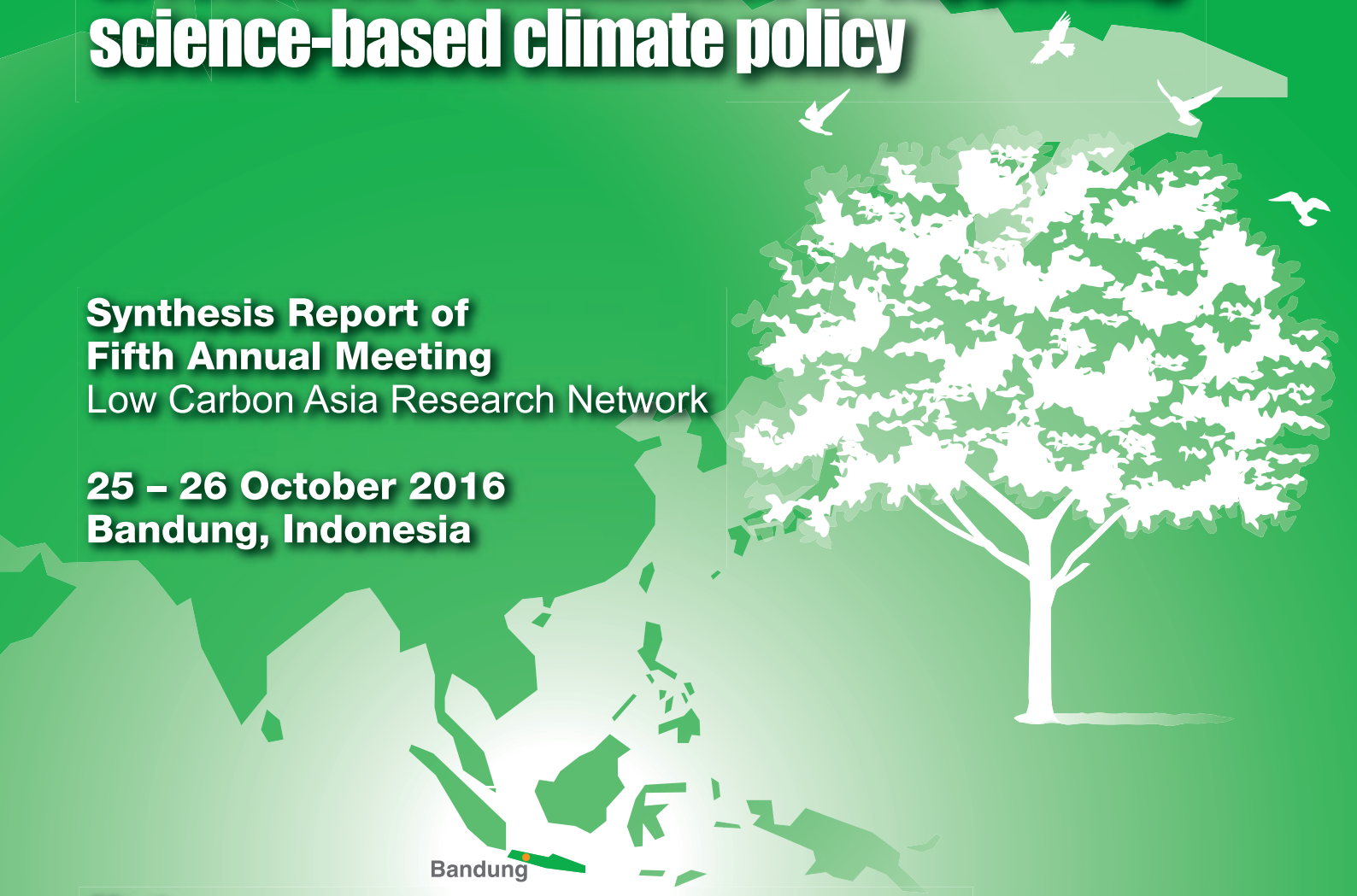
Low Carbon Asia Research Network

LoCARNet

Carrying out the Paris Agreement : Role of research communities in supporting science-based climate policy



Synthesis Report of
Fifth Annual Meeting
Low Carbon Asia Research Network

25 – 26 October 2016
Bandung, Indonesia

Host
Institut Teknologi Bandung (ITB)
Institut Pertanian Bogor (IPB)
Institute for Global Environmental Strategies (IGES)
National Institute for Environmental Studies (NIES)
Ministry of the Environment, Japan (MOEJ)

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Preface

Amidst the growing and urgent need to realise low-carbon, sustainable society, the Low Carbon Asia Research Network (LoCARNet) was launched. It acts as a knowledge-sharing platform linking research communities and other stakeholders together with the aim of assisting in drafting science-based policy aimed at low-carbon development in the Asian region. The Institute for Global Environmental Strategies (IGES) has acted as its secretariat since 2012, and in cooperation with the National Institute for Environmental Studies (NIES; Japan's Focal Point), promotes dialogue among researchers and policymakers in Indonesia, Thailand, Cambodia, Malaysia, Viet Nam and other Asian countries, and has held workshops to support collaboration among researchers. These activities have brought to light the need to prioritise knowledge-sharing on low-carbon issues within Asia.

LoCARNet's Fifth Annual Meeting was held over 25-26 October 2016, in Bandung, Indonesia, and was co-organised by the Ministry of the Environment, Japan (MOEJ), the Institut Teknologi Bandung (ITB), the Institut Pertanian Bogor (IPB), the National Institute for Environmental Studies (NIES), and the Institute for Global Environmental Strategies (IGES).

At this meeting, under the theme of "Carrying out the Paris Agreement: Role of research communities in supporting science-based climate policy", the network held lively discussions on urgent issues in Asia – such as low-carbon cities, innovative monitoring, land-use, adaptation, development and implementation of NDCs and desirable capacity building – together with researchers, policymakers, businesses, international organisations and others.

Climate change is an urgent matter. According to Japan's Greenhouse Gases Observing Satellite IBUKI (GOSAT), CO_2 concentrations in the Earth's atmosphere have been rising by two parts per million (ppm) every year, with global emissions reaching 400 ppm in January 2016. This growth rate suggests we will soon approach dangerous levels of warming – equivalent to a 2-degree temperature rise over pre-industrial levels – if society at large does not undergo a low-carbon transition.

Evidence also suggests that since the Industrial Revolution the global mean temperature has risen by approximately 1°C, and the impacts of the change in climate that this has brought about can be readily seen around the world - floods, heat waves and reduced crop yields for example. Global response measures have become a matter of urgency.

LoCARNet has held four annual meetings to date. The first, in Bangkok, scoped out topics for the network to address, while the second, in Yokohama, focused on how to advance its activities. At the third meeting, in Bogor in 2014, the LoCARNet Bogor Declaration was released, proclaiming "Asia is ready to stabilise the climate," and emphasised to the world Asia's high potential in attaining the 2-degrees target. The fourth meeting, held in 2015 in Malaysia and with a view towards COP21 in Paris and beyond, declared "Asia must be included in any global climate change mitigation and adaptation actions to be meaningful towards the year 2020 and beyond" and "Asia is ready to contribute".

The most recent, fifth annual meeting, stressed the growing importance of incorporating science-based knowledge into policymaking, in view of the high likelihood of adoption of the Paris Agreement, and calls for its steady implementation and increased transparency. The meeting also portrayed Asia as having already taken actual action – for example, by making efforts in some cities and devising individual projects that make use of the Joint Crediting Mechanisms (JCM).

Taking this opportunity, we would like to express our profound gratitude to all speakers and participants from academia, government, civil society, and international organisations for their contributions to the meeting. We would like to add our sincere appreciation to the chairs and rapporteurs of the meeting, the steering group of

LoCARNet, and the organising committee comprising ITB, IPB, and the LoCARNet Secretariat for their support in bringing this dialogue to fruition. We are also grateful to the Ministry of the Environment, Japan, for providing us with favourable opportunities to meet. Thank you very much.

