APN
Asia-Pacific Network for Global Change Research

ANNUAL REPORT
2010–2011

ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

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APN Annual Report 2010–2011
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MESSAGE FROM THE DIRECTOR

It is my pleasure to present to you APN Annual Report 2010/2011. This report provides a glimpse of the major activities of the Network, including summaries of APN-funded projects carried out and completed in 2010/2011.

During the reporting period (April 2010 – March 2011), we supported and managed 40 projects under the Annual Regional Call for Research Proposals (ARCP) and Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE) Programmes, as well as two Special Calls for Proposals for Focused Activities.

The year 2010 marks the first year of APN's Third Strategic Phase (2010–2015). Based on the evaluation of its second strategic phase, we developed the Third Strategic Plan with focus on APN's science and institutional agendas. With the support from its members and key partners, and guided by the strategies stipulated in the Third Strategic Plan, the APN will continue to enhance collaborative scientific research and capacity development in the Asia-Pacific region, particularly in developing countries.

At the sub-regional level, the APN successfully convened the Second South Asia Sub-Regional Cooperation Meeting in India, and the Philippines hosted the Third Southeast Asia Sub-Regional Committee Meeting in November 2010. The sub-regional arrangement has proved to be very effective in identifying emerging research themes of common interest and importance. Proposal Development Training Workshops were organized back-to-back with the sub-regional meetings to take advantage of the gathering of resourceful experts from different countries in the region.

In collaboration with Hyogo Prefectural Government, we organized an international symposium "Coexistence with Nature: Biodiversity and People – Hyogo Dialogue for the Future" in Kobe, Japan, where the APN Secretariat is based. The symposium was organized as a pre-event for the Tenth Meeting of the Conference of the Parties to the United Nations Convention on Biological Diversity (CBD COP10). It attracted 350 participants and provided a venue for sharing knowledge derived from various biodiversity-related activities in the region.

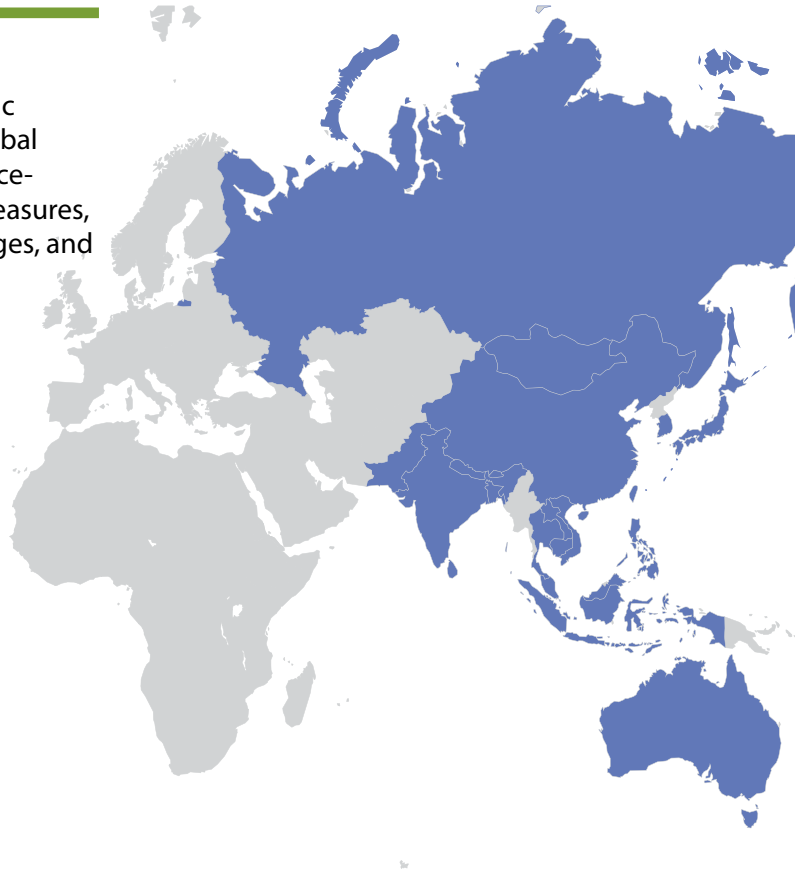
Let me take this opportunity to express my great appreciation to all the members and colleagues of the APN who provided scientific input, shared their expertise, contributed financially and further strengthened its institutional foundation, all of which has shaped the APN into a successful and effective research network in the region.

My sincere gratitude also goes to all project leaders and collaborators engaged in the projects featured in the present report. We are also grateful to all of our partners in the global change research community who share the same interests and whose partnerships are very valuable in the APN's pursuit of its strategic goals and objectives. I look forward to continually working with you all and I am very happy to present this publication to you as a token of our gratitude.

Akio Takemoto, PhD
Director, APN Secretariat

VISION

Enable countries in the Asia-Pacific region to successfully address global change challenges through science-based response strategies and measures, effective science and policy linkages, and scientific capacity development.



MISSION

The mission of the APN is to enable investigations of changes in the Earth's life support systems and their implications for sustainable development in the Asia-Pacific region. The APN supports investigations that will:

- Identify, explain and predict changes in the context of both natural and anthropogenic forcing;
- Assess potential regional and global vulnerability of natural and human systems; and
- Contribute, from the science perspective, to the development of policy options for appropriate responses to global change that will also contribute to sustainable development.

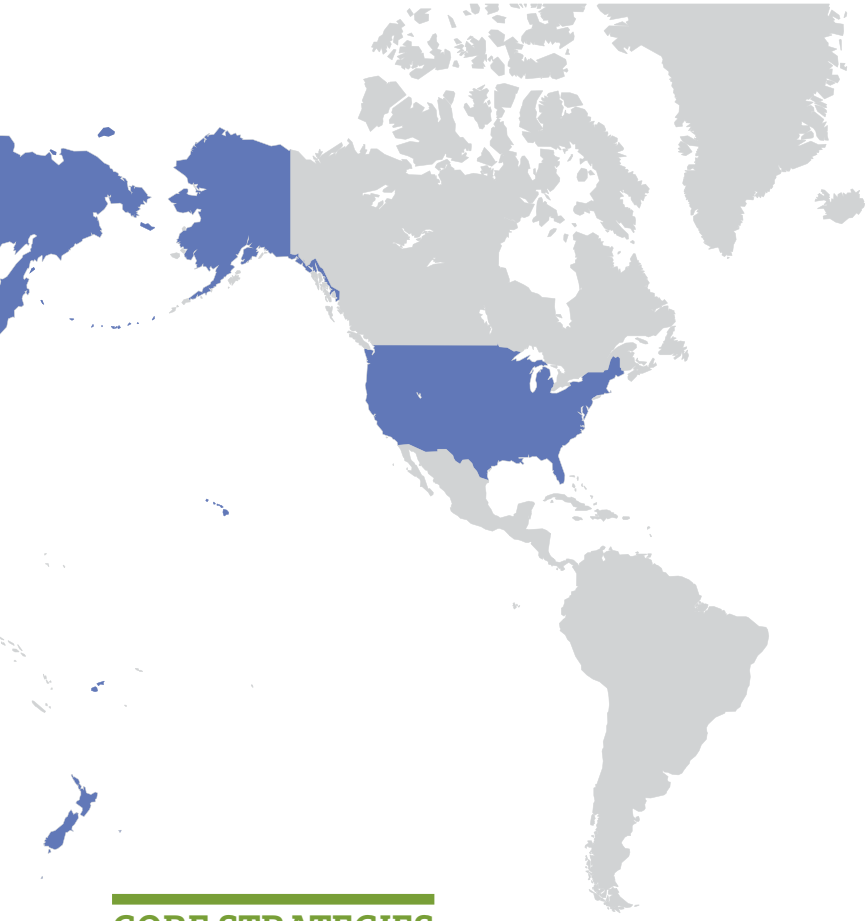
GOALS

Goal 1. Supporting regional cooperation in global change research on issues particularly relevant to the region

Goal 2. Strengthening appropriate interactions among scientists and policy-makers, and providing scientific input to policy decision-making and scientific knowledge to the public

Goal 3. Improving the scientific and technical capabilities of nations in the region, including the transfer of know-how and technology

Goal 4. Cooperating with other global change networks and organizations



CORE STRATEGIES

- Promote and encourage research that can improve understanding of global change and its implications for the region, and contribute to sound scientific basis for policy formulation and decision-making;
- Promote and encourage activities that will develop scientific capacity and improve the level of awareness on global change issues specific to the region;
- Identify and help address, in consultation with policy-makers and other end-users, present and future needs and emerging challenges.

MEMBERSHIP

The APN relies heavily on the generosity and commitment of all its member countries for financial and in-kind support.

The APN's membership has grown from 12 countries in 1996 to the current 22 member countries: Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, United States of America, and Viet Nam.

Individuals and organizations in Pacific Island States and Singapore are able to participate in all APN programme activities and are considered to be from an APN Approved Country under the programme membership participation criterion.

HIGHLIGHTS OF 2010/2011

PROJECT MANAGEMENT

Annual Regional Call for Research Proposals (ARCP)	Capacity Building/ Enhancement for Sustainable Development in Developing Countries (CAPaBLE)	Special Calls for Proposals for Focused Activities
Supported/managed 18 projects (11 new and 7 continuing) from the funded activities budget under the 2009 Annual Regional Call for Research Proposals (ARCP) process	Supported/managed 15 projects (13 new and 2 continuing) capacity building (CBs) projects and two continuing comprehensive research projects (CRPs) from the funded activities budget under Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE)'s Annual Call for Capacity Development Proposals and APN's Third Phase Call for Comprehensive Research Proposals	Supported/managed seven projects from the funded activities budget under the 2010 Special Calls for Proposals for Focused Activities: Ecosystems, Biodiversity and Land Use: Forestry and REDD-plus (EBLU) and Resources Utilization and Pathways for Sustainable Development: E.g. Sound Material Society — 3Rs: Reduce, Reuse, Recycle; Material Flow and Cycles, etc. (RUSD)

* A compilation of non-technical summaries of APN-funded projects completed in 2010/11 is included in a separate section of this Annual Report. Please refer to "APN Funded Projects" on page 19.

CALLS FOR PROPOSALS

Launched the 2010 APN Annual Calls for Proposals under the ARCP and CAPaBLE Programmes and managed the proposal submission and review process.

Launched and managed two Special Calls for Proposals for Focused Activities where 44 Expressions of Intent were received for EBLU and 31 Expressions of Intent were received for RUSD. Five projects for EBLU and two projects for RUSD were selected for funding according to the funds available and began activities in late 2010 and early 2011.

The Workshop produced a first draft of the Synthesis Report.

APN CLIMATE SYNTHESIS WORKSHOP

Climate issues are becoming more relevant and pressing these days, and the APN is conducting a two-year Synthesis Activity on *APN and Climate Change: Perspectives from Asia and the Pacific*, which officially kicked off in a scoping meeting held in 2009 at the APN Secretariat in Kobe, Japan. Following that Meeting, the APN convened its First Authors' Workshop on 25–27 August 2010, also in Kobe, Japan. The workshop produced a first draft of the synthesis report, due for publication in the third quarter of 2011.

SYNTHESIS ACTIVITY OVERVIEW

Fifty-six projects undertaken by the APN in climate-related research and capacity development over a period of 10 years were synthesized by the Climate Synthesis authors. The current Climate Synthesis is the third APN synthesis activity. The two previous syntheses are on "Land-Use Cover Change: An Initial Synthesis (2003)" and "Global Change and Coastal Zone Management: A Synthesis Report (2004)." The latter synthesis resulted in a number of citations in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) as well as the publication of APN's first book on "Integrated Coastal Zone Management" published by Springer in 2006.

WORKSHOP OUTPUT

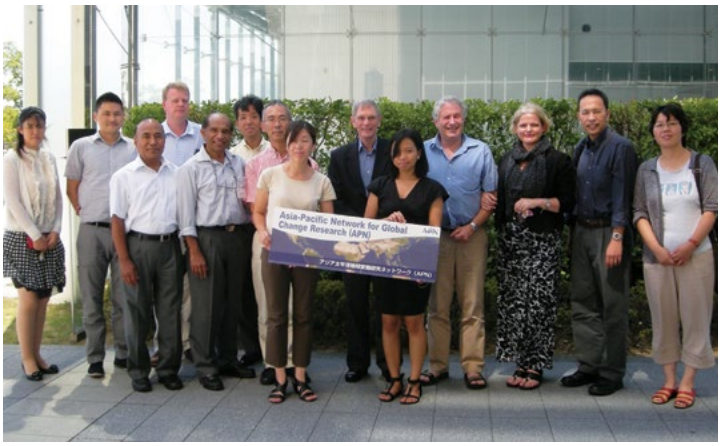
In the draft synthesis report,

the authors identified knowledge gaps and other issues and provided recommendations for policy- and decision-making related to climate in the Asia-Pacific. In addition to the draft synthesis report, the APN will also publish an academic book expanding from the contents of the synthesis report. The authors devised a draft structure and contents of the book entitled: *Climate in Asia and the Pacific: Security, Society and Sustainable Development*. The synthesis authors also identified potential authors for the academic book who are experts in their respective fields. The Synthesis Report and Book are aimed to be published in 2011 and 2012, respectively, prior to the cut-off dates for citations for the chapter of the IPCC AR5.

SYNTHESIS AUTHORS

The workshop was attended by a number of reputable scientists in the region namely: Dr. Ailikun from International Program Office Monsoon Asia Integrated Regional Study (MAIRS) of Atmospheric Physics, Chinese Academy of Sciences, China; Dr. Wenjie Dong from State Key Laboratory of Earth Surface Process and Resource Ecology, College of Global Change and Earth System Science, China; Dr. Lance Heath from Climate Change Institute, The Australian National University, Australia; Prof. Kanayathu Koshy from Centre for Global Sustainability Studies, Universiti Sains Malaysia; Dr. Rodel Lasco from World Agroforestry Centre, Philippines; Dr. Michael Manton from School of Mathematical Sciences, Monash University, Australia; Dr. James Salinger from School of Environment, University of Auckland, New Zealand; Dr. Madan Lall Shrestha from Nepal Academy of Science and Technology, Nepal; and Dr. Linda Anne Stevenson from the APN Secretariat. Dr. Srikantha Herath from United Nations University, Japan was not able to join the meeting but provided his input remotely.

The synthesis report and book are aimed to be published prior to the cut-off dates for citations for the chapter of the IPCC AR5.



SUB-REGIONAL COOPERATION

The APN sub-regional cooperation mechanism aims to enhance the flow of information among APN members and to strengthen collaboration with key partners at the sub-regional level. To date, two Sub-Regional Committees were established, respectively for the South Asia region and the Southeast Asia region.

Sub-Regional Committees meet during intersessional period of the IGM/SPG Meetings to discuss issues of sub-regional importance, identify research priorities for the sub-region, and to explore collaborative opportunities to address such priorities.

2ND SOUTH ASIA SUB-REGIONAL COOPERATION MEETING

2 November 2010, Pune, India. Participants reviewed and shared their input on proposed new institutional policies and initiated discussions on criteria for effective science-policy linkages.

The meeting also explored ways to enhance cooperation among the South Asia countries. Policy relevance was among the many important topics addressed in the meeting.

The Committee called for a centralized database that is accessible to both the science and policy making communities throughout the sub-region and APN membership as a whole.

