



Scientific Capacity Building and Enhancement for Sustainable Development in Developing Countries (CAPaBLE)

Key Findings of CAPaBLE Phase One (April 2003 to March 2006)

Summary for Stakeholders (Draft)

1. Overview of the CAPaBLE Programme

Having the capacity to conduct high quality research that provides underpinning scientific support for policy-makers and policy-making processes is vital for least-developed countries in the Asia-Pacific region and is recognised by the APN as crucial for improving the scientific and technical capabilities of these nations. In realising this, the APN embarked on a strategic approach to capacity building and sustainable development by launching its CAPaBLE Programme in March 2003. Under the CAPaBLE Programme, leading scientists of developing nations, young and aspiring scientists, and members of the policy and civil communities are provided with opportunities to develop their knowledge and capabilities in climate change. This was implemented in Phase One of CAPaBLE through the enhanced sharing of knowledge, experience and scientific information on quality data collection and analysis on the impacts, vulnerability, adaptation and mitigation to climate change.

CAPaBLE was registered as a Type II Partnership Initiative by the Japanese Government in Johannesburg, September 2002 as a concrete initiative to realise parts 107 to 114 of the Johannesburg Plan of Implementation (JPOI) for the World Summit for Sustainable Development. Of particular relevance to CAPaBLE is Part III of the JPOI:

- *Establish regular channels between policy-makers and the scientific community for requesting and receiving science and technology advice for the implementation of Agenda 21, and create and strengthen networks for sustainable development, at all levels, with the aim of sharing experiences and best practices and building scientific capacities, particularly in developing countries.*

CAPaBLE is implemented via a two-track mechanism: Capacity Enhancement for experienced leading scientists and capacity building for young, aspiring (early career) scientists and is financially supported by the governments of Australia, Japan, New Zealand, Republic of Korea and the United States of America.

Box 1. CAPaBLE Objectives & APN Goals

Objectives of the CAPaBLE Programme

1. Building the scientific capacity of aspiring scientists through sharing of knowledge, scientific information and data collection on climate change impacts, vulnerabilities, adaptation and mitigation
2. Enhancing the capacity of leading researchers in developing countries to produce comprehensive scientific results on climate change impacts, vulnerabilities, adaptation and mitigation
3. Improving informed decision-making in developing countries by disseminating outcomes of research activities to policy-makers and civil society

Main Goals of the APN

1. Supporting regional collaboration in global change research on issues particularly relevant to the region
2. Strengthening appropriate interactions among scientists and policy-makers, and providing scientific input to decision-making and scientific knowledge to the public
3. Improving the scientific and technical capabilities of nations in the region
4. Cooperating with other global change networks and organisations
5. Facilitating the development of research infrastructure and the transfer of know-how and technology

2. CAPaBLE Phase One Evaluation

With a focus on climate change, the first 3-year phase of CAPaBLE, which ran from April 2003 to March 2006, completed 17 projects throughout the Asia-Pacific region, at all levels from community to national and regional levels. Drawing from expert reviewers in the international global change community, the APN Scientific Planning Group (SPG) and the CAPaBLE Capacity Development Committee (CDC), these projects were evaluated based on completed questionnaires (self-evaluations) of Project Leaders as well as various other resources, including final project reports, publications, proceedings, etc. Two of the 17 projects were conducted under the comprehensive research element (capacity enhancement) of CAPaBLE and 15 were conducted under the capacity-building element of the programme. A non-technical summary of the projects is attached as *Appendix 1*).

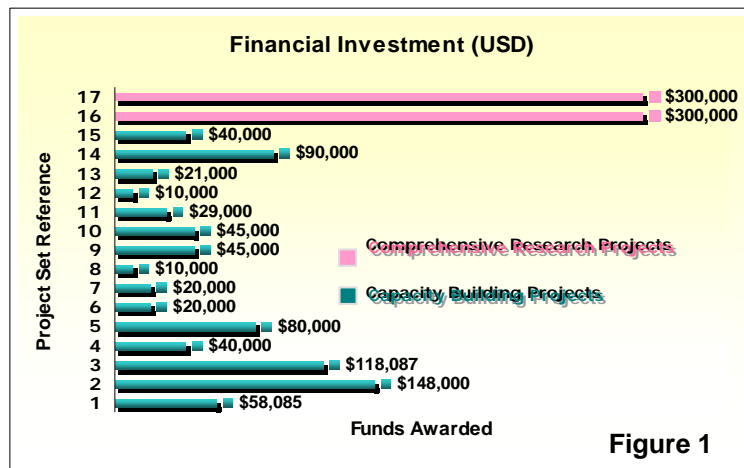


Figure 1

Experts conducted independent reviews based essentially on the responses received from project leaders, highlighting project performance against the 3 main objectives of the CAPaBLE programme (*Box 1*) and the APN's 5 main goals in terms of *relevance, efficiency, effectiveness, impact, and sustainability*. It is noteworthy to point out that the evaluation of the CAPaBLE programme itself was out with the scope of the present evaluation and the CAPaBLE

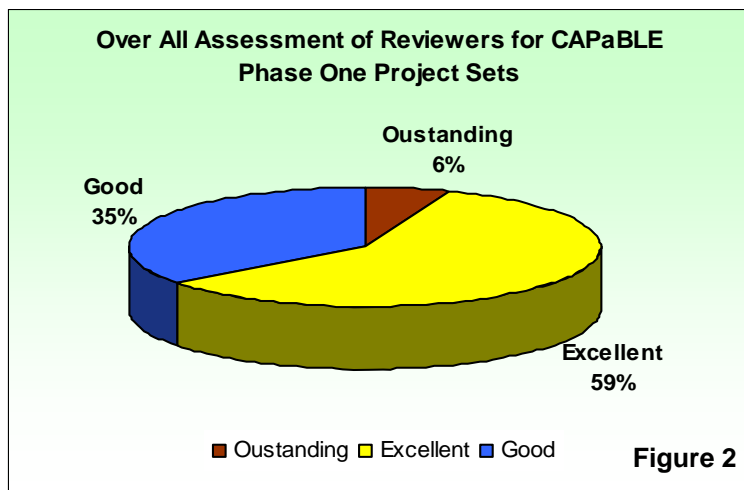


Figure 2

programme is to be evaluated under the APN's second strategic phase review, which is currently underway and due for publication in 2010.

