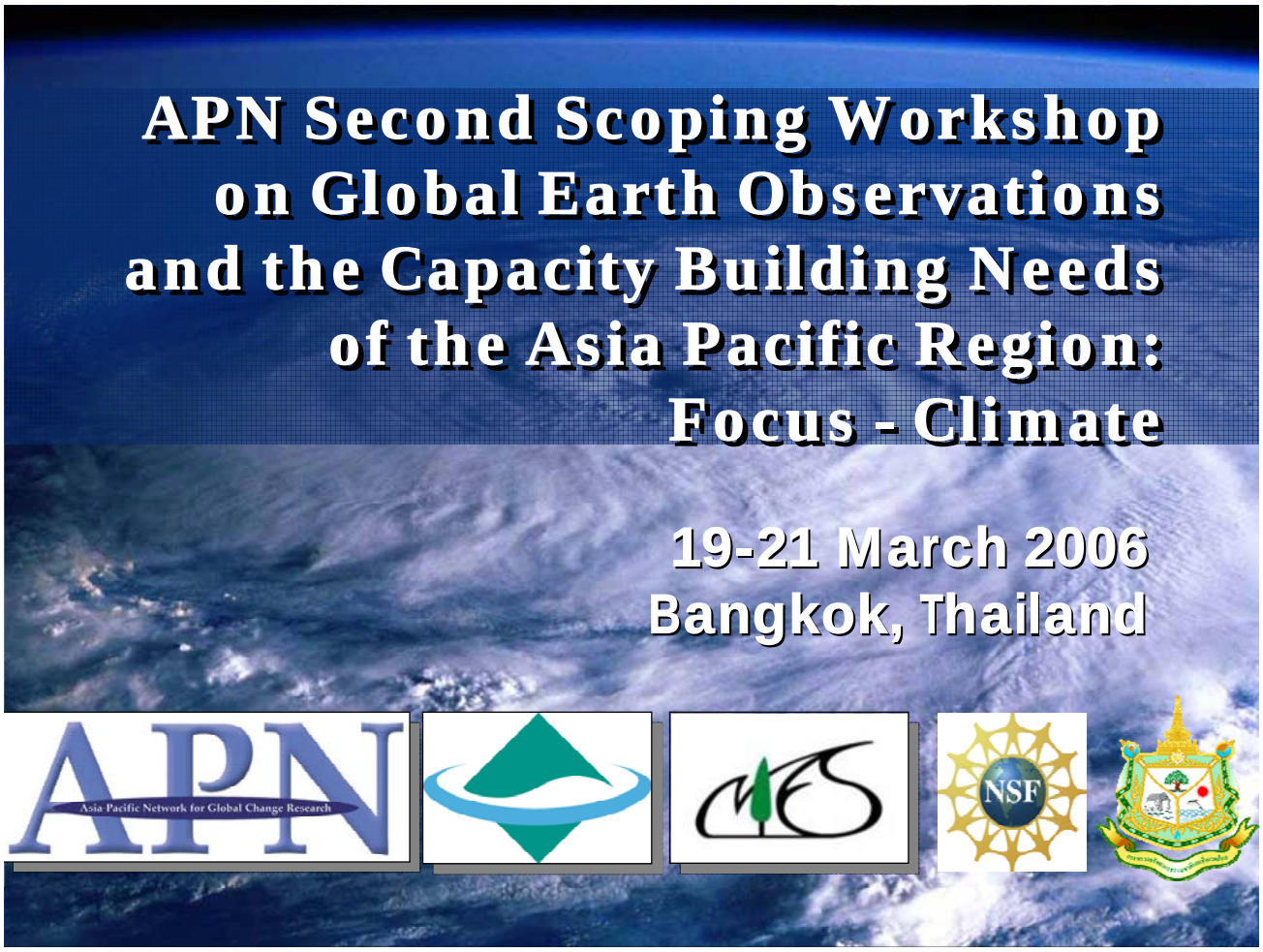

Workshop Report

APN 2nd Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate

19-21 March 2006, Bangkok, Thailand

WORKSHOP REPORT

1. Background

Understanding the Earth system - its weather, climate, oceans, land, geology, natural resources, ecosystems, and natural and human-induced hazards - is crucial to enhancing human health, safety and welfare, alleviating human suffering including poverty, protecting the global environment, and achieving sustainable development. Data collected and information created from Earth observations constitute critical input for advancing this understanding. However, current human knowledge of the Earth system, although advanced in certain areas, is far from complete. Many international organizations and programs are working to sustain and improve the coordination of Earth observations. However, current efforts to capture Earth observation data are limited by (1) a lack of access to data and associated benefits especially in the developing world, (2) eroding technical infrastructure, (3) large spatial and temporal gaps in specific data sets, (4) inadequate data integration and interoperability, (5) uncertainty over continuity of observations, (6) inadequate user involvement, (7) a lack of relevant processing systems to transform data into useful information, and (8) insufficient long term data archiving.

Current efforts to observe and understand the Earth system need to move from the separate observation systems and programs of today to coordinated, timely, quality, sustained, global information-developed in accordance with compatible standards - as a basis for future sound decisions and actions. It is also desired that implementation of comprehensive observations of greenhouse gases is essential in order to bring greater accuracy to our assessments of future climatic prospects and enable us to address global warming via concrete actions in accordance with the United Nations Framework on Climate Change and the Kyoto Protocol. Towards this, a consensus emerged among governments and international organizations in 2003 that, while supporting and developing existing Earth observation systems, more can and must be done to strengthen the U.S.-led initiative on global cooperation and Earth observations. This Framework, while not legally binding, marked a crucial step in developing the 10-Year Implementation Plan for the creation of a comprehensive, coordinated, and sustained Earth observation system or systems as envisioned by the Washington Declaration adopted at the First Earth Observation Summit (EOS-I) in July, 2003. During the two-day inaugural meeting of the 1st Earth Observation Summit, an ad hoc Group on Earth Observations (GEO) -- was established to begin the process to develop a conceptual framework and implementation plan. Subsequently, 43 countries and 25 organizations participating in the second Earth Observation Summit (EOS-II) held in Tokyo during April 2004 adopted the GEO Framework document, identifying nine areas of Societal Benefits. Later, in Brussels on 16 Feb 2005, 50 Nations and 40 International and Scientific Organizations

endorsed the GEOSS Agreement during EOS III when the GEO Executive was established, hosted by WMO in Geneva and a 10-year plan with more than 240 tasks identified and prioritized for implementation across 9 societal benefit areas plus 5 cross-cutting areas of activity.

It is envisaged that observing and understanding the Earth system more completely and comprehensively will expand worldwide capacity and means to achieve sustainable development and will yield advances in many specific areas of socio-economic benefit, including:-

- Reducing loss of life and property from natural and human-induced disasters;
- Understanding environmental factors affecting human health and well being;
- Improving management of energy resources;
- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change;
- Improving water resource management through better understanding of the water cycle;
- Improving weather information, forecasting, and warning;
- Improving the management and protection of terrestrial, coastal, and marine ecosystems;
- Supporting sustainable agriculture and combating desertification;
- Understanding, monitoring, and conserving biodiversity.

To achieve the many benefits of coordinated Earth observations and to move from principles to action, 62 member countries, the European Commission, and 43 participating organizations have adopting this Framework Document and set forth the primary components of a 10-Year Implementation Plan for establishing the Global Earth Observation System of Systems (GEOSS). GEOSS will be:-

- comprehensive, by including observations and products gathered from all components required to serve the needs of participating members;
- coordinated, in terms of leveraging resources of individual contributing members to accomplish this system, whose total capacity is greater than the sum of its parts;
- sustained, by the collective and individual will and capacity of participating members.