3RD SOUTHEAST ASIA SUB-REGIONAL COMMITTEE MEETING

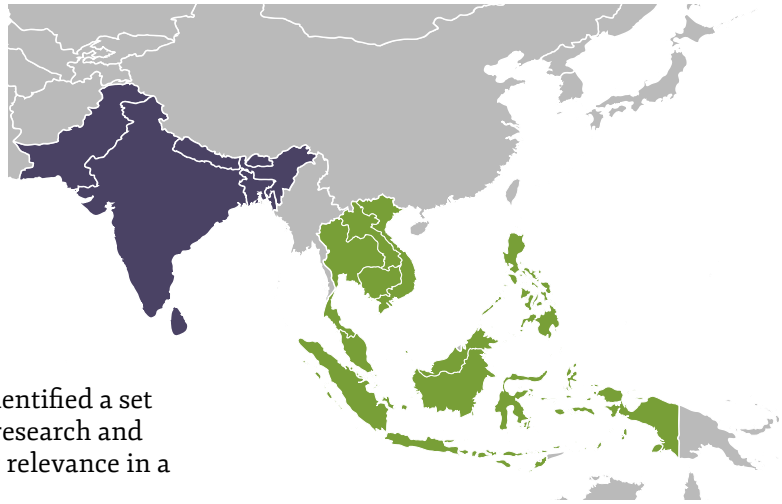
9–10 November 2010, Makati City, Philippines. The Southeast Asia Sub-Regional Committee reviewed outcomes of the previous sub-regional meeting, in particular the result of SWOT analysis and looked into how to enhance strengths and address weaknesses at country and sub-regional levels.

Each country shared its emerging research priorities, scientific trends and issues in a "country reporting" session and identified a set of emerging focus that the sub-region may wish to seek collaborative actions.

Participants reviewed the proposed institutional policies and provided solid recommendations for their refinement.

2nd South Asia SRC Meeting

SUB-REGIONAL PRIORITIES OF RESEARCH AND CAPACITY-BUILDING



Each Sub-Regional Committee identified a set of "hot topics" for global change research and capacity-building with particular relevance in a sub-regional context.

South Asia	Southeast Asia
➡ Melting Glaciers in Himalaya Areas and Water Resources Management ➡ Food and crop production strategies for adapting to climate change in the region ➡ Agriculture land use under changing climate scenario ➡ Climate induced diseases in relation to climatic change ➡ Urbanization and emerging socioeconomic issues caused by global environmental changes in the region	➡ Integrated waste management in urban communities ➡ Climate vulnerability and adaptation for agricultural-based community ➡ Community-based adaptation in the forest ecosystem focusing on biodiversity and sustainability

3rd Southeast Asia Sub-Regional Committee Meeting

LINKING SCIENCE AND POLICY

CONTRIBUTION TO THE INTERNATIONAL YEAR OF BIODIVERSITY (IYB) AND UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY (UNCBD)

Organized the APN/Hyogo International Symposium: Coexistence with Nature ~ Biodiversity and People – Hyogo Dialogue for the Future, 9 September 2010.

Organized the following activities UNCBD 10th Meeting of the Conference of the Parties (COP10), 18–29 October 2010, Nagoya, Japan

- **Side event:** Biodiversity Interactive Forum, 24 October 2010
- **Side event:** Towards Biodiversity Conservation and Sustainable Development of Forests in the Asia-Pacific Region, 25 October 2010
- **Side event:** Hyogo Prefecture's Biodiversity Conservation Efforts, 26 October 2010
- **Exhibition** at the Biodiversity Interactive Fair, 18–29 October 2010

INTERACTION WITH SCIENCE-POLICY BODIES

Engaged in a dialogue with the global change community on emerging scientific findings and other developments in climate change research activities at the thirty-second session of the Subsidiary Body for Scientific and Technological Advice (SBSTA32), 3 June 2010, Bonn, Germany.

Attended the Third *Ad Hoc* Intergovernmental and Stakeholder Meeting of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES), 7–11 June 2010, Busan, Republic of Korea

Participated at the United Nations Framework Convention on Climate Change sixteenth Conference of the Parties (UNFCCC COP16), 29 November–10 December 2010, Cancun, Mexico

SBSTA 33 Side event: Updated Information on Emerging Scientific Findings and Research Outcomes

Joint International Council of Sciences (ICSU)/Earth System Science Partnership (ESSP) Side event: Emerging Scientific Findings and Research Outcomes

Contributed to the Intergovernmental Panel on Climate Change (IPCC) and other policy processes and bodies through our scientific research, scientific capacity development and synthesis activities.

APN JOINS GC PARTNERS AT SBSTA32 DIALOGUE ON RESEARCH DEVELOPMENTS

The APN engaged in a dialogue with the global change (GC) community on emerging scientific findings and other developments in climate change research activities on 3 June 2010, during the thirty-second session of the Subsidiary Body for Scientific and Technological Advice (SBSTA32) in Bonn, Germany.

The APN, represented by Dr. Andrew Matthews, invited expert to the APN Steering Committee, set the context for two new APN activities by stating that the APN had just completed a strategic review of its programme and, in addition, was responsive to issues raised by the SBSTA32 and by the Copenhagen Accord. The two new programmes, launched in April 2010, of (1) activities relevant to "Reducing Emissions from Deforestation and Forest Degradation" and (2) "Resources Utilization and Pathways for Sustainable Development," have generated considerable interest.

Dr. Matthews summarized the progress of projects under of the APN umbrella "Scientific Capacity Development for Climate Impact and Vulnerability Assessments" (SCBCIA) that was announced at SBSTA30 last year. He pointed out that the importance of the involvement of developing country scientists in international climate research programmes and the need to train more scientists in developing states.

PROMOTING BIODIVERSITY CONSERVATION IN THE REGION AT UNCBD COP10

In taking an active role at the United Nations Convention on Biodiversity tenth Meeting of the Conference of the Parties (UNCBD COP10), in Nagoya, Japan, 18–29 October 2010 and to celebrate the 2010 International Year of Biodiversity, the APN, in collaboration with the Hyogo Prefectural Government, Japan and other key partner organizations, planned side events and an exhibit to promote APN activities in the region that contribute to biodiversity conservation and sustainable development.

On 24 October 2010, the APN held a Biodiversity Interactive Forum at Nagoya Gakuin University. Three Japanese experts were invited to talk about the Non-Governmental Organizations/Non-Profit Organizations (NGO-NPO) initiatives on safeguarding biodiversity in Hyogo Prefecture. Mr. Kazuhiko Takemoto, APN Secretariat Steering Committee Member and Senior Adviser to the Minister, Ministry of the Environment, Japan (MOEJ) facilitated the forum.

A side event entitled "Towards Biodiversity Conservation and Sustainable Development of Forests in the Asia-Pacific Region" convened on 25 October 2010 at the Nagoya Congress Center. The APN co-organized this event with the Hyogo Environmental Advancement Association (HEAA). Three expert presentations from

local and abroad and a panel discussion composed the side event.

Of the three expert presentations, Dr. Chimednyam Dorjsuren, National University of Mongolia introduced the joint reforestation project of HEAA and Mongolian Forest Forum. A report about the importance of symbiosis between fungi and trees and how to use this symbiosis for a sustainable forest development was presented by Prof. Koji Iwase, Tottori University, Japan. APN's Dr. Linda Anne Stevenson presented on the five new focused activities on the APN's science theme *Ecosystems, Biodiversity and Land-Use*, all of which are forestry-related, recently awarded by the APN.

The three invited presenters led a panel discussion, together with Dr. Henry Scheyvens, Natural Resources Management Group, Institute of Global Environmental Strategies (IGES). Prof. Hisakazu Kato, Teikyo University, Japan gave the opening speech and the closing remarks.

On 26 October 2010, another side event was co-organized by APN and the Hyogo Prefectural Government, and convened at the Nagoya Congress Centre. Dr. Tsogtbaatar Jamsran, APN Scientific Planning Group (SPG) Member for Mongolia gave a presentation highlighting joint efforts of the Hyogo Prefectural Government and APN in safeguarding biodiversity in the Asia-Pacific region.

PROPOSAL DEVELOPMENT TRAINING WORKSHOPS

Improving the scientific and technical capabilities of countries in the Asia-Pacific region is among the four goals of the APN.

Under the CAPaBLE programme (registered WSSD Type II partnership), early-career scientists are provided with such opportunities to develop their knowledge and capabilities in global change research. Since 2008, the APN has been conducting Proposal Development Training Workshops in various parts of the region.

The objectives of the workshop are to:

- Raise awareness of the APN among young/early career scientists in the Southeast sub-region of the Asia-Pacific.
- Increase capacity of young/early career scientists to submit proposals to the APN and compete effectively in its competitive Annual Calls for Proposals in key scientific areas.
- Empower APN Members to provide their knowledge on the APN proposal submission process; and to learn about this process so that they can go back to their respective countries and impart their knowledge.

In 2010, Proposal Development Training Workshops were organized, in Pune, India, from 1–2 November 2010, and in Makati, Philippines, from 11–12 November 2010, respectively, back-to-back with APN South Asia and Southeast Asia Sub-Regional Cooperation Meetings. A total of 33 young and early career scientists from 13 countries benefited from the workshops.

REPRESENTATION AT NATIONAL INTERNATIONAL EVENTS

APN representatives actively took part in major global change forums at national, regional and global events to showcase our work in the Asia-Pacific region and share our experience.

March 2010

Fourth Asia-Pacific Biodiversity Observation Network (AP-BON) Workshop, Tokyo, Japan

Fifth GEOSS Asia-Pacific Symposium, Tokyo, Japan

April 2010

China Low Carbon Economy Forum, Beijing, China

June 2010

2010 International Climate Change Adaptation Conference, Queensland, Australia

Past Global Changes (PAGES) Regional Workshop, Nagoya, Japan

ICSU Earth System Visioning Open Forum, Paris, France

Thirty-third session of the Subsidiary Body for Scientific and Technological Advice (SBSTA32), Bonn, Germany

IPBES Third *Ad Hoc* Intergovernmental and Multi-stakeholder Meeting, Busan, Republic of Korea

Workshop on Biodiversity conservation in human influenced areas, Yokohama, Japan

Public Debate on Biodiversity conservation in human influenced areas

July 2010

Nineteenth Asia-Pacific Seminar on Climate Change, Kitakyushu, Japan

ANU Climate Change Institute Young Scholars Conference 2010, Canberra, Australia

Second International Forum for Sustainable Asia and the Pacific (ISAP), Yokohama, Japan

August 2010

XXIII World Congress of the International Union of Forest Research Organizations (IUFRO), Seoul, Republic of Korea

September 2010

Storm Surges Congress 2010, Hamburg, Germany

Workshop on Integrated Studies of Environmental Change in Tibet-Himalayan Region, Kathmandu, Nepal

October 2010

Global Land Project Open Science Meeting 2010, Arizona, USA

International Group of Funding Agencies (IGFA) Fall Meeting 2010, Cape Town, South Africa

NEAR International Economic Forum, Gyeongju, Republic of Korea

November 2010

Seventh Plenary Session & Ministerial Summit of the Group on Earth Observations (GEO-VII), Beijing, China

December 2010

Capacity Building Workshop on Carbon Governance in Asia: Bridging Scales and Disciplines, Yokohama, Japan

Tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP10), Nagoya, Japan

Climate Change and DIMS Technology Workshop, Kuala Lumpur, Malaysia

Thirty-third session of the Subsidiary Body for Scientific and Technological Advice (SBSTA33), Cancun, Mexico

February 2011

International Conference on Biodiversity and Climate Change, Manila, Philippines

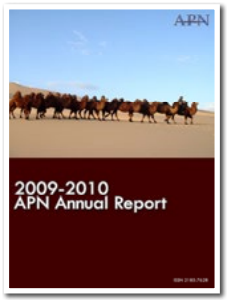
Third Earth System Visioning Meeting, Paris, France

COMMUNICATION AND OUTREACH

PUBLICATIONS

2005–2010 Evaluation Report and Third Strategic Plan

Year 2010 marks the completion of APN's Second Strategic Phase and the start of a new five-year period. At this juncture, the APN published an evaluation report for 2005–2010 to look at its achievements against it preset goals and targets. The evaluation findings fed into the Third Strategic Plan, which outlines the main scientific and institution arrangements for 2010–2015.



Annual Report 2009–2010

The Annual Report 2009–2010 presents a summary of APN's efforts in promoting global change research in the region, particularly highlighting the results and outputs of its completed projects conducted under the ARCP and CAPaBLE Programmes during fiscal year 2009–2010.

APN Science Bulletin, Volume 1

The APN launched a new publication series, APN Science Bulletin, to ensure that the work of the APN reaches all stakeholders, including science, policy and civil society community actors. The first volume, published in March 2011, featured all activities that were funded and undertaken since April 2010.

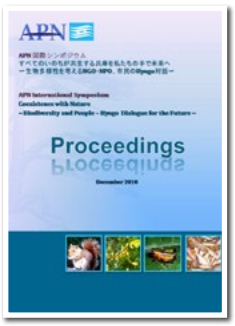
Proceedings for the 15 IGM/SPG Meetings

This publication summarizes the discussions and major action points from the 15th IGM/SPG Meeting that successfully convened in Busan, Republic of Korea, 17–19 March 2010. The proceedings contains major outputs of the Meetings, item papers and selected slide presentations. It serves as a reference for the APN members, colleagues from partner organizations and stakeholders from the Asia-Pacific region and beyond.

*All recent publications are all available in the "Publications" section of the APN Website (www.apn-gcr.org).

Proceedings of APN International Symposium "Coexistence with Nature: Biodiversity and People—Hyogo Dialogue for the Future"

The APN worked jointly with the Hyogo Prefectural Government, the Museum of Nature and Human Activities, Hyogo Environmental Advancement Association and Environmental Management of Enclosed Coastal Seas (EMECS) to organize this symposium in Kobe, Japan, on 9 September 2010. This publication is a compilation of documents, presentations and outcomes of the symposium.



Newsletter

A quarterly publication that features latest news from the Secretariat, APN's involvement in various events, updates from APN funded projects, and a calendar of upcoming events from APN projects and from the global change community. The newsletter is available in electronic format only and is available on the APN website.

Information Materials

A number of information materials were published to showcase APN projects and activities in major national and international events. These include posters, bulletins, flyers and CD-ROMs containing up-to-date information produced by the APN. To better serve for a broad membership of 22 countries in the Asia-Pacific region, some of the information materials are offered in different language versions including English, Japanese, Thai, Bahasa Malaysia, etc.

WEBSITE AND EMAIL LIST

The APN website was revamped to coincide with the APN entering its third strategic phase in April 2010. The website includes a new interface with dynamic features.

This is a an important communication tool of the APN which, from the time it was established, has become a source of useful information about the APN, how it is structured, who are the key players as well as details on the projects that APN supported and is currently funding; publications that were produced; global change events; and other activities that were conducted in the past. The website is maintained daily, providing up-to-the-minute information on the APN and its activities.

Regular updating and maintenance of the database and electronic mailing list.

APN maintains an internal database that can generate an electronic mailing list (EML) and uses this tool to strategically disseminate information as well as support the network. Aside from the quarterly Newsletter, periodic announcements and notifications that are related to global climate change or to APN activities are also sent via the EML. These include: upcoming global change events, call for papers, release of new publications such as technical papers, policy briefs, etc. APN also welcomes requests from partner organizations to post announcements on the website and distribute the information via the APN EML. The Secretariat also subscribes to other mailing list groups of various organizations to be able to receive information and further disseminate it to its members and the global change community.