In terms of financial investment into the programme in Phase One, the total investment made to the 17 projects was **US\$1,374,172**; a breakdown of which is outlined in *Figure 1*.

3. Key Findings

Utilising ratings of outstanding, excellent, good, satisfactory and unsatisfactory, the chart presented in *Figure 2* shows a summary of reviewers' findings in general. Of the projects conducted during phase one of the CAPaBLE programme, 6% were considered outstanding, 59% excellent and 35% good. No projects were rated satisfactory or unsatisfactory. CAPaBLE has successfully attained its objectives in its first phase to varying degrees of strength. In particular, expert reviewers highlighted key strengths as well as areas where effectiveness could be improved. Using a scoring system for the evaluation; *Box 2* highlights the top 4 ranked proposals; 2 of which are comprehensive research projects and 2 of which are capacity building projects. The key findings of these top-ranked projects are outlined in Section 4 of this evaluation report. It is expected that a more comprehensive report by way of a synthesis will be

prepared outlining the results of all projects. A timeline for this synthesis will be established in consultation with the APN's Capacity Development Committee.

3-1. Comprehensive research

With a total investment of US\$600,000 over 3 years and accounting for 44% of the funding available under CAPaBLE in its first phase (*Figure 1*), the two comprehensive research projects conducted were based on the outputs from Working Groups II and III of the IPCC third assessment report. These projects, which largely focussed on modelling aspects for adaptation and mitigation, were well conceived and implemented, largely successful, and delivered excellent outputs as a result of careful planning and structuring, the experienced scientists involved and the ability to cooperate across national borders in issues that are relevant to the region.

Regional-based modelling remains one of the key areas requiring advancement in improving our useful understanding of climate change – we need realistic regional simulations to understand the impacts and vulnerability that need to be adapted to. The results indicate that there is good science being conducted and the capacities to address climate changes issues are present right down to the national level, this is particularly true for developed-nations who are often exposed to the most severe impacts of climate change and it is critical to build their capacity in these areas. The dropping out of one of the national-level collaborators in one of the projects could be considered a weakness; however, this was beyond the control of the project. Another excellent output in terms of capacity building was the initiation of masters' courses in climate change.

The projects conducted under the capacity enhancement pillar of CAPaBLE are highly relevant and resulted in excellent scientific reports and key peer-reviewed publications, some of which have been cited in the IPCC 4AR. The outputs are categorised in *Figure 3*,

with specific details including full citations of refereed publications listed in *Appendix 2*. Project outcomes also interfaced with other reputable international environmental assessments and institutions including APEIS, GEO4, UNEP RISO Centre in Denmark; TWAS in Italy, ICTP among others. Further, the work of one of the projects has been noted by leading scientists and they are currently following up with several institutions on the question of how to better represent development transitions in the fast growing Asian developing economies in the long-term climate change policy models. While largely relevant and successful, it was felt by some that

Box 2. Top 4 Ranked Projects

1. Project 03 (CB activity)
2. Project 14 (APN-initiated CB Activity)
3. Project 17 (CRP activity)
4. Project 16 (CRP activity)

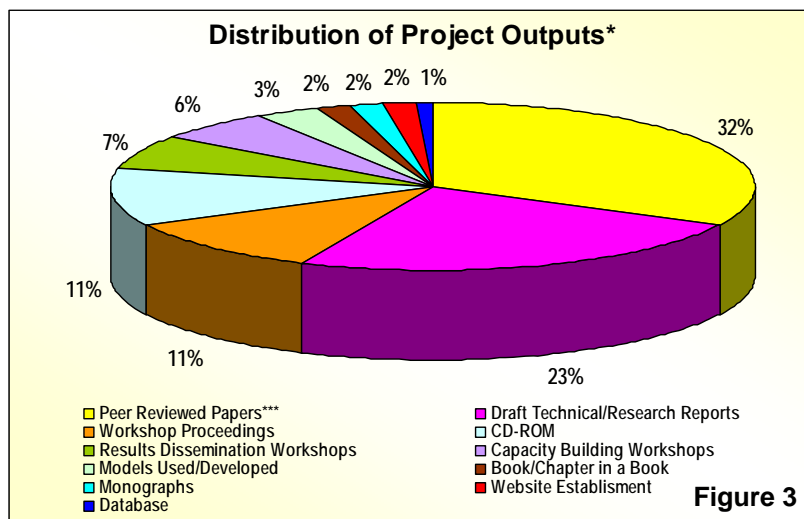


Figure 3

more time and resources could have been spent addressing the holistic aspects of project activities, particularly at the regional level (by way of an integrated regional assessment). While the projects appeared to be fully regional-based at the outset, significant time was focussed on national priorities. The projects could perhaps consider developing a regional-based integrated assessment of the project outcomes.

While overall a largely successful element of the CAPaBLE programme, one obstacle in maintaining the momentum achieved by the projects conducted is believed to be the lack of financial resources by the member teams to further sustain and progress the activities. While most reviewers expressed excellent outcomes in the form of publications, one reviewer expressed some dissatisfaction with the number of reputable refereed journal publications compared with the substantial investment. The projects have considerably strengthened sub-regional collaboration and capability, and enhanced awareness of policy-makers who were engaged in dissemination activities both nationally and regionally. It further appears that science and policy interactions were successful particularly in areas where they had previously been lacking. Concerning the overall impact of science-policy interfacing, it is perhaps too early to tell, particularly as true policy change is still under consideration. It can be said, however, that better tools have been developed for, and in some cases being used in, decision-making processes. Essentially, the project outputs were found to be both unique and timely to incorporate into the work of others.