The GEOSS is designed to address key challenges of data utilization, including the need for:-

- Full and open exchange of observations with minimum time delay and minimum costs, recognizing relevant international instruments and national policies and legislation;
- Assured data utility and usability (including thresholds for validation, calibration, and spatial and temporal resolution);
- Assured continuity and availability of the many observations and products in place or planned;
- A robust regulatory framework for Earth observations (e.g. through protection of radio frequency bands that are uniquely essential for Earth observations).

The GEO 2006 work plan focuses on (i) enhanced consultation with user / stakeholder community to determine user needs and priorities, (ii) need to engage systematically with the in-situ observation community and to build linkages with remote sensing community, (iii) need to integrate socio-economic data across all social benefit areas, and (iv) need for improved linkages with socio-economic policy makers. It aims to:-

- Produce a comprehensive review and analysis of gaps and methodologies, based on existing and planned capacity-building efforts.
- Facilitate, together with existing efforts, the maintenance and strengthening of education, training, research and communication.
- Facilitate, with developing countries and across all societal benefit areas, the establishment and maintenance of baseline sites for global in situ and remote sensing networks that cannot always be justified on national grounds alone, in cooperation with relevant global research programmes and activities to ensure that synergies in observations and understanding are achieved.
- Develop a network of experts involved in existing capacity building initiatives related to Earth observation, and encourage users to access this knowledge base.
- Encourage, in each societal benefit area, the development of capacity-building components as a requirement for any network, project, activity, or User Fora that will be a component of GEOSS.
- Facilitate access to data and models, particularly for developing countries.

GEOSS will, in cooperation with participating systems and with the various user communities, attempt to (a) identify gaps and unnecessary duplications, (b) redirect or initiate activities to optimize the system, (c) ensure the necessary continuity in observations, and (d) encourage a more effective overall fulfillment of user observational needs. GEOSS systems will abide by interface specifications with respect to the portion of their data systems that they agree to share, which will provide meaningful links between systems, and will help to make their products more compatible with those of other systems and thus of use to a wide community.

The GEOSS work plan also aims to facilitate both *current and new capacity building efforts*, particularly in developing countries, across the entire continuum of GEOSS activities, which will include education, training, institutional networks, communication, and outreach as fundamental to those efforts. The key capacity building needs in terms of information and data exchange identified in GEO work plan highlighted are: (a) there is a need to improve networks for the exchange of information — workshops to provide training on developing national Web sites would be desirable, (b) there is a role for the transfer of technology and also for regional capacity building to promote technology-related information networks — in particular there is a need to raise awareness of the existence of energy efficiency “win-win” solutions, (c) to ensure, to the extent possible, that relevant material, particularly that related to training and information, is available in all of the six official languages of the United Nations, and (d) assistance is required to improve data acquisition and storage, to obtain access to the Internet, and to build capacity to develop databases. Building on existing local, national, regional, and global capacity building initiatives, GEOSS aims to:-

- Focus on training and education for the development and/or utilization of existing human, institutional, and technical capacities for data utilization;
- Develop the infrastructure resources necessary to meet research and operational requirements;
- Build on globally accepted sustainable development principles - most notably those outlined in the World Summit on Sustainable Development Plan of Implementation.

The Global Earth Observation System of Systems can be accomplished only through promotion of international coordination and cooperation. Japan, the host country for the second Earth Observation Summit (EOS-II), experiences environmental conditions similar to the Asia and Oceania region, and faces common problems. In order to implement earth observation effectively and efficiently within this region, Japan has taken initiative to play an active part in the creation of a comprehensive, coordinated earth observation system that operates in a sustained fashion through international cooperation, and provide assistance in developing observation capabilities. Japan is implementing a variety of earth observations mainly in the Asia-Pacific region, including, for example, (1) observations on forest eco-systems in the tropics and sub-artic zone, (2) the Asia Pacific Environmental Innovation Strategy Project, abbreviated as "APEIS," which integrates MODIS satellite and ground-based observations, (3) observations on the marine environment in the NOWPAP marine region, namely in the Sea of Japan and the Yellow Sea, utilizing satellite observations, (4) observation on acid deposition by means of the Acid Deposition Monitoring Network in East Asia, called "EANET," and (5) observations on dust and sand storms utilizing LIDER (Light Deposition and Ranging).

2. GEOSS and APN

The fundamental driver that sustains observational networks is the utility of the data and information generated. It is therefore very important to build capacities in all the regions to utilize the data emerging from all available sources and networks. A global environmental research network in Japan known as the “Asia-Pacific Network for Global Change Research (APN)” has been playing a leading role in capacity building activity since its establishment in 1996. The mission of APN, an Inter-governmental network in the Asia-Pacific Region with 21 member countries, is to (a) Identify, explain and predict changes in the context of both natural and anthropogenic forcing, (b) Assess potential regional and global vulnerability of natural and human systems, and (c) Contribute, from the science perspective, to the development of policy options for appropriate responses to global change that will also contribute to sustainable development. The Networking and Capacity Building Programme of APN was initiated in the year 2000 following the Adoption of the ‘APN Strategic Plan 1999-2004’ in 1999 and it launched the CAPaBLE Programme in the year 2003 aimed at the promotion of global change research and capacity building of developing country experts in the region. The CAPaBLE has contributed significantly to development and enhancement of scientific & educational capacity in developing countries of Asia-Pacific region to improve their decision-making in the target areas related to global change, climate change & water and food security that are directly linked to their sustainable development. The CAPaBLE Programme is now an effective and integral part of APN’s activities in education & scientific capacity building for integrated assessment of climate change adaptation and mitigation options in the context of sustainable national development priorities and policies. During SBSTA-22 meeting in May 2005, after pointing out the importance of developing countries’ capacity building on climate model and analysis and of developing infrastructure to improve access to existing data, US called for support from international programs such as the APN…GEOSS should be continued.

In view of the increasing occurrences of weather extremes in the recent decade together with increase in global mean temperature of about 0.8C in the past century, and growing consensus among the scientific community on the potential threats of future climate change and associated impacts, adaptation to climate change has become a necessity in most developing countries of Asia and Pacific with improved understanding of the vulnerable populations and region.

Vulnerability and adaptation are also central to the international policy on climate change in both United Nations Framework on Climate Change (UNFCCC) and Kyoto Protocol (KP). It is noteworthy here that many of the recent APN funded projects have earth observation elements (improved monitoring of the state of the Earth), e.g., APEIS Capacity Building Workshop on Integrated Environmental Monitoring, Land-Use and Land-Cover Change and Greenhouse Gas Inventories and also those dealing with the vulnerability and adaptation to climate change. APN is one of the participating Organizations in GEO and it's current mission statement and science agenda as outlined in its Second Strategic Plan (2005-2010) illustrate that APN objectives are in line with those of GEOSS. In the year 2005, APN decided to launch a new initiative to identify and address (i) the capacity building needs for climate change related issues in relation to implementation of 10-year plan for GEOSS in the region, and (ii) the call in May 2005 by UNFCCC's SUBSTA conclusions on research needs relating to the convention (Agenda 8.4) inviting Parties to the Climate Change Convention to identify "research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing counties to contribute to and participate in climate change research". Two Scoping Workshops on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate were organized by the APN as part of this initiative in late 2005 and early 2006.