APN FUNDED PROJECTS

ARCP2008-07CMY-DUTTA

Climate Perturbation and Coastal Zone Systems in the Asia-Pacific Region: Holistic Approaches and Tools for Vulnerability Assessment and Sustainable Management Strategy

Project Leader: Dr. Dushmanta Dutta
Water Engineering
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Churchill, VIC 3842
AUSTRALIA

Tel: +61 3 51226407
Fax: +61 3 99026738
Email: dushmanta.dutta@scui.monash.edu.au
Participating Countries: Australia, Bangladesh, Japan, Sri Lanka, Thailand and Viet Nam
APN Funding: US$ 80,000 (for two years)

An innovative integrated tool was developed for accurately capturing changes in hydro-biogeochemical processes in coastal zone systems in the context of climate change and anthropogenic forcing, for identifying sound metrics for assessment of impacts of these changes and for examining long-term adaptation and mitigation measures for sustainable management. In the development of the tool, a holistic approach was adopted with the emphasis on applying life cycle analysis (LCA) principles to the coastal zone systems in cross-cutting issues to overcome the limitations of the existing fragmental approaches for evaluating more complex and interrelated biogeochemical and physical processes in coastal zones that include nutrient flux, salinity, floods, erosion and sedimentation and their impacts on society, economy and environment. The integrated tool included three major components: a process-model, an impact assessment tool and a multi-criteria decision-making (MCDM) tool. Several pilot case studies were conducted in six selected coastal regions in the six member countries of the project. The outcomes of the case studies were presented to broader audience from more than 15 countries in an international symposium that was held at Monash University, Australia during 12–13 April 2010 as part of the project. The key findings of the case studies have been presented in the proceedings of the symposium (Dutta and Wright, 2010).

PUBLICATIONS

Dutta, D. and Wright, W. (Ed). 2010. Coastal Zones and Climate Change: Assessing the Impacts and Developing Adaptation Strategies, Proceedings of the International Symposium, Organized School of Applied Sciences and Engineering, Monash University, Published by Monash University, ISBN 978-0-7326-4011-8, 474 pages.

Dutta, D. (Ed). 2007. Proceedings of the Planning Workshop of the APN Project on Climate Perturbation and Coastal Zone Systems In Asia Pacific Region, Bangkok, Thailand, 27–28 September 2007, A Report of the Sponsored Research Project, School of Applied Sciences and Engineering, Monash University, 51 pages.

Peer-reviewed Journal Papers

Alam, J.A. and Dutta, D. 2011. Predicting Climate Change Impact on Nutrient Pollution in Waterways: A Case Study in the Upper Catchment of the Latrobe River, Australia, Ecohydrology, (in review).

Alam, J.A. and Dutta, D. 2011. Development and Application of a Nutrient Dynamics and Transport Process Model in River Basins: A Sub-Catchment Based Modelling Approach, Hydrological Processes, (in review).

Bhuiyan, J. And Dutta, D. 2011. Assessing Impacts of Sea Level Rise on River Salinity in the Gorai River Network, Bangladesh, Estuarine, Coastal and Shelf Science, (in review).

Kabir, M.A., Dutta, D. and Hironaka, S. 2011. Evaluation of Transport Capacity Equations using Basin Scale Process-based Sediment Dynamic Modelling Approach, Hydrological Science Journal, (in review).

Bhuiyan, J. And Dutta, D. 2011. Analysis of Flood Vulnerability and Assessment of the Impacts in Coastal Zones of Bangladesh due to Potential Sea Level Rise, Natural Hazards, (in review).

Kabir, M.A., Dutta, D., Hironaka, S. and Peng, A. 2011. Analysis of Bed Load Equations and River Bed Level Variations using Basin-Scale Process-Based Modelling Approach, Water Resources Management, (IF: 2.201), (in press).

Dutta, D., Wright, W. and Rayment, P. 2011. Synthetic Impact Response Functions for Vulnerability Analysis and Adaptation Measures in Coastal Zones under Changing Climatic conditions: A Case Study in Gippsland Coastal Region, Australia, Natural Hazards, doi:10.1007/s11069-011-9812-x.

Kabir, M.A., Dutta, D. and Hironaka, S. 2011. Process-based Distributed Modelling Approach for Analysis of Sediment Dynamics in a River Basin, Journal of Hydrology and Earth System Sciences, 15(4):1307–1321.

Dutta, D. 2011. An Integrated Tool for Assessment of Flood Vulnerability of Coastal Cities to Sea Level Rise and Potential Socio-Economic Impacts: A Case Study in Bangkok, Thailand, Hydrological Science Journal, 56(5):805–823.

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ARCP2009-01CMY-FUKAMI

Flood Risk Management Demonstration Project under the Asian Water Cycle Initiative for the Global Earth Observation System of Systems (FRM/AWCI/GEOSS)

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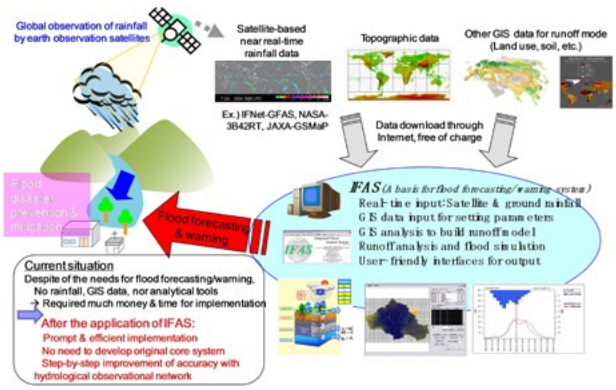
Participating Countries: Australia, India, Indonesia, Japan, Pakistan, Philippines, Sri Lanka, Viet Nam
APN Funding: US$ 84,000 (for two years)

This project aimed to build a scientific basis for sound decision-making and developing policy options for most suitable flood risk management in the Asia-Pacific region, through the full utilization of new opportunities on global, regional and *in situ* dataset, knowledge and/or resources under the framework of Asian Water Cycle Initiative (AWCI) contributing to GEOSS (Global Earth Observation System of Systems). To attain the goal above, the following three objectives were specified:

1. To convert observations and data, both through space borne platforms and data integration initiatives, to usable information for flood reduction;
2. To improve quantitative forecasts for coupled precipitation-flood-forecasting systems;
3. To facilitate flood risk assessment through providing scenarios and data for exposure estimation.



The research result is aggregated from each voluntary research activity in each member country based on mutual intensive information/human exchanges and cooperative research activities. Several key technologies such as WEB-DHM, DRESS & FLOWSS of UT, IFAS of ICHARM, RegHCM-PM of NAHRIM, and so forth, and practical approaches were developed and validated. All of those technologies and practices will be the basis for sustainable flood risk management in the Asia-Pacific region in the future.

RESULTS

As a result of two-year cooperative research activities among the Flood WG of GEOSS-AWCI, there have emerged many promising technologies and practices for future sustainable flood risk management. The most typical new technologies developed and/or validated through those activities are WEB-DHM, DRESS & FLOWSS of UT, IFAS of ICHARM, RegHCM-PM of NAHRIM, and so forth. Through regular meetings, discussions and cooperative activities, advanced technologies and innovative practices have been shared among all the members of Flood WG of GEOSS-AWCI, which are expected to lead to updating and enhancing a variety of science- and data-based foundations toward sound decision-making and developing policy options for effective flood disaster risk reduction in Asia.

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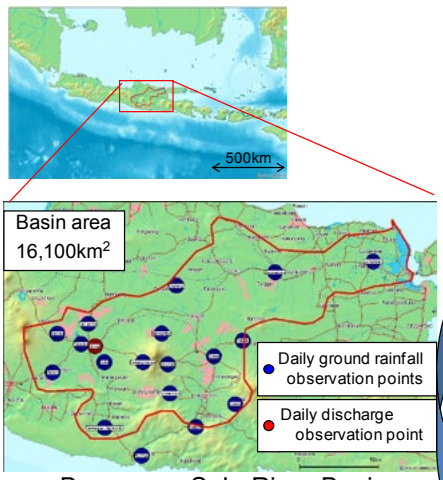
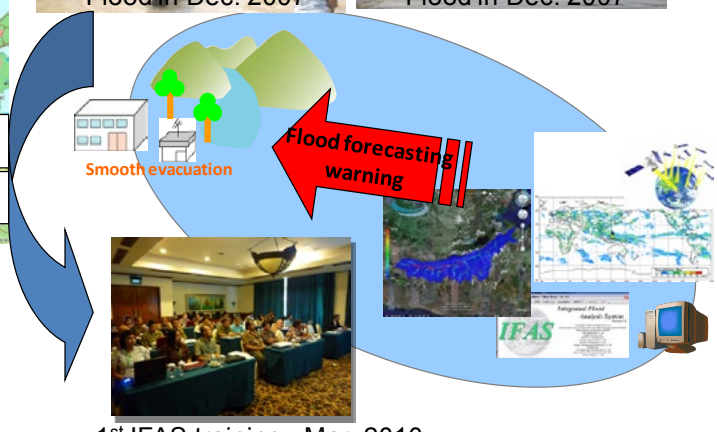


Bengawan Solo River Basin
(A:16,100km², L:600km)

Flood in Dec. 2007

Flood in Dec. 2007



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ARCP2009-02CMY-OKLADNIKOV

Human Impact on Land-cover Changes in the Heart of Asia

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Participating Countries: Mongolia, Russian Federation, USA
APN Funding: US$ 58,000 (for two years)
Project Website:
http://project.enviromis.scert.ru/asia/

Understanding human impact on land cover and the capacity to monitor its change are fundamental to sound research and informed decision-making to address global change and ensure sustainable development. While remote sensing technology is evolving rapidly and multiple land-cover products have been developed, the lack of reliable information on land cover remains a major problem. There is significant disagreement among available land-cover products, particularly in the proposed study region in the heart of Asia where validation sites are sparse, the impact of climate change is severe, and processes of land-cover change are widespread and strongly influenced by humans. Analysis of vegetation changes in the selected region includes a variety of vegetation types and provides a broad-scale evaluation of available land-cover products, human impact assessment, along with synthesis and documentation of results by research groups actively involved in supporting land-use policy decisions in the region. The project developed tools, methods, data and collaborations needed to characterize land-cover dynamics and contribute to broader regional and global efforts to study land cover and its change. These data are available on dedicated websites. The project also contributes to the ongoing effort of GOFC-GOLD and START International to develop a regional network of collaborators involved in the observations of land-cover change.

CONCLUSION

The project provided datasets of ground data in association with Remote Sensing/GIS data for the analyses of land-cover change in two areas in West Siberia and two areas in Mongolia. Land-cover change assessment found that changes were largely attributed to urban expansion and bare land. However, natural factors have also a great impact on land cover in West Siberia. The approach of the research combined thematic collection land cover data as well as continuous topographic and multi-temporal multi-sensor satellite data. The land cover data collected from ground validation and land cover maps derived from satellite imagery will be added to the GOFC-GOLD NERIN Regional Network Database to be shared with project members. Land degradation affected by climate change and human activity has become a significant risk in the study area. One of the most prevalent human activity in the Mongolian study areas is animal husbandry, characterized by livestock grazing, mining and urban expansion. Timber cutting is a typical human activity in the Russian study areas. The land-cover maps produced contributed to management of pastoral animal husbandry, agriculture, urbanization and regulation of timber cutting and mining activities.

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ARCP2009-05CMY-SELLERS

Peri-Urban Development and Environmental Sustainability: Examples from China and India

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Participating Countries: Australia, China, India, Singapore, USA
APN Funding: US$ 80,000 (for two years)

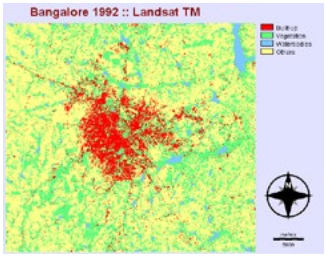
This study has assembled remote sensing, demographic, environmental and other data over a period of forty years for a systematic comparison of urbanizing regions in China and India. Data on trajectories of urban development in parallel samples of 10 Chinese and 10 Indian cities over 1970–2010 were compared to examine how urban forms have changed and the consequences for environmental change.

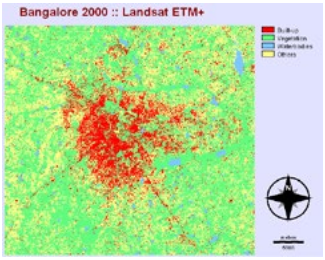
The analysis has revealed strikingly different transformations of urban form in Chinese and Indian urban regions. In China, peri-urban expansion has proceeded consistently in coastal regions with strong external investment regardless of city size, but less systematically in some inland regions and little in others. In India, peri-urban expansion has been less dramatic and has varied less between regions with higher and lower external investment. Indian patterns of peri-urban expansion also differ systematically from corresponding Chinese patterns.

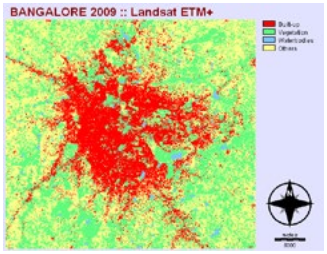
These variations are resulted from different land market institutions, policy-making structures, national policy, infrastructure investment, transnational investment flows and patterns of rural-urban migration. Detailed qualitative and quantitative case studies in several paired urban regions of China and India have examined these dynamics more closely. Meetings with stakeholders in both countries have provided lessons for policy and aided the analysis. Results have also been presented at the IHDP Conference on Urbanization and Global Environmental Change and other international scientific fora.

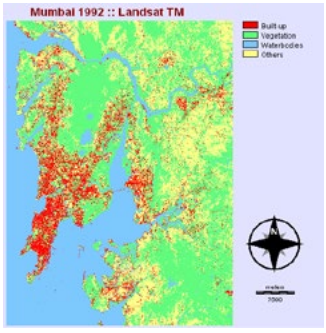
CONCLUSION

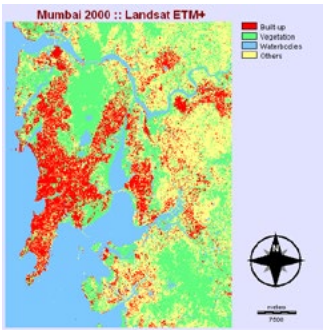
Both the macro analysis and the micro case studies have converged around similar conclusions. Although China and India have experienced parallel trajectories of land market liberalization and peri-urban expansion, urban development has proceeded under the influence of distinct social, institutional and policy conditions. These influences have reinforced and even magnified divergences in the patterns of urban expansion. The macro-level comparative perspective of this study enabled the first systematic comparative overview of these patterns and an assessment of their wider consequences for peri-urban development.