3-1-1. Key Project Outcomes

- GCM and downscaled-RCM simulations models
- CGE model development and regional-based/shared database; GHG mitigation strategies and socio-economic policy projection
- Scenario and model results that are used as bench-marks by stakeholders in national climate change action plans
- Substantial research papers including IPCC AR4 citations, technical reports, databases, web-based outreach activities and training courses
- Substantial stakeholder input and interaction for policy-driven issues for climate change mitigation and sustainable development.
- Trained personnel in climate simulation modelling
- Trained personnel in climate change research, including adaptation and mitigation strategies

3-1-2. Key Recommendations for the APN

- Continue financial investment in these kinds of activities while at the same time consider further whether the very large investment (compared with the more modest investment for capacity-building projects) has been worthwhile overall.
- Generate contingency funds to mitigate unforeseeable problems (for example, inadequate computer facilities by way of processors and data-storage capabilities, computer-generated viruses etc which stalled progress in one project)
- Encourage scientists to aggressively seek funding from other institutions to ensure project sustainability
- Encourage joint (regional-based) authorships across national borders
- Focus on capacity-building activities in a manner that uses local resources more efficiently
- Local government should be involved at the proposal-development stage – perhaps worthy of consideration of an additional criterion
- Continuing to invest in these kinds of activities will ensure APN publicity and recognition in global change science
- Engage more senior scientists in policy-dialogue with high level decision-makers
- APN needs to place more emphasis on major funded projects being supported by national agencies. The factor of ownership is key to sustainability.

3-2. Capacity Building

With an investment of US\$763,636, (56% of the funds available for CAPaBLE in Phase one) allocated to 15 capacity-building projects, the financial investment into individual projects in this pillar was modest compared with the comprehensive pillar of the programme. For the modest funding available, there was consensus that the objectives of the capacity-building pillar of CAPaBLE were met and Phase One on climate change has been instrumental in developing the capacity of the least developed nations in the region. With modest funding, activities are commendable and highly relevant to the region.

The capacity-building component of the programme has facilitated the development of research infrastructure and the transfer of expertise and technology through the provision of equipment and user-knowledge, transferring and sharing of data, provision of information and methodologies to researchers and institutions. The preparation of national reports, for example, is an important activity for policy-makers in all countries, especially in the areas of land-use and land-cover. The general response from reviewers is that continuous support through CAPaBLE is crucial, particularly for the least-developed nations in the region. It is further recommended that the outputs of a number of the sub-regional based activities, which are highly relevant for the entire region, be expanded across the Asia-Pacific and APN is encouraged to spend some time investing in follow-up activities of key projects conducted under the CAPaBLE programme.

In terms of the input to the 5 main goals of the APN, project activities largely contributed to the first 3. CAPaBLE has provided opportunities for scientists and policy-makers in countries in the region to develop their knowledge and understanding of climate change issues that include climate variability and change, climate extremes as well as impacts and adaptation over a broad aspect of socio-economic issues. Having become an integral part of the APN, the CAPaBLE activities are relevant and must be continued.

Key Outcomes

- Scientific capacity building of young and aspiring scientists
- Scientific capacity enhancement of leading researchers in developing countries
- Science-policy interfacing at various levels
- Development of skills in climate change, for example in preparing GHG Inventories for national communications, through training programmes held in-country and regionally
- Increased awareness of climate change among policy-makers and civil society through training programmes and awareness-raising fora
- Promotion of local technologies and technology transfer
- Capacity building activities in vernacular language
- Media outreach
- Enhanced partnerships among the global change community
- Local scientist involvement in regional assessments of climate change impacts

Key recommendations for the APN

- A further on-ground evaluation of CAPaBLE activities, particularly for those with a research element, after 5 years
- Establishment of an on-going monitoring system of enhanced capacity-building
- Establishment of long-term linkages with investigators and research-based institutions
- Identification of centres of excellence for each of the agendas of the APN
- APN should consider the establishment of a "virtual" research institute on climate change research, perhaps initially at the sub-regional level, and involve all

- climate-change research institutes in the sub-region.
- End-user involvement in APN activities needs to be given more consideration and implemented at the project stage.
- APN should ensure follow-up of activities for sustainability and needs to devise a strategy to do this successfully without the need to provide continuous and/or additional financial investment.
- APN should consider the development of internet-based training courses in order to reduce costs as well as reach the more remote areas of the region (for example in the Pacific Island Countries).
- Useful to identify local technological innovations practiced by different communities and perform a study on the most promising of these for wider adoption in the region.
- APN may want to conduct an impact assessment 3-5 years after capacity-building projects are completed to assess their long-term impacts.

This report was compiled by Linda Stevenson, Scientific Officer, APN Secretariat. The report is currently in a draft format and will be reviewed and finalised by the APN's Capacity Development Committee (CDC).

4-1 Comprehensive Research Project: Khan

With an investment of US\$300,000, the first 3-year comprehensive project conducted its research based on outputs of WGII of the IPCC third Assessment Report and was aimed at enhancing national capabilities to apply simulation models for the assessment of climate change and its impacts on economic sectors in three countries of Pakistan, Nepal and Bangladesh. The project was conducted in 2 phases, the first was targeted at enhancing the modelling capabilities of scientists and institutions and the second phase was aimed at demonstrating to policy-makers the potential value of these capabilities in understanding climate change processes, particularly impacts on water and food resources.

Outcomes: While the project largely achieved its objectives and the project was a success for individual country goals, changes in personnel in Bangladesh hindered phase 2 at the national level. The project led to a general improvement in simulation modelling capabilities and, hopefully, increased willingness of policy-makers in the countries involved to interpret the results of modelling and apply them successfully in adaptation procedures in the water and food sectors. While the project was rated excellent, it was noted by a number of reviewers that there should have been better coordination to establish a common regional assessment. While it is understood that this might be difficult, some attempts should have been made to determine a collective view of stakeholder capacity as well as evaluate country-driven policies.

