learning. The series showcases promising innovative approaches to TVET and education for the world of work. In so doing it also seeks to create an effective bridge among research, policy, and practice. This is a long-

standing publications program that began in 2005 at the instigation of the UNESCO-UNEVOC International Centre for TVET in Bonn, Germany. The numerous volumes published to date in this major Springer book series provide a comprehensive, in-depth picture of current issues, concerns, and prospects in TVET, as they relate to both individual countries and worldwide.

Rupert Maclean
Series Editor
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Abstract

International interest in sustainable and inclusive growth has gained impetus because of the recognition that the "brown" economy model does not address global issues such as growing inequality and social marginalization, environmental degradation, and resource depletion.

Evidence has shown that the "green" economy is a potential source of employment, can halt further productivity loss, and can address climate change and environmental degradation.

Broadly, three kinds of skills sets for green jobs can be identified. The first is general sustainability literacy, predominantly in the form of soft skills, awareness, and action competence. The second set includes occupation-specific science, technology, engineering, and mathematics (STEM) skills, while the third set encompasses leadership and management skills aimed at green transition. Many of these skills exist and are transferrable, but need to be further strengthened and mainstreamed, or complemented with additional green concepts and practices. Others, such as broader STEM skills and leadership skills are missing. All present particular opportunities for the training sector.

Each of the four countries studied—India, Indonesia, Sri Lanka, and Viet Nam—as part of this Asian Development Bank (ADB)–Education University of Hong Kong (EdUHK) research study, presents an overview of main research findings concerning education and skills for inclusive growth, green jobs, and the greening of the economy for each country. This includes examples of government and business sector responses to the issues and challenges being addressed, and examples of how technical and vocational education and training (TVET) systems and institutions are addressing both the revision of curricula in the context of green growth dynamics and patterns of training and skills development for meeting demands.

The research study reported on in this book is unique. The findings, conclusions, and recommendations are based on primary data that were specifically collected for the study. Similar studies conducted in Asia have relied largely on secondary sources of data, and report on existing research and related literature. By comparison, this study—in addition to reporting on existing research and related literature—surveyed TVET providers and business enterprises and examined survey responses of policy makers and practitioners on key aspects of education and skills for inclusive growth and the greening of economies. In addition, in-country workshops were held in each of the four countries to ascertain the views of key stakeholders in government, nongovernment organizations, members of the international development community, TVET providers, and members of the business sector. These workshops were organized to discuss key aspects of green growth, green jobs, inclusive growth, and the greening of economies, and to discuss the main findings emerging from the research.

In addition to reporting on research findings from India, Indonesia, Sri Lanka, and Viet Nam, this book examines cross-cutting issues, concerns, and prospects regarding education and skills for inclusive growth and green jobs for the four countries. These are critical themes and issues in the selected industry sectors triggering a demand for green jobs in the region; how industry is responding to those demands; areas impeding the transition from traditional to green practices; the importance of skills development, especially green skills, with regard to successful examples and the reasons for their success; the role of TVET in addressing industry needs; reasons for the slow response of TVET toward green skills, and key impediments; and,

what works concerning initiatives from countries to fast-track reforms in TVET to facilitate inclusive growth and the greening of economies.

The research study provides recommendations to help manage the transition toward green and inclusive growth, presents a suggested framework for implementation of potential strategies and policy initiatives, and examines areas for further research.

Summaries are provided in this book of the case studies undertaken for India, Indonesia, Sri Lanka, and Viet Nam.

The full, detailed case studies are available for viewing and downloading from www.cna-qatar.com/research/unesco-unevoc