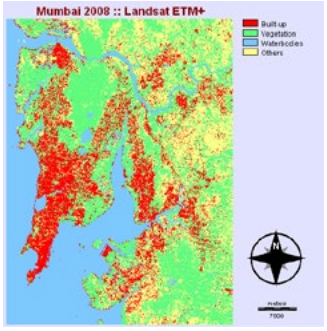


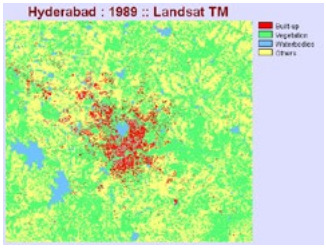


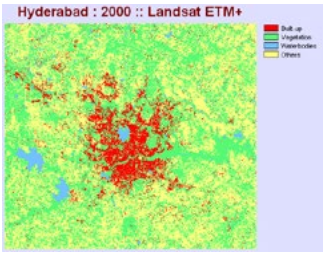


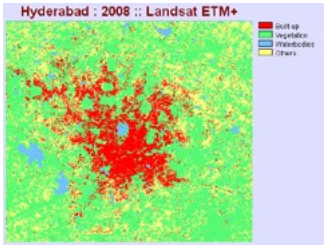












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ARCP2009-11NSY-ROY

Role of Experiments in Sustainability Transitions in Asia

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Participating Countries: India, Philippines, Thailand, USA
APN Funding: US$ 40,000 (for one year)




The project involved organizing scoping workshops to develop an international research programme on the role of innovative development project-level experiments in "sustainability transitions" in Asia. Two such workshops organized were "Role of Sustainability Transition in Asia" held in January 2010 at Jadavpur University, Kolkata, India and "Innovation and Sustainability Transition in Asia" held in January 2011 at Universiti Malaya, Kuala Lumpur, Malaysia. The process included preparation of a background paper setting the stage for initial discussion suggesting a conceptual framework, a strategy to analyse the main challenges and mechanisms for the development, up-scaling and governance of such experiments and a strategy to investigate the opportunities and barriers for sustainability experiments. It was successfully aimed to understand how experiments can/have influenced Asian development pathways and transform some of the unsustainable systems of provision (mobility, energy, food, water and housing) as well as what lessons can be learned about opportunities and barriers for policy-makers and practitioners who facilitate to set up such experiments. The workshops brought together an international group of academics, practitioners and policy-makers, especially from countries like China, Malaysia, Indonesia, Thailand, Viet Nam, the Netherlands and India that are engaged in this unique field to develop a collaborative research strategy.

CONCLUSION

The project prepared a research programme on ways in which alternative, more sustainable development pathways can be initiated in the local contexts of Asian countries and how to empower local communities and policy-makers to design initiatives that will help achieve the goal. The knowledge generated will directly help stakeholders in any future experiments.

ARCP2009-12NSY-KARVE

Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management

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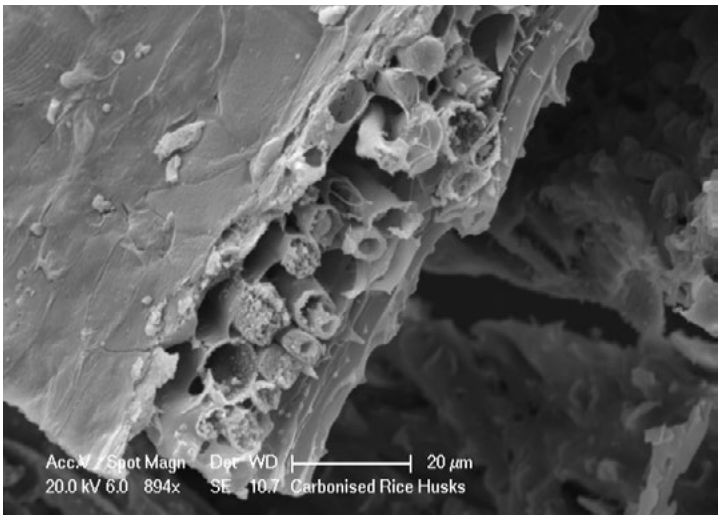
Participating Countries: Cambodia, India, Philippines
APN Funding: US$ 40,000 (for one year)



The project evaluated the benefits of using two different forms of biochar in terms of: a) how much carbon dioxide and other greenhouse gases are reduced and removed from the atmosphere across the biomass life cycle; and b) agronomic benefits of the biochar in rice and vegetable cultivation.

The carbon and energy balance of the rice husk gasifiers was calculated and the physio-chemical properties of the two biochar samples were examined. The unstable carbon — the component which is expected to be lost through decomposition in the time-scale of hours to decades — has been estimated using laboratory techniques, permitting an estimate of the carbon that would be stored in the long-term. We found that between 0.9 to 1 tonne of CO_2 is removed and avoided per tonne of rice husk gasified. India is the world's second largest rice producer at 132 million tonnes (Mt) of paddy rice in 2009–10; while the Philippines produced 14 Mt and Cambodia 7 Mt. Assuming that 22% of this paddy rice production is rice husk, which is typical, and that an arbitrary 1/3 of the rice husks could be made available, the potential carbon abatement from use of carbonized rice husks (CRHs) will be approximately 9 Mt CO_2 for India, 1 Mt CO_2 for the Philippines and 0.5 Mt CO_2 for Cambodia. If we compare CRHs to some other existing uses of rice husks, such as incorporation into irrigated rice fields, the greenhouse gas benefit of converting to biochar becomes more significant. This is because some of the carbon in rice husks added to soil converts to methane, a potent greenhouse gas.

Including such an evaluation of alternatives increases the greenhouse saving by two or more times per tonne of husk. On an area basis, the conversion to CRH may reduce greenhouse gas emissions up to five times compared with adding husks to irrigated fields.

The agronomic results provide a mixed picture of the effectiveness of biochar in existing agricultural contexts. While it is not yet known why different results were obtained, it may have been due to the differences in the soil types, agricultural management practices, biochar types, biochar incorporation methods, etc. Large uncertainties remain on the appropriate biochar dose, application methods, timing of application, medium- to long-term effects, combination with manures, green wastes, most responsive crops, etc.

CONCLUSION

The results of this project suggest that the use of a readily available agricultural residue offers potential not only as a way of affecting long-term carbon storage but also in improving crop productivity. The biomass-biochar system can also potentially effect a more sustainable disposal route for waste by-products such as CRHs which may otherwise be a pollutant.

PUBLICATIONS

Shackley, S. *et al.*, 2011. Sustainable Gasification-Biochar Systems? A Case-Study of Rice-Husk Gasification in Cambodia, Part I: Context, Chemical Properties, Environmental and Health and Safety Issues. Energy Policy (2011), doi:10.1016/j.enpol.2011.11.026

Shackley, S., *et al.*, Sustainable Gasification-Biochar Systems? A Case-Study of Rice-Husk Gasification in Cambodia, Part II: Field Trial Results, Carbon Abatement, Economic Assessment and Conclusions. Energy Policy (2011), doi:10.1016/j.enpol.2011.11.023

ARCP2010-01CMY-STHIANNOPKAO

Collaborative Research on Sustainable Urban Water Quality Management in Southeast Asian Countries: Analysis of Current Status and Strategic Planning for Sustainable Development

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Participating Countries: Cambodia, Indonesia, Republic of Korea, Thailand , Viet Nam
APN Funding: US$ 80,000(for two years)

This project focused on sustainable urban water quality management in the Southeast Asian cities of Bangkok (Thailand), Bandung (Indonesia), Ho Chi Minh City (Viet Nam), and Phnom Penh (Cambodia). Five analytical tools have been applied and/or developed as a strategic plan for sustainable urban water quality management by participating scientists and policy-makers. Conducted by Indonesia's research team, SWOT was applied for analysing water quality management policies in Bandung, Bangkok, Ho Chi Minh City and Phnom Penh. SWOT was applied to predict water quality in the Chao Phraya River, Thailand, by a participating USA member. WQI and WSI were developed for monitoring urban water quality in Viet Nam and Thailand, respectively, by a team from Viet Nam and Thailand. Furthermore, risk assessment

of water quality resulting from trace metals and pathogens was conducted by researchers from Korea and Chinese Taipei. The project team also built a database for water quality and its related data for a WQI. In addition, eight persons participating in this research project have been offered training opportunities on water sampling, analysis and management at Gwangju Institute of Science and Technology, Republic of Korea, with full financial support. Five APN meetings were organized at different Southeast Asian cities to allow both local participants and APN members to share and exchange their work experience and knowledge on sound management of urban water quality.

This project was able to collect data related to urban water quality management, which were combined in a systematic way for the benefit of both local scientists and policy-makers in Southeast Asia for their future research work and decision-making processes.

PUBLICATIONS

Hanh, P.T.M., Sthiannopkao, S., Ba, D.T. and Kim, K.W. 2011. Development of Water Quality Indices to Identify Water Pollutants in Viet Nam's Surface Water, Journal of Environmental Engineering-ASCE, Vol. 137, No. 4, 273–283.

ARCP2010-05CMY-LUCK

The Effects of Climate Change on Pests and Diseases of Major Food Crops in the Asia-Pacific Region

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Participating Countries: Australia, Bangladesh, India
APN Funding: US$ 78,240 (for two years)

This project investigated the impact of climate change on an important disease of potato, late blight, in the Asia-Pacific region. Potato is increasingly grown in the Asia-Pacific region as a food staple and cash crop, with India being the third largest producer in the world. Drawing on the project team's agrometeorology and plant pathology skills, an assessment was made on:

1. The climate projections for potato growing regions across India, Bangladesh and Australia;
2. The effects of climate change on potato production; and
3. The influence of climate change on potato late blight and subsequently the effects on potato yield under future climates.

One major achievement of this project was the new collaboration formed between the three countries on a significant disease issue of potato. This was the first time crop modellers, agrometerologists and plant pathologists combined their expertise to understand the effects of climate change on this important disease system for the three countries. Over 20 years of disease incidence data was collected from West Bengal and Bangladesh which was critical in predicting future disease incidence. The project team has developed three country policy briefs to deliver the key findings of this project to the Bangladeshi and Indian Agri-

culture ministers and to Australian biosecurity agencies. The project team has formed a new capability to investigate the risk of pests and diseases under future climates and the project team is considering extending this capability to other major crops and their pests and diseases within the Asia-Pacific region.

CONCLUSION

In evaluated regions the maximum temperature will increase by 0.2–0.6 °C and the minimum temperature increase will be 0.2–0.5°C per decade to 2050. In 2025, the average potential potato yield reduction will be around 3.3t/ha and in 2050 around 5.08 t/ha.

The future trend indicated that potato late blight severity is likely to reduce by 5–7% from 1981–2010 period to 2031–40 period in the intensive potato growing areas of West

Bengal, India. However, in similar intensive growing areas of Bangladesh, disease severity can increase up to 12% in intensive potato cultivation areas of northern Bangladesh and can reduce to around 7% in similar intensive growing areas of central Bangladesh. The onset of potato late blight is likely to be earlier in the growing season in the future decades as compared with the present decade (2011–20).

An interesting gap highlighted in this project was that fog data, which is critical to the development of potato late blight, is not routinely collected by the meteorological agencies. The collection of this data by the respective bureaus will provide the resources to establish a fog warning system for growers.

The development of a fully integrated model which incorporates a potato crop model with the potato late blight model needs to be further refined in future research. This model will provide a more comprehensive assessment of how late blight will affect potato crops under future climate conditions.

ARCP2010-07CMY-BAI

Asian Coastal Ecosystems: An Integrated Database and Information Management system (DIMS) for Assessing Impact of Climate Change and its Appraisal

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Participating Countries: Malaysia, India, Singapore
APN Funding: US$ 80,000 (for two years)

Researchers from Malaysia, India, Singapore and England embarked on developing an integrated Database and Information Management System (DIMS) for assessing climate change impact and its appraisal. Developed initially for the collaborating developing countries, DIMS includes physical, chemical, and biological parameters. The system is expected to be extended for other countries in the Asia-Pacific region in the future through further study and maintenance of the project website. As part of the project dissemination activities, a scientific workshop on "Climate Change and DIMS Technology" was organized from 1–3 December 2010 at the University of Nottingham, Malaysia Campus. The workshop focused on climate change and coastal modelling methodology, effective prediction of environmental changes, DIMS architecture, functioning, database schema information in particular metadata and searchable data. Participants learned the above topics particularly in using GIS tools, maps, relational databases, metadata etc.

RESULTS

Geographic information systems (GIS) and remote sensing (RS) technologies are very important tools for planning, managing and monitoring natural resources. Thus the DIMS project is pursued with the objectives of rehabilitating the capabilities and alleviating the climate change impact by developing an integrated information system using these technologies. DIMS should be viewed as an opportunity for the environmental and science community to advance in the field of land and coastal zone management and its changes resulted from climate change.

The DIMS technology is considered an important tool for the project which is charged with managing, improving and preserving the country's climate and environment. The coastal zone-DIMS concepts are major upsurge in the level of interest and there are grounds for optimizing the significant advances in this direction and are not too far away. At the end, it is concluded that the use of DIMS in coastal zone management is interesting and stimulating. The selected site in the collaborating country has been used for evaluating the database (DIMS) created by modelling for climate change and coastal mapping. The study gives an understanding of the climate change, its impact and the sensitiveness of coasts to potential changes in the climate.

PUBLICATIONS

Ramani Bai V., Mohan, S. and Kabiri, R. 2011. New Database Information Management System for Climate Change — An Online resource. *In:* Leal Filho, W. (Ed) Climate Change and the Sustainable Management of Water Resources, Springer Verlag, Berlin (in press).

Ramani Bai V., Bouwmeester, R. and Mohan S. 2009. Fuzzy Logic Water Quality Index and Importance of Water Quality Parameters, International Journal of Air, Soil and Water Research, Vol. (2): 51–59.

Ramani Bai V., 2010. Coastal Erosion due to Seawater Intrusion into Groundwater Aquifers, International Journal of the Open Hydrology, (in press).

Ramani Bai V. and Mohan S. 2009. Groundwater Model for Investigating Seawater Intrusion Hazards, Proceedings of International Conference on Disaster Mitigation and Management (ICDMM-2009), 16–18 December 2009, PSNA, Tamil Nadu, India.

Ramani Bai, V. and Gopinath R. 2010. Real Time Water Quality. Workshop on Sustainable Urban Stream Restoration (Rehabilitation), UNIVERSITAS 21, Nov 12–14, 2010, Delhi, India.

Ramani Bai, V. and Chan, A. 2010. Climate Change and DIMS Technology, Edited Proceedings of the 2010 Asia-Pacific Network for Global Change Research Workshop. 1–466.

CBA2009-04NSY-VISARTO

Workshop on Climate and Agricultural Risk Management, Phnom Penh, 2009

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Participating Countries: Australia, Bangladesh, Cambodia, India, Philippines, Thailand, USA, Viet Nam
APN Funding: US$ 30,000 (for one year)

The training-cum-symposium aimed to improve the management of climate associated risks in agriculture, including modified risk profiles associated with climate change scenarios.

The training-cum-symposium consisted of two parts:

1. A three-day training activity in the area of climate, crop, disease and pest modelling, building on the outputs of the original APN project.
2. A four-day international symposium on "Climate Risk and Agricultural Management" which focused on information exchange and regional priority setting.

A combined training-symposium was jointly supported by the APN, AusAID International Seminar Support Scheme, and the Crawford Fund. The project involved 11 participating countries and two organizations: WMO and ICRISAD.

The seven days of training-cum-symposium provided a venue to share and discuss the topic of climate variability and its challenges for agriculture, natural resource management and the subsequent social and economic well-being of associated communities. There have been improvements in understanding, analysing, and forecasting climate variability, data, and developments in climate change. However, there is a need to formulate new concepts to be introduced to the community and applied on a wider scale.