Publications:

Relevance: the APN was successful in creating crosscutting interactions among areas of interest to the APN. Significant regional research on modelling was undertaken that was highly relevant to the region. This largely contributed therefore to APN goals 1, 2, 3 and 5.

Effectiveness: Capacity development, networking and the scientific approach to scenario building were well achieved and largely contributed to the objectives of the CAPaBLE programme and the majority of the goals of the APN.

Impact: The project was a high profile one given the large amount of funding received. It garnered a significant amount of attention from local agencies and government sectors because of the funding scale. The region is now in a better position to engage the scientific and political community to work together and adapt to the impacts of climate change. Another important impact is in generating interest in policy-makers sufficiently to affect policy for climate change – this was achieved by both the large financial investment from the APN as well as the relevance of the research for the region.

Sustainability: A new set of projects appear to have been created; however these are not indications that future impacts are guaranteed and it is felt that sustainability must come within. Hindrance to the sustainability of this project will be the funding factor and the project team could have tried to be a little more aggressive in securing funding from national institutions, particularly for the costly computing infrastructure required to conduct such a project.

Future Recommendations: In order for the outputs of this project to maintain its

momentum, the regional efforts must not stop at this point and it needs to move forward to take the technical capabilities to various sectors to engage larger groups for scientific inquiry and knowledge delivery. Further, regional cooperation appeared in some cases only to be to the extent of data sharing. The implementation was on an individual country basis so it appears there was very little interaction across the region. The regional workshops were not really regional but country-specific. The aim was to achieve country-specific awareness and capabilities for climate change science and this was not achieved.

1.1 Outcomes

1.2 Publications

1.3 Strengths and Lessons Learned

Key Strengths:

Key Lessons learned:

- *On regional collaboration, joint authorship of peer-reviewed publications across national boundaries needs to be actively pursued*
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1.4 Future Recommendations

3-2. Capacity Building

2.1 Outcomes

With an overall investments

2.2 Publications

2.3 Strengths and Lessons Learned

2.4 Future Recommendations

4. Summary of the findings of the top 4 ranked projects

5. Key Recommendations for the APN

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Evaluation of CAPaBLE Phase One: CAPaBLE Projects Completed in Phase One April 2003-March 2006: Non-Technical Summaries

Project Set 1: 2-Year Project 2003-CB01-Chinvanno; 2004-CB02-Chinvanno

Project Leader: Suppakorn Chinvanno

Southeast Asia START Regional Centre, Chulalongkorn University, Thailand

Project Title: *Building the Capacity of Mekong River Countries to Assess Impacts from Climate Change: Case Study Approach on the Assessment of Community Vulnerability and Adaptation to the Impact of Climate Change on Water Resources and Food Production.*

Climate change is an issue of concern in the Southeast Asia for the reason that, among many other impacts, it may cause shift and change in rainy season pattern that would directly affect agriculture activity and may threaten livelihood of large number of population in the region. In addition, the countries in the region, being developing country, may be vulnerable to climate change impact as they have limited resource to cope with future situation. However, these countries have limited knowledge on the subject and know-how to conduct further study on climate change as well as its consequences.

This project aimed to fill the gap by building research capacity in Lao PDR and Thailand. The capacity building approach under this project was not only based on conventional training and workshop alone, but also included pilot research practice on real case study which was conducted under guidance from SEA START RC by using data, method and know-how transferred from other global climate change programs, namely Assessment on Impact and Adaptation to Climate Change in Multiple Sectors and Multiple Regions (AIACC). These activities covered training and case study research exercise on regional/local climate change analysis and analysis of impacts on water resource and food production (rain-fed rice production) as well as vulnerability & adaptation assessment. Over 60 scientists, academics, government officials, press and local stakeholders were involved in the process. However, these pilot studies were primarily serve as proof of concept on the methodology and research practice as they based on case study, which were conducted in small scale only, but they could lead to the study in larger scale, both at the national level as well as regional level, which could be collaboration initiated out of this capacity building activity.

Project Set 2: 3-year Project:

2003-CB02-Koshy; 2004-CB03CMY-Koshy; 2005-CB05CMY-Koshy

Project Leader: Kanayathu Koshy

University of the South Pacific, Suva, Fiji

Project Title: *Training Institute on Climate and Extreme Events in the Pacific*

A three-year APN CAPaBLE funded project on *Pacific Islands Training Institute on Climate and Extreme Events* was conducted as a collaborative effort combining the expertise, assets and capabilities of the University of the South Pacific (USP), the East-West Center (EWC) and the New Zealand National Institute of Water and Atmospheric Research (NIWA). Additional financial and in-kind support for the Training Institute was provided by the U.S. National Oceanic and Atmospheric Administration (NOAA), EWC, NIWA and USP and a host of other regional and international organizations. The overarching goal of the Training Institute (extended workshop) was to enhance the regional network of scientists, forecasters, disaster management officials, sectoral field workers and resource managers to enhance the capacity of Pacific Island jurisdictions to understand, anticipate and effectively respond to the consequences of current and future patterns of climate variability and climate-related extreme events such as droughts, floods and tropical cyclones both today and in the future. Each workshop was designed to be an intensive, two-week program of lectures, hands-on experience with climate forecasting and risk assessment tools, small group discussions, media training, and shared exploration of adaptation and mitigation policy options, and a role play to put into practice the skills developed during the workshop. About 30 participants from eleven Pacific island Countries participated in the inaugural Training in Suva (2004). This was followed by two in-country training in Samoa (2005) and Kiribati (2006), both attended by about 35 participants representing a wide spectrum of stakeholders, including government, community and other non-state actors. The feedback, both direct and indirect, revealed that the training was well conceived, planned and delivered to suit the regional and

national capacity needs of the countries concerned to address the implications of current and future climatic impacts, the resulting vulnerability and adaptation implementation.

