2nd International Workshop on Future Earth in Asia: Summary Report

4-5 February 2014, Kyoto, Japan

Inter-University Research Institute Corporation
National Institutes for the Humanities
Research Institute for Humanity and Nature

Japan Science and Technology Agency

RISTEX 社会技術研究開発センター
Research Institute of Science and Technology for Society

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Executive Summary

The 2nd ***International Workshop on Future Earth in Asia*** was held in Kyoto, Japan, during 4-5 February 2014, with a **twofold purpose**:

- To consult with stakeholders on role of Future Earth in Asia and on selected aspects of the draft Science Plan, receive feedback and inputs, and generate wider buy-in
- To develop an initial approach (principles and mechanisms) to the design of Future Earth research projects in Asia that enables co-design with stakeholders

The workshop brought together **63 participants** from Japan and eight other countries, representing NGOs, development organizations, research funding organizations, academe, and Future Earth.

The two-day **workshop program** featured: **keynote presentations** to set the scene for discussing major trends and transformations in Asia in the coming decades; **case studies** of different types of stakeholder engagement in research; and **interactive sessions** to stimulate discussion on research priorities as well as principles and mechanisms for meaningful engagement of stakeholders in Future Earth in Asia.

Key **outcomes** from the workshop included:

- Improved participants' understanding of Future Earth **research priorities** in Asia and **co-design approaches** with stakeholders
- Gained better understanding of the interactions between **nature** (monsoon climate, disasters, ecosystems) and **humanity** (equity, behavior, value, culture)
- Provided valuable inputs for the **draft Science Plan** for Future Earth in Asia: formulated possible research questions to be addressed under the four thematic areas
- Distilled key **principles and mechanisms for co-design** in Asia: emphasized need to develop trust and collaboration with interactive knowledge transfer among stakeholders (including capacity building)
- Strengthened **personal contacts and networking** among the participants and institutions present at the workshop
- Agreed on **common goal** to build together a **platform** for sharing experiences of co-design, methodology, data and knowledge for Future Earth in Asia
- **Renewed commitment** from Japan Science and Technology Agency, Science Council of Japan, and Research Institute for Humanities and Nature to support the establishment and implementation of Future Earth in Asia

Next steps for Future Earth in Asia in the coming year were also outlined, including a 3rd international workshop to be held in Kyoto circa December 2014/January 2015.

Overall, the participants appreciated the excellent organization and facilitation of the workshop, including the use of interactive methods such as World Café and Fishbowl.

Background

Future Earth is a 10-year international research initiative that will develop the knowledge for responding effectively to the risks and opportunities of global environmental change, and for supporting transformation towards global sustainability in the coming decades. Launched in June 2012 at the UN Conference on Sustainable Development (Rio+20), this initiative will mobilize thousands of scientists while strengthening partnerships with policy-makers and other stakeholders to provide sustainability options and solutions.

Future Earth is now underway: its initial design has been outlined; the Interim Secretariat, Science Committee and Interim Engagement Committee have been established; and the structure and content are being further elaborated.[1] In Asia, the Research Institute for Humanities and Nature (RIHN) and a number of other organizations have begun discussions to develop a draft Science Plan for Future Earth in Asia.

During 4-5 February 2014, RIHN organized the ***2nd International Workshop on Future Earth in Asia***, as a sequel to the International Symposium held at RIHN in December 2012. Co-hosted by the Science Council of Japan, the Japan Science and Technology Agency (JST), and the Research Institute of Science and Technology for Society (RISTEX), the workshop had a twofold purpose:

1. To consult with stakeholders on role of Future Earth in Asia and on selected aspects of the draft Science Plan, receive feedback and inputs, and generate wider buy-in.

2. To develop an initial approach (principles and mechanisms) to the design of Future Earth research projects in Asia that enables co-design with stakeholders.

The two-day workshop program (see Annex 1) featured: keynote presentations to set the scene for discussing major transformations in Asia in the coming decades; case studies of different types of stakeholder engagement in research; and interactive sessions to stimulate discussion on research priorities as well as principles and mechanisms for meaningful engagement of stakeholders in Future Earth in Asia.

Held in Kyoto, Japan, the workshop brought together 63 participants (see Annex 2) from Japan and eight other countries – representing NGOs, development organizations, research funding organizations, academe, and Future Earth.

An external consultant was engaged to provide inputs for the workshop program and interactive processes, facilitate the two-day event, and compile the summary report.[2]

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[1] For more information see: www.icsu.org/future-earth and www.futureearth.info

[2] Mr. Chun K. Lai, Independent Consultant based in the Philippines, chunklai2002@yahoo.com

Getting Started

In his opening remarks, Prof. Tetsuzo Yasunari, Director-General of RIHN, warmly welcomed all the participants, and highlighted the importance of the workshop for developing research priorities and co-design modalities for Future Earth in Asia. He also invited participants to provide feedback on the draft Science Plan

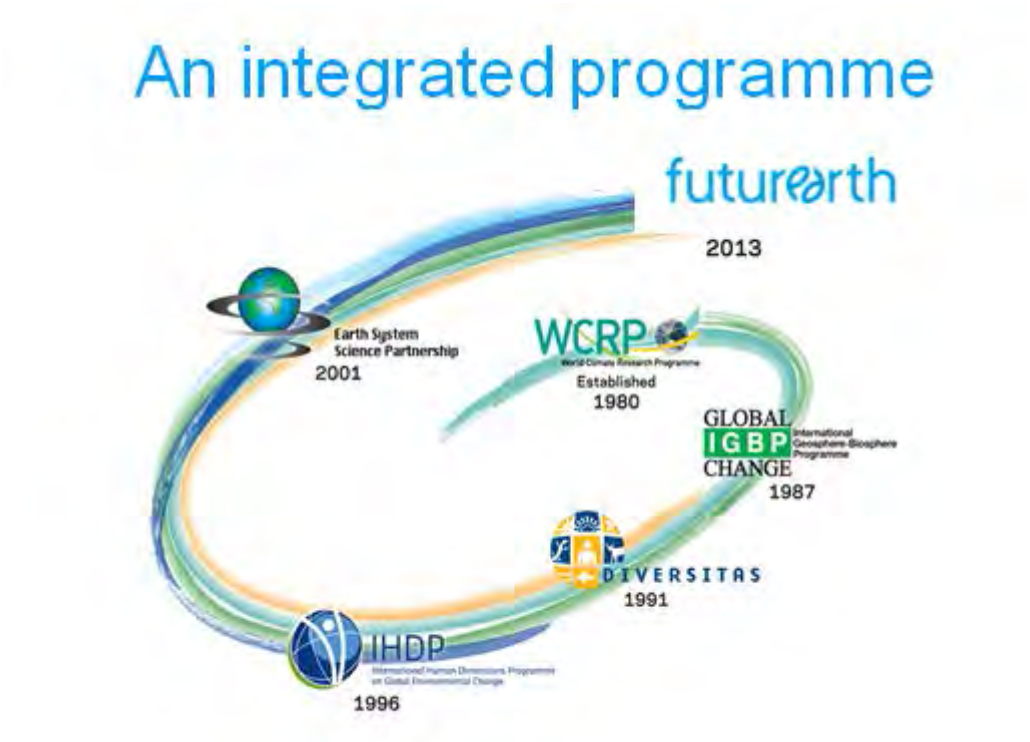
Mr. Chun K. Lai, workshop facilitator, then provided a brief overview of the workshop, including its purpose, range of participants, structure, suggested house rules, and time management.