CBA2009-06NSY-BRUNNER

Capacity Building for Mainstreaming Climate Change Issues into Socio-Economic Development Planning in Viet Nam

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The project originally intended to focus on national-level decision-makers and national-level climate change impacts. Bearing in mind the projected severity of sea level rise in the Mekong Delta, the project was redesigned to address climate change issues in the delta. It did so in two ways: (1) it produced a high-resolution GIS database of land cover in the southern part of the delta using SPOT images acquired in 2009 and 2010 and made this available to government and international organizations; and (2) it organized two workshops to discuss environmental changes and emerging climate change impacts in the Mekong Delta. These workshops provided cutting-edge assessments of environmental conditions and trends in the delta. Based on the workshop outcomes, an advocacy programme was designed to build the demand for policy reform among provincial leaders who can then lobby central government officials with respect to dams on the mainstream of the Mekong River and other large-scale infrastructure that risk undermining the delta's ability to adapt to climate change. This advocacy programme will be carried out by other future projects.

RESULTS

The project provided up-to-date information on climate change scenarios and impacts by generating and disseminating latest information on land cover and other relevant information and by raising understanding of climate change in the Mekong Delta. While it made less progress in establishing a forum to mainstream climate change into development planning, funding has been secured to establish a forum targeting provincial leaders in the delta and this objective will therefore be advanced beyond the conclusion of this project.

PUBLICATIONS

Land Cover Database for Southern Mekong Delta, Space Technology Centre and IUCN, Hanoi.

Land Cover Database for Southern Mekong Delta: Technical Report, Jake Brunner and Nguyen Hanh Quyen, IUCN, Hanoi.

Presentations at Environmental Trends in Mekong Delta Workshop, Can Tho, December 2010, Can Tho University and IUCN, Hanoi.

Mekong Delta Wetlands Suffering Emerging Threats, Saigon Economic Times, December 23, 2010, 56–57, in Vietnamese and English.

CBA2010-02CMY-TOGTOHYN

Dryland Development Paradigm (DDP) Application for the Most Vulnerable to Climate and Land Use Change of Pastoral Systems in the Southern Khangai Mountains of Mongolia

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This study initially focused on the Tuin River basin. During its first year, the project provided scientific knowledge on climate change, its impact on rangeland ecosystems, sustainable land use, resilience reduction with land fragmentation in arid and semi-arid lands, and research findings in a suitable format for policy-makers and resource users. Integrated drought-*zud*, pasture use and ecological vulnerability indices were calculated for the districts of Erdenetsogt (forest steppe), Olziit (dry steppe), Jinst (desert steppe) and Bogd (desert steppe), using climate and livestock data (1986–2008).

Average values of ecological vulnerability indicate that desert steppe region of the Tuin River basin is most vulnerable to climate and land use changes among the four sites studied. The project studied examples of a successful herder with traditional knowledge and management skills (win-win model), the Ortomt River community (traditional community model), herders with fenced pasture (rich herder model), and the "tragedy of the commons" for pastoral social-ecological systems. Many traditional pastoral communities are at the critical bifurcation stage that might either lead to sustainable livelihoods or a "tragedy of the commons" scenario.

The social survey in the Tuin river community found that "global warming has become a critical slow variable, already over-passing thresholds in terms of its negative impact on surface water and it is leading to collapse." A prime example of it is that the Tuin River is not reaching the Lake Orog, which is dried out already for several years. The frequency and intensity of climatic disasters (drought, *zud*, dust and sand storms, and floods) has increased as a consequence of climate change.

PUBLICATIONS

Chuluun, T. and Altanbagana, M. 2010. Vulnerability and Adaptation Policy Options of Social-Ecological Systems to Climate Change. Proceedings of the Conference on Development, Science and Technology of the Western Region, Ulaanbaatar, 369–384 (in Mongolian).

Chuluun, T. 2010. Recommendations for "Institutional Capacity in Pastoral Risk Management", Sustainable Livelihoods Project II, Mongolia. Executive Summary of the National Conference on Community Participation in Local Development, Ulaanbaatar, 2010, 46–53.

Altanbagana, M., and Chuluun, T. 2010. Vulnerability Assessment of Social-Ecological System of Mongolia. Proceedings of the 4th International and National Workshop on Applications of Geo-Informatics for Natural Resource and Environment", June 2010, Ulaanbaatar, Mongolia.

Chuluun, T., Tserenchunt, B., Ojima, D., Tsolmon, R., Enkhjargal, N., Erdenezaya, T. and Batbileg, B. 2010. Vegetation Trends Analysis in Mongolia: Using Long-term Remotely Sensed Vegetation Index NDVI (1982–2008). Proceedings of the 4th International and National Workshop on Applications of Geo-Informatics for Natural Resource and Environment", June 2010, Ulaanbaatar, Mongolia.

Ojima, D., Chuluun, T. and Altanbagana, M. 2010. Vulnerability and Resilience of the Mongolian Pastoral Social-Ecological Systems to Multiple Stressors. GLP book.

Chuluun, T., Altanbagana, M., Davaanyam, S., Tserenchunt, B. and Ojima, D. 2010. Vulnerability of Pastoral Communities in Central Mongolia to Climate and Land Use Changes. GLP book.

Chuluun, T. 2010. Land Degradation and Desertification in Mongolia. Background Paper for the "Human Development Report Mongolia 2010".

Altanbagana, M., Chuluun, T. and Ojima, D. 2010. Vulnerability Assessment of the Mongolian Rangeland Ecosystems. 42–62. *In*: Chuluun, T. and Watanabe, M. (Eds). 2010. Proceedings for Consultative Meeting on "Integration of Climate Change Adaptation into Sustainable Development in Mongolia", 17–18 June 2010, Ulaanbaatar, Mongolia.

Chuluun, T. 2010. Opportunities for Synergies between Climate Change, Desertification, Conservation and Human Development at Multiple Scales, 105–127. *In*: Chuluun Togtokh and Masataka Watanabe (Eds). 2010. Proceedings for Consultative Meeting on Integration of Climate Change Adaptation into Sustainable Development in Mongolia, 17–18 June 2010, Ulaanbaatar, Mongolia.

Tserenchunt, B., Chuluun, T. and Ojima, D. 2010. Plant Productivity Trends Analysis using Remotely Sensed Information. 141–142. *In*: Chuluun Togtokh and Masataka

Watanabe (Eds). 2010. Proceedings for Consultative Meeting on Integration of Climate Change Adaptation into Sustainable Development in Mongolia, 17–18 June, Ulaanbaatar, Mongolia.

Chuluun, T., Tserenchunt, B., Altanbagana, M. and Stafford Smith, M. 2011. Applying the Dryland Development Paradigm to Pastoral Systems in Mongolia. IRC, 2–8 April, Rosario, Argentina.

Chuluun, T., Altanbagana, M., Ojima, D., Davaanyam, S. and Tserenchunt, B. 2011. Diverse Rangelands for Social Sustainability in Mongolia. IRC, 2–8 April, Rosario, Argentina.

Chuluun, T., D. Ojima and M. Altanbagana. 2011. Vulnerability and Adaptation of Pastoral Human-Environmental Systems to Climate Impact at Multiple Scales in Mongolia. IRC, 2–8 April, Rosario, Argentina (invited paper).

Chuluun, T., Altanbagana, M., Davaanyam, S., Tserenchunt, B. and Ojima, D. 2009. Vulnerability of Pastoral Communities in Central Mongolia to Climate and Land-use Changes. Workshop on Vulnerability and Resilience of Land Systems in Asia, Beijing, China.

Chuluun, T., Ojima, D., Altanbagana, M. , Davaanyam, S. and Tserenchunt, B. 2010. Vulnerability and resilience of pastoral social-ecological systems in Mongolia (oral presentation).

Ojima, D., Tserenchunt, B. , Chuluun, T., Tsolmon, R., Enkhjargal, N., Erdenezaya, T. and Batbileg, B. 2010. Vegetation trends analysis in Mongolia: Using long-term remotely sensed vegetation index NDVI (1982–2008).

Chuluun, T., Altanbagana, M. and Ojima, D. 2010. Vulnerability assessment of pastoral systems to climate and land use changes. (Accepted to 2nd International Conference: Climate, Sustainability and Development in Semi-arid Regions (ICID). 16–20 August 2010. Brazil)

Altanbagana, M., and Chuluun, T. 2010. Vulnerability Assessment of Mongolian Social-Ecological Systems. The Proceeding of 4th International and National workshop "Applications of Geo-informatics for Natural Resource and Environment", Ulaanbaatar, Mongolia.

Chuluun, T., Tserenchunt, B., Altanbagana, M. and Stafford Smith, M. 2011. Applying the Dryland Development Paradigm to pastoral systems in Mongolia.

Chuluun, T., Altanbagana, M., Ojima, D., Davaanyam, S. and Tserenchunt, B. 2011. Diverse Rangelands for Social Sustainability in Mongolia.

Chuluun, T., Altanbagana, M., Tserenchunt, B. and Davaanyam, S. 2011. "From Vulnerability to Sustainability: Social-Ecological System of Tuin and Baidrag River Basins" brochure draft (in Mongolian). Ulaanbaatar, Mongolia.

CBA2010-03NSY-INDRAWAN

Developing the Capacity for Teaching Biodiversity and Conservation in the Asia-Pacific Region

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APN Funding: US$ 33,190 (for one year)
Project Website: http://www.pfs-tropasia.org

In the Asia-Pacific region, many young researchers working on biodiversity conservation and related sustainable development issues have limited opportunities to obtain quality field-based training or exposure to modern analytical techniques. The problem is self-reinforcing because faculty in regional developing country institutes have rarely received adequate training themselves, and thus, lack the knowledge to teach advanced courses. This project strove to break this negative feedback cycle by giving junior faculty and researchers high-level training in biological field research and data analysis.

The project included a six-week field course, a six-day experimental design and data analysis course, and a one-day scientific paper writing course. In addition, a website was established for the future management of the programme (www.pfs-tropasia.org). A web-based alumni network was also created for future collaboration and scientific exchange.

The project successfully ran the training activities as planned, offering advanced courses on topics related to environmental resource management through training junior faculty and researchers in modern field research methods and data analysis, and to increase the capacity of institutions in regional developing countries to conduct research on environmental issues.

CBA2010-04NSY-DHAKAL

Carbon Governance in Asia: Bridging Scales and Disciplines

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Project Website: http://www.gcp-urcm.org/CG

A three-day capacity building workshop entitled "Carbon Governance in Asia: Bridging Scales and Disciplines" was held on 1–3 November, 2010. The workshop invited young researchers from the Asia-Pacific region, who were competitively selected along a set of criteria through an open call. Established senior scholars from Asia, North America and Europe played mentoring roles to the young researchers before and during the workshop. The workshop provided a platform for young researchers to present their work, to discuss and get feedback and suggestions for improvement of their research from the established senior scholars. It also provided opportunities for scholars to interact with decisions makers and to grasp the reality of actual decision making for carbon governance.

The participants were made aware of the challenges and needs for bridging the various disciplines when tackling a topic such as carbon governance that spans over multiple sectors, disciplines and approaches. The human network developed during this workshop has the potential to assist both senior and young scholars in finding avenues for future collaboration which the organizers will foster, especially on some of the thematic issues such as carbon governance related to REDD and the multi-level governance of carbon.

The workshop brought together 12 early career scientists, 7 leading scientists, and 16 other participants from all over the Asia Pacific region and from a variety of scientific, mostly social science disciplines. The workshop was also attended by policy-makers and APN representatives. In three intense days, through presentations, discussions, tutorials, and social events, all participants worked hard and achieved the objectives of the workshop. In addition, numerous valuable new research connections and potential collaborations have emerged.

CBA2010-05NSY-LORREY

Improving Pacific Island Meteorological Data Rescue and Data Visualization Capabilities through Involvement in Emerging Climate Research Programmes

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Participating Countries: Australia, Fiji, New Zealand, Pacific Islands, USA
APN Funding: US$ 40,000 (for one year)

A workshop was held in Auckland, New Zealand on emerging climate research programmes focused on the southwest Pacific region. Participants included representatives of Pacific Island National Meteorological Services (PINMS), who were engaged in cutting-edge research techniques that use rescued climate and weather data from their region of the world.

This workshop helped to address some of the gaps that APN and GEOSS has identified for capacity building needs in the Pacific region, including collaboration with new science initiatives, increasing regional opportunities for gaining research experience, and with a central focus on the priority actions of rescue, interpretation, and use of archived meteorological and climate data. The workshop representatives supported the formation of "Atmospheric Circulation Reconstructions over the Earth (ACRE)" for the Pacific, which will seek to recover, digitize, share, and submit daily surface pressure measurement contributions from each Pacific island nation. This will be done to enhance the spatial and temporal coverage of the 20th Century Reanalysis (20CR) dataset.

The primary goals of this project were to increase Pacific Island Meteorological Service awareness and stimulate their involvement in emerging climate and weather research initiatives that pertain to Southwest Pacific. An additional goal was to gain feedback about the visualization tools that had been developed. A key project highlighted at the workshop was the ACRE initiative. Many of the presentations showcased research at the

workshop that draw on data that ACRE has either directly provided, or that use a new reanalysis data set (20CR) that ACRE data rescue efforts has helped to create (Compo *et al*., 2011). The urgency of obtaining access to meteorological data in analogue format that has been rescued but not digitized was discussed in terms of the improvements that could be made to 20CR. Coordination from the region will be needed in order to fulfil obligations to submit new data in a series of rolling updates planned for years ahead.

PUBLICATIONS

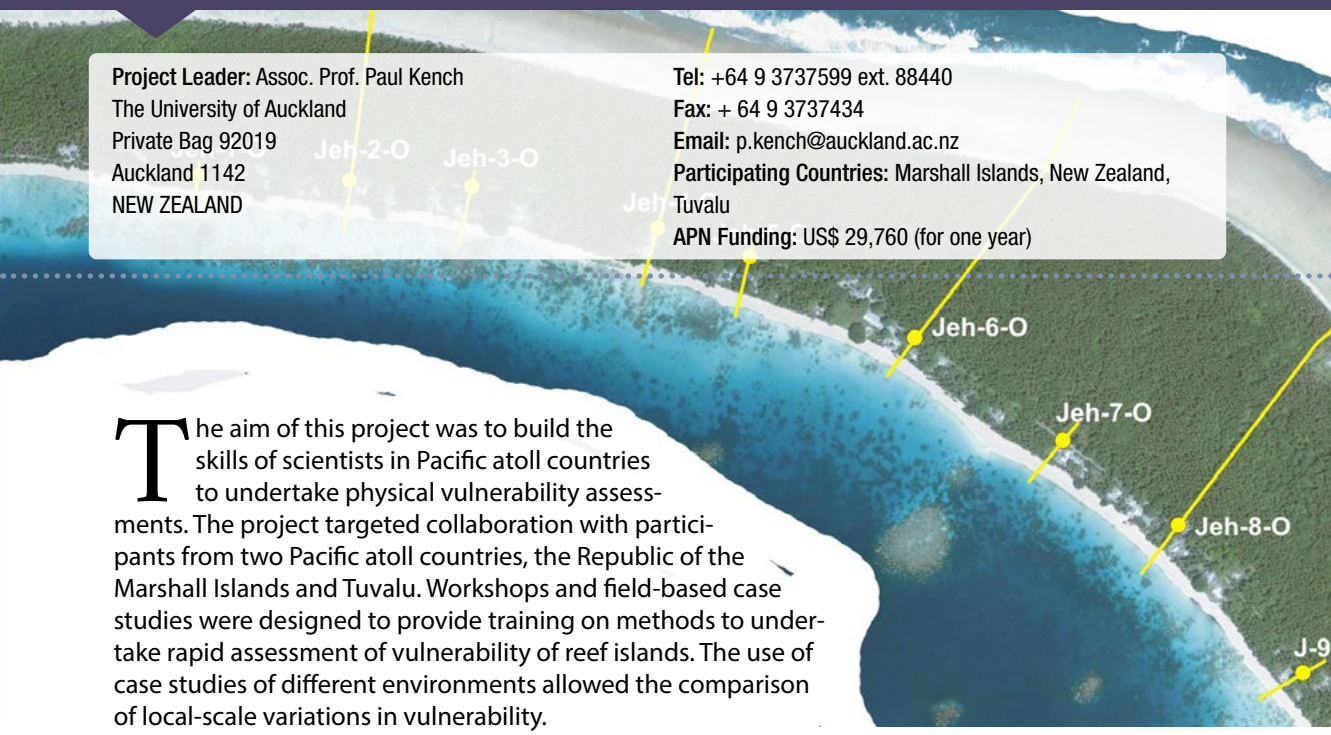
Diamond, H.J., Lorrey, A., Knapp, K.R. and Levinson, D.H. 2011. Development of an Enhanced Tropical Cyclone Tracks Database for the Southwest Pacific from 1840–2009. International Journal of Climatology.