Co-Chair of the Meeting, representing the steering group of the Fifth Annual Meeting of LoCARNet

Dr. Ucok Siagian
Institut Teknologi Bandung (ITB), Indonesia

Prof. Rizaldi Boer
Institut Pertanian Bogor (IPB), Indonesia

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Authors of the Synthesis Report

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Key Findings

A Stable Climate Is a Common Asset for Humankind

> According to IPCC AR5, human impacts on the climate system cannot be denied, and the likelihood of human impacts being the leading cause of global warming observed in the latter half of the 20th century is extremely high.

> Global temperatures have already risen 0.85 degrees. Mere "adaptation measures" cannot counteract the impacts; the strongest adaptation measures are actually mitigation measures.

> The pathway to stabilising the temperature rise below 2 degrees requires a 40-70% reduction by 2050 from 2010 levels, and near zero emissions by 2100. Implementation of such reductions raises substantial technological, economic, social and institutional issues.

The Responsibilities and Role of Asia Are Vital

> Asia plays a major role and bears a heavy responsibility in climate stabilisation. If it maintains its current rate of high energy- and carbon-dependent societal development it is predicted to account for half of the global economy, energy consumption and carbon dioxide emissions by 2050. It is therefore no longer possible for rapidly developing countries to mimic the path of their highly energy- and carbon-intensive predecessors.

> If present patterns in infrastructure development and industrial investment follow conventional norms, developing countries in Asia will be locked into high carbon emissions for another half-century. Therefore, they need to explore different paths of development and "leapfrog" to low-carbon societies.

> Southeast Asia's Agriculture, Forestry and Other Land Use (AFOLU) sector holds a large potential in terms of carbon reduction and carbon sinks.

An Opportunity to Leapfrog by Integrating Knowledge and Wisdom In-Country

> The worldwide transition to low-carbon societies is a massive undertaking and one which must be carried out by each Asian country individually in order for the vision to take shape for future society. Policies for national and local development need drafting via domestic knowledge resources without outside help. Each country needs to grasp its specific circumstances and explore how best to realise its future vision along with its devoted citizens, who will have full ownership.

> Implementation of the Paris Agreement (PA) will require strong science-based evidence to enable parties with diverse circumstances, capacities, and capabilities to cooperate and bring about long-term improvements.

> The scientific community needs to assume a bigger role and fill the gaps between research programmes/activities and decision making/planning needs.

> The level of collaboration between research communities and policymakers needs boosting in the context of development/implementation of Nationally Determined Contributions (NDCs) via use of sophisticated methodology, baseline analysis and scenario study for modeling, to enable more objective policy decisions to be made.

> More discussion needs to take place on how international research communities can provide scientific bases and evidences on 'how the current and local climate distresses connect to conditions on the national or regional scale and future situations'.

> As an implication of the PA for cities, some municipalities and cities in Asia have developed climate change action plans by themselves. Developing such plans requires heavy contributions related to research and science.

> Appropriate action plans may differ from one city to another, thus finding the most suitable technologies and policies in developing such plans is paramount for actual implementation.

The Importance of Quantitative Data

In order to monitor progress toward low-carbon society, holistic surface to satellite monitoring systems would greatly contribute, thus the research community needs to see ramped up development of satellite monitoring systems such as GOSAT and PALSAR-2.

Policymaking needs quantitative data, which is only obtainable if it is freely accessible, or open-access. Indonesia has made use of data from forest monitoring technology, WEBGIS, since 1990s under the National Forest Monitoring System (NFMS) strategy.

Energy monitoring started in Bogor in 2014, via a collaborative project involving researchers, businesses and policymakers, data and technology, which helps frame the city's low-carbon policy, and reinforces the notion that social activity monitoring and data sharing positively assist in policy planning for low-carbon society.

Seamless Planning for Achieving Low-Carbon Development

The role of scientific communities in reinforcing Deep Decarbonisation Pathways is to explore the scientific evidence supporting strategic policy planning whilst also bridging the gap between national and subnational levels.

National adaptation/mitigation action plans must be integrated into development plans at provincial and district levels to ensure synergy with climate change adaptation/mitigation at the local level, as well as co-benefits for each party.

As local communities are those most affected by disasters due to climate change, climate change adaptation planning should involve such communities and incorporate their traditional knowledge.

Governance and coordination among line ministries and between national and subnational levels need to be improved.

The Growing Importance of Capacity Development in Asia

Gaps in capacity between scientists in developed and developing countries significantly affects developing country participation at the global level e.g., in IPCC processes.

Training to increase knowledge capacity of low-carbon cities should focus on key points – the international and regional context of low-carbon development, LCS scenarios development, and integration of low-carbon development in provincial climate change planning processes.

Roles and Actions of All Stakeholders/Actors

Successful implementation of PA, and chiefly the 2-degrees (below 2 degrees) target, requires a "zero-carbon society" to be realised in the second half of this century, especially for cities, which account for two thirds of global energy consumption and about 70% of GHG emissions and carry a huge burden as one of the key players in implementing adaptation and mitigation actions.

Implementing low-carbon cities requires multi-level support – from national and local government, citizens and various other stakeholders.

Johor State, which involves Iskandar Malaysia and the five local authorities within the Iskandar region, has actively implemented LCS scenarios by formulating the Blueprint and the Action Plans and establishing the Green Technology and Climate Change Council (MTHPI) to draw up long-term strategies.

In order to successfully implement the LCS programmes and actions, Johor State engaged the participation of local councils, citizens, and media.

The implementation of REDD+, due to the involvement of various stakeholders with different interests, should accommodate economic advantages within the framework of climate change mitigation by utilising local wisdom and local natural resources.

Keynote Reports

Paris Agreement and follow up agenda for its implementation

[Speaker]:
Dr. Nur Masripatin, Ministry of Environment and Forestry, Indonesia

[Reporters]: Riany Oktaviani Sungkawa, Wahana Universal, Indonesia
Mega Sulistia Octaviany, Wahana Universal, Indonesia

The Paris Agreement (PA) entered into force in November 2016, with the signatures of at least 55 Parties and with estimated coverage of least 55% of total global greenhouse gas emissions. Concurrently, the 2030 Agenda for Sustainable Development has set 17 Sustainable Development Goals, which are all in some interlinked with climate change itself. The PA aims at strengthening the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. Implementation of the PA includes measures to carry out low-carbon development (LCD) and its finance flows, under the principle of equity and common but differentiated responsibilities and respective capabilities, in light of differing national circumstances.

Climate-safe technology development and transfer, capacity building enhancement, transparency of measurement and reporting of climate related actions, and global stocktaking are some of the key elements recognised by the PA as being highly relevant to the scientific community.

Furthermore, addressing challenges to take the PA forward will release a series of research opportunities. At the global level, such opportunities exist within the IPCC process for preparing the sixth assessment report and special reports, in facilitative dialogue on 2018 to take stock of the collective efforts and inform on the preparation of NDCs communication, in supporting a global stock-take in 2023, and in enhancing actions pre-2020 that include strengthening the technical examination process, enhancement of provision of urgent finance, technology and support, as well as measures to strengthen high-level engagement.

At the national level, the science community is expected to support planning, implementation, and investment planning of INDCs/NDCs, and help bring about a gradual transformation to low emission carbon development with a strong science-based foundation.