State of Future Earth[3]

Prof. Frans Berkhout, Interim Director of Future Earth, characterized the initiative as a **global platform** for international scientific collaboration, which:

- Enables **integrated research** on grand challenges and transformations to sustainability
- Strengthens global **partnerships** among researchers, funders and users of research
- **Communicates** science to society, and society to science

Future Earth provides a means for integrating the major global environmental change programs established during the past three decades.



[3] PowerPoint slides in this section extracted from: *Future Earth*, a presentation by Frans Berkhout at the workshop on 4 February 2014

Such a global environmental change platform has distinctive advantages, including:

1. Heavy research **infrastructure**
   - Earth observations and data

2. **Internationalization** of science and engagement
   - Partnerships and engagement between science and society

3. **Epistemic fit**
   - Scale of research needs to align with global scale of the problems and solutions

4. **Leveraging** resources
   - Leverage research across science systems in period of pressure on budgets

At the heart of Future Earth is the concept of co-design and co-production of knowledge through collaboration by key stakeholder groups.

Co-design and co-production of knowledge

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Future Earth addresses a set of three broad and integrated research themes:

1. **Dynamic Earth**: understanding how planet Earth is changing due to natural phenomena and human activities
2. **Global development**: providing the knowledge for addressing the most pressing needs of humanity
3. **Transformations towards sustainability**: providing the knowledge for transitioning toward a sustainable future

During the first half of 2014, the focus will be on implementing these activities:

- Appointment of "full" **Engagement Committee**
- Selection of globally-distributed consortium for Future Earth **Permanent Secretariat**
- GEC Core Projects **join** Future Earth
- Completion and launch of **2014 Future Earth Research Priorities**
- Launch of 8-10 Future Earth **'fast track initiatives'**
- Progress on Future Earth inputs to **Sustainable Development Goals (SDGs), Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)** and **new climate agreement**
- Development of new **funding model**

Prof. Berkhout encouraged the participants to get involved in a number of ways:

- Follow Future Earth communications
- Attend Future Earth events
    - Global Land Project Open Science meeting, Berlin, 19-21 March
- Join a GEC project
- Bring an existing international initiative into Future Earth
- Develop a new initiative (health, food and energy)

Co-design in Future Earth

Dr. Robert Watson, Chair of **Interim Engagement Committee**, joined the workshop via Skype and briefed participants on the **importance of co-design**. The role of his committee is to advise the Science Committee and Future Earth Council on research priorities from the perspective of key stakeholder groups in the government, civil society and private sectors. Consultations with the UN regarding the Sustainable Development Goals are ongoing. There is also considerable engagement with science funders, both traditional and new; and a donor roundtable is planned for October 2014.

During the upcoming months, the Interim Engagement Committee will be working closely with stakeholders and the Science Committee to provide inputs for:

- **2014 Strategic Research Agenda**: focus within the research themes providing guidance to funders
- **2025 vision**: articulate long-term success factors for Future Earth

Keynote Presentations on Major Trends in Asia

Three keynote presentations helped to set the scene for discussions on major transformations in Asia in the coming decades, and their implications for sustainability and the role of Future Earth.

Development Trends, Issues and Needs

In his keynote presentation, Mr. Surendra Shrestha, Director, International Environmental Technology Centre, UNEP, focused on three key aspects: global developments, mega issues and knowledge needs.

He reminded us that the onset of the 21st century has been marked with major political shifts that impact the way business is conducted globally. Also impacting global direction are the outcomes from Rio+20 and negotiations on the post-2015 Development Agenda by 193 countries.

The world population currently stands at 7.3 billion; it is projected that we will cross the 9 billion mark by 2050. More than half of the world's population now resides in cities. The increase in urban populations coupled with rising income levels is resulting in increasing consumption and production patterns and in growing amounts of waste. The 21st century will be led by Asia, and the key mega issue for Asia is urbanization.

One important trend in **global development** is the emergence of **new powers** in the global South – the so-called BRIC and MINT countries – as a result of global economic and geopolitical shifts. Another key trend is the **financial crisis** and its impacts on the economy.

The **post-2015 development agenda** is intended to meet the basic needs of all peoples by 2030 in terms of: zero poverty, hunger, water, energy and shelter. This agenda recognizes the poverty and consumption link, the need to go beyond GDP, and the need to align with political agendas. The SDGs are regarded as the means of implementation. However, something is missing in the engagement with science: still lacking the bigger picture.

Mr. Shrestha identified the following **mega issues for Asia**:

1. **Population and demographic shifts**: ageing societies; by 2050, there will be more seniors than children for the first time in history

2. **Rural-to-urban shift**: sustainable cities will be needed as some 70% of the population in Asia will live in urban areas by 2050

3. **Increasing consumption**: 300% growth of middle classes in developing countries by 2030 will fuel consumer spending on goods and services

4. **Environmental degradation**: waste generation (growth is fastest in Asia); carbon emissions (45% of total projected to be from Asia by 2013); and economic growth leading to rapid resource depletion

He also highlighted these critical **knowledge needs**:

1. **Urban sustainability**:
   - **60% of cities still to be built**: need climate resilience, buildings as net producers of energy, decentralized waste, water and energy
   - **Prevention policies**: ensure sustainable land and resource use, and integrated waste management

2. **Sustainability**: move from a sectoral to a holistic approach; imbed in every human activity

3. **Bio-mimicry**: strive for closed loops in nature, not man-made linear processes

4. **Markets for mother nature**: need to reduce global consumption and unsustainable lifestyles

5. **Guidance in a multi-polar world**: move toward decentralized democracy, public capital, frugality, well-being and happiness (BRIC/MINT paradigm)

Finally, Mr. Shrestha pinpointed critical **needs from the scientific arena**:

- Need new model of development: more holistic picture
- Need to implement solutions: move to "how?"
- Asia will lead the 21st century, need new science for sustainable future
    - Future Earth in Asia will need to play a major role: if we do not succeed in Asia, then sustainable development will remain an empty concept

Historical Perspective of Asian Economic Development

Prof. Sugihara Kaoru, National Graduate Institute for Policy Studies/Science Council of Japan, made a keynote presentation on: *The Asian Approach to Global Sustainability: A Perspective from Economic History*. This presentation outlined the evolution of economic development in monsoon Asia over the long run, and discussed its relevance to global environmental sustainability, given the environmental foundations of Asian capitalism.

Monsoon Asia. The common socio-ecological characteristics of monsoon Asia can be described in terms of: seasonal rainfall patterns induced by monsoon winds; the centrality of large deltas with rich soils at the mouth of major rivers originating from the Himalayas; and the development of rice farming leading to the unparalleled capacity to support large populations. By the 17th century, the peasant family economy in the lower Yangzi delta developed labor-intensive technologies and labor-absorbing institutions through rice cultivation, combined with commercial crops and proto-industry. As populations grew and land became scarcer, other East Asian countries like Japan pushed these efforts further – a development pattern described as the "industrious revolution" path.

Industrialization path. This path provided the basis for labor-intensive industrialization, which began in Japan after the late 19th century and in other parts of East Asia in the first half of the 20th century. During this phase, good-quality cheap labor was fully exploited, while the use of capital was minimized, in implementing Western technology and institutions. After World War II, the labor-intensive model diffused beyond East Asia, slowly but steadily, making a decisive contribution to global industrialization.