Lorrey, A. 2011. Improving Pacific Island Meteorological Data Rescue and Data Visualization Capabilities through Involvement in Emerging Climate Research Programmes. APN Science Bulletin, 1, 64.

Lorrey, A.M., Dalu, G., Renwick, J., Diamond, H.J. and Gaetani, M., 2011. Reconstructing the South Pacific Convergence Zone Position during the Pre-Satellite Era: a La Niña Case Study. Monthly Weather Review, (in print).

CBA2010-06NSY-KENCH

Improving Understanding of Local-Scale Vulnerability in Atoll Island Countries: Developing Capacity to Improve In-Country Approaches and Research



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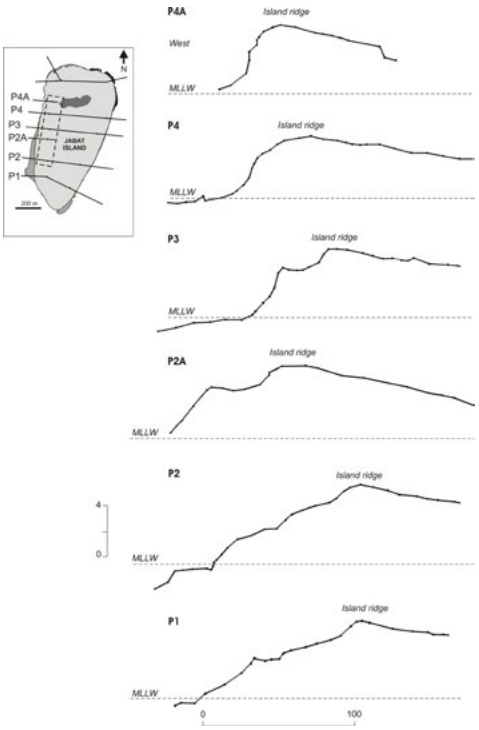
Participating Countries: Marshall Islands, New Zealand, Tuvalu
APN Funding: US$ 29,760 (for one year)

The aim of this project was to build the skills of scientists in Pacific atoll countries to undertake physical vulnerability assessments. The project targeted collaboration with participants from two Pacific atoll countries, the Republic of the Marshall Islands and Tuvalu. Workshops and field-based case studies were designed to provide training on methods to undertake rapid assessment of vulnerability of reef islands. The use of case studies of different environments allowed the comparison of local-scale variations in vulnerability.



Two training workshops were successfully completed in the Republic of the Marshall Islands and Tuvalu. These workshops trained 10 Pacific Island researchers on techniques for community-scale vulnerability assessment. Project participants undertook three case studies to determine local-scale vulnerability. These exercises provided participants experience in application of research skills.

Two follow-up workshops were held (one in each country) to reduce, catalogue and interpret data captured from the case study sites. The data was used to develop participant generated maps of the location of community structures and the elevation of these structures. This information allowed discussion of possible inundation scenarios.

Three vulnerability reports were prepared for the islands studied. Final workshops were undertaken in Tuvalu and the Republic of the Marshall Islands to present findings of the study to government officials and policy-makers.

Case study reports were disseminated at the end of each workshop programme.

PUBLICATIONS

Kench, P.S., Owen, S.D., Ford, M.R., Trevor D., Fowler, S., Langrine, J. and Lometo, A. 2010. Improving Understanding of Local-Scale Vulnerability in Atoll Island Countries: Case Study 1: Jeh Island, Ailinglaplap Atoll, Republic of Marshall Islands.

Kench, P.S., Owen, S.D., Ford, M.R., Trevor D., Fowler, S., Langrine, J. and Lometo, A. 2010. Improving Understanding of Local-Scale Vulnerability in Atoll Island Countries: Case Study 2: Jabót Island, Republic of Marshall Islands.

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CBA2010-07NSY-STONE

Web-based "Discussion-support" Agricultural-Climate Information for Regional India

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Participating Countries: Australia, India
APN Funding: US$ 35,000 (for one year)
Project Website:
http://www.usq.edu.au/acsc/apnproject

The rapid development of computer-aided decision support systems was regarded as a panacea that would be able to bring about a means of joining complex climate forecast model outputs with crop and pasture simulation model outputs in graphic or tabular form. Yet, it was becoming increasingly obvious that farmers, while being the intended recipients, were not the major users of computerized decision-support systems. Instead, what were known as "kitchen table" discussions was developed whereby outputs of integrated climate-crop simulation were provided "face-to-face" by a visiting farming systems specialist so that free discussions could evolve in order to derive a range of key decisions that could then have practical value to the farmers present (McCown *et al.*, 2002).

RESULTS

The workshops proved highly successful. "Armed" with feedback obtained at these farmer workshops, the "eLearning" web-based portal team set about developing the pilot customizable, web-based climate "discussion-support" portal that would be able to transmit and then disseminate climate forecast information of the type suitable for the key group of farmers in Andhra Pradesh, India.

The following processes have been developed:

- Videos containing the avatar actors in a 2nd Life environment have been placed within a web portal environment at University of Southern Queensland for user access.
- Aspects related to input of climate forecasts from recognized sources for use in discussion scripts in 2nd Life videos have been achieved.
- Copies of a "final video" have also been made available to local village television.
- Farmer feedback has been forthcoming regarding style, content, and value of the videos and workshops.
- Development of a process that focused on the management scenarios pertaining to the core (summer) monsoon period.

CBA2010-08NSY-SALINGER

Addressing the Livelihood Crisis for Farmers: Weather and Climate Services for Sustainable Agriculture – Development of Tools

Project Leader: Dr. Jim Salinger
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Participating Countries: Australia, Cambodia, China, India, Indonesia, Japan, Malaysia, Mongolia, New Zealand, Pacific Islands, Philippines, Russian Federation and Viet Nam
APN Funding: US$ 20,000 (for one year)

The workshop was developed to take stock of a number of important issues facing the agricultural communities around the world including rising populations with the consequent increase in demand for food; the pressures on the world's food producers due to climate variability and change, as well as socio-economic conditions; the need to use natural resources productively and sustainably; and the need within the agriculture communities for increased knowledge and better tools for risk management and adaptation.

The workshop was organized into seven technical sessions, and a set of key recommendations were developed and adopted at the fifteenth session of the Commission for Agricultural Meteorology, particularly while prioritizing the future work of the Commission for the upcoming 2011-2013 period. A follow up workshop was held in Luganville, Santo, Vanuatu from 11–13 December 2010 where farmers from each province of Vanuatu met with climate change scientists and agricultural advisers to devise strategies to help cope with climate variability and climate change.

The project identified various weather and climate services for the farming community, communication methods and ways to implement new tools for dissemination of the weather and climate products and services, especially in regions most vulnerable to weather and climate extremes. This provided capacity building in the area of strategies for more targeted weather and climate information and forecasting for increased preparedness to sustainable agricultural development, especially in the Asia-Pacific region, and also assisted policy-makers and civil society in responding effectively to varying weather and climate conditions.

PUBLICATIONS

http://www.wmo.int/pages/prog/wcp/agm/meetings/walcs10/walcs10_present.html

CD-ROMS, Presentations for the International Workshop were prepared and distributed at the end of the workshop.

CBA2010-11NSY-DEGUZMAN

Capacity Building for Research and Monitoring of Marine Protected Areas: An Adaptive Mechanism for Climate Change in the Asia-Pacific Region

Project Leader: Dr. Asuncion B. de Guzman
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Naawan and MSU Naawan Foundation
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Participating Countries: Indonesia, Philippines
APN Funding: US$35,600 (for one year)

The project contributed to building local and regional capacity for Marine Protected Areas (MPA) monitoring. Developing a pool of capable MPA monitors in selected coral reef-rich countries in the Asia-Pacific region is a means of improving MPA governance and increasing their ability to adapt to climate change, human-induced stresses and other environmental effects.

The project was implemented by the Mindanao State University at Naawan Foundation for Science and Technology Development, Inc (MSUNFSTDI) in collaboration with the Centre for Coastal and Marine Resource Studies of the Bogor Agricultural University in Bogor, Indonesia. The project organized two training courses: a local training course attended by 20 participants from the Philippines, and a regional training course that benefited 20 participants from Indonesia, Thailand, Viet Nam, Timor Leste, and the Philippines.

RESULTS

A post-training evaluation conducted toward the end of the project showed that around 42% of the participants were actively involved in MPA monitoring activities following their graduation from the two training courses

under the project.

PUBLICATIONS

De Guzman, A.B., Abrea, R.A., Nañola, C.L. and Uy W.H. 2010. Monitoring Marine Protected Areas in the Asia-Pacific Region: A Training Manual. Asia-Pacific Network for Global Change Research and MSU-Naawan Foundation for Science and Technology Development, Inc.

CBA2010-12NSY-PRADHANANGA

Graduate Conference on Climate Change and People

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Participating Countries: Nepal, Bangladesh, India, Pakistan, Sri Lanka, Kyrgyzstan, USA, China and Republic of Korea
APN Funding: US$ 26,000 (for one year)
Project Website:
http://gradconference.wordpress.com

The first ever of its kind, the five-day International Graduate Conference on Climate Change and People was organized in Kathmandu, Nepal, 15–19 November 2010. At the conference, 17 experts from fields as diverse as biodiversity, water resources, climate change science, natural hazards, anthropology, biogeography, policy, equity, and ethics, shared their experiences and opinions with 130 delegates representing 17 countries from the Greater South Asia and beyond. The conference focused on multidisciplinary capacity building of graduate students and encouraged participants to engage actively in the lecture sessions, interacting with experts, in group discussions, in panel discussions, and in the formation of a network for communicating with one another beyond the conference on climate change issues.

As a follow-up activity of the conference and one of the activities of the Eco-Generation Network, a Virtual COP16 was conducted from 29 November to 11 December 2010 among the network members with the intention of informing students about COP16 through online discussions and live video. There were altogether 122 participants at the Virtual COP16. Though this Virtual COP16 does not have a visible impact, it was a very successful forum to broach the issues of young people.

CBA2010-15NSY-SOUTH

Global Change and Coral Reef Management Capacity in the Pacific: Engaging Scientists and Policy-Makers in Fiji, Samoa, Tuvalu and Tonga

Project Leader: Prof. G. Robin South
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Participating Countries: Fiji, Samoa, Tonga, Tuvalu
APN Funding: US$ 40,000 (for one year)

Sustaining healthy coral reefs is vital to the livelihoods of the peoples of the Pacific Islands. The project targeted four countries all heavily dependent on their coral reefs: Fiji, Samoa, Tonga and Tuvalu. This challenge was addressed through face-to-face dialogue between reef experts and government personnel responsible for coral reef management policies. For each country a national dossier was developed, leading into two-day workshops. The dossier included a series of issues (including gaps) pertinent to each country which were used in the development of national coral reef plans. Countries were revisited to review progress on the plans. Although progress varied in the four countries, it was evident that collaboration between relevant government departments needed to be improved and that there was a need for the establishment and implementation of management systems that will be ongoing and self-financing given the resources available.

The highly successful workshops identified priority actions for coral reef management. It was found that all four countries had in place, or under development, appropriate policies for the sustainable management of their coral reefs, taking into account the anticipated impacts of global change. All lacked, however, an overarching policy and the necessary human resources and expertise required for implementation. This situation highlights the dilemma faced by the Small Pacific Countries responsible for the custodianship of the unique biodiversity of their reefs. In follow-up discussions two countries (Samoa and Tuvalu) requested the project team's assistance in developing their National Ocean Policies, which would provide the necessary overarching policy and national commitment to sustainable coral reef management.

PUBLICATIONS

South, G.R. 2011. Global Change and the Sustainable Management of Coral Reefs in Fiji, Tonga, Samoa and Tuvalu, Proceedings of the Second International Seminar on Islands and Oceans, Ocean Policy Research Foundation, Tokyo. Japan. 29 November–1 December 2010. 69.

CIA2009-02-PULHIN

Capacity Development on Integration of Science and Local Knowledge for Climate Change Impacts and Vulnerability Assessments

Project Leader: Dr. Juan Pulhin
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APN Funding: US$ 38,000 (for one year)

The reality of climate change calls for the understanding of how it might affect a range of natural and social systems, and to identify and evaluate options to respond to these effects (Ionescu *et al.*, 2009). This has led to in-depth investigation of vulnerability and adaptation to climate change, which has become central to climate science, policy and practice.

The capacity, however, to conduct vulnerability and adaptation assessments is still limited in the Philippines, particularly with gaps in downscaling simulated scenarios and mainstreaming research findings into policy- and decision-making processes (Sajise 2010).

With the decentralization policy, the Philippines local government units (LGUs), particularly at the provincial level, are at the forefront of action to respond to climate change impacts and risks. It is therefore necessary to capacitate them on how to conduct climate change impacts and vulnerability assessments in their respective jurisdictions to enhance their preparedness strategies.

Hence, this capacity development project proposed to train key stakeholders in Albay, the Philippines to conduct impact, vulnerability and adaptation assessments using a computer-based modelling system "SimCLIM" and participatory approaches.

Objectives	Key Results
Familiarize relevant stakeholders in Albay on the concepts of climate change; Train the target audience, particularly the municipal planning development officers, on the use of SimCLIM customized for Albay (AlbayClim); Introduce participatory approaches for assessing climate change impacts, vulnerability and adaptation; Demonstrate, using case studies, vulnerability, impact and adaptation assessments to climate change and sea-level rise in selected areas in the province using a participatory approach and a computer-based modelling system (AlbayClim); and Investigate how to mainstream assessment results into adaptation planning processes.	Greater understanding of the concept of climate change by local stakeholders; Increased local capacity to conduct vulnerability and adaptation assessments; AlbayClim, a customized SimCLIM modelling system for Albay province, was developed by partners from CLIMsystems; Training on the use of AlbayClim was conducted for planning development officers and local governmental staff from the Albay province; Local knowledge was integrated in the impact and vulnerability assessments; Contributed to the establishment of a Climate Change Academy in the province; Provided direct input to the revision of Albay's Comprehensive Land Use Plan; and Contributed to the Climate Change Commission process on promoting a climate-resilient Philippines.

CIA2009-03-LUN

Climate Change in Eastern Himalayas: Advancing Community-Based Scientific Capacity to Support Climate Change Adaptation

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APN Funding: US$ 28,500 (for one year)

The Eastern Himalayas in the Yunnan province of China is a hot spot for biological and cultural diversity. In recent years, climate change impacts have increasingly threatened traditional communities, agro-pastoral livelihoods and surrounding mountain ecosystems.