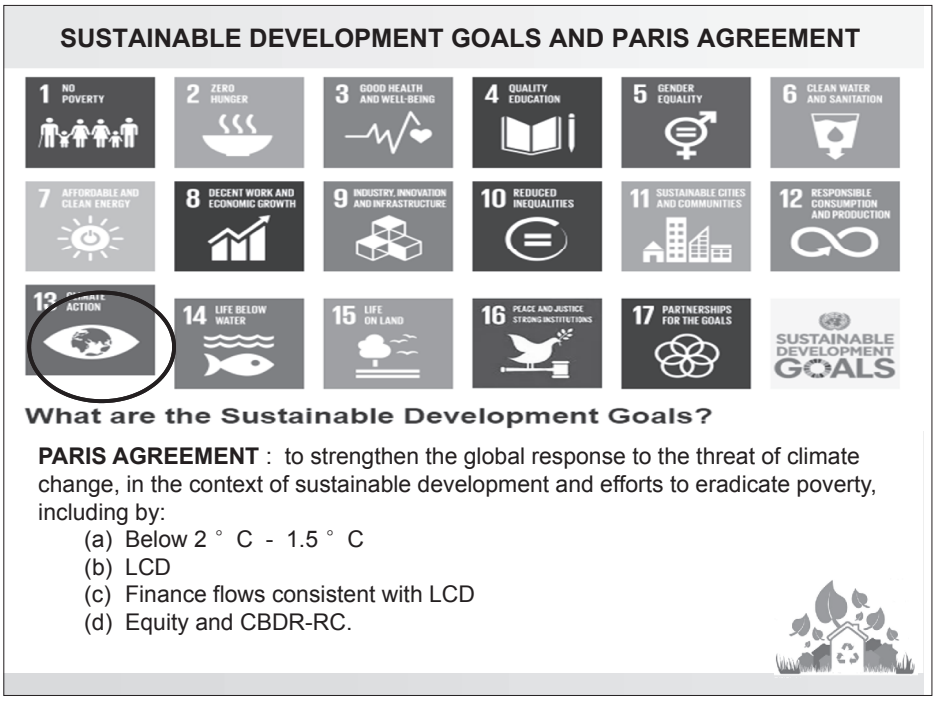
Key Findings of the Session

- Implementation of the PA will require a strong science base to enable Parties with diverse circumstances, capacities, and capabilities, to progress together and improve over time.
- Science community needs to enhance its roles to fill the gaps between research programmes or activities and the needs of decision-making and planning processes.
- Gaps exist in capacity between scientists in developed and developing countries, which significantly affects participation of developing countries at the global level, e.g., in IPCC processes.

Concrete/Practical Steps for Low Carbon Transformation

- Mapping of current conditions, identifying strengths and gaps, and enhancing participation via ongoing reviews at the global level.
- Improve consistency and coherency between research programme/activities and the (anticipated) needs for decision-making and planning processes.
- Enhance collaboration at all levels – national, regional, and global.
- Enhance effectiveness of science-policy dialogue.

Sustainable Development Goals and Paris Agreement



Source: Presentation by Dr. Nur Masripatin, Ministry of Environment and Forestry, Indonesia

Low carbon implementation policies in Johor, Malaysia

[Speaker]:
YB Datuk Ayub Rahmat, Johor State Executive Council for Health and Environmen, Malaysia

[Reporters]: Riany Oktaviani Sungkawa, Wahana Universal, Indonesia
Mega Sulistia Octaviany, Wahana Universal, Indonesia

In recent years, Johor State, the most populous area in Malaysia, has experienced rapid economic growth linked with its industrialisation and tourism. This sits alongside its mixed development in housing, land and agriculture. Its strong economy has raised the quality of life but also led to environmental degradation, quality and increased volumes of industrial, residential and commercial waste.

In the effort to make Johor a sustainable state, the authority has prepared key strategic plans and strategies toward a vision of "Inclusive, Sustainable and for the Wellbeing of Johor". The Johor development strategic plan, "Budget Johor 2016", comprises 6 pillars, one of which is the Johor sustainability policy. The policy consists of 10 priority programmes covering biodiversity conservation, natural resources protection, pollution control and green technology development. In 2015, Johor's Government established the Green Technology and Climate Change Council (MHTPI) to communicate and disseminate federal policy at the state level, and conduct evaluation and monitoring toward implementable policy.

The Iskandar Regional Development Authority of Iskandar Malaysia, the main southern development corridor of Johor State, launched the Low Carbon Society (LCS) Blueprint for Iskandar Malaysia 2025 at COP 18 in 2012. This was followed by the LCS Action Plans 2025 of Johor Bahru, Johor Bahru Tengah, Pasir Gudang, Kulaijaya, and Pontian within the Iskandar Malaysia region, launched at COP 21 in 2015.

Efforts associated with the above include creation of an energy monitoring and reporting system, holding an energy and water saving competition, completion of green economy guidelines, a master plan and guidelines on pedestrian and cycle lanes as well as tree planting programmes. It engages local councils, citizens, and the media to support the efforts of LCS implementation in Iskandar. Carrying out the LCS scenario is projected to reduce GHG emission intensity by 58%, equivalent to a 40% emission reduction from business as usual by 2025 compared to the 2005 base year.

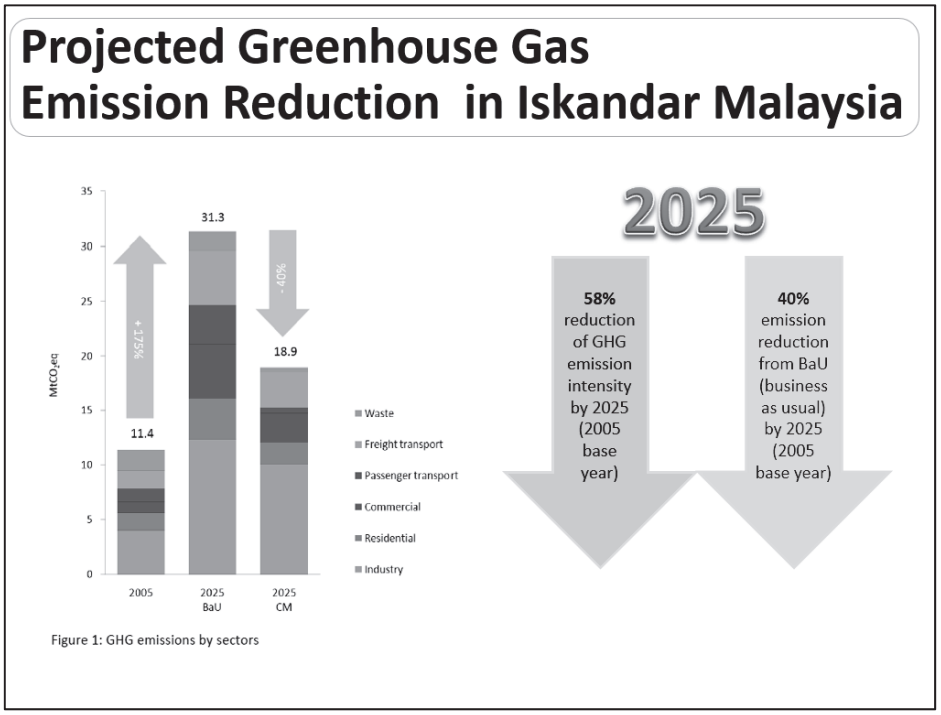
Key Findings of the Session

- Johor State, which includes Iskandar Malaysia and the five local authorities within the Iskandar region, has actively implemented LCS scenarios by establishing the Green Technology and Climate Change Council (MHTPI), and the Blueprint and Action Plans.
- In order to successfully implement the LCS programmes and actions, Johor State engaged the participation of local councils, citizens, and media.

Concrete/Practical Steps for Low Carbon Transformation

- Implementation of the LCS Action Plan requires frequent monitoring and evaluation in order to achieve its goal in 2025, which means capacity building for MRV is required.
- Cooperation between the government, science community and citizens is key to the success of LCS action plans.
- In addition to local authorities, local councils and parliamentary members need to be exposed to the progress made by their counterparts in other countries, and also to share knowledge and plans through means such as LoCARNet forums.

