Initial Strategic Research Plan for Future Earth in Asia

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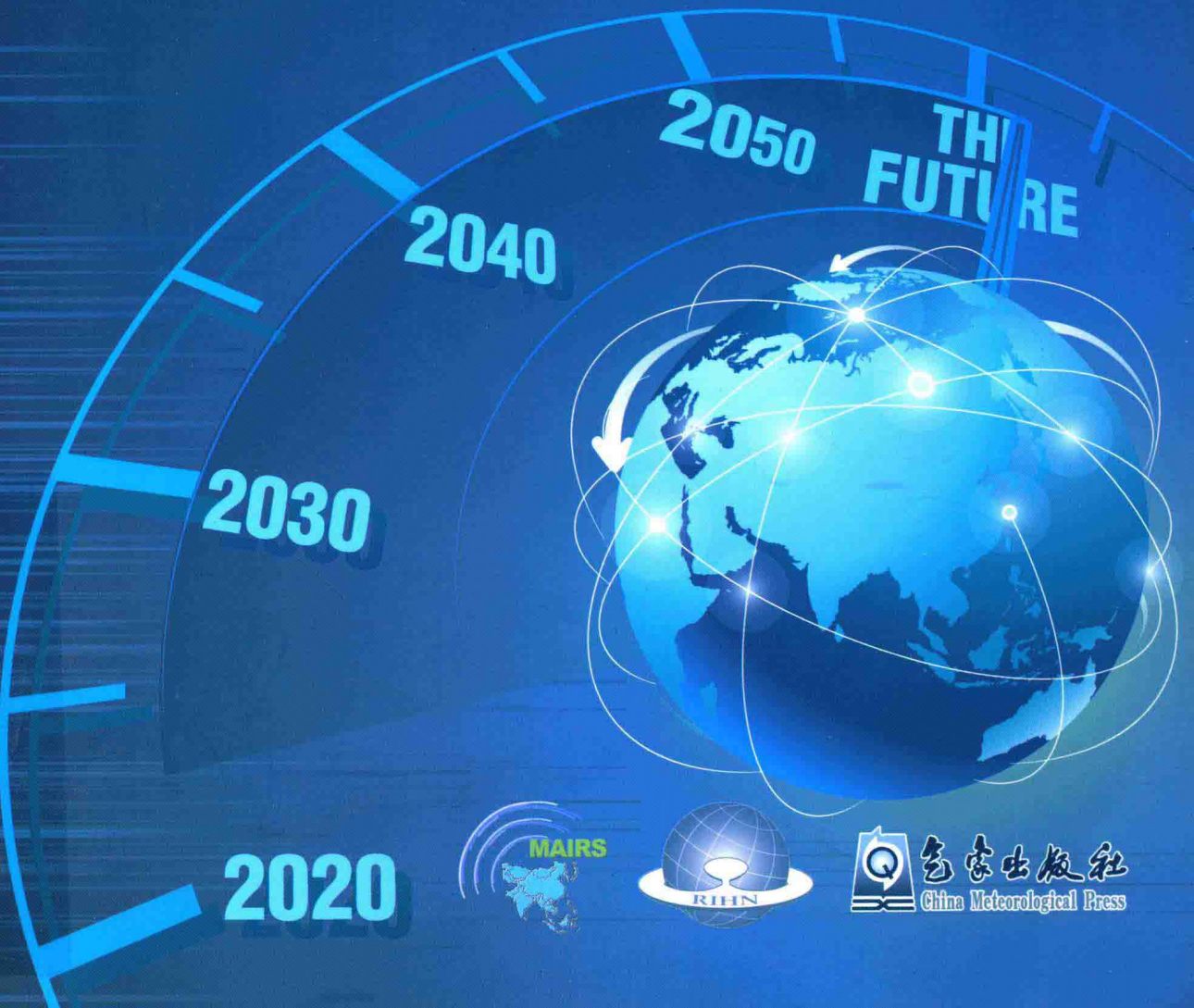

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Initial Strategic Research Plan for Future Earth in Asia

(未来地球亚洲战略研究计划)

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Abstract

The Future Earth program, initiated by ICSU, ISSC and other international partners, is now established, and researchers around the world are working with stakeholders on the development of the trans-disciplinary research needed to resolve some of the key challenges for global sustainability. To inspire the realization of Future Earth in Asia, the Monsoon Asia Integrated Regional Study(MAIRS), in collaboration with the Research Institute for Humanity and Nature (RIHN) and with inputs of numerous other contributors, facilitated the preparation of this strategic research plan. This strategic research plan aims to be consistent with the global plans for Future Earth by recognizing the unique qualities of Asia and its challenges for sustainability. It has 6 chapters including 1) Introduction, 2) Dynamic Asia, 3) Asian development, 4) Crosscutting capacities, 5) Transformation to Asian sustainability, 6) Conclusions and key messages. Chinese Academy of Sciences (CAS) and Chinese Association of Science and Technology(CAST) financially supported the related workshops/meetings and publication.