According to a 2007 study by the Centre for Tibetan Region Sustainable Development (CTRSD) of Yunnan Academy of Social Sciences (YASS), the climate change not only threatens biodiversity and local livelihoods, but also affects local knowledge and traditions. Traditional knowledge reflects local values to adapt to climate change and can provide important information for decision-making if it is combined with scientific methodology.

To complement earlier work, there is a crucial need to study the strategic and scientific approaches with an input of indigenous knowledge to climate change vulnerability assessments. As a described "white spot" in terms of lack of data in the IPCC AR4 report, the Himalayan region lacks much-needed assessments. In response, a team of multi-disciplinary experts proposed to support data collection involving local Tibetans and their traditional knowledge to contribute to global climate change assessments and to contribute to decision-making and science-policy interfacing. Thereby, it aims to set a benchmark for incorporating indigenous knowledge into the contributions from China to international assessments.

PUBLICATIONS

Local Knowledge on Climate Change — A Case Study of a Tibetan Village in Northwest Yunnan, China

Changing of Agro-pastoralist Livelihood in NW Yunnan, China: Impact of and Response to Climate Change

Gender Mainstreaming and Climate Change — a Case Study of Eastern Himalaya, SW Yunnan, China

China Culture and Environment (Chinese), Yunnan Publishing House, 2010

Climate Change and Indigenous Knowledge, Yunnan Technology Publishing House (in print)

Objectives	Key Results
Develop the capacity of climate scientists, local government officers, and multidisciplinary NGOs to contribute to the extension, application and diffusion of knowledge related to climate change impact and vulnerability assessments; Allow the project stakeholders to develop a locally tailored training programme in climate change impact and vulnerability assessments, hence contributing to sustained capacity building beyond the life of the current project; Organize a project meeting to share information, knowledge and experience on: (a) collaboration of indigenous knowledge with mainstream science; (b) scientific capacity building in climate vulnerability and impact assessments in China; and (c) establish best practices in interfacing indigenous knowledge with international global change policy; Advocate recommendations and advice to relevant international assessments and conventions on the scientific and socio-economic aspects of climate change impacts and vulnerability in the Eastern-Tibetan Himalayan region of North-West Yunnan Province, China; and Enhance cooperation and communication between the project team, NGOs, government bodies, and international global environmental change organizations, and general climate change awareness among public groups and civil society.	Developed a link between scientists, local communities and government officials; Enhanced capacity of young scientists by engaging university students in scientific data collection, policy analysis, filed research and communication activities; and Collected over 200 plant samples at high (above 3500 m), middle (2500–3500 m) and low (below 2500 m) altitudes.






CIA2009-04-GAOL

Increasing Capacity of Local Scientists for Climate Change Impact and Vulnerability Assessments in Indonesia Archipelagos: Training in In Situ/Satellite Sea Level Measurements

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APN Funding: US$ 28,500

The Ministry of Fisheries and Marine Affairs of Indonesia predicts that more than 2000 small islands are at high risk of inundation due to sea level rise (SLR), which is a major impact of climate change. In order to assess the impacts and vulnerability of coastal zones, it is of critical importance to properly measure and monitor SLR. However, Indonesia lacks the necessary skills, trained human resources, and facilities, specifically in the field of sea level measurement and Geographical Information System (GIS) analysis. Indonesian scientists studying marine science and technology are poorly equipped with the skills required to measure sea level and to assess the vulnerability of Indonesia's coastal zones.

In response to the current situation, a team from Bogor Agricultural University, Indonesia proposed a one-year project of capacity development activities for local scientists and policy-makers in collaboration with experts from world-renown institutions as well as Indonesian national research institutions.

Objectives	Key Results
Develop the capacity of Indonesian scientists to process and analyse sea level rise (SLR) data and conduct coastal vulnerability assessment in local areas; Raise awareness of Indonesian local scientists and policy-makers on the impacts of SLR in the coastal zone; and Contribute to a better understanding among Indonesian scientists and policy-makers on SLR impacts in the coastal zone for planning mitigation and adaptation activities.	30 Indonesian local scientists benefited from the training; Upon completion of the training, each participant worked on home assignments in their respective local areas; Three training modules for satellite SLR data processing, coastal inundation analyses, and coastal vulnerability index with GIS, were developed respectively; and Science-policy linkages were forged by engaging national policy-makers responsible for adaptation and mitigation.

PUBLICATIONS

Module of Training: In Situ/Satellite Sea Level Measurement. 2010. Department of Marine Science and Technology, Bogor Agricultural University.

Proceedings of Workshop on In Situ/Satellite Sea Level Measurement. 2010. Department of Marine Science and Technology, Bogor Agricultural University.

Leben, R. R and J. L. Gaol. Training Workshop on Vulnerability Assessment of the Indonesian Archipelago to Climate Change. Presented at 2010 Ocean Surface Topography Science Team (OST-ST) Meeting in Lisbon Portugal.

Workshop Speaker

CIA2009-05-JITPRAPHAI

Building Research Capacity on Assessing Community Livelihood Vulnerability to Climate Change Impacts in Central Viet Nam and the Mekong River Delta

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APN Funding: US$ 28,500

As one of the most vulnerable countries to climate change impacts, Viet Nam needs extensive studies and assessments on risk, vulnerability and adaptation to climate change. However, with limited scientific capacity, existing assessment work focuses only at sectoral levels, without taking local communities into consideration.

Specific assessments need to focus on local communities in vulnerable areas and consider the local context where communities' livelihoods are at risk due to climate change impacts. Such assessment work can help policy-makers plan properly for community-based adaptation to climate change. Based on long-term experience in Southeast Asia, the START Regional Centre project team engaged two groups of researchers from Can Tho University and Nong Lam University, Viet Nam.

Objectives	Key Results
Develop and enhance research capacity of two newly established research centres hosted at two universities in Viet Nam. The local institutions are expected to gain experience on the use of climate projection data to assess climate change risk of key sectors; and Understand the integrated approach of assessing the vulnerability of community livelihood to impacts of climate change.	Enhanced research capacity in climate change vulnerability and adaptation assessments; Raised public awareness on climate change issues in a local context by engaging local stakeholders in the assessment process; Raised awareness on the concept of integrated assessment, which helped improve research capacity on climate change studies in the two newly established research centres; and Developed knowledge-base can be used as a foundation for developing science-policy dialogues in mainstreaming climate change into rural development plans in the future;

PUBLICATIONS

Chinvanno, S., Tuan, L.A. and Nguyen, K.L, 2011. Assessing Climate Change Impact and Rick in Viet Nam: The initial pilot study in Mekong River Delta and central Viet Nam. Bangkok: Southeast Asia START Regional Centre Technical Report. (In print)

CIA2009-07-LOTIA

Capacity Development of the Scientific Community for Assessing the Health Impacts of Climate Change

Project Leader: Ms. Hina Lotia
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APN Funding: US$33,000

Rapid and intense climate change is likely to delay progress towards achieving development targets such as the Millennium Development Goals in developing countries. Pakistan falls among the list of developing countries whose population's health is most likely to suffer harm from environmental hazards and health professionals have not come to the climate change debate. However, as impacts of climate change on health vary according to the geography of the area and the overall vulnerability of the local population therefore, as a first step an assessment of the nature and extent of risk that climate change poses for the health of people of Pakistan is imperative. Any definitive conclusions about the country's capabilities and recommendations for practical or policy measures need to be based on such an investigation. In view of this and in line with the fact that in Pakistan the area of Climate Change and Human Health is relatively under-developed as a formal research arena; the project aimed at bringing a change in the status quo by strengthening capacities of health professionals for research on negative health impacts of climate change.

Objectives	Key Results
Stimulate the interest of health professionals in the relationship between the direct as well as indirect effects of global climate change on human health; Build their capacities for exploring, analysing and assessing the same; Add to the relatively meagre resource of research work on the health impacts of climate change; and Contribute to the formation of a critical mass of trained researchers working in the climate change-health arena.	The first workshop enhanced participants' understanding of the climate change phenomena at the global level and built their capacity for analysing and evaluating the corresponding impacts of climate change on human health; The second workshop assisted in conducting much-needed vulnerability and impact assessments in the under-explored area of climate change and health; The third workshop, organized as an international training in Port Elizabeth, South Africa, in collaboration with LEAD International and LEAD South Africa, brought together professionals in different areas from across the globe to learn and share knowledge through a combination of case studies, skills modules and interactive sessions. The relationship between climate change and health was one of the thematic areas covered; Four research papers were put together, compiled and published under the title, "Climate Change and Health — Exploring Linkages"; and Findings of these research papers were taken to decision-makers in the Ministry of Health. They were briefed about the research findings and copies of the report were provided to them for reference and record.

PUBLICATION

Climate Change and Health — Exploring Linkages, 2011. LEAD Pakistan. ISBN 978-969-8529-59-8

NEW PUBLICATIONS FROM APN COMPLETED PROJECTS

CIA2009-06-DUC

Capacity Development for Adaptation to Climate Change in the Rural Coastal Zone of Vietnam

Duc, D.M., Nhuan, M.T. and Ngoi, C.V., 2011. An Analysis of Coastal Erosion in the Tropical Rapid Accretion Delta of the Red River, Viet Nam. Journal of Asian Earth Sciences 43: 98–109.

CRP2008-02CMY-YAN

Integrated Model Development for Water and Food Security Assessments and Analysis of the Potential of Mitigation Options and Sustainable Development Opportunities in Temperate Northeast Asia

Wang, M., Li, Y., Ye, W., Bornman, J.F. and Yan, X., 2011. Effects of Climate Change on Maize Production, and Potential Adaptation Measures: A Case Study in Jilin Province, China. Climate Research. Vol. 46: 223–242.

ARCP2005-01CMY-NIKITINA

Institutional Capacity in Natural Disasters Risk reduction: A Comparative Analysis of Institutions, National Policies, and Cooperative Responses to Floods in Asia

Lebel, L., Manuta, B. J. and Garden, P., 2011. Institutional Traps and Vulnerability to Change in Climate and Flood Regimes in Thailand. Regional Environmental Change, 11:45–58.

ARCP2007-09NSY-SKOLE

Carbon Financial Markets, Rural Poverty, and Global Climate Change in Southeast Asia — Scoping Workshop, Training and Project Site Development

Samek, J.H., *et. al*. 2011. Inpang Carbon Bank in Northeast Thailand: A Community Effort in Carbon Trading from Agroforestry Projects. *In:* Kumar B.M. and Nair P.K.R. (eds.), Carbon Sequestration Potential of Agroforestry Systems: Opportunities and Challenges, Advances in Agroforestry 8, DOI 10.1007/978-94-007-1630-8_15.

ARCP2001-12-DING

Monitoring and Prediction of ENSO Event and SSTA over the Warm Pool in the Western Pacific Ocean

Ding, Y., Li, Q., Zhang, Z. and Zhai, P., 2005. Monitoring and Predicting ENSO Events and Sea Temperature Structure of the Warm Pool in the Western Pacific Ocean. Global Environmental Research, 9(1): 57–68.

ARCP2010-02CMY-PHUA

Integrated Prediction of Dipterocarp Species Distribution in Borneo for Supporting Sustainable Use and Conservation Policy Adaptation

Tsuyuki, S., Goh M. H., Teo S. P., Kamlun, K. U. and Phua, M-H. 2011. Monitoring Deforestation in Sarawak, Malaysia using Multitemporal Landsat Data. Kanto Forest Research, 62: 87–90.

ARCP2009-12NSY-KARVE

Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management (BIOCHARM)

Shackley, S., *et al.*, Sustainable Gasification–Biochar Systems? A Case Study of Rice-Husk Gasification in Cambodia, Part I: Context, Chemical Properties, Environmental and Health and Safety Issues. Energy Policy (2011), doi:10.1016/j.enpol.2011.11.026

Shackley, S., *et al.*, Sustainable Gasification–Biochar Systems? A Case Study of Rice-Husk Gasification in Cambodia, Part II: Field Trial Results, Carbon Abatement, Economic Assessment and Conclusions. Energy Policy (2011), doi:10.1016/j.enpol.2011.11.023

MESSAGE FROM YOUNG SCIENTISTS

CBA2010-04NSY-DHAKAL

I cannot stress enough what an important networking exercise this proved to be. Not only was the event itself extremely informative, providing a wide range of papers on climate-change related issues in the Asia-Pacific region, but also the social opportunities, and the new colleagues met. As a consequence of the workshop I have found new colleagues, with whom I will be writing a paper. I also identified further contacts, with whom I hope to be collaborating on some funded research. Well done to all. The linkages between UNU-IAS, ESG and GCP worked in great synergy for the benefit of all concerned. The hospitality of our Japanese colleagues was overwhelming! Many many thanks.

Tim Cadman, University of Southern Queensland, Australia, presented in the workshop.

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The capacity building workshop examined progress, opportunities, and mechanisms of carbon governance on the local, regional, and global scales. It provided an open forum for diverse intellectual communication among scientists from academia and other research entities. The workshop enriched my knowledge, and encouraged further collaboration. It was an exciting and rewarding experience for me.

Liguang Liu, Florida International University, USA, presented in the workshop.

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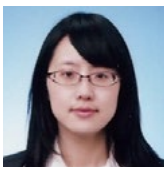

I gave a presentation in the ESG-UNU/IAS workshop on the role of social networks in environmental governance. Social network analysis was applied in this study for investigating the influence on countries' behaviour social networks have. Participants in the workshop provided valuable comments about my work. Some of them sent me their paper and some references, to which I am very thankful. During lunch breaks, senior researchers and professors gave me lots of suggestion on my career-building. This workshop gathered researchers from different universities and institutions, and provided junior researchers like us with very good opportunities to think about our study and career in different perspectives.

Jue Yang, University of Tsukuba, Japan, presented in the workshop.

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CBA2010-05NSY-LORREY

The APN workshop was very successful in terms of broadcasting the importance of the data rescue process in the Pacific. Being part of the organizing team for the APN workshop gave me the opportunity to build my communication skills (verbal and non-verbal) and presenting skills. The workshop also gave me the opportunity to mix and mingle with top researchers from the US, Europe and the Pacific, and thorough this process I shared a bit of my knowledge while at the same time gained new knowledge from talking to them and listening to their presentations. To top of my experience I presented a short talk highlighting my experiences of digitizing paper climate data from the Pacific region.

Davina Hosking-Ashford, NIWA, New Zealand, helped organized the workshop.

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I just wanted to say thanks for organizing such a fantastic workshop this week. It was great to meet people from around the world who are really interested and what we are doing. Thanks also for giving me the opportunity to make the presentation. It was a great experience.

Petra Chappel, NIWA, New Zealand, presented in the workshop.

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CBA2010-07NSY-STONE

Working on this project has provided us with an exciting opportunity to integrate the research and application of climate science with the end user in an approach which could reach a greater proportion of farmers. Having developed a method for producing relevant and appropriate information in a relatively fast and less expensive way has been very rewarding and is sure to provide further opportunities for many other areas.

Shahbaz Mushtaq, University of Southern Queensland, Australia, developed concept frameworks for eLearning approach in the project.

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CBA2010-08NSY-SALINGER

The workshop has achieved its objectives especially in knowing the farmers' expectation on weather and climate risks and uncertainties at the farm level. They need timely and accurate information on weather and climate forecasts to facilitate on-farm operational decisions. Various weather and climate services such as agro-meteorological monitoring, agro-meteorological adaptation strategies to cope with climate change and agro-climatic zoning for crop planning presented by the speakers during the workshop has given us in-depth knowledge on how the services could be implemented to benefit our farmers. The objective to review and summarize the current means of communication of various weather and climate services to the farming community was also been discussed and very good suggestions were given in term of ways to implement tools for dissemination of the weather and climate products and services.