Projected greenhouse gas emission reduction in Iskandar Malaysia



Source: Presentation by YB Datuk Ayub Rahmat, Johor State Executive Council for Health and Environment, Malaysia

The path to low carbon society: Challenge for Asia and the world

[Speaker]:
Dr. Shuzo Nishioka, Senior Research Advisor, IGES, Japan

[Reporter]: Tomoko Ishikawa, IGES, Japan

According to IPCC AR5, based on climate system change predictions obtained by combining various observation results to date and abundant scientific data, a near proportional relationship between accumulated greenhouse gas emissions since the age of industrialisation and temperature rise has been observed. In other words, it has been shown that as long as greenhouse gases (the majority of which is CO_2) are being emitted, temperatures will continue to rise. This implies that regardless of the actual number of degrees at which the rise is stopped, temperatures will not stop increasing unless greenhouse gas emissions are brought to zero (or more accurately, are in balance with absorption).

As the Paris Agreement set out to keep the temperature rise within 2°C, the political implications of this are significant. The total amount of permissible accumulated post-industrial emissions of greenhouse gases (CO_2 equivalent) that can be released before reaching a 2°C increase is estimated to be approximately 2.9 trillion tonnes, based on the proportional relationship between temperature and emissions. Of this amount, approximately 1.9 trillion tonnes have already been emitted up to 2010, leaving a total of only about 1 trillion tonnes (total budget) that can be emitted from here on before reaching 2°C. As current global annual emissions are approximately 36 billion tonnes, even if emissions are maintained at present levels, this 1-trillion tonne budget of permissible emissions will be depleted in about 28 years, and absolutely no emissions can take place after 29 years.

Based on this natural theory, the human race has no choice but to move toward society based on zero emissions. Thus, the major task of this century is to whittle down greenhouse gas emissions as much as possible while somehow also adapting to the changing climate, extending 28 years to 50, and then 100, and in the interim to transition to low-carbon societies and finally achieve zero emissions.

Pathways that enable this transition are already known. If emissions continue as is, the temperature rise will reach 4°C by the end of this century. The pathway to stabilisation under 2°C requires a 40-70% reduction in 2050 from 2010 levels, and near zero emissions by 2100. Implementation of such reductions raises substantial technological, economic, social and institutional issues. Thus in order to achieve the targets by 2050, on the supply side, low-carbon energies need to be increased by a factor of four over the present amount to account for 60% of all primary energy. On the consumer side, substantial energy conservation (reductions in total amount) is purported to be possible, where energy consumption is to be reduced by 30% in the transportation sector, approximately 25% in the construction sector, and approximately 30% in the industrial sector.

A figure that more clearly depicts this course of action is 2 tonnes per capita by 2050. The representative scenario for a sub-2°C suppression follows a path of reducing global emissions by about half as of 2050. Present emissions of approximately 40 billion tonnes (CO_2 equivalent) are to be halved to 20 billion tonnes by 2050. As the global population in 2050 is expected to be approximately 10 billion, an average per-capita emissions figure of approx. 2-tonnes is permissible. This is one benchmark for the emissions targets of each country. Thus, a process is recommended whereby we first develop a vision for a "2-tonne society", then carry out backcasting from there, discussing targets for 2030 and 2040, and boldly formulating the policies required to create low-carbon societies.

Asia, which includes China, ASEAN, India and so on, following its present course as centre of global economic growth, is set to account for half of global GHG emissions by around 2050. Investments in infrastructure and industry are high, and if such makes use of conventional high-energy consuming technologies, this will bind our societies to a high-energy pathway over the next 30 years.

Developed countries in Asia have already exceeded 2 tonnes per capita emissions and can no longer continue emitting high amounts of carbon. Developed nations can reach the 2 tonne per capita target with a roughly 80% reduction, and if all nations in Asia were to share this aim, it would be less wasteful to consider "leapfrogging" – or, pathways for new development that do not rely on present-day highly energy-dependent technologies. A good example of leapfrogging is in China overcoming the need to expand its wired communications network over its vast land area due to the explosion in use of cellphones, thanks to the advent of the IT age. It now ranks as a global top producer of handsets. Likewise, following low-carbon trends, it also ranks No.1 globally in production of renewable energies.

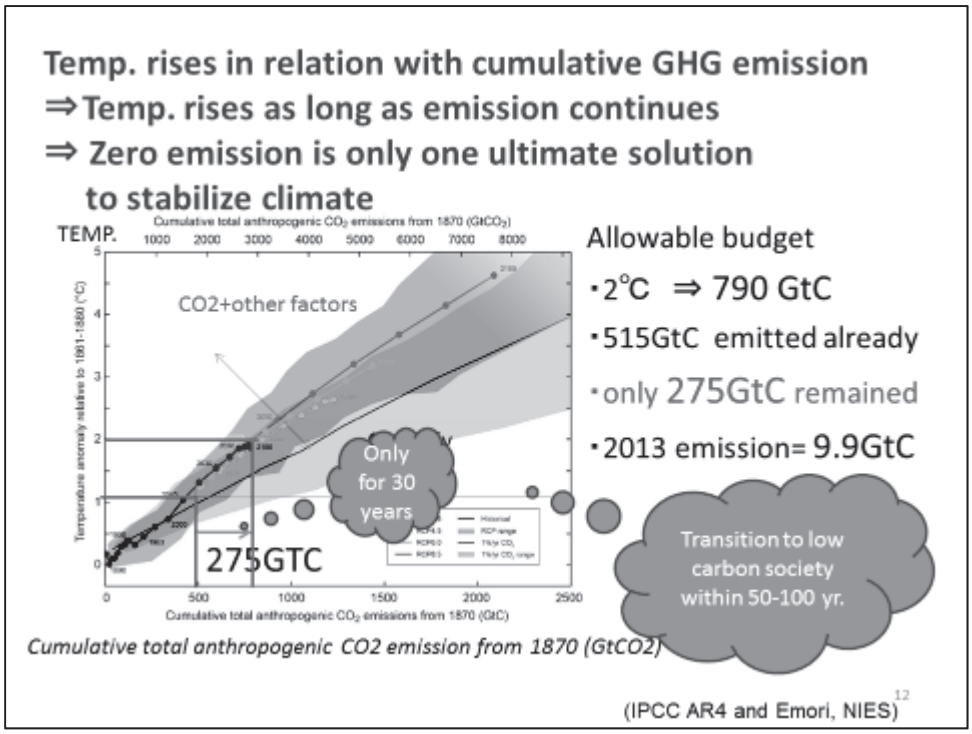
Key Findings of the Session

- According to IPCC AR5, human impacts on the climate system cannot be denied, and the likelihood of human impacts being the leading cause of global warming observed in the latter half of the 20th century is extremely high.
- The pathway to stabilising the temperature rise below 2°C requires a 40-70% reduction in 2050 from 2010 levels, and near zero emissions by 2100. Implementation of such reductions raises substantial technological, economic, social and institutional issues.
- Advanced countries in Asia have already exceeded 2 tonnes per capita emissions and can no longer continue under high carbon emissions. Countries need to consider "leapfrogging", which is to adopt pathways for new development that avoid use of present-day highly energy-dependent technologies.

Concrete/Practical Steps for Low Carbon Transformation

- Global temperatures have already risen by 0.85 degrees. Mere "adaptation measures" cannot counteract the impacts. The greatest adaptation measures are mitigation measures.
- A process is recommended whereby we first develop a vision for a 2 tonne society, then use backcasting to arrive at targets for 2030 and 2040, and boldly forge the policies required to create low-carbon societies.

Relationship between accumulated greenhouse gas emissions and temperature rise



Source: Presentation by Dr. Shuzo Nishioka, IGES, Japan

Session Reports

AFOLU: Science needs and challenges for deep decarbonisation of AFOLU sector in Asia

[Co-chairs]:

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Dr. Agus Susatya, Bengkulu University, Indonesia

[Speakers]:

Mr. Fredericus Gebze MS, Regent of Merauke District, Papua Province, Indonesia

Prof. Dr. Rizaldi Boer, CCROM-SEAP, IPB, Indonesia

Dr. Nguyễn Huy Thắng, Forest Inventory and Planning Institute, Vietnam

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Mr. Jusupta Tarigan, NTFP-EP Indonesia

Dr. Agus Susatya, Bengkulu University, Indonesia

[Reporter]: Ratna Patriana, CCROM-SEAP, IPB, Indonesia

In the 2015 Paris Agreement, countries agreed to achieve net-zero emissions by 2070 for CO_2 and all greenhouse gasses by 2100, which implies a drastic reduction in fossil fuel use and maximised role of the agriculture, forestry and land use (AFOLU) sector for carbon sequestration. This session focused on sharing views and lessons learnt on science support needed for designing the Deep Decarbonisation Pathway Project (DDPP) in Southeast Asian countries.