Modern capitalism. On the other hand, most modern technology and institutions were originally developed in north-western Europe, an environmental periphery. In institutional development the environment was usually represented by land, which was scarce. The idea of private property rights was established, assuming that a piece of land could be freely bought and sold. Likewise, it was assumed that certain working hours of a person could be bought and sold as labor in exchange for a wage. These arrangements provided the institutional basis for modern capitalism. In economics, the notion of resource scarcity became the basis for price theory, while labor was often regarded as a factor cost.

Mismatches. These ideas and institutional arrangements had to be modified, when applied to a much more diverse and dynamic landscape of global environment. For the price to be determined, uncertainty was often as important as scarcity itself. In monsoon Asia, air and water circulation were just as important a resource as land. During the period of Western colonialism and domination, a number of "mismatches" between the tropical environment and the temperate-zone- inspired technology and institutions became apparent. But the depth of its problems has not been fully appreciated to this day.

Better resource use. Over the past twenty years, growth economies of Asia became the largest net importer of mineral resources and fossil fuels. Energy consumption increased not just in manufacturing and transport sectors, but also in the household sector, as air conditioners and refrigerators diffused among the ordinary people. Arrival of the ageing society would only reinforce the relative importance of energy consumption at home, care institutions and hospitals. At the same time, Japan developed resource- and energy-saving technology by responding to diversified needs. Other Asian countries also compete in the international markets of energy-saving and eco-friendly products. Today, Asia contributes significantly to the global trend towards energy efficiency and better resource use.

Global environmental sustainability. Monsoon Asia has been feeding a very large proportion of world population over millennia. Its institutional design can accommodate the careful, efficient use of limited natural resources, rather than increasing productivity through labor-saving, resource-intensive methods. While fully appreciating the contributions of modern technology and institutions developed in the West, we also need to take advantage of the norms and institutions engrained in monsoon Asia in order to secure global environmental sustainability.

Urbanization and Sustainability Transition in Asia[4]

"The battle for sustainability to be won or lost in cities"

Prof. Xuemei Bai, Australian National University/Future Earth Science Committee, delivered the third keynote, which examined urbanization trends and implications in Asia. Humanity has passed the threshold where more than half of its population lives in cities. By 2050, an additional 3 billion population will be added to cities.

As a region, Asia has the world's largest urban population, a majority of its megacities, and is experiencing some of its fastest urban growth rates. Cities may be viewed as centers for economic growth, resource use, environmental impacts, and technical, social, and cultural innovation. Urban areas are also characterized by large diversity and disparity. Rapid urbanization in China and other parts of Asia presents great challenges in terms of the demand for resources, environmental impact and management of growing cities.

Drivers and impacts of urbanization in Asia. The **primary driver is job opportunity** and aspiration for better life. Among push and pull factors are policy considerations such as:

- Concurrence of urbanization, industrialization and economic growth
- Significant urban contribution to national economy
- High income countries often have higher urbanization level

Given the national policy tendency to promote urbanization, the big question arises: Does urbanization actually bring about economic growth? **Positive impacts** of urbanizations in Asia include the following:

- Larger cities tend to gain more income and richer cities tends to expand more
- Long-term causality between urban expansion and GDP per capita
- Positive feedback between landscape urbanization and urban and regional economic growth in China
- In peri-urban areas where local people can seize the opportunity, there may be tremendous increase in social/economic capital

Among the important **policy implications** are:

- Measured by a landscape indicator, urbanization has a causal effect on economic growth in China, both at city and regional levels
- Urban land expansion is not only the consequences of economic growth in cities, but is also a driver of such growth
- Under its current economic growth model, it might be difficult for China to control urban expansion without sacrificing economic growth
- China's policy to stop the loss of agricultural land, for food security, might be challenged by its policy to promote economic growth through urbanization

[4] PowerPoint slide in this section extracted from: *Urbanization and Sustainability Transition in Asia*, a keynote presentation by Xuemei Bai at the workshop on 4 February 2014

Urban processes and dynamics. Cities are both driver of as well as responder to environmental change. Cities are complex systems subject to constant change, the process of which can be viewed as a dynamic evolutionary process.

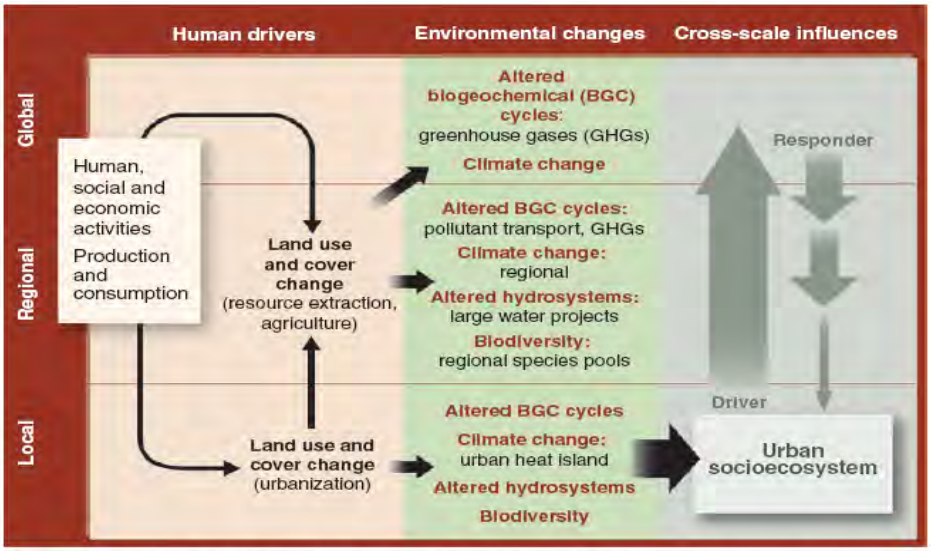


Fig. 2. Framework showing urban socioecosystem (lower right) as a driver of (upward arrows) and responder to (downward and horizontal arrows) environmental change. Land change to build cities and support their populations drives local to global alterations of biogeochemical cycles, climate, hydrosystems, and biodiversity. Large local environmental changes are greater than those that filter down from global environmental change (horizontal black arrow). Not all possible interactions and drivers are shown.

Although urban population growth over the past century occurred on less than 3% of the Earth's surface, the impact has been global – with 78% of carbon emissions, 60% of residential water use, and 76% of wood used for industrial purposes attributed to cities. The causes and impacts of major types of urban environmental issues are related to poverty, rapid growth and wealthy lifestyle/overconsumption.

Urban sustainability innovation and transition. Is it possible to alter the future trajectory of cities? Key findings from 30 urban sustainability practices in Asia indicate that:

- About half of all cases either multiplied or up-scaled to change system of practice
- Political aspect prominent for both success and failure
- Technology or cultural aspect seldom identified as major barrier
- Many international donor funded projects tend to stay as individual experiment, sometimes multiplied but seldom up-scaled to change system of practice

Prof. Bai concluded her presentation with these salient points:

- Urbanization is the most significant transition of human society unfolding
- Cities are human-dominant, complex, dynamic, evolving systems that drive and are in turn influenced by many global environmental changes
- Internal and external dynamics of cities not necessarily well-understood (e.g., urban-agriculture interactions)
- Cities present enormous challenges as well as opportunities for sustainability
- The role of sustainability practices and experiments need to be better understood
- What happens in cities will, to a large extent, define human-environment interactions

World Café: Research Priorities for Future Earth in Asia

Drawing on seven integrated design principles, the **World Café** methodology is a simple, effective, and flexible format for hosting large group dialogue. Following the keynote presentations, the workshop room was transformed into a World Café comprising eight tables, each with a designated "host."