Project Set 3: 3-year project
2003-CB03-Nakane; 2004-CB05CMY-Nakane; 2005-CB02CMY-Nakane
Project Leader: Hideaki Nakane
National Institute for Environmental Studies, Japan
Project Title: *Capacity Building for Greenhouse Gases Inventory Development in Asia-Pacific Developing Countries*

Developing countries are particularly vulnerable to the adverse impacts and threats of climate change. To help prioritise countermeasures against those impacts and threats, greenhouse gas (GHG) inventories that can provide an accurate knowledge of GHG emission/removal trends are critically important. In Asia, it is known that the country-specific information for emission/removal factors and activity data, which are essential to prepare reliable GHG inventories, is not readily available. Moreover, although the degree of development of inventories varies widely, forums for neighbouring countries to share information and experiences related to GHG inventory development have not been established enough. The ultimate goal of this project was to clarify the methodology for effectively improving inventories of countries in the Asia region and enhance the regional contribution to the relevant international efforts. Pilot studies were implemented in Cambodia and Thailand to demonstrate the comprehensive and source-specific approaches to improve inventories. The former identified the priority areas of inventories for improvement by primarily studying the entire aspects of them. The latter adopted measures to improve the inventories of particular source categories, given speciality available. In addition to implementing the pilot studies, the progress and outcomes of the studies were shared in annual regional workshops.

Project Set 4: 1-year project
2003-CB04-Meinke (APN/IAI)
Project Leader: Holger Meinke
APSRU, Department of Primary Industries, Queensland, Australia
Project Title: *Creating Climate Knowledge Networks through Strategic Global Linkages*

One overarching aim of CAPABLE is to establish regular channels between policy makers and the scientific community for better sustainable development. It is widely acknowledged that effective policy cannot be made in isolation from the people most affected by it. Farmers' actions have consequences for sustainable development. This drives policy formulation with the aim to influence the behaviour of farmers and resource managers in order to achieve better outcomes in terms of improved livelihoods of people in rural regions (ie. better economic, environmental and social outcomes). The approach and knowledge used in this project effectively links decision makers at the farm and policy level by providing scientifically sound, quantitative information that allows objective comparisons of options and a clear evaluation of choices and consequences.

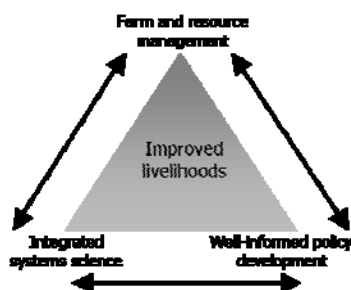


Fig. 1: Schematic diagram outlining the role of integrated systems science for farm and resource management as well as for policy development (H. Meinke, unpublished).

In spite of some positive case studies, climate applications in developing countries have been criticised for either having no value or even doing damage by making some farmers poorer risk managers than they were before. This project is partly in response to such criticism by building the networks and the capacity that is necessary to benefit from climate knowledge through integration

of such knowledge into existing risk management frameworks.

Project Set 5: 2-year Project
2003-CB05-Naito; 2004-CB04CMY-Naito
Project Leader: Masaaki Naito
Kyoto Institute for Eco-Sound Social Systems (KIESS), Japan
Project Title: *Capacity Building in Climate Change Mitigation with Locally-Owned Technology and Systems.*

Mitigation of greenhouse gas emissions to combat climate change continues to have high priority under the provisions of the UNFCCC and its Kyoto protocol, as climate change could endanger the future well-being of humans, ecosystems and economic progress in all regions. All countries, taking into account their common but differentiated responsibilities, should continue to advance the implementation of their commitments under the Convention to address climate change. Technology transfer should be strengthened as much as possible via means such as concrete projects and capacity-building in all relevant sectors. With this in mind, the present project focused on capacity building in climate change mitigation with locally owned technology. Information on locally owned technologies beneficial for climate change mitigation was collected from the Asia-Pacific Region. Two meetings were then held in 2003, in Tianjin, China and Kalyani, India, respectively, to exchange and share information, to select good examples of appropriate technology and to discuss effective ways to promote technical transfer. During the second year of the project, a symposium and a workshop were organized in Hyogo and Kyoto prefectures, Japan in November 2004 to exchange and share information among scholars and experts from local governments and NGOs. The technologies discussed were considered earth- and user-friendly technology matched to the scale of community life and also defined as intermediate technology by Dr Ernst Friedrich Schumacher.

Project Set 6: 1-year Project
2003-CB06-UNFCCC/Perdomo
Project Leader: Ms. Martha Perdomo
UNFCCC Secretariat, Bonn, Germany
Project Title: *UNFCCC Training Workshop for National Climate Change Focal Points in the APN region on Guidelines for National Communications from Non-Annex I Parties*

A workshop on the preparation of national communications from Parties not included in Annex I to the Convention (non-Annex I Parties) was attended by experts from Parties and representatives of the multilateral and bilateral agencies that facilitate and provide financial and technical support for the preparation of national communications. Participants identified several important needs and concerns which would require immediate action to facilitate and enhance the preparation of national communications by non-Annex I Parties. At the twentieth session of the Subsidiary Body for Implementation, Parties may wish to provide guidance on the activities, programmes and projects that would facilitate the preparation of national communications by non-Annex I Parties.

Project Set 7: 1-year project
2003-CB07-Muhammed
Project Leader: Amir Muhammed
Asianics Agro Dev. International, Islamabad, Pakistan
Project Title: *National Capacity Building Workshop on Global Change Research*

Global change, especially in the biophysical environment, is impacting the lives of all inhabitants of planet Earth. Global climate change especially the ramifications of global warming are having disastrous consequences in the form of hurricanes, floods, unusually high temperatures leading to uncontrollable forest fires, and severe draughts that are taking a very heavy toll of life and property. It is important that various aspects of global change including the biophysical and human dimension aspects are carefully studied and researched especially with respect to modeling the anticipated changes in order to prepare for the mitigation measures well in time. While Pakistan has a very modest research program on environmental issues, there has been virtually no organized research on global change aspects. This project was developed to create awareness for

global change issues among the young scientists with the objective of stimulating research activities in various aspects of global change especially relevant to Pakistan.