In essence, in Southeast Asian countries, the AFOLU sector has high potential as the main carbon sink. Even though Indonesia's current AFOLU sector contributes to 56% of the national GHG emissions, under the DDPP scenario, AFOLU emissions can be made zero and progress to deep decarbonisation thereafter is possible without significantly affecting the target production of food, feed and timber.

To bring about this low-carbon development scenario, however, Indonesia needs to make critical changes to its land management policy. Use of low-carbon stock land for agriculture expansion needs to be optimised by granting access to local communities to manage it. Land reform should be accelerated by simplifying the process enabling local ownership of "conflict" land, or land that has no "clean and clear" ownership. This process – supported by the improvement of agricultural infrastructure irrigation facilities and crop productivity, and assistance – will improve livelihoods of the local community, put unproductive land to use and increase the carbon stock from the AFOLU sector.

In terms of measurement of the carbon storage potential of different ecosystems in Indonesia, Indonesia's Climate Change and Forestry Experts Network (APIK) has actively supported national and regional government in implementing low-carbon development. One of the activities developed is measurement of local emission factors to improve the accuracy of emission estimates from the AFOLU sector. Studies on different ecosystems – such as mineral land, mangrove, peatland, dense forest and small islands – have been published.

The concept of technology transfer for low-carbon development in the AFOLU sector should also, as a starting point, attempt to understand the mindsets of local communities. NTFP-EP (Non Timber Forest Product Exchange Programme) has embraced this need by promoting and supporting communities around Danau Sentarum National Park by using non-timber forest products such as rattan, honey, tengkawang (oil-bearing seeds such as shorea sp.), kamsiah (firewood), damar (resin) and fish.

In Rejang Lebong, Bengkulu, implementation of REDD+ involved participation of the community which subsequently led to its livelihood improvement. As of 2016, 2,068 hectares of community forest (hutan kemasyarakatan/HKM) had been developed to promote agroforestry and environmental services in the area. The efforts also helped develop coffee and nutmeg plantations for local farmer groups, and strengthen their business acumen through product diversification and marketing strategies.

In Merauke, Papua, where the local community possesses an innate ecological mindset, low-carbon development is implemented by strengthening cultural identity and local wisdom in conserving forests. This is achieved by prioritising local/endemic species as main commodities as part of land reforestation and rehabilitation programmes introduced by the district's government.

Viet Nam, on the other hand, has predicted that net carbon absorption will have risen to 37.3 tCO2e per year by 2020 under its current land use policy scenario. Its nationally approved policy on green development targets GHG emission to be reduced to 8-10% for the period 2011–2020 compared to 2010 level. However, without a fossil fuel replacement for its main source of energy, by 2030 emissions from the energy sector are projected to reach 296.35 million tonnes, 14 times the level in 1993. Therefore, development of renewable energy needs to be prioritised in the government's agenda, but cautiously, due to the risk of deforestation in expanding agricultural land to produce raw materials for biomass-based energy.

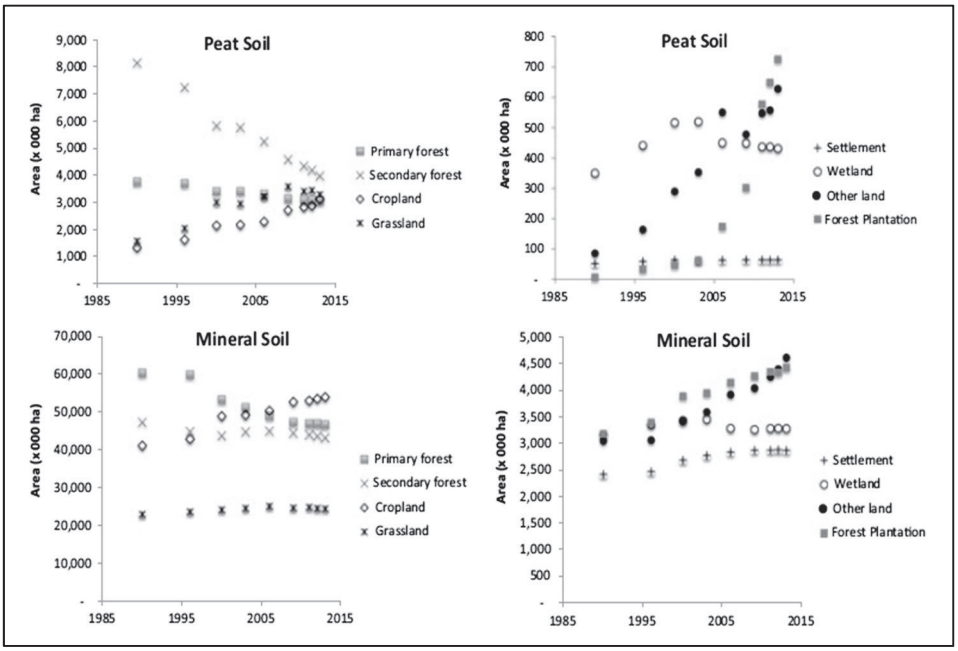
Key Findings of the Session

- In order to achieve the Deep Decarbonisation Pathways target, land management practices need a radical overhaul, particularly for peatland and optimisation of low-carbon stock land for agriculture expansion.
- Due to the involvement of various stakeholders with different interests, REDD+ should accommodate economic advantages within the framework of climate change mitigation by utilising local wisdom and local natural resources.
- The role of scientific communities in reinforcing the Deep Decarbonising Pathway can be carried out by exploring scientific evidence for developing an appropriate strategic DDPP plan, whilst also bridging the gap between national and subnational levels.

Concrete/Practical Steps for Low Carbon Transformation

- Strengthening local capacity of city/district levels in spatial and land use planning policies and governance;
- Recognition and strengthening of the indigenous/local community's role in terms of cultural identity and local wisdom in local forest management. In parallel, prioritise local-endemic species for reforestation and land rehabilitation to avoid alien species invasion, as demonstrated by Merauke

Land use change of peat soil land and mineral soil land over 30 years



Source: Presentation by Prof. Dr. Rizaldi Boer, CCROM-SEAP, IPB, Indonesia

Innovative monitoring system and its role in building a low carbon Asia

[Co-chairs]:

Dr. Shuichi Ashina, NIES, Japan

Dr. Tsuyoshi Fujita, NIES, Japan

[Speakers]:

Dr. Ryuichi Hirata, NIES, Japan

Dr. Ruandha Agung Sugardiman, Ministry of Environment and Forestry, Indonesia

Dr. Muhammad Ardiansyah, IPB, Indonesia

Prof. Ucok Siagian, ITB, Indonesia

Dr. Takaaki Furubayashi, Tohoku University, Japan

Mr. Toto M. Ulum, Bogor City, Indonesia

Ms. Tri Widayati, Ministry of Environment and Forestry, Indonesia

[Reporter]: Mega Sulistia Octaviany, Wahana, Indonesia

Commitments of Parties and stakeholders in reducing GHG emission need to be measured, reported and verified (MRV). However, the MRV system still leaves open many questions. The session provides examples of cases of innovative monitoring system development in Indonesia and Japan, both at regional, national and city scales. Holistic innovative monitoring involves a satellite-based system such as a greenhouse gas observing satellite (GOSAT), GHG ground monitoring system and social monitoring system combined with an ICT application. Data collected from this monitoring, as local emission source data, provides the input to development of precise, low-carbon action plans, as shown in Bogor City's mitigation scenario, and to the national MRV system framework being developed in Indonesia.