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INITIAL STRATEGIC RESEARCH PLAN FOR FUTURE EARTH IN ASIA

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Preface

The Future Earth program, initiated by ICSU and ISSC, is now established, and researchers around the world are working with stakeholders on the development of the trans－disciplinary research needed to resolve some of the key challenges for global sustainability. A significant aspect of Future Earth is that it is building on the global environmental change programs that have successfully promoted international collaboration for some decades. The Monsoon Asia Integrated Region Study (MAIRS) program is a regional environmental change program that has promoted regional collaboration across monsoon Asia for nearly a decade. At the meeting of the MAIRS Scientific Steering Committee in Guangzhou, China in March 2013, it was agreed that a strategic science plan should be prepared to show how MAIRS could link to Future Earth in Asia. The plan, which would aim to be consistent with the global plans for Future Earth but also recognize the unique qualities of Asia and its challenges for sustainability, would be prepared in cooperation with partners such as the Research Institute for Humanity and Nature(RIHN) in Japan.

To commence the process to prepare the plan, a small international workshop of invited experts was held on 31 July to 2 August 2013 at the Hong Kong Polytechnic University, Hong Kong. The participants in the Hong Kong workshop are listed in Appendix 1. The workshop was excellently led by Professor Tetsuzo Yasunari, Director General of RIHN. At that meeting an outline was prepared as the basis for the current draft plan, with input from representatives of the Asia Pacific Network for Global Change Research (APN)and the ICSU Regional Office for Asia and the Pacific.

This draft plan is now being distributed to the broader stakeholder community to seek guidance on the improvement of the document. Input is

being sought especially from the international community involved in the consolidation of Future Earth, so that this plan can support the directions being taken in worldwide plans for the program.

I am grateful to all the people who have provided input to the plan at this stage, especially to Hein Mallee at RIHN and Ailikun at the MAIRS Office, and I look forward to receiving valuable suggestions from all potential stakeholders in Future Earth Asia.

Michael Manton

Chair, MAIRS Scientific Steering Committee

Foreword

In preparing a set of Sustainable Development Goals, world leaders recognize that global societies need to transform so as to support and protect both human communities and the environment in the future. The International Science and Technology Alliance for Global Sustainability has established the Future Earth program to promote transdisciplinary research that addresses key challenges for global sustainability. The Future Earth Initial Design Report of the Transition Team(2013) provides an initial framework for establishing the program's research agenda.

The Initial Strategic Research Plan for Future Earth in Asia, based on the Initial Design Report, aims to give an Asian perspective for the development of Future Earth activities across Asia and the Pacific. This perspective is necessary because of the unique features of both the environmental and social features of the region. The region has a very complex topography, extending from the highest mountains in the world to extensive coast-lines and small islands. The annual cycle of the Asian monsoon has influenced the development of natural ecosystems and human communities across the region over thousands of years. The natural disasters of the region vary from glacial lake outburst floods to typhoons and earthquakes.

Asia and the Pacific has given rise to stable and diverse cultures that have adapted to the local environments for past centuries up to millennia. But in recent decades it has experienced the most rapid economic growth along with increasing urbanisation and social mobility. Asia is in transition, and must confront the associated challenges of land degradation, air and water pollution, and social inequality.

It is essential that Asia and the Pacific's transition to sustainability is built on its long history of recognition of harmony between nature and humanity.

The traditional cultures of the region provide a sound foundation for Asia to have its own vision of future sustainability and its own pathways for reaching sustainability. This Initial Research Plan for Future Earth in Asia can provide an opportunity for the communities of the region to work together to develop the required vision and pathways to sustainability.

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Executive Summary

Future Earth has been launched as a global research platform to provide the knowledge and support to accelerate our transformations to a sustainable world. It will bring together existing global environmental change programs and strive to generate knowledge in partnership with society and the users of science. To inspire the realization of Future Earth in Asia, the Monsoon Asia Integrated Region Study in collaboration with the Research Institute for Humanity and Nature and with inputs of numerous other contributors facilitated the preparation of this strategic research plan.

Asia is a special region of the world, particularly when considering future pathways towards sustainability. The Asian monsoon and the Himalaya-Tibetan Plateau drive a unique climate with global impacts and which, through traditional cultures and practices, have supported a range of sustainable natural ecosystems and human societies for millennia. However, Asia is now in transition. Its population accounts for about 60% of the world total and its rapidly growing economies produce 36% of world GDP, more than any other region. Soon half of Asia's population will live in cities, including 21 of the world's 37 megacities. Asia's geographical extent and demographic and economic weight mean that developments in the region will inevitably influence global environmental change trends. Global sustainability is not possible without major transformations in Asia.

The research programs for Future Earth in Asia will need to be developed carefully, through consultation and collaboration with stakeholders across the region and with the international research community. This research plan

identifies the following ten key issues that can provide appropriate focuses for Future Earth in Asia.