3. Tokyo Scoping Workshop Summary

A questionnaire (grouped into three sections, namely, (a) Climate Change Science – Data and Research Needs, (b) Vulnerability, Adaptation and Development in Asia Pacific Region, and (c) Capacity Building Needs in Asia – Pacific Countries) was sent to APN National Focal Points, Scientific Planning Group Members and other experts in the region to seek their feedbacks on (a) the current level of scientific understanding on global change issues in the region (*i.e.*, extreme climatic events, climate change and its impact on water and food security, sea level rise versus adaptation measures, *etc.*), (b) uncertainties and the gaps in current scientific knowledge, and (c) the capacity building needs of various countries in the region. A review of the feedbacks received from Responding Countries / Institutions/ experts suggested that the following factors currently limit the scientific and technical capacity in Asia and the Pacific Region:-

- Scarcity of scientists, science infrastructure and science funding,
- Lack of observed data (meteorological, socio-economics etc.) and analytical tools,
- Limited research experience of scientists,
- Lack of familiarity with relevant methods and models,
- Capacity to construct credible scenarios, and
- Difficulty of establishing and continuing collaborations from scientists from multiple disciplines needed for climate change research.

In order to facilitate further activities to address the capacity building needs for climate change related issues in relation to implementation of 10 year plan for GEOSS in the region and exchange of information on observational data needs, experience and views on climate change and adaptation strategies among the countries in Asia and the Pacific more effectively, the Asia Pacific Network for Global Change Research jointly with the Ministry of the Environment, Japan and National Institute for Environmental Studies, Japan, organized the First Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate which

was held in Mita Kaigisho, Tokyo during 17-18 November 2005. The workshop was attended by 32 participants from 12 countries, which included Bangladesh, China, Fiji, Indonesia, Japan, Malaysia, Mongolia, New Zealand, Samoa, Thailand, United States of America, and Vietnam. The attendees also included representatives of several key organizations, namely International START Secretariat in Washington DC, Intergovernmental Oceanographic Commission (UNESCO) in France, Secretariat of the Pacific Regional Environment Programme (SPREP), US Climate Change Science Program (US National Science Foundation), Research and Information Office in the Global Environmental Bureau - Ministry of the Environment of Japan and National Institute for Environmental Studies (NIES) Japan. A number of resource persons from research institutes, universities, and private companies also attended the Workshop. The Key objectives of Tokyo workshop were:-

(a) To consider the capacity building necessary for research and monitoring related to climate change and its impacts,

(b) To discuss the role of the APN in such research and underpinning systematic observations; and

(c) To create road maps for designing ideas appropriate for capacity building activities in the Asia – Pacific Countries.

Prior to focused discussions, invited experts made technical presentations in the Tokyo workshop on topics covering some aspects of Global Earth Observations, Advances in Climate Modeling Research, Impacts of Climate Change and Adaptation, and Capacity Building Needs. The key messages that emerged out of the deliberations on Observational Data Requirements for Advancing the Understanding of Climate Change – Capacity Building Needs in this workshop were:-

(1) Many existing data are not accessible to researchers in Asia Pacific, either within country or internationally. Resolution of this barrier requires promoting political commitment to data sharing; removing practical barriers by enhancing electronic interconnectivity and metadata; and data rescue and digitization.

(2) Substantial ongoing research and surface observation is needed to calibrate and verify algorithms and satellite products.

(3) The provision of necessary resources to improve and make available existing archives of observed data on the variables noted above will require largely national efforts to be complimented with international support on technology transfer and human resource training / capacity building for analytical interpretations and appropriate use for societal benefits.

The participants agreed that, as the fundamental driver that sustains observational networks is the utility of the data and information generated, it is important to build capacities in the region to utilize the data emerging from all available sources and networks. Some key capacity building needs of Asia Pacific region as regards information exchange and data needs were identified as under:-

1. there is a need to improve networks for the exchange of information — workshops to provide training on developing national Web sites would be desirable;

2. there is a role for regional capacity building to promote technology-related information networks; and
3. assistance is required to improve data acquisition and storage, to obtain access to the Internet, and to build capacity to develop databases.

As regards the Capacity Building Needs on Vulnerability and Adaptation to Climate Change for Sustainable Development, the participants felt that, for effective adaptation, understanding is needed of the vulnerabilities and adaptation options that are specific to place and time, and that the level and quality of adaptation in most developing countries of Asia and the Pacific is currently insufficient and falls short of that which is required to cope effectively with present-day risks of extreme weather events and to prevent further growth of vulnerability to the now inevitable and unavoidable changes in climate. They identified a number of factors which are responsible for this: One is the lack of priority given to adaptation, which itself may be due to lack of awareness and knowledge of climate change impacts or perceptions that the impacts are less threatening or less immediate than other risks. Lack of financial resources, technical capacity, and institutional capacity are also factors that constrain adaptation responses. The constraints are most binding in some of the poorest countries (including Island Nations), where climate change threatens to impede and undermine development and poverty reduction. Need for systematic observation of sensitive and fragile systems (hot spots) in the region was considered very important as detection of early warning indicators of climate change and for demonstrating the evidence of global warming to national leaders and the society. An urgent need for education, training, research and related capacity building initiatives in the developing countries of the Asia-Pacific was desired so that these are able to meaningfully participate in international initiatives and plan and implement national sustainable development activities.

The participants felt that the precise targets for capacity building activities on both observational systems and related host of issues of data availability, analysis and interpretation for enhancing the coping strength of the impacts of climate change and development of adaptation strategies in Asia Pacific region need more focused discussion within a larger group engaging all of the APN National Focal Points and other stakeholders. It was desired that the issue needs to be re-visited at the next Workshop planned for Bangkok in 2006.

4. Follow-up Scoping Workshop in Bangkok

The 2nd Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate, was held in Bangkok, Thailand during 19-21 March 2006. This follow-up Workshop was organized by the Asia-Pacific Network for Global Change Research jointly with the US National Science Foundation, Ministry of Environment, Japan, National Institute of Environmental Studies, Japan and the Ministry of Natural Resources and Environment, Thailand. The workshop was attended by 42 participants from 16 countries, which included Australia, Bangladesh, China, Cambodia, Indonesia, India, Japan, Korea, Malaysia, Mongolia, New Zealand, Pakistan, Samoa, Sri Lanka, Thailand, and Vietnam. The attendees also included participants from several key organizations, namely International START Secretariat, Washington D.C., Intergovernmental Oceanographic Commission (UNESCO), Paris and US Climate Change Science Program (US National Science Foundation). A number of resource persons from research institutes, universities and private companies also attended the Workshop.

(a) Objectives of the Workshop

The key objective of this workshop was to re-visit the outcome of the Tokyo Workshop held late last year and update the identified capacity building needs of the Countries in the Asia-Pacific region necessary for research and monitoring related to climate change and its impacts. The discussions also included the role of the APN in such research and underpinning systematic observations to create road maps for designing ideas appropriate for capacity building activities in the Asia-Pacific. The discussions focused on exchange of information on observational data needs, experience and views on climate change and adaptation strategies among the countries in the Asia-Pacific region and to facilitate further activities to address the capacity building needs for climate change-related issues in relation to implementation of 10 year plan for GEOSS in the region and the call in May 2005 by UNFCCC's Subsidiary Body for Science and Technological Advice conclusions on research needs relating to the convention, Agenda 8.4, inviting Parties to the Climate Change Convention to identify "research needs and priorities relating to the Convention, including information relating to the enhancement of the capacity of developing counties to contribute to and participate in climate change research."