As mandated by the Cancun Agreement, Indonesia has been developing the National Forest Monitoring System (NFMS), which reflects the phased approach of REDD+ implementation and enables different types of forest in the country to be assessed according to national definitions. NFMS enables forest carbon dynamics monitoring which is of benefit for the MRV of REDD+ implementation. Satellite-based monitoring was used also for carbon monitoring in Borneo's peatland restoration programme, a collaboration between NIES, the Japan Aerospace Exploration Agency (JAXA) Hokkaido University and Japan Space Systems. Satellite-based assessment revealed that MODIS (Moderate Resolution Imaging Spectroradiometer) is effective at detecting forest loss, whilst PALSAR 2 (Phased Array type L-band Synthetic Aperture Radar-2) is useful for detecting forest-cover change, for REDD+ MRV, and to detect fire damage to forests.

At the city level, experiences from Bogor City and Hirosaki City provide lessons for city planning in areas of energy efficiency and low-carbon design. The Bogor City government is collaborating with NIES, the Ministry of the Environment, Japan, and Fujitsu Ltd. to develop a social monitoring system for energy consumption and transport. Both projects aim at supporting policy design to reduce both energy consumption and CO_2 emissions, as well as increasing local awareness of energy consumption, encouraging use of low-carbon technologies, and bringing about behavioural change. There is a potential to reduce energy consumption by 30% via adoption of energy efficient equipment and improved thermal insulation performance. In Hirosaki city, an optimal district heating system has been designed to reduce primary energy consumption and CO_2 emissions by utilising a biomass boiler and high efficiency heat pump.

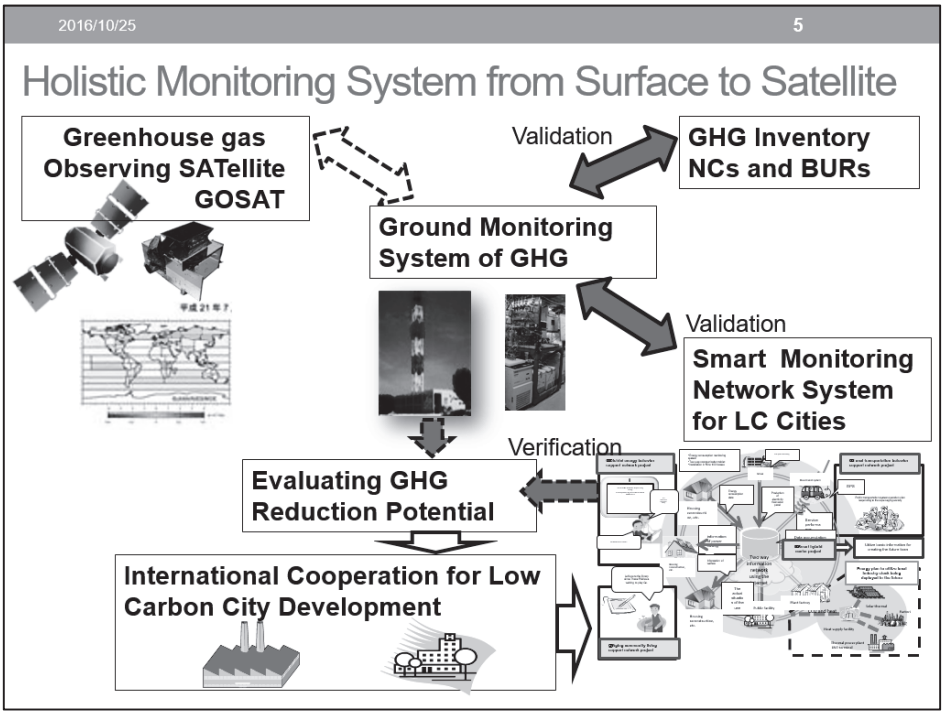
Key Findings of the Session

- In order to monitor progress toward low-carbon society, holistic surface to satellite monitoring systems would greatly contribute, thus the research community needs to see ramped up development of satellite monitoring systems such as GOSAT and PALSAR-2.
- Open-access data is key to incorporating quantitative data into policymaking. Indonesia adopted technology for obtaining forest monitoring data, WEBGIS, in the 1990s, under the National Forest Monitoring System (NFMS) strategy.
- An energy monitoring project was started in Bogor city in 2014, and is run in collaboration with researchers, businesses and policymakers, with data and technology therefrom framing the city's low-carbon policy. The project has conclusively shown the benefits of social activity monitoring and data sharing, and the significance thereof on policy planning for low-carbon society.

Concrete/Practical Steps for Low Carbon Transformation

- International cooperation with advanced technologies such as satellite monitoring and ICT-based social monitoring can assist in low-carbon transformation. Collaboration involving technologies, research communities and policymakers in donor countries and recipient countries is key to success.
- Data/information collected by networked monitoring systems such as satellite-based monitoring by GOSAT and GHG ground monitoring systems enables more precise MRV implementation.
- City level monitoring contributes to local awareness of energy consumption and encourages adoption of low-carbon technologies and behavioral change.

Holistic monitoring system from surface to satellite



Source: Presentation by Dr. Shuichi Ashina, NIES, Japan

Low carbon cities : Implementation of the Paris Agreement in Asian cities

[Co-chairs]:

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Dr. Junichi Fujino, IGES, Japan

[Speakers]:

Mr. Yoshihiro Mizutani, Ministry of the Environment, Japan

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[Reporter]: Riany Oktaviani S, Wahana, Indonesia

Cities are one of the key players in implementing climate action to respond to the Paris Agreement (PA), and account for two thirds of world energy consumption and about 70% of GHG emissions. This session focuses on sharing examples of efforts implemented towards achieving low-carbon societies in some Asian cities.

Some municipalities in Asia have already developed climate change action plans based on research and science. Agendas relevant to the research community, as well as key elements of PA have also been drawn up, in order to take PA forward. Moreover, opportunities and the means to address the challenges also need to be understood.

Appropriate action planning may differ from one city to another. Thus, finding the most suitable methodology in developing such plans is paramount in the implementation thereof. For instance, Hai Phong, in Viet Nam, aimed at setting GHG reduction targets for 2030, and developed scenarios using the Asia-Pacific Integrated Model (AIM) in close collaboration with local research institutes, municipalities, Hai Phong city and other stakeholders concerned. Further, in line with the scenarios, various mitigation actions have been implemented in green industry, green cities, energy efficiency, clean transport and green energy.

Before implementing efforts aimed at low-carbon society, capacity building is needed in administering the knowledge related to low-carbon development. Support is required both for long-term monitoring and low-carbon scenario development and planning.

Furthermore, in order to bring about low-carbon society, significant attempts have been made in some Asian cities. Japan, for instance has implemented city-to-city collaboration feasibility studies, which are aimed at providing knowledge based on experience in developing countries in order to aid in replicating low-carbon cities. The ASEAN Environmentally Sustainable Cities (ESC) Model City Programme is also run in order to support low-carbon development. Another best practice is demonstrated by Semarang City, Indonesia, which has introduced low-carbon development based on a scheme created by the government, the Green City Programme (GCP).