At the onset of this interactive session, Prof. Michael Mantan, Monash University, introduced the ***Initial Strategic Science Plan for Future Earth in Asia***. The draft science plan, completed in January 2014, had its origins during a small international workshop of invited experts held 31 July to 2 August 2013 at the Hong Kong Polytechnic University. Led by Prof. Tetsuzo Yasunari, Director General of RIHN, that meeting prepared an outline for the draft plan, with inputs from leading partner organizations in the region.

This draft is now being distributed to the broader stakeholder community for review and feedback. Inputs are being sought especially from the international community involved in the consolidation of Future Earth, so that this plan can be better aligned with the global directions and strategies.

Based on the draft plan's chapter on "transformation to Asian sustainability," four broad and interrelated **thematic areas** were identified:

- **Human interactions with climate and disasters**
- **Rapid economic growth and urbanization**
- **Safeguarding ecosystems and food, water and energy**
- **Governance, institutions and policy**

Two World Café tables focused on each of the thematic areas. All tables deliberated on one guiding question: ***What are the specific priority research questions that need to be addressed in Asia within these four thematic areas?***

Participants were also asked to keep in mind two crosscutting questions:

- What is special to Asia?
- How to incorporate equity and inclusion concerns in future research?

With four 20-minute rounds, most participants were able to contribute to all four thematic area discussions. The table hosts played important roles in terms of: 1) facilitating the discussion and maximizing contributions from all participants; 2) at the beginning of each new round, summarizing the key points already discussed; and 3) consolidating and sharing in plenary the priority research questions that emerged.

Emerging Priorities, Questions and Recommendations

The World Café enabled far-ranging and open discussions on the interrelated thematic areas articulated by the draft science plan. This process served the first purpose of the workshop: to consult with stakeholders on the role of Future Earth in Asia and on selected aspects of the draft Science Plan, receive feedback and inputs, and generate wider buy-in.

Based on the diverse outputs generated through the eight table discussions, the following consolidated set of research priorities, questions and recommendations emerged for Future Earth in Asia:

Human Interactions with Climate and Disasters

Disaster-prone zones in Asia

Disaster-prone hot spots should receive priority attention for Future Earth research in Asia. These include:

- Costal and marine areas undergoing rapid human-induced transformation and global warming
- Himalayan Mountains and Tibetan Plateau – with too much and too little water, along with severe disasters like landslides and glacial lake outburst floods (GLOF)
- Deforestation/desertification in dryland areas, such as grassland degradation in the northern part of East Asia
- Small islands and lowland mega-cities ("heat islands") that are vulnerable to climate change, rising sea levels and devastating storms

One possible key research question would be: ***Which critical variables related to extreme events in disaster-prone areas have major impacts on society, and particularly on vulnerable communities?***

Interactions with local communities

Imbedded in the concept of co-design is the need to build more active and efficient interaction between science and local communities, who should be engaged from the very beginning of the research process. Constant information exchange should be supported.

We need to recognize who are the most vulnerable people, and what are the risks driven by social and climate changes. Research should seek to answer the question: ***How to minimize the damage to these most vulnerable people?***

Education, training, and learning processes are critical for building the resilience capacity of vulnerable people, so they can better prepare for and cope with disasters – both traditional and new types. There is a need to recognize new inequities across the environmental and geographical divide, and prioritize special support to people under vulnerable situations. Migration options should be considered for supporting possible climate refugees from disaster-prone places like Bangladesh and small islands.

Other priorities include:

- Building the resilience indicators for Asia to support climate change adaptation
- Understanding/predicting climate change impacts on the agricultural sector by focusing on drought, fisheries and aquaculture
- Developing ecosystem-based adaptation approaches to strengthen resilience (e.g., mangrove plantation in coastal areas)

Innovative ideas should be added from Future Earth to existing GEC projects through mutual learning – by developing demand-driven research (balancing top-down and bottom-up processes).

Cities and Urbanization

There is a strong view that Future Earth in Asia needs an overarching program on urbanization. Cities encompass all aspects of sustainability. They are sinks of food, water and energy; as well as sources of GHG emissions, air pollution, and loss of biodiversity and ecosystems.

Possible research questions could be framed as follows:

1) What are the drivers of urbanization across Asia and what are their impacts on cities, peri-urban and rural areas?

This would focus on the interaction between urban and rural areas. Key driver of urbanization in Korea and Japan was government policy on industrialization, while in much of Asia it is government policy on market economy leading to unemployment in rural areas.

There is a yearning in many Asian urbanites for their rural roots. This links to the observation that Asia had sustainable societies for centuries in the past. Analysis of the balance between public and private goods may be relevant. Associated questions would be:

- *How are water, food and energy supplied to cities from peri-urban areas?*
- *What drives lifestyle changes with socio-economic status?*

2) Given the diversity of cities across Asia, what are the characteristics that support the sustainability of future cities?

This would focus on urban design and planning, recognizing the diversity across cities in Asia (e.g., relationships between size and density and resilience indicators). Cities are recognized as innovative/experimental sites, cultural drivers, and incubators of new lifestyles. 60% of new cities will be built in Asia. In visualizing the future human-nature relationship, it is necessary to question consumerism, the "good life" and "well-being."

Key issues are health and well-being, including mental health, inequality, water management within cities, and transport.

Associated questions would be:

- *How do we define a "healthy" city?*
    - What indicators and units are needed?
- *How do we design a "healthy" city?*
    - Need to compile and analyze best cases/practices vis-à-vis: urban-rural interface, ageing society, landscape mosaics, polycentric designs

3) Given the diversity of cities across Asia, what are the risk management strategies that support resilience for human and natural systems?

This would focus on governance and management strategies. Cities have the critical mass to support innovation, and promote behavior modification strategies. There is also a need to identify champions to drive the scaling-up of successful practices.

4) How to create new urban communities/networks with ageing members as the driving force/leading edge?

This is particularly relevant to the ageing cities of Japan, Korea and China.

Safeguarding Ecosystems

Transition energy systems

As energy demand increases, there is an urgent need to move from traditional fossil fuel-based energy to renewable energy systems. This will require: local energy production and consumption; behavioral change toward energy conservation; and innovative biomass and technology improvement.

Ecosystem health with food security

Future research should examine various kinds of ecosystems and their linkages with factors that influence food security, such as: population growth, maximizing production, local indigenous knowledge, benefit sharing, and existing GEC programs (e.g., IPBES).

Urbanization, links to rural areas, cultural diversity and vulnerability are also key issues.

Future food-water-energy nexus

Attention should be paid to this important nexus, especially with respect to:

- Simulation of maximizing production
- Use of satellite data
- Translation of findings to end users
- Involvement of the private sector
- Mega-cities: population growth, waste management, water recycling, health

With regard to this nexus, the **trade-offs between ecosystem functions and food, water and energy needs** are an important research area. Education and awareness-raising are required to promote responsible consumption and to access technology for safeguarding ecosystems.

Scientific evaluation

The question arises: ***Who can/how to judge "good" or "appropriate" technologies and activities conducted in Future Earth context?***

There is also a need to develop indicators and methods for **evaluating co-design and co-production** as new scientific approaches.