(b) Workshop Proceedings

At the outset, Dr. Ampan Pintukanok, Director, Office of International Cooperation on Natural Resources and Environment, Ministry of Natural Resources and Environment, Kingdom of Thailand and Mr. Naoya Tsukamoto of the Ministry of the Environment, Government of Japan thanked all the participants for being able to participate in the APN 2nd scoping workshop, with a welcome note. Dr. Pintukanok pointed out that scientific knowledge on the global change is scarce in this region for lack of information and data availability as also due to poor capacity, particularly in developing countries. She stated that the development of the Global Earth Observation System of Systems (GEOSS) has its roots in the decision to organize the first Earth Observation Summit in Washington DC in July 2003. GEOSS was originally conceptualized as a "system of systems". This approach is now firmly embedded in the 10-Year Implementation Plan for a global observing strategy that builds on existing systems and initiatives, is comprehensive, coordinated and sustained, supports developing countries, and is based on open exchange of the range of observations available in a timely and cost-effective manner. The information collected under this platform is expected to help us obtain a much better understanding of the complex global change mechanism. Dr. Pintukanok appreciated the efforts of the Government of Japan and the APN in facilitating and initiating the first responding action in the field of capacity building in Asia-Pacific region to these policy agendas. Mr. Tsukamoto stated that the ongoing policy processes, e.g., the UNFCCC and WSSD (related to climate change and sustainable development) are placing greater emphasis on the need for capacity building and now we are in the stage to advance concrete discussions to develop a common awareness of global change issues.

The entire proceedings of the workshop over the two and a half days were conducted in seven sessions (see Workshop Agenda in Annex – 1). Session I consisted of presentations on the objectives of the workshop and on the outcome of the First Scoping Workshop held in Tokyo during November 17-18, 2005. Three expert presentations focusing on Current Status of GEOSS and Japan's Perspective, and GEOSS in relation to Climate Change in the Asia Pacific context including Capacity Building Aspects were made in Session II. Dr. Ikuko KURIYAMA described GEOSS as an international framework for earth observation due to its immense importance in

filling data gaps, developing regional capacity for interpreting observational data, and establishing decision-support systems and tools relevant to local needs. The presentation also highlighted the specific outcomes for GEOSS, both short and long-term, as elaborated in the 10-Year Implementation Plan. A list of the essential climate variables that are both currently feasible for global implementation under GEOSS and will have a high impact on UNFCCC requirements was presented. She stated that, the important goals for GEOSS include ensuring the sustained provision of both key climate data and climate products derived from these data in all domains, promoting the completion of partially implemented observing systems, and facilitating access to quality-assured climate data. She also presented an overview of Japan's basic Earth Observation strategy and prioritization for the next 10 years and stated that, in the year 2006, Japan will focus on issues such as the global warming & carbon cycle, Climate change & water cycle in the Asia-Pacific Region and be committed to facilitating interoperability among Digital Elevation Models (DEM), in implementation of Global Precipitation Mission (GPM) and in the development of a guidance document for basic geographical data.

While speaking on GEOSS in Relation to Climate Change in Asia Pacific Region, Dr. Jinlong Fan stated that currently there is very poor coordination in the management and timely distribution of data collected from more than 50 environmental satellites orbiting the globe, the thousands of land-based environmental stations on the ground and the thousands of data buoys in the world's oceans in a cohesive manner. In this context, GEOSS builds on and adds value to existing Earth observation systems by coordinating their efforts, addressing critical gaps, supporting their interoperability, sharing information, reaching a common understanding of user requirements, and improving delivery of information to users. He stated that important goals for GEO include ensuring the sustained provision of data relevant to climate studies, promoting the enhancement of climate observing systems (especially in the terrestrial and ocean domains), facilitating access to quality-assured climate data, and facilitating international coordination of climate observations. Dr. Fan spoke about the existing Global Climate Observing System (GCOS) and its relevance to the United Nations Framework Convention on Climate Change (UNFCCC) and its Conference of the Parties (COP) for whom it has developed an adequacy assessment and the GCOS Implementation Plan for defining and obtaining systematic observations of the climate system to meet the needs of the UNFCCC. He highlighted current efforts to make GCOS a sustainable and robust system both regionally and globally, and that can serve the needs of an improved global climate monitoring system that will be part of the Global Earth Observing System of Systems (GEOSS). He also briefly described the GEOSS related activity in China while emphasizing that better understanding of the climate and its impacts on the Earth system, including its human and economic aspects, will contribute to improved climate prediction and facilitate sustainable development while avoiding dangerous perturbations to the climate system.

Dr. Rizaldi Boer highlighted the capacity building needs of the region for research and monitoring related to climate change and its impacts. He emphasized the lack of understanding among the scientific community in the region on skill of climate predictions, how future climate will behave under elevated CO_2 (high uncertainty), limited access to global & regional climate models, and limited capacity to use global and regional climate models. Dr. Boer pointed that the developing countries in the region have limited capacity to use impact tools & data for sensitivity and vulnerability analysis, to produce climate information products tailored into user needs, to streamline adaptation and mitigation strategies into national development plan, no coping capacity of community and local & national institutions to changing climate, and non-availability of effective

system for disseminating and communicating climate information to users. The key messages that came out of these presentations were (i) Current observational systems in Asia Pacific are very weak; (ii) Relevant data accessibility is very poor, and (iii) Capacity building activities in climate change research need stronger emphasis at both institutional and individual levels. A presentation on introduction to key discussion themes on Priority Needs in Advancing the Understanding of Climate Change, Vulnerability and Adaptation was made by the Workshop Coordinator with a view to facilitate the discussions in the Working Group Parallel Sessions.

Sessions III and IV were break-out discussion sessions for deliberations on the identified theme areas namely (1) Sharing the information of the present situation: Earth observation and climate change researches among APN countries; (2) Sharing the information of the present situation: Future plans of climate change research among APN countries; (3) Finding gaps in individual countries and A-P region; (4) Identifying actions needed to overcome gaps; (5) Identify the future collaboration among the countries and in the A-P region and role of APN to support them; and (6) Identify priority action plan focusing on capacity building needs of the Asia Pacific region in observational data requirements and on vulnerability and adaptation to climate change for sustainable development.

In Sessions V and VI, Plenary presentations by the Working Group Chairs on the outcome of the discussions in Break-out sessions were made and open discussions were held for improvements in and collation of the priority action plans. A broad agreement was reached among participants on these thematic priority issues as regards capacity building needs of the region. Session VII was a closing Plenary Session chaired by the Workshop Chair Dr. Andrew Matthews wherein the workshop coordinator made a summary presentation on the Workshop recommendations for Priority Action. This was followed by closing remarks and a vote of thanks respectively by the Workshop Chair and APN Secretariat.

(c) Workshop Outcomes

(i) Observational Data Requirements for Advancing the Understanding of Climate Variability and Climate Change

The workshop participants stated that the current observing systems in the Asia-Pacific region were very weak and that the time and space resolution as well as calibration routines of existing and future satellite-based measurements should be enhanced, particularly for water resources management, land management for food production and biodiversity, integrated coastal zone management and local and trans-boundary issues in air quality to better understand the impacts of climate variability and climate change.

The workshop participants supported the Tokyo workshop Outcomes in that the mountain glaciers and ice caps - key variables for early-detection strategies in global climate-related observations, require application of remote sensing technologies; high-resolution satellite, visible and infrared imagery would need to be coordinated with the *in situ* measurements.

An urgent need to develop a comprehensive time series of recent land cover changes with a high spatial resolution (national / regional scale) and a decadal temporal resolution was also felt.