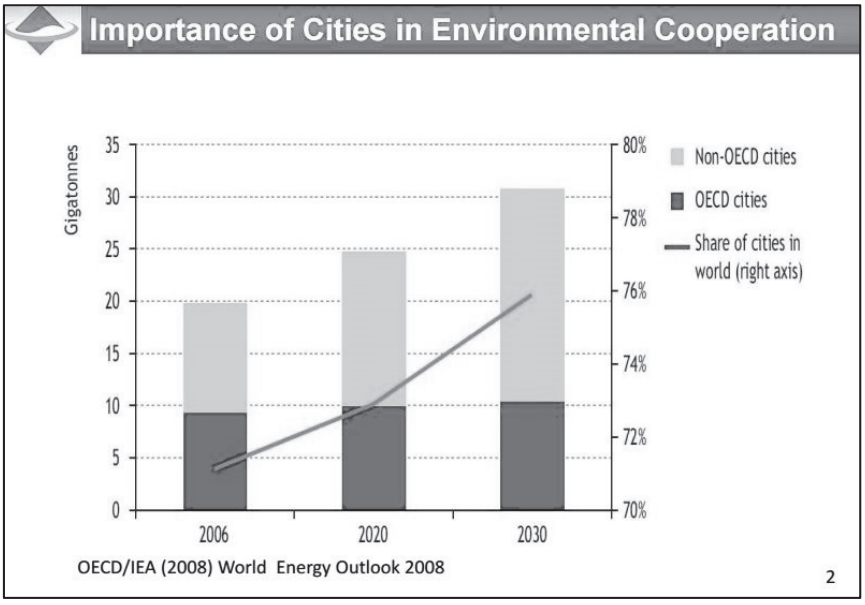
Key Findings of the Session

- Successful implementation of the Paris Agreement, in particular achieving the 2°C (below 2°C) target, requires realisation of a zero-carbon society in the second half of this century. Cities in particular are key players in implementing climate action, as they account for two thirds of global energy consumption and about 70% of GHG emissions.
- In response to the Paris Agreement, some municipalities in Asia have developed climate change action plans by themselves. Developing such plans requires much work related to research and science.
- Due to differences at the city level in what is appropriate in terms of action planning, exploring the most suitable methodology in developing such plans is paramount for the implementation that follows.

Concrete/Practical Steps for Low Carbon Transformation

- In order to achieve low-carbon cities, city-to-city cooperation is effective as it allows ongoing implementation and transfer of knowledge.
- Implementation of low-carbon cities requires support from the national and local government, citizens and the various stakeholders involved.

Importance of cities in environmental cooperation



Source: Presentation by Mr. Yoshihiro Mizutani, MOEJ, Japan

Adaptation

[Chair]:

Prof. Dr. Hidayat Pawitan, IPB, Indonesia

[Speakers]:

Dr. Elza Surmaini, Perhimpi, Indonsia

Mr. Kustiwa Adinata, IPPHTI, Indonesia

Mr. Prananto Mori, SFSA, Indonesia

Ms. Ana Veronica Gabriel, OML Centre, Philippines

Ms. Kiki Kartikasari, CCROM IPB, Indonesia

[Reporter]: Ratna Patriana, CCROM-SEAP, IPB, Indonesia

Establishing the global goal on adaptation, including enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, is an important agenda item of the Paris Agreement, as stated in Article 7. As one implication, research communities around the world must now acknowledge the importance and need of providing a scientific basis for the development of appropriate strategies to cope with climate change. This session intends to discuss what kind of research is needed to conduct appropriate Mr. adaptation measures and what lessons can be learnt and used to strengthen a low-carbon society under pressure of extreme climate, climate variability and change.

Agriculture remains one of the most vulnerable sectors to the impact of climate change. Considering its significant contribution to the national GDP of many countries in Southeast Asia and its role as the main source of livelihood for rural communities, it is imperative that adaptation to climate change in the agricultural sector be carried out swiftly. In this respect, Indonesia's Ministry of Agriculture has developed several programmes, particularly for small-scale farmers, including integrating climate resilient agriculture programmes into national policies, developing agricultural vulnerability and risk maps, and various other programmes implemented at the grassroots level, such as climate field schools and introduction of crop varieties tolerant to climate stress.

Likewise, many farmers' groups have established local technologies to adapt to the impact of climate in their area. One example is the Indonesian Farmers Association for Integrated Pest Control (IPPHTI) introduction of 'Floating Paddy Field' technology, in response to flooded rice fields in Pangandaran. They have also implemented a climate field school combined with action research by learning from farmers' experiences, water management, and many other measures taken to adapt to the changing climate.

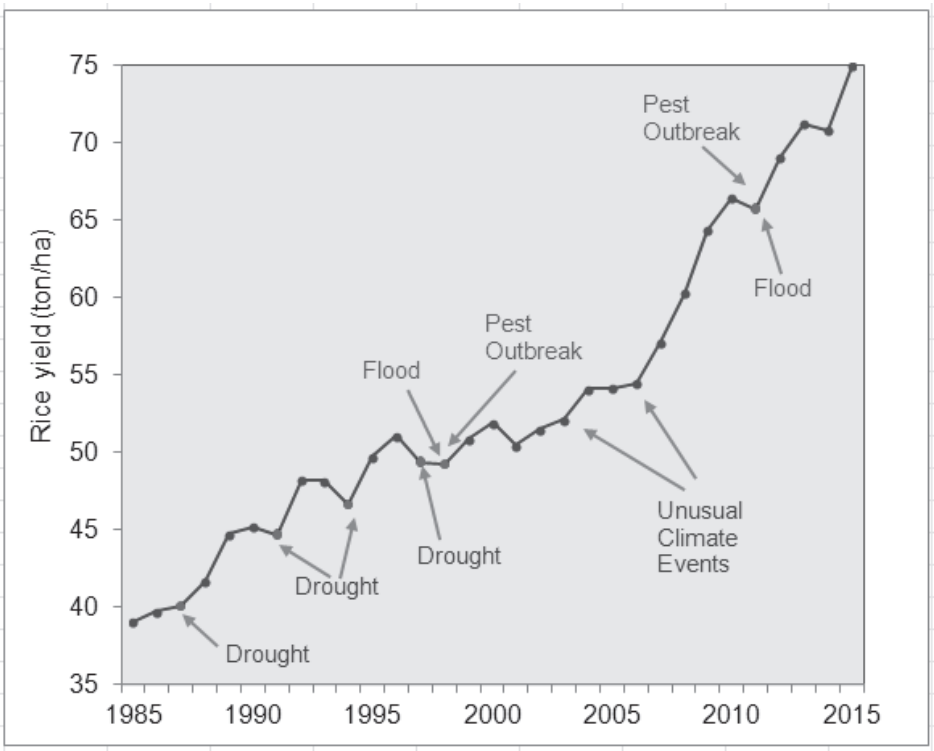
An attempt to secure food production under climatic pressure is also being initiated by SFSA (Syngenta Foundation for Sustainable Agriculture), an international NGO which is now focused on developing and promoting weather index insurance solutions for smallholder farmers in Asia, such as in Indonesia, Myanmar, Bangladesh, and India. Their innovation, called 'bundled solution approach', offers not only an index insurance product, but also access to loans, high quality agricultural inputs, and agricultural extension services. However, this type of indexed-insurance has only been developed for drought issues, as the parameter is relatively simple (e.g., rainfall), while for agricultural flood insurance much more detailed hydrological scientific research is needed to cover various extraneous issues, such as river flow and rising sea levels.

The issue of adaptation to climate change also cannot be classified into separate loss and damage issues, as climate-related disaster events are very common in Southeast Asia. Nevertheless, most loss and damage assessments, both potential and actual, have not been conducted comprehensively. Despite the destruction caused by the Haiyan Typhoon in the Philippines in 2013, no in-depth assessment or analysis for resilience planning has been carried out. Other problems in characterising loss and damage due to climate change are mainly related to the lack of reliable, consistent and comparable data, as well as coordination among stakeholders. Quantification methods for various disasters have also not been considered in the framework of climate policies.

Key Findings of the Session

- It is essential to integrate the national adaptation/mitigation action plans into provincial and district level medium-term development plans to ensure adaptation to climate change at the local level takes place in synergy with and offers co-benefits for each party.
- As local communities are the parties most affected by climatic disasters, their traditional knowledge needs to be reflected in any climate change adaptation action plans developed.
- The international research community is required to discuss how the present local climate distresses are linked to conditions at the national or wider scale, as well as future situations.