Project Set 8: 1-year project
2003-CB08-1-WCRP/Determmerman; 2003-CB08-2-WCRP/Determmerman
2003-CB08-1-WCRP/Determmerman

Project Leader: Valery Determmerman
WCRP Secretariat

Project Title: *Travel Fellowships for Young Scientists to attend the 1st CLIVAR conference and Climate Modeling Workshop on RCMs.*

The focus of the Workshop was on comparing the merits and limitations of various approaches to climate modelling at regional scale, including limited-area nested models, variable-resolution or stretched-grid global models, and uniform high-resolution global models. Contributions were also invited on impact analyses using these approaches for climate-change projections. Contributions were invited on topics such as the role of resolution beyond physiographic details, and on the best strategy to achieve progress in regional-scale climate modelling.

2003-CB08-2-WCRP/Determmerman

Project Leader: Valery Determmerman
WCRP Secretariat

Project Title: *WCRP 1st International CLIVAR Conference, Baltimore MD USA, 21-25 June 2004*

The Climate Variability and Predictability (CLIVAR) programme is the component of the World Climate Research Programme (WCRP) which focuses on describing and understanding variability and change of the physical climate system on time scales from months to centuries and beyond. The main goals of CLIVAR are to assess predictability and develop information systems and practical prediction capabilities through the use of new suites of observations, historical records, paleo records, analysis of data, and development of products and application of coupled climate system models. In order to highlight the many advances in CLIVAR science as well as to assess the progress of CLIVAR and identify the future challenges of research in these important areas, the 1st International CLIVAR Science Conference was held June 21-25, 2004 in Baltimore, MD USA.

Project Set 9: 1-year project

2004-CB01NSY-Dutta

Project Leader: Dushmanta Dutta
Asian Institute of Technology, Thailand.

Project Title: *An Assessment of the Socio-Economic Impacts of Floods under Climate Change Conditions in Large Coastal Cities in South and Southeast Asia*

Annual flood events in Asia have tripled with economic losses and human casualties increased by more than five folds in the last 30 years. Majority of the events are concentrated in South Asia (39%) and South-east Asia (30%). High rate of urbanization and population growth in these regions are likely to aggravate the situation, especially in low-lying large cities, which are affected by sea water intrusion. Based on the 2001 study, Intergovernmental Panel on Climate Change (IPCC) predicts that global mean sea level (msl) may rise as much as 88 cm by the end of the 21st century. The coastal zone is expected to be home to nearly 75% of the Asian population by 2025. Large coastal cities like Bangkok and Dhaka have already been facing severe problems due to lower elevation, some parts of which being tens of centimeters below msl. Potentially, sea level rise will have the greatest impacts in these large coastal cities and very few countries have planned the ways to deal with these problems. The project was aimed to assess socioeconomic impacts of flooding under climate change conditions in low-lying large coastal cities in South and South-east Asia to assist the policy makers of the region to better understand the vulnerability of fast developing coastal cities under climate variability and socio-economic changes. The major recommendation of this project is the need for a single organization/agency dealing with flood mitigation and which can simultaneously address climate change issues. The need for delineating flood mitigation and management policies from disaster management policy is also suggested.

Project Set 10: 1-year project

2004-CB06NSY-Rahman

Project Leader: Aminur Rahman

IHDP (Independent University, Bangladesh)

Project Title: *Training Seminars on Methodological Issues related to the Human Dimensions of Global Environmental Change*

IHDP, in collaboration with the co-organizing partners of the 6th Open Meeting, the world's largest social science conference on Global Environmental Change research, decided to take concerted efforts to use this unique opportunity for the systematic promotion of young scientists, particularly those from developing and emerging economies from all regions of the world, to interact, cross-link, and exchange information on various methodological aspects of global change. Four Pre-Open Meeting Training Seminars took place from October 6 - 8, 2005 in Königswinter, Germany. These capacity building activities focused on methodological issues related to research questions on the human dimensions of global environmental change, with topics linked to IHDP core projects and the Earth-System-Science projects. Not only did these seminars make an effort to develop concrete skills and give state-of-the-art information and knowledge about the topics in question, but they also sought to enhance collaboration and networking between the young researchers and the broader Global Environmental Change research community. To foster integration with the core projects of IHDP, key scientists linked to the IHDP networks volunteered to take up on the training mandate for three days. The four training seminars proved to be an exiting and challenging interactive exercise, which enabled young researchers from all over the world to meet with top researchers to learn from each other and feel inspired for further collaboration.

Project Set 11: 1-year Project

2004-CB07NSY-Glantz

Project Leader: Michael H. Glantz,

NCAR, Colorado University, Boulder USA

Project Title: *Prototype Training Workshop for Educators on the Effects of Climate Change on Seasonality and Environmental Hazards*

Most environmental hazards are seasonal and coping strategies have been sought and in many cases developed to respond appropriately within the limits of forecast uncertainties about the timing, magnitude, and location of occurrence of specific hazards. As climate changes with global warming of the Earth's atmosphere, societies will gradually, and in some cases precipitously, be forced to respond to and cope with events and process that will surprise them. These may include prolonged droughts in new locations, shifts in tropical storm tracks in the Atlantic and Pacific Oceans, changes in intensity of the various characteristics of severe storms such as winds and rainfall, appearance of new infectious diseases in unsuspecting places, and so on. Rather than focus on just the causes for such shifts in hazard behavior or dwell only on the specific impacts on society, it is imperative to identify more specifically the chain of events from cause to ultimate impacts on humans, including responses to those impacts. We propose to highlight "seasonality." Early warnings of changes in seasonality, whether qualitatively or quantitatively based, can elevate to prominence the key influence that subtle changes in the characteristic flow of the seasons can have on the behavior of living things on land and in the sea.