Sea level rise and coastal inundation, salt water intrusion and the changing frequency and intensity of extreme events, are likely to be the most important consequences of anthropogenic climate change and are particularly important to all low-lying land regions including many small island states. Changes in sea level are a significant parameter in the detection and attribution of climate change and an indicator of our ability to model the climate system adequately. The participants stated that the existing knowledge of global and regional sea level variability and change was not adequate.

The expansion of monitoring network for the greenhouse gases including carbon dioxide, methane, ozone and other long-lived greenhouse gases and anthropogenic aerosols at various spatial and temporal scales was also considered essential.

The workshop participants collectively identified several sensitive and fragile 'exposure' systems (hot spots) in the Asia-Pacific region for which conventional *in-situ* and remotely-sensed observational data at appropriate spatial and temporal scales are required for advancing the current understanding of climate variability and climate change. The hot spots in this region include:

- Himalayan Glaciers – Spatial and temporal distribution of snow cover
- High Elevation Areas of Tibetan Plateau
- Degradation and depletion of Ground Water Aquifers
- Desertification trends in Arid/Semi-arid areas of West Asia
- Mongolian Tundra
- Hydrological Cycle and its changes in Asian Monsoon System and its linkage to El Niño – Southern Oscillation episodes
- Potential Changes in Extreme weather events including Tropical Cyclones and Typhoons.
- Trends in deterioration of Coral reefs, mangroves, and sea grass in Coastal Waters of East, South, Southeast Asia, Australia and Island Countries
- Loss of Biodiversity in Fragile Ecosystems of Highlands, Wetlands and Islands
- Coastal Zones – erosion, sea level rise etc.
- Forest Fires
- Land Degradation

The participants collectively felt that a systematic observation of sensitive and fragile systems (hot spots) in the region is very important as detection of early warning indicators and for demonstrating the evidence of global warming to national leaders and the society. It was suggested that appropriate outreach activity to policy makers and the general public is also needed to enhance their support to the Global Earth Observation System of Systems. The key messages that emerged out of the deliberations were that:-

- Many existing data are not accessible to researchers in Asia and the Pacific, either within country or internationally. Resolution of this barrier requires promoting political commitment to data sharing; removing practical barriers by enhancing electronic interconnectivity and meta data; and data rescue and digitization.
- Substantial ongoing research and surface observation is needed to calibrate and verify algorithms and satellite products.

- The provision of necessary resources to improve and make available existing archives of observed data will require largely national efforts to be complimented with international support on technology transfer and human resource training / capacity building for analytical interpretations and appropriate use for societal benefits.

The participants agreed that, since the fundamental driver that sustains observational networks is the utility of the data and information generated, it is important to build capacities in the region to utilize the data emerging from all available sources and networks. Some key capacity building needs of the Asia- Pacific region as regards information exchange and data needs were identified as:-

- a need to improve networks for the exchange of information — workshops to provide training on developing national Web sites would be desirable;
- regional capacity building to promote technology-related information networks; and
- assistance to improve data acquisition and storage, to obtain access to the Internet, and to build capacity to develop databases.

The detailed outcome of the discussions held by the Working Group A on observational data requirements is reproduced in Annex-2.

(ii) Capacity Building Needs of Asia & the Pacific Countries on Vulnerability and Adaptation to Climate Change for Sustainable Development

The workshop participants discussed at length the current status of the vulnerability assessment in Asia Pacific Countries and the required understanding to undertake effective adaptive measures. The participants stated that the level and quality of adaptation in most developing countries of the Asia-Pacific region is currently insufficient and falls short of that which is required to cope effectively with present-day risks of extreme weather events and to prevent further growth of vulnerability to the now inevitable and unavoidable changes in climate. The participants identified a number of factors which are responsible for this: One is the lack of priority given to adaptation, which itself may be due to lack of awareness and knowledge of climate change impacts or perceptions that the impacts are less threatening or less immediate than other risks. The lack of financial resources, technical capacity, and institutional capacity are also factors that constrain adaptation responses. These constraints apply particularly to some of the poorest countries (including Island Nations), where climate change threatens to impede and undermine development and poverty reduction.

The workshop participants felt that the capacity of earth observation in the individual countries of the Asia-Pacific region vary in their effectiveness because of the existing challenges to the maintenance and sustainability of the operations of national meteorological services and other relevant agencies. Human resource issues also compound of these issues, in particular the lack of technically and scientifically trained personal. The participants suggested that many developing countries in Asia and the Pacific lack systems for real time or near real time data processing, analysis and transferring the processed product as daily, weekly, monthly and seasonal weather forecasts to farmers and other user communities. The capacity to acquire, process and utilize

remotely sensed satellite data for meteorological / climatological applications and for land use management through GIS tools is also quite different among countries of the region.

The workshop participants re-iterated the factors identified in Tokyo workshop which limit the scientific and technical capacity in the Asia-Pacific region on coping with and developing adaptive strategies to climate change as under:-

- Scarcity of scientists, science infrastructure and science funding,
- Limited research experience of scientists,
- Lack of observational data (meteorological, oceanographic, and socio-economic etc.) and analytical tools,
- Lack of familiarity with relevant methods and models,
- Capacity to construct credible future climate scenarios, and
- Difficulty of establishing and continuing collaborations from scientists from multiple disciplines needed for climate change research.

The workshop participants identified the current constraints and needs of observation which included:-

- availability of long-term station–wise meteorological / climatological data in particular the historical records in digitized form, and
- a concise data set on national socio-economic developments, and
- credible projections of future climate scenarios in the Asia- Pacific region.

A critical issue that drew attention of all in the workshop was that of the availability of credible regional and local climate change scenarios at various temporal scales to enable sector-specific vulnerability analysis and it was widely agreed that there is a lack of understanding between the researchers engaged in impact assessment and the climate modelers in terms of the appreciation of the uncertainty in currently available climate change projections and the limitations of various downscaling approaches.

The participants identified region-specific sectors that are the most vulnerable to climate change and emphasized the need for data and research to enhance the region's capacity to better understand the current and future climate vulnerability and plan for adaptation strategies:-

Critical sectors	Data / Research Needs	Regions most affected	Research priority*
Food and Fibre	Land surface temperature, rainfall records, agricultural production statistics and time series. Regional and local climate change scenarios, interface to crop models.	South/East Asia, North Asia	High
Biodiversity	Land and ocean surface temperature, rainfall, sea level, circulation variability & trends. Measures of biodiversity and species change. Links between climate variability and ecosystems (terrestrial and marine)	All	High
Water	Rainfall data, monsoon variability, river flow,	Central, South and	High

Resources	snow storage, groundwater information. Models of interaction between climate variability (e.g., ENSO) and change and monsoon behavior. Interfaces between climate and hydrological models.	East Asia	
Coastal Ecosystems	Land and ocean surface temperature, rainfall, sea level, ocean wave activity, circulation variability & trends. Ecosystem statistics & time series. Links between climate variability and ecosystems.	South/East Asia, Pacific Island States	High
Human Health	Health and disease statistics, surface climate data and future scenarios. Models of linkages between climate variations and disease outbreaks / susceptibility.	Central, South & Southeast Asia	Moderate
Human Settlements	Sea level, ocean circulation variability, surface climate data, sea surface temperature, ocean wave activity. Scenarios for sea level rise and regional circulation.	Pacific Island States South Asia	Moderate
Land Degradation	Land use & agricultural data, atmospheric circulation, hydrological data, sea level; Models and tools for integration of climate, hydrology and soil information.	Central, South and East Asia	Moderate-high

** Based on expert judgment only*

The detailed outcome of the discussions held by the Working Group B on capacity building needs of the countries in the Asia-Pacific region on vulnerability and adaptation to climate change is reproduced in Annex-3.

