



The Association of Academies of Sciences in Asia (AASA)

TOWARDS A SUSTAINABLE ASIA

ENVIRONMENT AND CLIMATE CHANGE



Science Press
Beijing

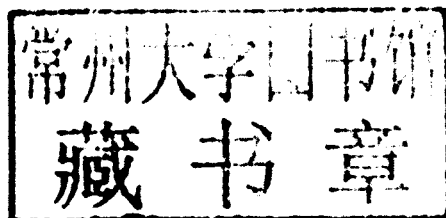


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TOWARDS A SUSTAINABLE ASIA: ENVIRONMENT AND CLIMATE CHANGE

With 38 figures



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Foreword

Asia is not only the largest and most populated continent in the world, but also the region with the most diverse development models and most dynamic economies. In the past half century, Asia has been witnessing rapid economic growth and playing an increasingly more important role in world's political and economic arena. At the same time, Asia has developed the commonly-called "Asia Model", which has attracted worldwide attention. The Asia Model shows a new way for the developing nations or late-development countries on how to realize industrialization and modernization. All these achievements are made by Asian countries with a focus on the advantages of their late development, re-examination of their internal cultural values, active absorption of modern S&T and management experiences and constant exploration and innovation.

These social progresses have made great contributions to the realization of the UN Millennium Development Goals and have played a pioneering and demonstration role on what can be accomplished in today's world. However, Asia is facing big challenges. The most prominent one is that the rapid development of Asian economies is based on large input of production factors at the huge expense of natural resources and environment, which has been sharpening the conflicts in population, resources, environment, socio-economic development. The sustainable development in the region is being severely threatened and challenged. The rethinking and questioning of the Asia Model in the international community is growing especially in the era of post Asia Financial Crisis and Global Financial Crisis.

It is not only a common challenge for the governments of Asian countries, but also a common task for the Asian scientific communities to cope with the resources and environment crisis and to seek a new way of sustainable development in Asia. AASA, as a non-governmental and regional international scientific organization with 26 member academies, is mandated to initiate and conduct investigation on issues concerning S&T, economic and social development. As early as April 2007, AASA proposed to initiate a project on "Sustainable Development in Asia" (SDA) within AASA framework in the hopes to provide consultation and advice for national and regional governments in Asia and relative international organizations. This study proposal was approved at AASA board meeting held in Russia in August 2007 with the Chinese Academy of Sciences as the initiator. The project covers environment, energy,

resources and culture with the establishment of four working groups among AASA member academies.

Soon after, the SDA project was officially launched and implemented at different levels. The efforts include the clarification of the research content, emphasis, structure and division of tasks. Various meetings at the working level and international workshops have been held to coordinate the research activities and project progress: the first international workshop under this project was held in February 2008; the AASA Workshop on Sustainable Energy Development in Asia in November 2008; the AASA Workshop on Agricultural Culture and Asian Sustainable Development in August 2009; and the AASA Workshop on Environment and Resources in September 2009.

With the joint efforts of AASA member academies, the SDA project has now come up with a series of studies including four thematic reports, namely, “Towards a Sustainable Asia: Energy”, “Towards a Sustainable Asia: Environment and Climate Change”, “Towards a Sustainable Asia: Natural Resources”, and “Towards a Sustainable Asia: The Cultural Perspectives”. Based on these four reports, a synthesis report has also been written entitled: “Toward a Sustainable Asia: Green Transition and Innovation”. All these reports have looked deeply into the common issues and challenges for the Asian sustainable development from different perspectives.

The synthesis report is an integration and extension of the four thematic reports. It aims at the major resource and environmental challenges and issues in Asia in the general context of the challenges of financial crisis and climate change, and in line with green transition and innovation in Asia. Of its major findings, it includes: the diagnosis of key resource and environmental issues in Asia, such as water, minerals, land resource, environmental pollution, eco-degradation, energy and environment and climate change, the revelation and reflection of the diverse, different, complicated and severe nature of resource and environmental issues in Asia, the systematic analysis of the main driving forces and future trends of resource and environmental changes in Asia, the empirical analysis and discretion of current evolution of the relationship between environment and development in Asia with the establishment of theoretical and conceptual models, the initiation of principals, strategic framework, focus and advice for promoting the green development of Asia on the basis of summarizing Asia's advantages and disadvantages.