(1) Co-design and co-implementation within diverse cultures. A key innovation of Future Earth is the involvement of stakeholders beyond the research community in the design and implementation of the initiative. How to do this in practical and meaningful ways in the diverse Asian context needs to be explored and evaluated.

(2) Uniqueness of monsoon climate and topography. The monsoon and the Himalayas form the foundation of the Asian rice-based economies and cultures. Research needs to incorporate knowledge of past harmonies and the likely future projections of climate for the region.

(3) Vulnerability to natural disasters. The Asia-Pacific region is the most disaster-prone in the world, being susceptible to both earthquakes and typhoons. Research needs to take a long-term view and contribute to development pathways that reduce vulnerability.

(4) Rapid economic growth. Exceptional growth has increased prosperity for many, but also is at the root of environmental deterioration. Global environmental change cannot be addressed without changing the development models in Asia. Research should assess the implications of different growth scenarios.

(5) Accelerated urbanization. The demographic balance of Asia is swinging towards the cities. This has provided numerous benefits, but the ecological footprint of these urban areas is enormous. Research needs to address urbanization as a dynamic process as well as point the way to integrated urban design.

(6) Sustainable food, water and energy systems. These provide Asia's growing populations and economies with their basic needs, but current practices are clearly unsustainable. Research needs to consider these aspects as connected and interdependent systems.

(7) Safeguarding ecosystems. From tundra to tropical forests and from

deserts to coastal zones, ecosystems are under severe pressure in Asia. Research not only needs to monitor their dynamics and tipping points, but also uncover the drivers of degradation and explore solutions.

(8) Pathways guided by Asian traditions and cultures. Asia is characterized by a complex mosaic of social and ecological diversity developed through a long history of human interaction with nature. Research should examine how this history can inspire new pathways to sustainability.

(9) Social equity and inclusion. Not all of Asia's population has benefited from rapid economic growth and in many countries inequality has increased. Research must catalyze transformational change to enable Asia to increase equity and inclusion while effectively addressing environmental change.

(10) Institutions and governance. These guide individual and collective behavior and thus are the key to the transformation to sustainability. Research needs to assess the effectiveness of different governance regimes and explore institutional alternatives and innovations.

The transformation of Asia to sustainability requires a major research effort to underpin and guide future policy and planning. This research plan aims to support the development and implementation of that effort.

CONTENTS

Chapter 1
Introduction

Future Earth (FE) has been launched as an international initiative to promote research for global sustainability by the international science and technology alliance, a partnership of the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum of funding agencies, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), the United Nations University (UNU), and the World Meteorological Organization (WMO) as an observer (Future Earth, 2013). Future Earth will provide a single overarching structure for researchers, funders, service providers, and users, and it integrates the existing Global Environmental Change (GEC) programs[①]. The GEC programs have provided foci for several extensive international and multi-disciplinary networks of researchers investigating key human-environmental dynamics. Future Earth will build on these to develop a new generation network[②]. Future Earth proposes national and regional level committees, in addition to the regional nodes. The most

① Four major global environmental change programs, all(co) sponsored by ICSU, operate in the planning and coordination of international global environmental changeresearch: DIVERSITAS: an International Programme on Biodiversity Science; International Geosphere-Biosphere Programme (IGBP); International Human Dimensions Programme on Global Environmental Change(IHDP); World Climate Research Programme (WCRP).

② http://www.icsu.org/future-earth/

essential issue for the overall FE activity towards global sustainability will be how to integrate efforts and activity for solving environmental problems and achieving sustainability at local to regional scales.

This document presents a strategic science plan for FE in Asia, including the Pacific/Australasia and the Indian Ocean basin region. The aim of the plan is to commence a dialogue amongst the broad stakeholder community with interests in the transformation to sustainability across Asia.

1.1 Asia as a key region for Future Earth

More than 60% of the global population is concentrated in Asia, and the total GDP of Asian countries is equal to about one-third of the global GDP. The region as a whole is characterized by dramatic demographic change and rapid economic growth and urbanization, great disparities of wealth both within and between countries, and social and ecological vulnerability to the potential impacts of climate change. This region is also a huge hot-spot region for greenhouse gas emissions and air and water pollutions, which are affecting emissions and pollution at the global scale. The biodiversity loss of the terrestrial and marine ecosystems of this region is increasing most rapidly in the world.

At the same time, however, the region has offered many examples of long-term social and ecological sustainability under the humid monsoon climate and in the so-called "Asian Greenbelt(from tropics to boreal region)" with great biodiversity, where many traditional systems of agriculture and livelihood have supported large numbers of people through time. The contemporary sustainability challenges in Asia, therefore, will require wholly new approaches in science, technology and governance; "innovation" will also entail more active recognition of the wisdom already embedded in traditional thought and patterns of livelihood. Designing sustainable interactions between humanity and nature in Asia is a global challenge, and the ultimate goal of