Governance, Institutions, Policy

Epistemic communities

There is a need for cross-national "epistemic communities" (or communities of practice) to share scientific knowledge, and make that knowledge accessible to different stakeholders. This must go beyond only the academic community, and involve "real" communities on the ground. NGOs and other boundary organizations can play an important bridging role in this regard: to develop partnerships between citizens and the government.

What is the role of epistemic communities in navigating international relations, as scientific and environmental issues are being negotiated?

Urban governance

What is the role of city-level governance? *How do large city governments interact with national governments?*

Universities were also identified as a key stakeholder in this arena. They can provide education and spearhead research on innovations in urban sustainability, as well as be good role models in establish green campus-towns.

It is also important to ask: ***What key sustainability issues in Asia are limited by governance?*** For example, data sharing may be considered as a regional governance issue.

Role of civil society

Engaging communities and civil society groups is fundamental to Future Earth for these reasons:

- Tapping local wisdom, knowledge, participation, and decision-making
- Working together to improve implementation: strengthen capabilities, plug gaps, learn by doing
- Promoting policy dialogue and partnerships; providing feedback to policy-makers

Future Asia governance

There was a recommendation to create an **Asian Institute/Fund** to promote Asian knowledge, heritage, science and research. Such an institute could fund and disseminate research on: characterizing Asian communities; Asian governance in urban, peri-urban and rural areas; and incentives and trade-offs regarding ecosystems and human needs.

Given the tremendous diversity within Asia, there is a great need for an effective mechanism to generate, translate and share knowledge with a range stakeholder groups.

Role of Future Earth

A number of interesting questions emerged regarding the role and internal governance of Future Earth:

- ***What is the role of Future Earth in mobilizing international stakeholders?*** There is a need to convene regional forums to choose appropriate stakeholders and champions – including from the private sector – for co-design and co-production activities.
- ***How can Future Earth maintain a focus on solutions?***
- ***What is the role of Future Earth in setting norms and the terms of debate?***
- ***How can Future Earth influence the discourse on complex issues such as rent-seeking and corruption?***
- ***How can Future Earth link to social and political movements in Asia such as: eco-civilization, green growth and inclusive green economy?***

Outside-the-Box Thinking

During the World Café wrap-up, there was a call to create a "**new science**" for Asia, by Asians.

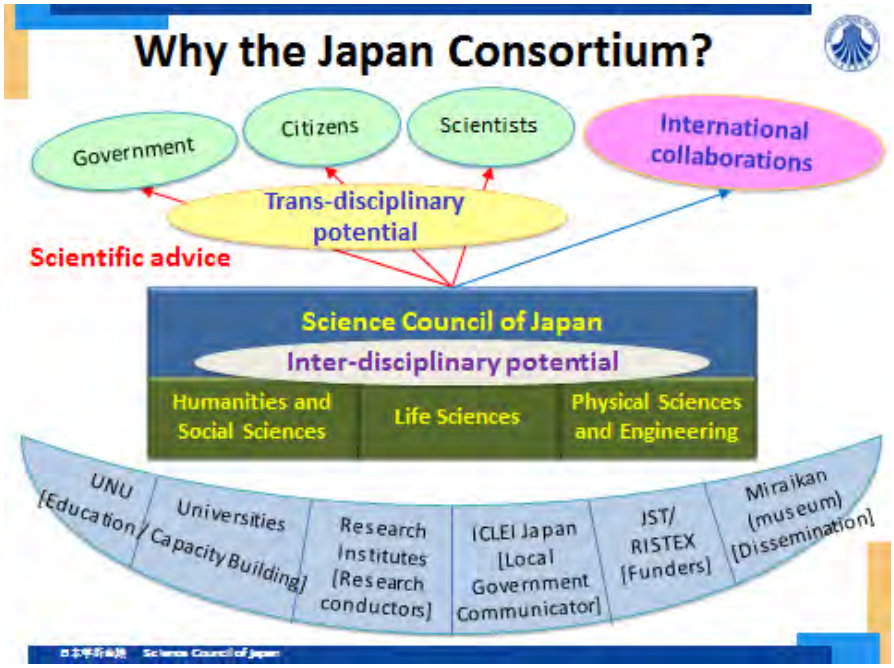
There was also an observation that many of the discussions and outcomes were like "old wine in a new bottle." Thus, we need to challenge ourselves to **think outside the box**, and together come up with new and bold ideas, approaches and solutions.

Future Earth in Japan[5]

Dr. Fumiko Kasuga, Vice-President, Science Council of Japan (SCJ), started off day 2 of the workshop with a presentation on preparatory activities for Future Earth in Japan. She informed the group that SCJ has been:

- Participating in international symposia and workshops regarding Future Earth
- Establishing the "Committee on promoting Future Earth" in July 2013, and the "Sub-committee on capacity building and education" in Nov 2013
- Introducing Future Earth to relevant Ministries and institutions, and preparing to establish the "Future Earth Japan Committee"

Dr. Kasuga also presented the stakeholder groups who form the Japan consortium interested to collaborate on Future Earth, and be part of the Permanent Secretariat.



In terms of establishing the Future Earth Permanent Secretariat, the steps include:

- **Expressions of interest**: submission of individual specification of interest, capabilities, funding strategy (deadline: 23 September 2013)
- **Bidders' conference**: held 13-14 November 2013 in Gressy, France; 16 bid presentations (5 minutes each) were made
- **Full bids**: full proposal for globally-distributed Secretariat (deadline: 31 March 2014)

[5] PowerPoint slide in this section extracted from: *Preparatory Activities for Future Earth in Japan*, a presentation by Fumiko Kasuga at the workshop on 5 February 2014

From Competitors to Collaborators

During the bidders' conference, it soon became apparent that no single country possessed the necessary resources to host the Permanent Secretariat. There was consensus to formulate a **single globally-distributed Secretariat** with several hubs, and five countries (Canada, France, Japan, Sweden, USA) decided to work jointly to produce one final bid.

Based on discussions among the five global hubs, the following picture emerged:

- **Structure**: Executive Director, with Hub Directors and an Executive Team
- **Functions**: grouping of required functions; role-sharing strategies among five global hubs and also with regional hubs
- **Communications** among five hubs: daily e-mails, weekly teleconference, face-to-face meetings (6-8 January 2014 in Paris, 24-26 February 2014 in Montreal?)
- **Discussions needed**: relationship between global and regional hubs; fund raising, fund managing; daily operation with remote partners

The remaining **selection process** will entail the following:

- Deadline for full bids – end March 2014
- Selection committee will review proposals and make recommendations to Alliance members
- Alliance members will receive the proposals and recommendations, and decide
- Site visits may be requested, as part of a negotiation phase with a preferred consortium
- Result to be announced by the end of June 2014
- Transition from the Interim Secretariat during July to December 2014, then operation of Permanent Secretariat from January 2015

Case Presentations: Experiences with Engaging Society

A series of four cases were presented to share experiences of engaging society in different contexts, and through different means. This was followed by a panel discussion with questions and comments from the participants, and responses from the four presenters.