Indonesia's rice production during 1985-2015



Source: Presentation by Ms. Elza Surmaini, PERHIMPI-IAARD, Indonesia

NDCs and beyond

[Co-chairs]:

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This section aims at identifying challenges and needs in developing and implementing the NDCs, as well as the available supports for capacity building in light of five critical elements for NDC implementation – governance, mitigation, adaptation, finance and MRV/transparency. Developing and implementing the NDCs still represent substantial challenges for Asia's developing countries, as shown in the cases of Indonesia, Cambodia, and Vietnam, countries that still prioritise economic development based on natural resource extraction, and poverty reduction. Despite some countries not being major contributors to GHG emissions, they are vulnerable to climate change, which demonstrates that mitigation and adaptation actions are equally necessary.

In terms of planning, Indonesia has recently submitted its NDC to the UNFCCC, while Viet Nam and Cambodia are close to submission. The INDCs/NDCs of these countries indicate both an intention to transit to low-carbon economies and a focus on social objectives. At this moment, the three countries share similarities in land-use change and forestry as a major sources and sinks of GHG emissions/absorption, and emissions from the energy sector have gradually increased, which poses a challenge for the related institutions in terms of governance and coordination in supporting implementation of the INDCs/NDCs. For MRV and transparency, Viet Nam and Indonesia have established a National MRV System. Nevertheless, it is a challenge to keep up with the strategies with only limited data and human resource capacities. Similarly, the countries welcome bilateral and multilateral cooperation to overcome low financial and technology supports, lack of competent human resources, and ineffectiveness of MRV.

The Paris Agreement reiterates that all Parties need to cooperate to enhance the capacity of developing countries through climate change education, training, public awareness, public participation and public access to information. Bilateral-regional cooperation, as well as international organisations under the UNFCCC framework, have together realised ample capacity building practices, covering support, preparation and implementation of the INDCs/NDCs and climate action related to MRV methodologies. The remaining issue is how to increase the effectiveness of capacity building in the context of UNFCCC negotiations.

Modelling and projection of long-term low-carbon scenarios, as well as the LCS action plans, as shown by the example of Asia-Pacific Integrated Model (AIM) and Deep Decarbonisation Pathways Project (DDPP), are necessary to support more ambitious cuts in GHGs emissions, and implementation of NDCs. These approaches have shown promise in bridging science and policymaking (policy scenarios), both in national, sub-national, and city levels. Effective implementation of climate actions and low-carbon measures requires to adopt a certain city-based approach which considers local conditions and needs, multi-disciplinary professional inputs and many stakeholders. Moreover, it has to linked to local co-benefits, both social and economic.

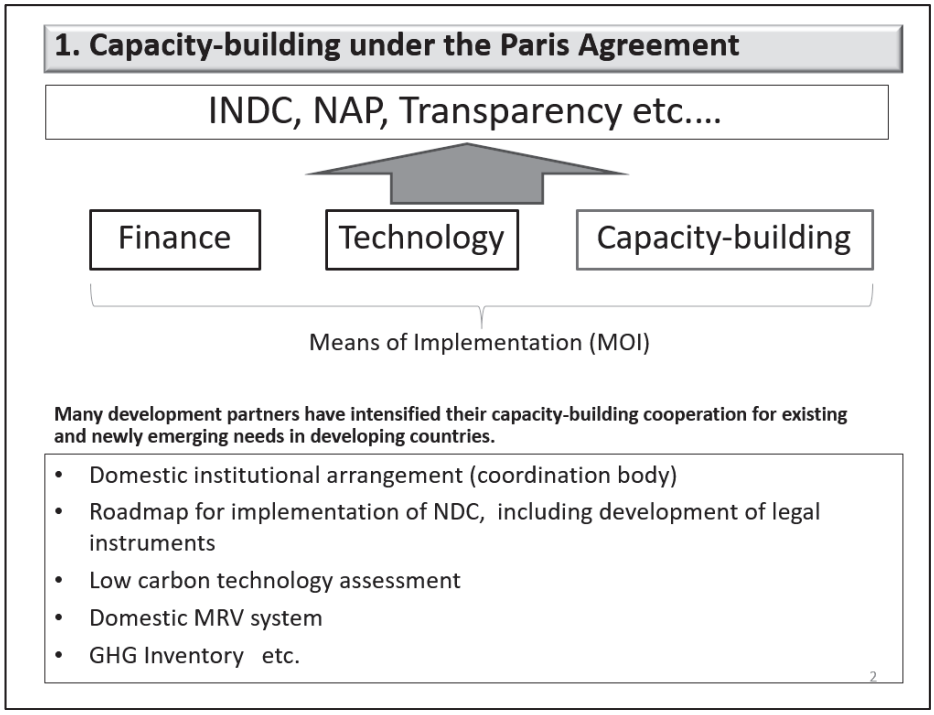
Key Findings of the Session

- Management of knowledge, as well as series and aggregate data are common challenges, which could hinder future projection scenarios. Recent development of INDCs/NDCs and MRV were mainly conducted by foreign experts without any knowledge transfer.
- The role of research communities towards NDC development and implementation is through collaboration with policymakers and effective methodology, baseline studies and models for developing scenarios to make more objective decisions.
- Governance and coordination among line ministries and between national and subnational levels need improving.

Concrete/Practical Steps for Low Carbon Transformation

- Create overall strategy covering capacity development, including target stakeholders, priority areas, methodologies, resources, etc.
- Increase capacity through networking, mutual learning, co-design and co-work, as part of a two-way learning process for both parties to encourage self-learning and continuous improvement focusing on applications tailored to local conditions, broader stakeholder participation and identification of leading entities;
- Increase capacity in science-based policy development and planning by co-working with research community and policymakers;
- Increase capacity through project implementation on the ground, including development of core institutions, as platforms for low-carbon finance; as well as technology development and transfer, exchanging best practices that are accessible and understood by different multi-stakeholder – and in particular policymakers;

Capacity building under the Paris Agreement



Source: Mr. Makoto Kato & Ms. Emiko Matsuda, Overseas Environmental Cooperation Center (OECC), Japan

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Acknowledgements

This synthesis report was developed with the aim of highlighting cross-cutting conclusions emerging through the discussions held during the Fifth Annual Meeting of LoCARNet in Bandung, Indonesia, 25-26 October 2016.

A breakthrough in global climate policy was realised at COP21. As a result all nations throughout the world need to address greenhouse gas reduction with the aim of stabilising climate with a temperature rise of less than 2°C. In order to achieve this target over the next half century, knowledge and wisdom from around the world must be collated. Further, having entered the stage of action, sharing of scientific knowledge with civil society, private industry, the financial sector, cities and local administrative bodies (Non-party stakeholders: Decision V), it is necessary for the actors involved to implement mitigation measures and take action.

Asia has an important role to play in the global low-carbon transition, both due to its significant present and future emissions as well as its high vulnerability to climate change. Looking back over the recent two days of discussions, we believe our annual meeting was heading in a positive direction, and also that it provided a number of takeaways for its participants in terms of knowledge on climate policies in Asia and emerging research. It also provided opportunities for Asia to accumulate knowledge, to discuss subsequent challenges for future research and how we can best overcome them – challenges such as adaptation, land-use, and low-carbon cities. In other words, we hope we have managed to clarify the path that research needs to take in Asia in terms of climate policy research, and that a virtuous cycle of research support for science-based policymaking can result.

I would like to express my special appreciation to ITB and IPB for their generous support for the LoCARNet Fifth Annual Meeting. I would also like to express my appreciation to Dr. Ucok Siagian, ITB for the hospitality graciously received in Bogor. In addition, I would like to thank the Focal Points of LoCARNet who attended the meeting – Prof. Rizaldi Boer (Indonesia), Dr. Hak Mao (Cambodia), Prof. Ho Chin Siong (Malaysia), Dr. Toshihiko Masui (Japan), Dr. Nguyen Tung Lam (Viet Nam), and Dr. Sirintornthep Towprayoon (Thailand) – for their strong support before, during, and after the meeting.

And, last but not least, I would like to express my appreciation for the Ministry of the Environment, Japan, for their ongoing support of this network.

Shuzo Nishioka

Secretary General, Low Carbon Asia Research Network (LoCARNet)

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