(iii) Role of APN in Capacity Building of Asia and the Pacific Countries

The workshop participants deliberated at length on the priority issues relevant to capacity building needs and on ways and means to strengthen regional cooperation in the Asia-Pacific region. They collectively identified three levels of capacity to be developed in the region, namely, individual, organizational / institutional and system of institutes/society. Coordination of capacity building activities within and between these levels was also considered important. The participants suggested that a number of actors can play major roles in enhancing the capacity building activities in the Asia-Pacific region for implementing the GEOSS related activities. It was felt that the precise targets for capacity building activities on both observational systems and related host of issues of data availability, analysis and interpretation for enhancing the ability to cope with the impacts of climate change and the development of adaptation strategies in the Asia-Pacific region need to be addressed urgently through a two way interaction between APN and GEOSS Sub-Committee on Capacity Building. In addition, a more focused dialogue between APN and its National Focal Points to find ways to support Institutional CB activities and facilitate the implementation of projects on the critical issues mentioned above by way of developing the human resource capability and by strengthening institutional structures and the technical capacity necessary to cope with climate change.

The major actors identified were (1) APN secretariat and (2) APN member countries, and (3)

International and regional agencies. These are summarized as under:-

(i) Use APN's existing activities to promote new GEOSS related Capacity Building Needs

- Use the existing APN Conventional Project Proposal Processes e.g., CAPaBLE etc, and
- Increase fund allocations for CAPaBLE and seek additional funds for new GEOSS Activities.

(ii) Strengthen the role of APN Focal Points and SPG Members

- Establish contact with National Meteorological and Hydrological Services and other relevant services related to climate change research,
- Seek national proposals through APN Focal Points/Member Countries on sectoral issues, e.g. Water, Agriculture, air Quality, Biodiversity etc.

- Encourage National Focal Points and SPG Members to promote public awareness.

(iii) Facilitate improvement in access to data and established data centers.

a. Facilitate communication with International Data Centers,
b. Develop a meta information of Data Centre and Data Base,
c. Develop resource directory of Data sources.

(iv) Institutionalize Capacity Building activities;

a. Strengthen collaboration with International Agencies e.g., UNESCO, WMO, UN-ESCAP,
b. Promote institutionalization of Capacity Building and organize workshops to train the trainers,
c. Identify Institutions, Researchers/Scientists to work on specific project proposals
d. Conduct / support Training Institutes / Workshops on Topics / Issues that enhance capacity of institutions / groups of researchers / NGOs / Nations
e. Develop meta information of major institutions and climate change experts in the region.

(v) Expand access to funding opportunities

a. Enhance the ability of scientists and relevant institutes to seek funding support from International Funding Organizations such as AIACC, etc. and foreign aid systems such as USAID, JICA, AusAID, NZAid; and

b. Initiate two-way dialogue between APN and GEOSS Sub-Committee on Capacity Building to facilitate funding for implementation of projects on critical issues relevant to development of the human resources and strengthening the institutional structures and the technical capacity in the region.

(d) Closing Remarks

The Workshop Chair commended the participants for their commitment to enhance the capacity of their country and the region in coping with the adverse impacts of climate variability and climate change and to help the decision makers through development of appropriate adaptive strategies to protect their communities.

The very constructive discussions over the two and a half day Workshop allowed us to focus and develop a list of key issues for the Asia-Pacific region. The intense discussions and the resultant consensus provided an excellent platform for the development of detailed plans for action and potential pathways for this action.

The Chair concluded by thanking all the Workshop participants for their open and frank contributions, the donors who made the Workshops possible and to those who worked behind the scenes to make the Workshop such a success.

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Annex - 1

APN 2nd Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate

19 - 21 March 2006, Bangkok, Thailand

Jointly organized and supported
by
National Science Foundation, USA
Ministry of Natural Resources and Environment, Thailand
Ministry of the Environment, Japan, and
National Institute for Environmental Studies, Japan

Workshop Chair: Dr. Andrew Matthews

AGENDA

Day 1: Sunday, 19 March 2006

Session: I **(Chair: Dr. Hideo Harasawa)**

0930 – 0950: **Welcome Notes by Dr. Ampan PINTUKANOK, MONRE Thailand, and Mr. Naoya TSUKAMOTO, MOE Japan (10+10 min)**

0950 – 1010: **Workshop Objectives: Dr. Andrew Matthews (15 + 5 min)**

1010 – 1030: **Tokyo Workshop Outcome on Capacity Building Needs in the Region: Dr. Murari Lal (15 + 5 min)**

1030 – 1100: **Coffee Break**

Session: II **(Chair: Dr. Hideo Harasawa)**

1100 – 1130: **Current Status of GEO / GEOSS and Japan's Perspective: Dr. Ikuko KURIYAMA (20 + 10 min)**

1130 – 1200: **GEOSS in Relation to Climate Change in Asia Pacific Region: Dr. Jinlong Fan (20 + 10 min)**

1200 – 1230: **GEOSS in Asia Pacific Region: Capacity Building Aspects: Dr. Rizaldi Boer (20 + 10 min)**

1230 – 1315: **Working Group Parallel Sessions Action Plan for the Workshop: Introduction of the Discussion Themes on Priority Needs in Advancing the Understanding of Climate Change, Vulnerability and Adaptation and Outcomes Expected[#] from the Working Groups – Dr. Murari Lal (30 + 15 min)**

[#]Discussion Themes and Outcomes Expected from Working Groups:

1. **Sharing the information of the present situation: Earth observation and climate change researches among APN countries**
2. **Sharing the information of the present situation: Future plans of climate change research among APN countries**
3. **Finding gaps in each countries and A-P region**
4. **Finding actions needed to overcome gaps**
5. **Identify the future collaboration in the countries and the A-P region and role of APN to support them**
6. **Suggestions for priority action plan to APN**

1315 – 1430: **Lunch**

Session: III **Parallel Sessions**

1430 – 1730: **Working Group Parallel Sessions: Discussion Theme – Issues (1), (2) and (3)**

Working Group – A: OBSERVATIONAL DATA REQUIREMENTS FOR ADVANCING THE UNDERSTANDING OF CLIMATE CHANGE – CAPACITY BUILDING NEEDS IN A & P

Chair: Dr. Kwang-Joon Park; Co-Chair: Dr. Nobuo Mimura;
Rapporteurs: Dr. Jinlong Fan & Dr. R.S.K. Basnayake

Objective: To Formulate Action Plan for Manpower Training in Specialized Data Processing, Analysis and Interpretation Techniques at Centres of Excellence in the Region for Improved Understanding of Climate Change and Its Variability.

Working Group – B: CAPACITY BUILDING NEEDS OF A & P COUNTRIES ON VULNERABILITY AND ADAPTATION TO CLIMATE CHANGE FOR SUSTAINABLE DEVELOPMENT

Chair: Dr. James Renwick; Co-Chair: Dr. Rizaldi Boer
Rapporteurs: Dr. Ehrlich Desa & Dr. Wan Azli WAN HASSAN

Objective: To Identify Priority Needs of Sector-specific Capacity Building Activities on assessing Climate Vulnerability in the Asia Pacific Region and steps to formulating Plans for Action on Implementation of Adaptation Options at Local / Country Level in Most Vulnerable Regions for Sustainable Development.