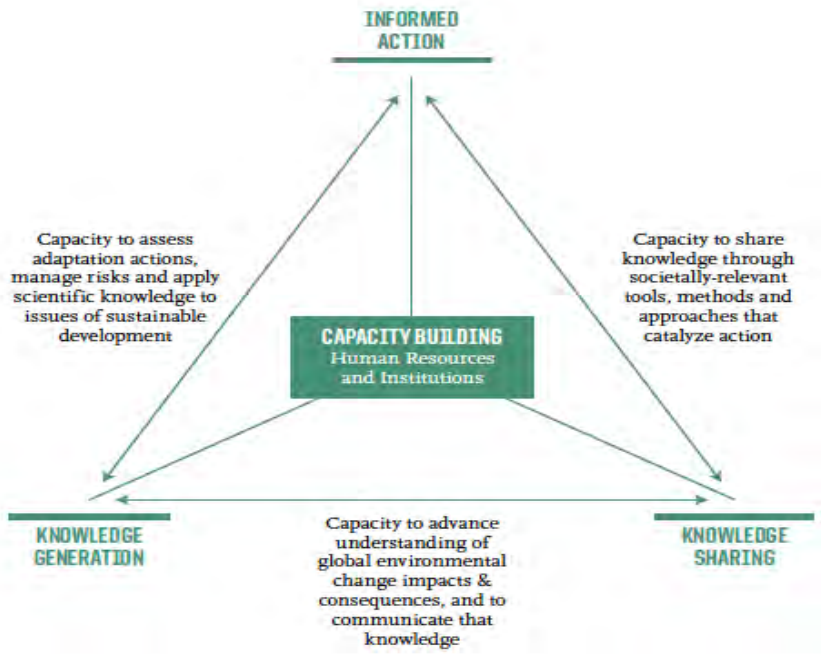
START: Cities at Risk[6]

The Future is not something that happens to us. The future is something we create with every choice. (Todd Reubold, 2012 Momentum Magazine, U. Minnesota)

Dr. Hassan Virji, International START Secretariat, presented the case of the Cities at Risk Program. He first explained that START's mission is to enhance scientific capacity to inspire informed action on global environmental change. Its work contributes to building and enhancing capacities for advancing knowledge on global environmental change in Africa and Asia-Pacific. This is accomplished through research grants and fellowships, curricula

[6] PowerPoint slide in this section extracted from: *Co-design and Production in START's Cities at Risk Program*, a case presentation by Hassan Virji at the workshop on 5 February 2014

development, advanced training institutes, multi-stakeholder dialogues, knowledge assessment and synthesis, and place-based strategic planning.



START implements the **Cities at Risk Program**, which builds adaptive capacities for managing climate change risks in coastal cities in Asia and Africa. The program:

- Provides a platform for sustained collaboration to foster resilient urban future
- Deals with urban vulnerability, poverty and climate change
- Delivers training in risk management and disaster risk reduction, and support of education, learning and research for humanitarian assistance

Working at the **interface of science, policy and practice**, Cities at Risk aims to:

- Focus on connecting the research and academic community to urban planners, private sector, policymakers, civil society
- Assess both natural and social vulnerability now, and do projections for the future
- Develop and promote dynamic process of adaptation for both rapid/sudden events as well as slowly accumulating disasters-in-making
- Enable a rational process of inclusive action to attain sustainable development pathways

Cities of current focus include: coastal mega cities of Asia and Africa; and a city-based network of administrators, academia, and civil society activated in Manila, Shanghai, Bangkok, Hanoi, Jakarta, Mumbai and Dar es Salaam, Lagos, Durban and Vancouver.

Training sessions are offered on: visioning the future city, vulnerability assessment tools and methods, and research support. The Program also supports a series of **advanced**

institutes on disaster risk management and adaptive capacity, visiting scientists and research fellows, curriculum development, and research support. Another focus area is on **communicating and informing decisions**, including the development of games for decision making. The advocacy process is crucial for implementing research results within government policy, and to communicate findings to the community and policy makers.

The **private sector** is ready and ripe for collaboration. Examples include insurance for poor farmer in Ethiopia and Tanzania, and health sector work in Vancouver.

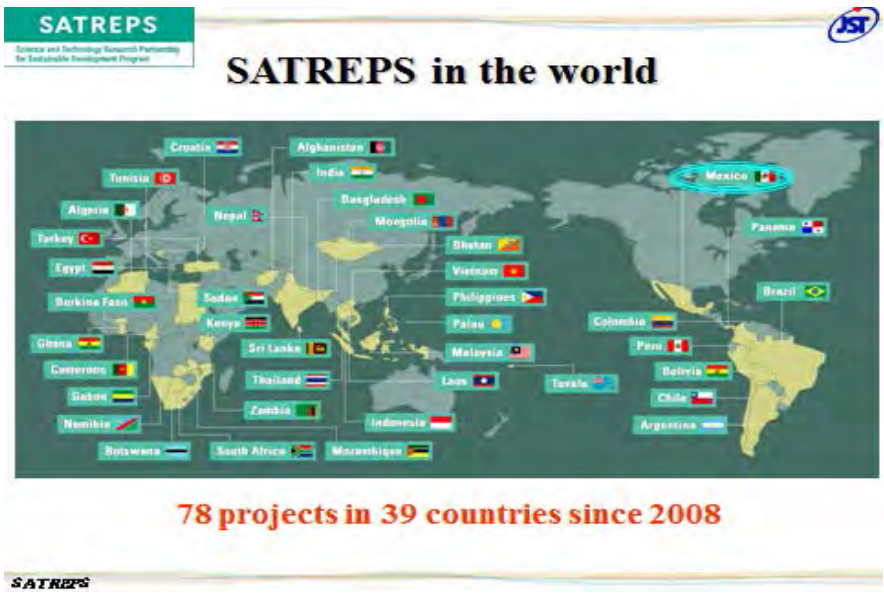
Cities at Risk built expectations with stakeholders through visioning exercises, and enhanced confidence, trust and leadership roles. Capacity-building is not a one-off deal; there is a need to focus on the younger generation. There is START-Future Earth collaboration in capacity-building. All these activities contribute to the **outcome** of forming and sustaining **regional networks**.

Co-design is very complex, very contextual. It differs from participatory design. One has to be careful about introducing researcher biases. Co-design is not a panacea for all problems, but should focus on science for sustainability.

SATREPS: Science for Society[7]

Prof. Yoshifumi Yasuoka, SATREPS Program Officer, focused his presentation on: a general framework towards sustainable society; the Science and Technology Research Partnership for Sustainable Development (SATREPS) Program; and towards Future Earth.

SATREPS is a Japanese international bilateral collaborative research program, which supports some 78 projects in 39 countries throughout the world as of November 2013.



[7] PowerPoint slide in this section extracted from: *Introduction of SATREPS: Social Implementation of Science and Technology for Sustainable Development*, a case presentation by Yoshifumi Yasuoka at the workshop on 5 February 2014

The project selection process is **highly competitive**: only 10% of proposals are selected. Through a collaborative arrangement, **JICA** supports activities in counterpart countries, while **JST** supports activities in Japan and scholarships for counterpart researchers. The total budget per project is about US$ 5 million over 5 years.

In participating countries, SATREX conducted community-level surveys, provided information to local people, and respected local culture and traditions.

SATREPS and Future Earth share **common attributes** such as:

- Addressing global issues
- Enhancing science and technology
- Implementing with society
- Working towards sustainable society
- Seeking international cooperation

World Wide Views: Citizen Consultation[8]

Prof. Yasushi Ikebe, National Museum of Emerging Science and Innovation, shared the experience of **World Wide Views**. He began by situating **citizen consultation** within the range of consultation methods, including deliberative poll and consensus conference.