Our initial seasonality focus is on countries in a greater Southeast Asia. This region was chosen in part because of the wide range of the kinds of climate-related hazards that the governments and their citizens are affected by and, in part because the countries in Southeast Asia consider themselves (and are, in fact, considered by others) to be an integral part of the region for geographical as well as functional reasons (political, cultural, and shared natural resources, such as rivers as well as natural hazards). The notion of a "Greater Southeast Asia" has been introduced because regional politics, cultural, ethnic, and climate similarities do not stop at political or administrative borders. Four countries were originally chosen for the prototype workshop: Vietnam, the Philippines, Malaysia, and Thailand. Each of these countries has been actively involved in climate variability and climate change issues, and the organizers have had interactions with various researchers within each of them. There has been preliminary interest expressed by the University of Malaya (Kuala Lumpur) in climate affairs as a program. Participants were also selected from Ho Chi Minh City and Hanoi, Vietnam. Some universities in Bangkok also participated in the workshop. It is hoped that the universities and training centers that participated will continue

**Project Set 12: 1-year project
2004-CB08NSY-Kishi**

Project Leader: Michio J. Kishi
Hokkaido University, Japan

Title: *Toward Quantitative Understanding of natural Fluctuations of Marine Coastal Fisheries of Sardines and Anchovies and their Impact on Fishing-Dependant Human Communities*

Together with long-term ecosystem-specific oceanographic and fisheries data sets, our aim is to understand the effect of climate change effects on marine ecosystems, quantify its effects on fish growth and production in distinct geographic regions that support sardine and anchovy populations. We also aim to provide explanations for the sardine and anchovy abundance trends, and explore how to best integrate these results into the decision making process by fisheries/resource managers and policy makers.

**Project Set 13: 2-year project
2004-CB09NMY-Dharmarathna**

Project Leader: G.H.P. Dharmarathna
Department of Meteorology, Government of Sri Lanka

Title: *National Climate Change Public Awareness and Outreach in Sri Lanka*

This project was primarily focused on the dissemination of information contained in the reports of IPCC Working Group II and III and recent findings related to climate change in Sri Lanka. As the issue of climate change is somewhat newborn concept to public in Sri Lanka, it is a pre-requisite to raise the awareness on the overview of the climate change issue before launching any targeted program to reduce or minimize the vulnerability of different sectors of the economy to the climate change. This was accomplished by conducting 25 seminars at many administrative districts of Sri Lanka within a period of 18 months. The composition of the participants in these seminars represented different stakeholders including school teachers and students. A seven hour long seminar was consisted of six presentations at each occasion, out of which one was highly specific to the respective geographical region. Other five presentations included Science of climate change, Impacts, Adaptation and Mitigation to climate change in different sectors (Agriculture, Water resources, and Health) and Extreme climatic events. A panel discussion was held at the end of each seminar and there was a very high response from the participants on various emerging issues. Several Leaflets on climate change issue, which were prepared under the project were distributed among the participants of each seminar. During the last few seminars, a documentary film, which was produced under the project, was also screened.

Project Set 14: 2005-CB01-NSY-Lal

Organised by the APN Secretariat in Kobe Japan;
Reports written by Murari Lal, University of South Pacific Fiji

Project Title: *APN Scoping Workshops on Global Earth Observations System of Systems (GEOSS) & the Capacity Building Needs of the Region: Focus Climate*

Workshop 1: Summary Report

The "APN Scoping Workshop on Global Earth Observations and the Capacity Building Needs of the Region: Focus – Climate" was held at Mita Kaigisho, Tokyo, Japan, during 17-18 November 2005. The Workshop was organised by the Asia-Pacific Network for Global Change Research (APN) jointly with the Ministry of the Environment, Japan and National Institute for Environmental Studies, Japan. The workshop was attended by as many as 32 participants from 12 countries, which included Bangladesh, China, Fiji, Indonesia, Japan, Malaysia, Mongolia, New Zealand, Samoa, Thailand, United States of America, and Viet Nam. The key objective of this workshop was to consider the capacity building necessary for research and monitoring related to climate change and its impacts, to discuss the role of the APN in such research and underpinning systematic observations and to create road maps for designing ideas appropriate for capacity building activities in the Asia-Pacific. The discussions also focused on exchange of information on observational data needs, experience and views on climate change and adaptation strategies among the countries in Asia and the Pacific, and to facilitate further activities to address the capacity building needs for climate change related issues in relation to the 10-Year Implementation

Plan for GEOSS in the region. The entire proceedings of the workshop over the two days were conducted under four sessions. Session I focused on presentations on the GEOSS outline and the workshop objectives. Session II was devoted to recent developments in climate change research and the need for capacity building.

It was 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. Some of the identified hot spots for more intensive observations and systematic analysis of the available ground truths are listed as below:

- Himalayan glaciers – Spatial and temporal distribution of snow cover;
- High elevation areas of Tibetan Plateau;
- Degradation and depletion of ground water aquifers in China, India and Pakistan;
- 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; and
- Loss of biodiversity in fragile ecosystems of highlands, wetlands and islands.

The workshop identified three levels of capacity to be developed in the region, namely, individual, organisational/institutional and system of institutes/society. Coordination of capacity building activities within and between these levels was also considered important. The identified capacity building needs are:

- Global and regional climate models;
- Credible high resolution climate scenarios;
- Integrated impact assessment models;
- Remote sensing and Geographic Information System (GIS);
- Linkage between climate change observations and human dimensions;
- Emergency preparedness;
- Rescue, re-analysis, and dissemination of historical data and knowledge focusing to the use of end-users;
- Institutional framework (regional, national and local); and
- Funding resources to meet the capacity building needs.