Coffee Break:	**During the Working Group Session**
1800 – 2000:	**Reception / Dinner**

Day 2: Monday, 20 March 2006

0930 – 1000:	**Plenary Session (Chair: Dr. Roland Fuchs)**
	Progress Report of Discussions held in Session III by WG Chairs on Themes 1, 2 and 3 (15 min each)
Session: IV	**Working Group Parallel Sessions: Discussion Theme – Issues (3), (4) and (5)**
1000 – 1300:	**Parallel Sessions Continue**
Coffee Break:	**During the Working Group Session**
1300 – 1400:	**Lunch**
1400 – 1530:	**Discussion Theme – Issue 6: Identification and Collation of Priority Action Plans for CB Activities by Each Working Group**

1530 – 1600: **Coffee Break with Small Snack**

Session: V **Plenary Session (Chair: Mr. Naoya Tsukamoto)**

1600 – 1730: **Presentation of Reports from WG Chairs (45 min each)**

Day 3: Tuesday, 21 March 2006

Session: VI **Plenary Session (Chair: Prof. M. Mimura)**

0900 – 1045: **Open Discussion and Improvements on Priority Action Plan**

1045 – 1115: **Coffee Break (Working Groups to Collate Comprehensive Action Plans)**

Session: VII **Closing Plenary Session (Chair: Dr. Andrew Matthews)**

1115 – 1145: **Summary Presentation on Workshop Recommendations for Priority Action Plan, Dr. Murari Lal**

1145 – 1215: **Workshop Chair's Summary and Closing**

1215 ~ : **Lunch**

Annex – 2

Observational Data Requirements for Advancing the Understanding of Climate Change
Working Group A Report

A. Identification of Potential Targets for Observation (Table A.1)

1) First we discussed what "hot spots" means to identify the potential targets of more intensive observation in the A-P region.
   We agreed on the following definition as a working hypothesis; "Hot spots" are sensitive and fragile "exposure" systems to climate change and variability, which are associated with specific areas when appropriate.
2) We added four new items of hot spots to the list in the Summary Report of the First Workshop held in Tokyo.
3) Participants presented the hot spots for their countries and the region on the whole to see their distribution in the region. The result is shown in Table A.1.

B. Finding Gaps in the Asia and Pacific Region (Table A.2)

1) We tried to identify the major gaps in the capacity building (CB). The gaps exist in wide areas at different levels.
2) The identified gaps in capacity building may be classified by two axes as shown in Table 2; one is the level of actors ranging from personal to regional/inter national, and the other is stages of observational work such as observation/data acquisition, data access, analysis, data exchange, and outreach to policy makers and the society.
3) The gaps widely suggested included lack of access to data and data acquisition facilities such as satellite remote sensing, lack of know-how on monitoring facilities, observation methodologies, access to existing data and their re-analysis, different data format and lack of capability of data exchange. Outreach to policy makers and the general public is also needed to enhance their support to the Earth Observation.
4) We also identified good examples to fill the gaps. They are mostly international or regional collaborative projects, such as regional water data systems, monitoring Himalayan water cycles (China, Korea, JPN etc), and APN funded Training Institute for extreme events (USP, NIWA, E-W Center). Regional or international collaborations should be highlighted to promote CB in the Earth Observation.

C. Suggestions for Priority Action Plans to APN (Table A.3)

1) We identified that three different time frames existed in the target observation and data; past observations and analysis of existing data, present observations, and future prediction and scenarios. The suggested research theme and associated CB activates are listed in Table A.3. CB needs vary with the scientific activities needed in each category.
2) The research themes and CB activities should be organized so that they fit the GEOSS work plan and contribute to the GEOSS.
3) We also identified actors who can play major roles of these activities. They are (a) APN (conventional projects and new initiatives), (b) APN member countries, (c) GEO, and (d) International funding organizations. APN should consider delivering the roles for CB activities to appropriate actors.

Table A.1: Distribution of Potential Targets for Observation: Focus-Climate

	Hot spot	Mongolia	China	Korea	Japan	Vietnam	Malaysia	Thailand	Pakistan	India	Sri Lanka	Indonesia	Samoa	Most A-P Region
1	Himalayan glaciers – Spatial and temporal distribution of snow cover	2	2	2		2			1	1				
2	High elevation areas of Tibetan Plateau		2	2	1				2	2				2
3	Degradation and depletion of ground water aquifers	1		2		2		2	1	1	1	2	1	1
4	Desertification trends in arid/semi-arid areas, e.g., West Asia		2	1					1			2		
5	Mongolian Tundra	1			1									
6	Hydrological cycle and its changes in Asian Monsoon System and its linkage to ENSO Episodes		1	1	1	1	1	1	1	1	1	1	1	1
7	Potential Changes in extreme weather events including tropical cyclones and typhoons	2	1	1	1	1	2	1	1		1	1	1	1
8	Trends in deterioration of coral reefs, mangroves, and sea grass in coastal waters of Asia and the Pacific Countries			2		2	2	2	2	1	2	1	2	2
9	Loss of biodiversity in fragile ecosystems of highlands, wetlands and islands	2	2	2		2	1	2	2	1	2	1	2	2
10	Coastal Zones - e.g., erosion, sea level rise			1	1	1	2	2	1	1	1	2	1	1
11	Anthropogenic aerosols	2	1	1					2	1	2			2
12	Forest fire					2	2	1	2	2		1		
13	Land degradation	1		2		2			1	1	2	1		2

Note: 1 and 2 indicate the highest and the second highest priorities respectively (Based on expert judgment only)

Table A.2: Gaps in Earth Observation: Capacity Building Needs

	Observation/ Data Acquisition/ Access to Data	Analysis/Research	Data Exchange / Use	Outreach to Policy makers and Society
Personnel/ Institute	Limited experience	More chance for young scientist		
National/ Inter-institute	Access to satellite image data Access to facilities including satellite RS Processing of satellite data No remote sensing stations Lack of remote sensing data More resources for RS monitoring Observation systems for climate Observation in some critical regions ,such as semi-arid Asia, high mountains, urban zones Dataset building, e.g. water cycle, population, land use Ecological footprint data Collaboration of institutes	Training of data rescue and analysis , and downscaling Lack of budget specially for young people Courses in climate related topics to be included in higher training / university level	Sharing and exchange of data / information To improve the communication among their national data center and users Permission / security for Sharing data	Outreach to larger audience Increase people's awareness to climate modeling National planning and awareness program
Regional/ International	International collaborative projects Good examples: Regional water data systems Monitoring Himalayan water cycles Sub-regional collaboration with Lao and Cambodia, and SEA monitoring program on frost fire and transboundary haze	Training opportunities: Training institute for Extreme Events (USP, NIWA, E-W Center), and APEC Climate Center in Korea Establishment of regional training institute to take up courses in mathematics modeling and modern numerical statistic techniques Understanding the problem of climate model outputs when using for impact assessment More trainings important including training for people working in disaster management domain	Exchange climate change impact data with regional research networks Data Exchange with international data center 1/100 000 DEM	Regional and sub-regional meetings
General / Institute to Region	Know how on monitoring facilities Observation methodologies Access to existing data Access to global datasets	Data quality requirement Lack of knowledge on and access to analytical tools	Not exchangeable data, e.g., hydrologic data Directory of information on climate change data	