With support from the Danish government, World Wide Views was deployed in the run-up to the **Climate Change COP 15** in 2009 (with 38 participating countries), as well as the **Biodiversity COP 11** in 2012 (with 25 countries).

The **WWViews method** may be summarized as follows:

- 100 lay people chosen to reflect the demographic diversity in each region
- Provided with balanced and scientifically-based information material
- Individual discussion group consists of 15-17 participants and a facilitator
- Discussing questions commonly given to all the participating countries

[8] PowerPoint slides in this section extracted from: *World Wide Views*, a case presentation by Yasushi Ikebe at the workshop on 5 February 2014

- Individual voting for given choices
- All the voting results are integrated into a policy report

WWViews participants enjoyed the exchange of opinions on global issues, as well as the unique opportunity to network with different people and communities. There is high potential for **creative exchanges among lay people**.

He also shared some **challenges** associated with this method, including:

- Difficult to provide **well-balanced information**:
    - Information material cannot be too lengthy (e.g., 200 pages long)
    - Bias cannot be avoidable due to different cultural or social background
- Difficult to **formulate good questions:** structurally, but also in the framing of issues; the questions determine the responses
- The target was UN COPs; therefore the results needed to be compatible with their agendas, which introduced a **strong bias** to the process
- **Policy report** depends totally on questions and votes
    - Discussion tend to be restricted due to given questions
    - The true variety of opinions is not captured by voting on questions

Lake HEAD: Working with Communities and Governments

Prof. Jaime Galvez-Tan, University of the Philippines (retired), presented the experiences of the Health Risk Evaluation Team, Lake HEAD Project, on managing environmental risks to food and health security in the Silang–Santa Rosa Sub-watershed Area, Laguna Lake, Philippines. This involved a **transdisciplinary, participatory ecohealth research approach**.

The Lake HEAD team utilized **transdisciplinary co-design** in initial stages to understand the expectations of the stakeholders. Often the starting research questions were not relevant to the community. Willingness to participate arises from long-term up-front engagement. Once interest has been stimulated, the local community will be a creative partner in research.

Mismatch between the problems of communities and research questions can occur: Lake HEAD started with a health status study, but people wanted to talk about flooding and waste management. The entry point for mothers was participation in the food and market diaries to improve the health status of children.

The project employed **community-based technologies** in research and public policy development. These included: household survey, food diary, market diary and village assembly, health risk assessment of environmental lead exposure, as well as the *Yaman ng Lawa* initiative to foster social transformation through participatory policy development.

Lake HEAD engaged four key sectors – science, community, business, and government. **Best practices in engaging communities and governments** may be summarized as follows:

In research

- Research is tailored to the identified community needs and issues
- Communities and governments are engaged even at the pre-research phase
- Communities are involved in important research activities
- Salient research findings (even from interim analyses) are shared with communities and governments in a timely manner

- Interventions for specific individuals are weaved with the preventive, curative, and rehabilitative services of village health centers (not a separate point-of-care)

In public policy development

- Empower people and communities with knowledge rather than extracting data
- Facilitative rather than investigative approach
- Organized activities with (NOT merely for) community stakeholders
- Community discussions not steered by research interests, allowing for issues relevant to the community to be identified, prioritized, and discussed
- Promoting the voice of the community

Moreover, the **private sector** was very accommodating in Santa Rosa, including industries, fisheries, Coca-Cola, Toyota, and multi-land use private developers.

In concluding his presentation, Prof. Galvez-Tan shared some of the challenges encountered in working with communities and governments:

- Encouraging involvement of key stakeholders in early phases of the project
- Ensuring that participation is genuine and not token-based
- Maintaining neutral, solutions-focused stance in the sharing of research findings

Co-design Principles and Mechanisms

Two interactive sessions focused on co-design, in particular the articulation of key principles and mechanisms for engaging stakeholders in Asia.

Small Group Discussions

After lunch on day 2, participants divided themselves into five groups in order to:

- Further explore the lessons and relevance of the case presentations
- Provide other examples of how to engage with society
- Distill key principles and mechanisms for co-design in Asia

The task for all five groups was to:

Identify up to 3 key principles and up to 3 mechanisms for co-design, and explain why they would be relevant and useful for Future Earth in Asia.

After an hour of discussion, rapporteurs from each group shared their results in plenary. There was strong convergence on many of the co-design principles and mechanisms articulated by the five groups.

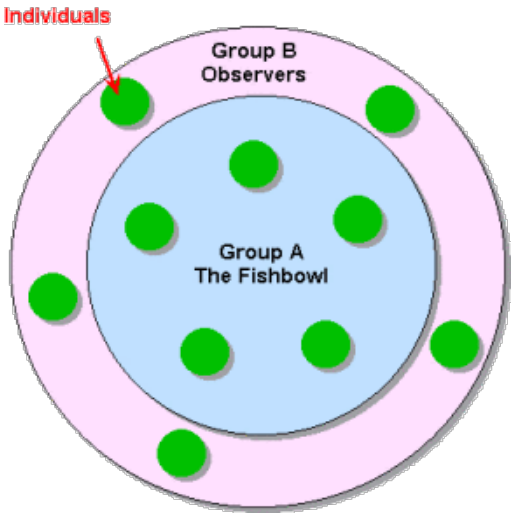
Co-design principle #1: work hard and be happy together!

Fishbowl Conversation

The final interactive session employed the "fishbowl" conversation technique to explore the fundamentally important question in co-design:

Who are the real "stakeholders" that should be engaged for different levels and stages of Future Earth in Asia?

With the **"fishbowl" process**, only people inside the fishbowl may speak. Pre-identified "fish" start the conversation, and other participants enter the fish bowl when there are empty chairs. Existing members of the fishbowl voluntarily leave the fishbowl to free up chairs, and the conversation continues with participants frequently entering and leaving the fishbowl. When time is up, the fishbowl is closed and the moderator summarizes the key discussion points.



Based on the outputs from these two interactive sessions, a consolidated set of co-design principles and mechanisms emerged:

Co-design Principles	Co-design Mechanisms
❖ Need to **co-identify** with stakeholders the **problems** that scientists should address ❖ Need strong **leadership** to make **transdisciplinary** approach work ❖ **Scientist** has to **change** o Learn from stakeholders o Have many hats/roles o Be humble ❖ Form mutual **trust/collaboration** ❖ Maintain **transparency** ❖ Have clear **vision** ❖ Address really **big issues**/problems/risks ❖ Use **systems approach** (to impact) ❖ Multiple **participation**: inclusive and democratic consensus-building ❖ Important role of "**translators**" to bridge stakeholders, connect with scientists ❖ Careful selection of **stakeholders** o Depends on nature of problem/project o Engage responsible SHs o Clear expectations/roles of SHs ❖ The three Future Earth **themes** invite **different approaches to engagement** o Dynamic Earth: science-driven, top-down framing o Global Development: science-stakeholder interaction in co-production stage o Transformations: local and global stakeholder-driven ❖ Need to also consider **imaginary stakeholders**: future generations and non-human stakeholders	➢ **M&E**: build in evaluation process that goes beyond research outputs/outcomes ➢ **Bridge** scientists and public, scientists and policy o Form partnerships with **boundary organizations** ➢ Utilize **top-down framing** of research ➢ **Build capacity** of stakeholders ➢ Sustain **dialogue** with stakeholders ➢ Provide **incentives** for being engaged ➢ **Learn by doing** ➢ Target "**champions'** in dissemination stage ➢ Combine sustainability science with **ICTs** ➢ Tap **IT/information sharing**: e.g., WWViews, The World We Want – SDGs ➢ Use **mass media** in co-production and dissemination ➢ Involve **local government leaders**, particularly in co-production stage ➢ Engage **private sector** (e.g., oil palm industry) and **local universities**: connect local and global studies ➢ Also engage **non-environmentally friendly stakeholders** (e.g., polluting industries) in co-design ➢ Include **users** in Future Earth **governance mechanisms**

Closing Remarks

In the final workshop session, closing remarks were delivered by representatives of JST, Science Council of Japan, and RIHN.