While both the working groups identified a number of hot spots (listed above), 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 coping strength of the impacts of climate change and development of adaptation strategies in the Asia-Pacific region need more focused discussion within a larger group engaging all of the APN national Focal Points and other stakeholders. The working group decided that the potential participants to the follow-up workshop would take stock of the capacity building needs of their individual nations and return back to the APN with more specific issues and requirements that the APN could facilitate through implementation of projects on those critical issues by way of developing the human resources and by strengthening the institutional structures and the technical capacity necessary to cope with climate change.

Workshop 2: Summary Report

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 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 countries to contribute to and participate in climate change research."

The entire proceedings of the workshop over the two and a half days were conducted in seven sessions. Session I consisted of presentations on the objectives of the workshop and on the outcome of the First Scoping Workshop (see previous report). 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. 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.

**Project Set 15: 1-year Project
2005-CB07NSY-Ieng**

Project Leader: Sovannora Ieng

Ministry of Environment, Royal Government of Cambodia

Project Title: *Development of a Mobile Environmental Education Programme to Raise Awareness about Climate Change*

The MEEP represents an innovative means to increase awareness about the causes and impacts of climate change in Cambodia. The programme will focus on students and opinion-formers involved in formulating responses to climate change and environmental degradation, in particular, around Tonle Sap Lake. Participants will visit communities located around the Tonle Sap lake by boat. They will observe at first-hand the impacts of climate change and environmental degradation on these communities and learn from examples of best practice in environmentally sustainable resource management. Participants will also have the opportunity to carry out scientific tests, developing basic skills in these areas as well as helping build up a public database over time. It is planned that MEEP will be undertaken as a public-private partnership. Donor support would be required for capital expenditures but MEEP is expected to cover its operating costs from participant fees. Funding under the APN's CAPaBLE Programme was used to develop a feasibility study for the MEEP, including an extensive community consultation process. This study will subsequently be used as the basis for implementing an initial partnership. If successful, it is hoped that this will form the basis for similar future initiatives in Cambodia and regionally.

Comprehensive Research Projects

**Project Set 16: 3-year comprehensive study
2003-CRP1-Khan; 2004-CRP01CMY-Khan; 2005-CRP02CMY-Khan**

Project Leader: Arshad Muhammed Khan
GCISC – Global Change Impact Studies Centre

Project Title: *Enhancement of National Capacities in the Application of Simulation Models for the Assessment of Climate Change and its Impacts on Water Resources and Food and Agricultural Production*

This was one of the first two comprehensive capacity building cum research projects of 3 years duration awarded by APN under its CAPaBLE programme, which was launched in 2003. The project, which concluded on 31 August 2007, has played an effective role in enhancing the capacities of Bangladesh, Nepal and Pakistan in the area of simulation modelling for Climate Change (CC) research. It helped to impart training to a total of 99 scientists from the three beneficiary countries (Bangladesh, Nepal and Pakistan) in the fields of Regional climate modelling (RCM), Watershed simulation modelling (WSM), Crop simulation modelling (CSM), and Development of regional CC scenarios, with a minimum of 4 persons from each country benefiting from each of the 4 training activities conducted for this purpose. This enhanced capacity was effectively utilised to varying extent by the three countries to pursue envisaged research on (i) implementation, validation and calibration of a variety of RCMs, WSMs and CSMs, (ii) development of coarse and fine resolution CC scenarios for the three countries, (iii) assessment of the impacts of expected CC on annual and seasonal flows of their main rivers and on the yields of major crops in different agro-climatic zones, and (iv) identification and evaluation of appropriate adaptation measures and coping mechanisms to counter the negative impacts of CC. Two regional workshops were held during the last 3 months of the project tenure to discuss the research results and to review and harmonize the draft technical reports. Unfortunately the scientists from Bangladesh could not participate in these two regional activities due to some unforeseen difficulties. In the last two weeks of the project tenure, 2 national level seminars were held, one in Kathmandu and the other in Islamabad, to brief the national planners and policymakers in Nepal and Pakistan about the capacity building achievements and research findings of the project. The chief guests at both these seminars were the respective heads of National Planning Commissions, while the audience comprised senior and middle level professionals from various relevant ministries, government departments, NGOs and international organizations. The project outcomes were much appreciated by the heads of the Planning Commissions in Nepal and Pakistan, who emphasized that this type of research is highly relevant to the countries of the South Asia region whose Water Security and Food Security are at great risks due to global climate change.

**Project Set 17: 3-year comprehensive study
2003-CRP2-Shukla; 2004-CRP02CMY-Shukla; 2005-CRP03CMY-Shukla**

Project Leader: P.R. Shukla
Institution Indian institute of Management

Project Title: *Integrated Assessment Model for Developing Countries and Analysis of Mitigation Options and Sustainable Development Opportunities*

The project was jointly implemented by three institutions of excellence: Indian Institute of Management, Ahmedabad (IIMA), India; Energy Research Institute (ERI), China and Asian Institute of Technology (AIT), Thailand. The project work was organized around three themes - i) development of national scenarios with developing country perspective; ii) explicit recognition of developing country dynamics in the modelling, iii) initiation of national modelling exercises and development of national databases in three participating countries. The project teams carried out activities jointly and independently. The joint activities included designing model framework, database and application outlines. Besides, each country team has developed national scenarios and policy modelling in the context of national development plans and greenhouse gas mitigation. The dissemination and project level coordination was done via a comprehensive website (www.e2models.com) which displays intellectual resources related to the project domain including an inventory of papers, and presentations. The website has received excellent feedback from researchers and other stakeholders in terms of its design, relevance of materials and comprehensiveness. The website includes the publications and presentations linked to project

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activities. Three project workshops were held (AIT, Bangkok in August 2004; ERI, Beijing in September 2005; IIM, Ahmedabad in March 2007) with participation of diverse stakeholders. The project work has led to numerous publications. The project outcomes are interfaced with various international environmental assessments by the project team members participating in the activities such as IPCC's Fourth Assessment Report (AR4), GEO 4, Asia-Pacific Environment Innovation Strategy (APEIS), and Development and Climate project led by UNEP RISO Centre on Energy, Climate and Sustainable Development, Denmark.