Table A.3: APN Priority Actions

Target Time	Priority Action for Capacity Building	Roles of APN
Past Observation Excising Data	Collection, rescue and analysis of historical data to identify the trends of climate change and variability and its impacts - Improve access to existing data and compile integrated datasets - Develop and training of methods to rescue and analysis of the historical data - Develop methods for enhance the capability of data exchange - Promote simple analyses of primary climate data including statistical methods	- Use the existing APN mechanisms such as CAPaBLE to promote the activities - Enhance the ability of scientists and relevant institutes to apply to projects funded by international funding organizations e.g., AIACC, IAI etc. and foreign aid systems such as USAID, JICA, AusAID, NZAID. - Facilitate communication with international data centers - Develop a function to provide meta information of data base and major institutes (clearing house function) - Promote the institutionalization of CB and organize workshops to train trainers - Focus on countries who need more assistance
Present Observations	Observation to detect ongoing phenomena related to climate change and variability such as water cycle and extreme events - Develop observation systems for critical areas and phenomena - Need to develop a network of tide gauges in the coastal countries to monitor sea-level change and storm surges - Training on how to use the monitoring facilities and equipment - Development and training of observation methodologies particularly satellite remote sensing - Sharing and exchange of observed data - Improve access to global database - Improve detection and early signals of hazards including tropical cyclones and ENSO - Development of international network of institutions to promote above CB activities	
Future Prediction/Scenarios	Linkage of earth observation and climate model to enhance predictive capacity of future climate change - Capacity building for access, transfer, and analysis of the climate model and its results - Develop assimilation methodologies for observation and climate model outputs - Develop climate scenarios for the A-P region - Downscaling of climate change model outputs for regional scenarios	

Annex - 3

CAPACITY BUILDING NEEDS OF ASIA PACIFIC COUNTRIES ON VULNERABILITY AND ADAPTATION TO CLIMATE CHANGE FOR SUSTAINABLE DEVELOPMENT

Working Group B Report

A. Identification of Potential Targets for Capacity Building Needs (Table B.1)

1. First we discussed the target for capacity building, and it was agreed that there were three target groups namely policy makers, scientist and communities on the area of:
2. Modes for the capacity buildings include training, workshop/seminar and research
3. Themes for the capacity building covered the following areas:
   - Communication and Information sharing
   - Climate Modeling, Socio-Economic Impact and Adaptation
   - Public awareness

B. Finding Gaps (Table B.2)

4. There were a number of gaps identified during the discussions which include:
   - Low understanding on uncertainties and limitation of climate projections and scenarios
   - Low skill of climate forecast as well as effective communication of the forecast to end users
   - Limited activities for increasing awareness of communities to climate changes issues
   - Limited expertise in climate modeling and socio-economic impact assessment
   - Low level of institutional support for climate data sharing
5. We have identified a number of activities and experts in the region to address the above issues
6. We have identified a number of potential international and regional agencies who can provide support for the implementation of activities related to the above issues

C. Suggestions for Priority Action Plans to APN (Table B.3)

7. We identified a number of activities related to the three themes mentioned above and also actors who can take a major roles for implementing the activities.
8. The major actors were (1) APN secretariat (2) APN member countries, and (3) International and regional agencies

Table B.1: Potential Targets for Capacity Building in Climate Change Vulnerability & Adaptation

	Critical sectors	Data/research needs	Regions most affected*	Research priority*
1	Food and Fibre	Land surface temperature, rainfall records, agricultural production statistics and time series. Regional and local climate change scenarios, interface to crop models.	South and East Asia, North Asia	High
2	Biodiversity	Land and ocean surface temperature, rainfall, sea level, circulation variability & trends. Measures of biodiversity and species change. Links between climate variability and ecosystems (terrestrial and marine)	All	High
3	Water Resources	Rainfall data, monsoon variability, river flow, snow storage, groundwater information. Models of interaction between climate variability (e.g., ENSO) and change and monsoon behavior. Interfaces between climate and hydrological models.	Central, South and East Asia	High
4	Coastal Ecosystems	Land and ocean surface temperature, rainfall, sea level, ocean wave activity, circulation variability & trends. Ecosystem statistics & time series. Links between climate variability and ecosystems.	South and East Asia, Pacific Island Countries	High
5	Human Health	Health and disease statistics, surface climate data and future scenarios. Models of linkages between climate variations and disease outbreak/susceptibility.	Central, South & Southeast Asia	Moderate
6	Settlements	Sea level, circulation variability, surface climate data, sea surface temperature, ocean wave activity. Scenarios for sea level rise and regional circulation.	Pacific Island States South Asia	Moderate
7	Land Degradation	Land use & agricultural data, atmospheric circulation, hydrological data, sea level. Integration of climate, hydrology and soil information and models.	Central, South and East Asia	Moderate-high

**Based on expert judgment only*

Table B.2: Gaps in Climate Change Vulnerability and Adaptation - Capacity Building Needs

	Data/information sharing	Capacity of local scientist on modeling and scenario development	Communicating climate forecast and related data/information to end users	Communicating certainties and uncertainties to decision-makers	Effective public awareness raising on climate change
Personal/ Institute	Ability and facility to access data and information	Limited chance for young scientists in AP region to join modeling and socio-economic scenarios development works and research. Tertiary education initiatives: on going course and curricula in climate science	Lack of research activities in area of climate forecast communication	Limited understanding of policy makers on limitation and strength of climate modeling	Ineffective outreach activities
National/ Inter-institute	Lack of collaboration between Institutions in a country	Limited number of institutions and universities who work in the area of climate change modeling, socio-economic impacts and adaptation studies Tertiary education initiatives: on going course and curricula in climate science	Needs for institutionalizing process of communicating climate forecasts to end users	Limited understanding of policy makers on limitation and strength of climate modeling	Limited funding allocated for action research to deal directly with communities. Low involvement of focal point to encourage or engage public or private entities to assist public awareness program
Regional/ International	Lack of institutional channels to regional and international data holding institutes and centers	Tertiary education initiatives: on going course and curricula in climate science	Needs for institutionalizing process of communicating climate forecasts to end users	Data and information sharing between member countries.	

Table B.3: APN Priority Actions

Targeted Activities	Priority Action for Capacity Building
Communication and Information sharing	1 Leadership workshop for decision makers (need to address issues on data and information sharing between member countries and strengthening network to improve capacity to adapt to climate extremes and changes) 2 Workshops on institutionalizing process of communicating climate forecasts to end users for sharing experiences of APN countries in communicating climate forecasts and hazard warnings to communities – failures and successes 3 Use institutional channels to strengthen collaborations
Climate modeling, Socio-Economic Impact and Adaptation	1 Training for young scientists on climate modeling, socio-economic impact and adaptation to climate change 2 Conducting research on climate modeling, socio-economic impact and adaptation, focusing especially on hot-spot areas 3 Training for young scientists on writing proposals for international funding agencies 4 Tertiary education initiatives: on-going courses & curricula in climate science
Public awareness	1 Conduct action research dealing directly with communities 2 Produce printed and electronic media materials that use simple language with real examples & explanations
Roles of APN	1 Coordinating workshops 2 Establishing contact with APN Focal Points to bring scientists and staff from NMHS (National Meteorological and Hydrological Services) for effective climate communication 3 Facilitating networking and communication channels, and developing resource book on data sources (e.g. climatic data used by APN projects and person who has the data) 4 Developing contact with international agencies in the region who can provide support for conducting workshops, and provide co-funding for supporting participation of experts from APN Countries 5 Increasing funding allocated for CAPaBLE program (regional training and research) 6 Increasing collaboration with international agencies such as UNESCO, WMO, UNESCAP etc in conducting training for trainers, documenting existing climate curricula in APN countries, developing resource database for climate change experts 7 Encouraging APN focal points and SPG Members to facilitate and engage public and private sectors to be involved in public awareness programs

[END]

Appendix 1: Participants List

APN 2nd Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus - Climate
19 - 21 March 2006, Bangkok, Thailand

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