Japan Science and Technology Agency

Prof. Ohtake Satoru, Senior Executive Director, JST, commended the **participatory style** and the excellent facilitation of the workshop. The workshop discussions helped to form the **protocol** for inter- and trans-disciplinary research in the context of Future Earth in Asia.

Diversity is not enough, need **global leadership** to move Future Earth forward. Thus far, there has been slower progress of Future Earth than expected. **Asian leaders** need to take a stronger leadership role. Japan is involved in discussions on the globally-distributed Permanent Secretariat as well as the regional node for Asia.

Looking ahead, there is a need to **secure funding** for Future Earth as soon as possible.

Science Council of Japan

Prof. Satoru Onishi, President, Science Council of Japan, shared his "*Thinking about Future Earth in Asia*." The diversity in the region is reflective of the world: impacts are global.

Lessons from Japan are very relevant:

- Rapid development under limited space, energy, resources
- History of trial-and-error with some success
- Solutions developed under changing circumstances
- 50 years ago there were strong links within sciences, and with industry and public administration: these have weakened, and presents a serious problem

For common problems across Asia, **science** plays a central role. We have a responsibility to think about the future of the planet: need to achieve integration and co-design.

In the 4th Science and Technology Basic Plan (2011-2015), there is a major change driven by societal needs toward **green innovation**.

The Future Earth vision is common to that of JST/MEXT. Future Earth is a science program, but should not remain at that level alone: anticipating a global transdisciplinary program.

The Science Council of Japan will play an active role in Future Earth. Appropriate research funding schemes need to respond to the challenges of Future Earth:

- International collaboration
- Science integration
- Stakeholder engagement through knowledge production

Research Institute for Humanities and Nature

In his closing remarks, Prof. Makoto Taniguchi, RIHN/Workshop Chair, shared his impressions of the two-day event, and next steps for Future Earth in Asia. He highlighted the key **outcomes** from the workshop in terms of:

- Better understanding of the interactions between **nature** (monsoon climate, disasters, ecosystems) and **humanity** (equity, behavior, value, culture)
- Valuable inputs for the **draft science plan** for Future Earth in Asia: additional feedback is invited before 28 February
- **Co-design principles and mechanisms**: develop trust and collaboration with interactive knowledge transfer among stakeholders (including capacity building)
- **Common goal**: build together a **platform** for sharing experiences of co-design, methodology, data and knowledge for Future Earth in Asia

He also announced the immediate launch of the new Future Earth in Asia website:

http://www.chikyu.ac.jp/future_earth/index_eng.html

Regarding next steps for Future Earth in Asia, these were outlined as follows:

- 31 March: Full proposals for global and Asia regional hubs
- 7-10 April: MAIRS Open Science and Future Earth meeting in Beijing
- 4-6 June: Joint Future Earth Science Committee and Engagement Committee meeting in Beijing
- 18-19 June: Science Council in Asia meeting in Malaysia: "Future Earth: Research for global sustainability & a holistic understanding of sustainable development of Asia"
- 28 July 28-1 August: Asia Oceania Geoscience Society Meeting in Sapporo (Future Earth session, IG16); abstract deadline: 11 February
- August/September: ICSU-RCAP/ ICSU GA (report of Future Earth) in New Zealand
- December 2014/January 2015: 3rd international workshop on Future Earth in Asia (Kyoto)

Finally, he thanked the RIHN team and workshop facilitator for the excellent organization and conduct of the workshop, and wished all participants a safe journey back home.

Annex 1: Final Workshop Program

Day1 4 February 2014, Tuesday	
Start **(9:00-9:15)**	***Workshop Introduction*** – Tetsuzo Yasunari (Director-General, Research Institute for Humanity and Nature / Future Earth Science Committee) ***Workshop Overview*** – Chun K. Lai (Facilitator)
Opening Remarks **(9.15-10.00)**	***Introduction of Future Earth*** Frans Berkhout (Interim Director, Future Earth) ***Co-design in Future Earth*** Robert Watson (Chair, Future Earth Interim Engagement Committee)
Keynote presentations **(10.00-11.50)** ***Major trends in Asia*** Break (10.30-10.50)	***Development*** Surendra Shrestha (Director, International Environmental Technology Centre, UNEP)
	Asian Economic Development in Historical Perspective: Its Implications for Global Sustainability Kaoru Sugihara (Professor, National Graduate Institute for Policy Studies / Science Council of Japan)
	Urbanization and Sustainability Transition in Asia Bai Xuemei (Professor, Australian National University / Future Earth Science Committee)
Lunch (11.50-13.00)	
Interactive Sessions 1 **(13.00-17.20)** Break (15.00-15.20)	***Introduction of "Initial Strategic Science Plan for Future Earth in Asia"*** Michael Manton (Professor, Monash University) ***Identifying research priorities for Future Earth in Asia*** World Café – Small Groups; Plenary Discussion of Priorities Impressions of Day 1 - Nordin Hasan (Director, ICSU Regional Office for Asia and the Pacific), Toshio Koike (Professor, University of Tokyo)
Reception (18.00-20.00)	
Day2 5 February 2014, Wednesday	
Opening Remarks **(9.00-9.15)**	***Preparatory activities for Future Earth in Japan*** Fumiko Kasuga (Vice-President, Science Council of Japan)
Interactive Sessions 2 **(9.15-12.00)** Break (10.50-11.10)	***Experiences with engaging society*** Panel case presentations 1. Hassan Virji - Cities at Risk project (Executive Director, International START Secretariat) 2. Yoshifumi Yasuoka – Science for society (Program Officer of SATREPS, Program Advisor of RISTEX（JST）) 3. Yasushi Ikebe - WWViews: Citizen Consultation (Professor, National Museum of Emerging Science and Innovation) 4. Jaime Galvez-Tan – Working with Communities and Governments (Professor, University of Philippines) Plenary Discussion based on the panel presentations
Lunch (12.00-13.00)	
Interactive Sessions 3 **(13.00-16.30)** Break (15.00-15.20)	***Principles & Practices for Co-design in Future Earth in Asia*** *Lessons & Relevance of Case Studies* (13.10-14:10) Group Discussions (14:10-15:10) Plenary Feedback from Discussions *Design Principles and Mechanisms for Co-design in Asia* (15.30-16.45) "Fish Bowl" Plenary discussion and Summing Up of Day 2
Closing remarks **(16.30-17.20)**	Satoru Ohtake (Senior Executive Director, Japan Science and Technology Agency) Takashi Onishi (President, Science Council of Japan) Next Steps – Makoto Taniguchi (Professor, Research Institute for Humanity and Nature / Workshop Chair)

Annex 2: List of Participants

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