The synthesis report differs from other similar reports. It focuses more on the combination of theoretical and empirical research in the evolution of environment and development, on the combination of trends analysis in time series and comparative study at spatial scale, and on the combination of Asia's integrated analysis and regional and national differences. Besides, attempts have been made here on the innovative modeling of the evolutionary and theoretical relationship between environment and development, analysis of the driving

forces in environmental evolution, and utilization of newly developed composite index to conduct empirical research of Asia's environment and development relation in the evolution.

We hope the reports will be of good value to the facilitation of the green development in Asia, providing advice on dealing with the shortage of conventional resources, environment pollution and climate change, fostering new economic growth and enhancing Asia's competitive advantages. This is the first time that AASA has ever undertaken such a study, and it surely leaves grounds for more detailed study and analysis of various issues and challenges that Asian countries face in the future.

The SDA project is sponsored by AASA. I want to give my special thanks to all AASA member academies for their consistent support, advice and assistance, without which, the accomplishment of such an internationally interdisciplinary scientific project would be impossible. My thanks also go to all the members in the working groups, especially Professors Namık Aras and Yi Wang, co-chairs of this study, without whom, efficiency and quality of the study would not be guaranteed. I also need to thank United Nations Environment Programme (UNEP), InterAcademy Council (IAC) and InterAcademy Panel (IAP) etc. for providing us the references and various advice and inspirations. Last but not the least, I want to express my thanks to all friends and the institutions that have rendered us encouragement and assistance all the way along.

The SDA project features with a wide range of fields and a huge amount of data, some of which are still in their early stage of development. Any comments or suggestions from our friends and various international institutions are warmly appreciated.

Prof. Jinghai Li

President

The Association of Academies of Sciences in Asia (AASA)

September 20, 2010

Preface

Diverse landscape and culture, dense population, rapid economic growth, world manufacturer center, ..., those are all about Asia, the most economically dynamic region in the world. In the past two decades, most Asia countries have experienced major booming in industrial and agricultural production, along with fundamental changes in lifestyle and consumption patterns. While Asian countries produce more and higher quality products for world markets, more people than any other continent have walked out of the shadow of poverty. However, environmental change and deterioration are also highly evident as Asia regional economy continued to grow at a high rate. Under combined pressure of climatic change and human disturbances, the natural environment in Asia has been steadily degrading, which compromises the future development and the livelihood of its 3.8 billion residents. Meanwhile, share of Asian developing countries to global GHG emissions is rising rapidly. Impacts of climate change are especially visible in Asian various sectors including agriculture, forestry, biodiversity conservation, water resources, human health, air quality, energy security, etc. Impacts of climate change in Asia are already serious, and will very likely further worsen in future. Environmental sustainability is under serious threat.

This report of the Association of Academies of Sciences in Asia (AASA) aims to investigate the common environmental problems that threaten human livelihood and compromise sustainable future in Asia where we are in the same boat facing global climate change and environmental degradation. This report intends to provide governments and general public with up-to-date information on ongoing and future environmental changes, with guidelines of best practices of adaptation and mitigation by scaling-up of useful local and national experiences to regional level, and with regional overview/recommendations of environmental policies. It is designed to cover the entire continent, with four foci units: coastal Asia, dryland Asia, highland Asia, and urban Asia. The report of environment and climate change covers the following schemes:

- Environment states and trends: current situations and recent changes of key environmental issues and regional climate change over entire Asia, along with specific problems/solutions over the foci units.
- Best practices for environment improvement and climate change adaptation as scaling-up of useful local and national experiences to regional

level.

- National and regional overview of environmental policies and recommendations for policy options for mitigating climate change and major environmental problems to achieve sustainability in Asia.

AASA Sustainable Development in Asia Project was established in 2007 to investigate common issues related to natural resources, energy, the environment and climate change, and culture from particular perspectives of agriculture. This report summarizes the key findings from the environment and climate change component of the project. It also reflects the outcomes of two AASA project workshops held in Beijing, China (February 2008) and İzmir, Turkey (September 2009) respectively.

Study Group on Environment and Climate Change

August 2010

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