Azhar Ishak, Malaysian Meteorology Department, participated in the project workshop.

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Through the workshop I enhanced my knowledge on appropriate services and technologies for farming communities in adaptation of climate change and weather risk; obtained higher consideration on policy options to enhance weather and climate services for farming; extended my network to the international community of people who deal with weather and climate aspects of the agriculture sector.

Nelly Florida Riama, The Agency for Meteorology, Climatology and Geophysics of Indonesia, participated in the project workshop.

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ARCP2009-05CMY-SELLERS

I have been involved in the APN project since the first workshop in Bangalore (10-12 May, 2010). During the project implementation period, I participated in data collection, both from remote sensing imagery and through ground-based observations. I was able to guide other students and researchers while performing classification of the satellite images of the 10 Indian cities. While doing the metrics analysis, I had reviewed several published literature to narrow down to a few selected spatial metric that could describe a landscape appropriately. In the process, I was much benefited from the fruitful discussions with Prof. Jefferey Sellers, Dr. T. V. Ramachandra, Huang Jingnan along with several students participating in the work. The entire study constituted a chapter in my PhD thesis. I along with many other students and researchers were benefited with the APN Project. The study carried out as part of the project can be extended further to many other cities that would form the starting point for further research on urban growth pattern in India and other countries.

Uttam Kumar, Research Scholar and PhD. candidate, IISc ,Indian Institute of Science, Bangalore, India.

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ARCP2009-12NSY-KARVE

It was a great experience to work on this project and take on new responsibilities, including financial planning, managing field trials and moderating an e-workshop, which was challenging but the hard work paid off! These new skills will be extremely useful and I hope to be able to use them in my next assignment. I also had the opportunities to interact with new organizations, and as a result learned a lot from some experts in different fields. Working in Asia also gave the chance to experience new cultures, and travel to new places, which was an added bonus.

Sarah Carter, Research Assistant, University of Edinburgh

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ARCP2010-05CMY-LUCK

It is a great exposure for me that strengthened my knowledge in the field of disease early warning system by interacting with experts from different disciplines and countries especially in data interpretation and analytical studies. I gathered a lot of field experience in potato farming related processes in different countries. It is really a great learning process on how an inter-disciplinary project works in solving the future threats of potato crops in three different countries.

Dr. Subrata Dutta, M.Sc. (IARI), PhD. (IARI), Department of Plant Pathology

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PEOPLE IN THE APN

The APN is made up of dedicated experts who play an active role in promoting the APN programme and its activities within their countries, sub-regions and the global change community. The lists below are current, at the time of publication, May 2012.

NATIONAL FOCAL POINTS (NFP) AND SCIENTIFIC PLANNING GROUP (SPG) MEMBERS

Each member country appoints one nFP who sets policy for programmes, finances and other APN activities, and one SPG Member, who recommends science themes and activities for the Inter-Governmental Meeting (IGM) to consider for support.

AUSTRALIA

Identifying nominees is in progress

BANGLADESH

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STEERING COMMITTEE (SC)

The SC acts on behalf of the IGM during the period between IGMs, implementing IGM decisions, with assistance from the Secretariat.

Elected Members

Sundara SEM
nFP for Cambodia

Eunhae JEONG
nFP for Republic of Korea

Hermien ROOSITA
nFP for Indonesia

Host of the 18th IGM/SPG Meeting

Chengyong SUN
nFP for China

Ex-Officio

Madan Lall SHRESTHA
SPG Member for Nepal

Alexander STERIN
SPG Member for Russian Federation

Co-opted Members

B. M. U. D BASNAYAKE
nFP for Sri Lanka

Louis BROWN
International Cooperation in Global Change Research, USA

Roland FUCHS
East-West Centre

W. Andrew MATTHEWS
New Zealand National Commission for UNESCO

Yutaka MATSUZAWA
nFP for Japan

Kazuhiko TAKEMOTO
Senior Fellow, Institute of Advanced Studies, United Nations University

SPG SUB-COMMITTEE (SPG-SC)

The SPG Sub-Committee oversees the implementation and development of the APN scientific activities, particularly the Annual Regional Call for Research Proposals.

Madan Lall SHRESTHA
SPG Member for Nepal

Alexander STERIN
SPG Member for Russian Federation

Marcial AMARO Jr.
SPG Member for Philippines

G.B. SAMARASINGHE
SPG Member for Sri Lanka

Kensuke FUKUSHI
SPG Member for Japan

INVITED EXPERTS TO THE SPG

International organizations and research institutions involved in global change research activities may attend the SPG Meeting as observers and to participate in SPG activities.

Ailikun
International Program Office of Monsoon Asia Integrated Regional Study (MAIRS)

Congbin FU
START Regional Committee for Temperate East Asia

Kanayathu KOSHY
Centre for Global Sustainability Studies, Universiti Sains Malaysia

Lance Clive HEATH
Australian National University Climate Change Institute

Chao Han LIU
Southeast Asia START Regional Committee

CAPACITY DEVELOPMENT COMMITTEE (CDC)

The CDC oversees the processes related to the operation of the CAPaBLE Programme and the development of strategies for its advancement.

SPG Co-Chair

Madan Lall SHRESTHA
SPG Member for Nepal

Alexander STERIN
SPG Member for Russian Federation

SC Chair

Sundara SEM
nFP for Cambodia

Donor Representative

Yutaka MATSUZAWA
nFP for Japan

Capacity Building Experts

Roland FUCHS
East-West Centre

Srikantha HERATH
Institute for Sustainability and Peace, United Nations University

W. Andrew MATTHEWS
New Zealand National Commission for UNESCO

Harini NAGENDRA
Ashoka Trust for Research in Ecology and the Environment

SECRETARIAT

The Secretariat performs the daily operations of the APN and, in particular, assists the IGM, the SC, the SPG and the CDC, in implementing the APN's Strategic Plan and Operational Plans; programme; budget; and other activities, as appropriate. Its Office is located in Kobe, Japan, under the support of the Hyogo Prefectural Government.

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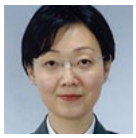

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Natsuki NIIMI
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FINANCIAL RESOURCES

The following member countries provided direct financial support to the APN for its activities in 2010/2011: Japan (Ministry of the Environment and Hyogo Prefectural Government); USA (National Science Foundation/United States Global Change Research Program); New Zealand (Ministry for the Environment); and Republic of Korea (Ministry of Environment). The figure below displays member countries' contributions.

APN's 22 member country governments, including Hyogo Prefectural Government, the host of the APN Secretariat in Kobe, Japan, together with the staff from a whole range of institutions, strongly supported the network with in-kind contributions including time and equipment, supplies and other support. In addition, national Focal Points and Scientific Planning Group Members spend considerable time on issues directly related to the APN. These include:

- Attending annual IGM/SPG and Sub-Regional Cooperation Meetings;
- Hosting APN Meetings;
- Reviewing the science activities and agendas of the APN;
- Reviewing proposals under the APN annual Calls for Proposals;
- Producing APN materials in vernacular languages and distributing at strategic events and to in-country institutions;
- Communicating with the Secretariat on issues that require regular input throughout the year; and
- Promoting APN and its programmes and activities on various occasions at the national, sub-regional and international levels.

The Hyogo Prefectural Government generously supports the Secretariat by providing office space and fixtures, etc. This in-kind support amounts to more than US$ 500,000/year.

Furthermore, in order to successfully conduct many APN-funded projects/activities, substantial in-kind support and additional resources in the form of matching funds, are in the order of US$ 3 million/year by the institutions of the Leaders and Collaborators of the projects/activities and other sources of funding.

Of the completed projects in 2010/2011, the following projects successfully secured in-kind contributions and fund-matching from other sources. Other projects did not specify the amount of in-kind contributions and fund-matching secured.

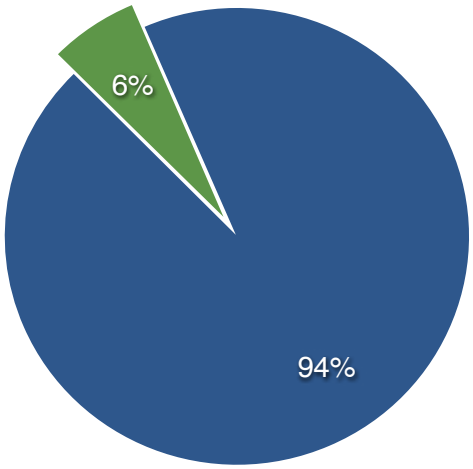
ARCP2009-12NSY-Karve	US$ 13,500
CBA2009-04NSY-Visarto	US$ 7,000
CBA2009-06NSY-Brunner	US$ 20,000
CBA2010-03NSY-Indrawan	US$ 15,000
CBA2010-08NSY-Salinger	US$ 175,000
CBA2010-11NSY-DeGuzman	US$ 10,000
CBA2010-15NSY-South	US$ 10,000
CIA2009-04-Gaol	US$ 10,000

Majority (94%) of the overall direct cash contribution to APN was invested in supporting/conducting global change research, capacity development, and networking activities. Investments were also made in fellowship programmes and science/policy fora. Six percent (6%) was spent on administrative/operative costs. The following figures show the breakdown of expenditure in 2010/2011.

RESOURCES IN FY 2010/2011 (US$)

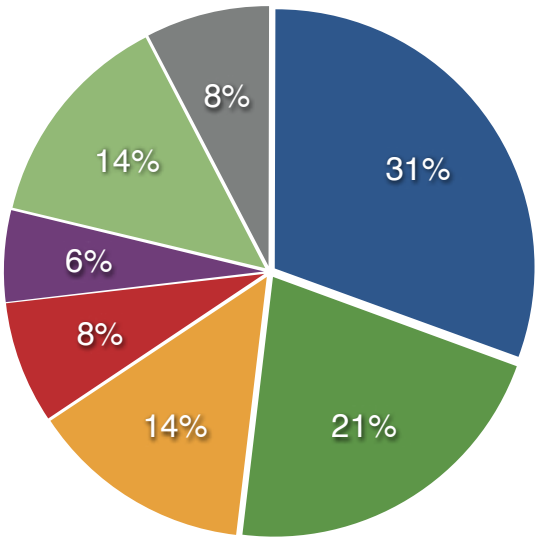
3,276,000

USE OF RESOURCES IN FY 2010/2011 (US$)



- Science Policy Institutional Activities ($2,861,500)
- Administrative and Operative Costs ($183,500)

BREAKDOWN IN THE USE OF RESOURCES FOR SCIENCE, POLICY AND INSTITUTIONAL ACTIVITIES (US$)



- ARCP
- CAPaBLE
- Focussed Activities: Ecosystems Biodiversity Land Use
- Focussed Activities: Resources Utilization Pathways for Sustainable Development
- Annual IGM Meeting & SRC Meetings
- Posts and Programme Fellowship
- Others (Workshops, Fora, Publications etc.)

MAJOR SPONSORS

The following sponsors provide direct funding for the APN that is complimented by in-kind support from APN members, such as hosting workshops and seminars and the sharing of scientific and management expertise.

Ministry of the Environment, Japan

Hyogo Prefectural Government, Japan

Ministry of Environment, Republic of Korea

National Science Foundation, USA

Ministry for the Environment, New Zealand

United States Global Change Research Program, USA

PARTNER ORGANIZATIONS

The APN believes in the value of partnerships and networks and considers working with other organizations involved in global change research, capacity building and policy development a crucial effort in fostering global change research in the region.

Together with the organizations and institutions that are directly co-implementing APN projects and activities, the following are among APN's key partners:

NEXT STEPS

With active support from its 22 member countries, the APN will continue its efforts in supporting collaborative scientific research and enhancing global change research capacity in the Asia-Pacific region, particularly in developing countries.

We will keep on exploring opportunities creating synergy with core projects of the global change programmes in research activities, while continuing to effectively manage the new and ongoing projects under the ARCP and CAPaBLE programmes.

To better disseminate the knowledge and experience generated by its funded activities, the APN is committed to play a more active role in high-level forums and dialogues such as UNFCCC, IPBES, CBD, IPCC, etc., which will in turn lead to the achievement of our goal to foster appropriate interactions among scientists and policy-makers.

The APN will work more closely with scientists in the region to synthesize APN climate related activities. It is our hope that the results will feed into the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports and other major science-policy publications.

At the sub-regional level, the South-East Asia and the South Asia Sub-Regional Committees will keep up with the momentum generated in 2010–2011 and work towards identifying and implementing activities of regional relevance and common importance which will assist APN in achieving its goals, including fostering sound and effective science-policy linkage.

More Proposal Development Training Workshops will be organized to increase the capacity of early-career scientists to submit a competitive proposal to APN for its Annual Calls for Proposals in key scientific areas for sustainable development in the Asia-Pacific region.

The APN will continue to count on the expertise of its Scientific Planning Group (SPG) and the pool of external expert reviewers in providing sound and fair judgement on which proposals submitted to APN will be deliberated and considered for funding and finally recommended at the Inter-Governmental Meeting (IGM).

ACRONYMS

AP-BON	Asia-Pacific Biodiversity Observation Network
APN	Asia-Pacific Network for Global Change Research
ARCP	Annual Regional Call for Research Proposals
AWCI	Asian Water Cycle Initiative
CAPaBLE	Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries
CBD	Convention on Biological Diversity
CRH	Carbonized Rice Husks
CRP	Comprehensive Research Projects
EBLU	Ecosystems, Biodiversity and Land Use
EMECS	Environmental Management of Enclosed Coastal Seas
EML	Email List
ESG	Earth System Governance
ESSP	Earth System Science Partnership
GCP	Global Carbon Project
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GIS	Geographic Information Systems
HEAA	Hyogo Environmental Advancement Association
IAHR	International Association for Hydro-Environment Engineering and Research
IAI	Inter-American Institute for Global Change Research
ICHARM	International Centre for Water Hazard and Risk Management
ICRISAD	International Crops Research Institute for the Semi-Arid Tropics
ICSU	International Council for Science
ICSU ROAP	ICSU Regional Office for Asia and the Pacific
IGBP	International Geosphere-Biosphere Programme
IGES	Institute of Global Environmental Strategies
IGFA	International Group of Funding Agencies
IGM	Inter-Governmental Meeting
IHDP	International Human Dimensions Programme on Global Environmental Change

IPBES	Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ISAP	International Forum for Sustainable Asia and the Pacific
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
IUGG	International Union of Geodesy and Geophysics
IYB	International Year of Biodiversity
MAIRS	Monsoon Asia Integrated Regional Study
MOEJ	Ministry of the Environment, Japan
MPA	Marine Protected Area
NIES	National Institute for Environmental Studies, Japan
NIWA	National Institute of Water and Atmospheric Research, New Zealand
NSF	National Science Foundation, USA
PAGES	Past Global Changes
PINMS	Pacific Island National Meteorological Services
REDD	Reducing Emissions from Deforestation and Forest Degradation
RUSD	Resources Utilization and Pathways for Sustainable Development
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCBCIA	Scientific Capacity Development for Climate Impact and Vulnerability Assessments
SEN	Small Earth Nepal
SPG	Scientific Planning Group
SRCom	Sub-Regional Committee
START	Global Change SysTem for Analysis, Research and Training
UNFCCC	United Nations Framework Convention on Climate Change
UNU-IAS	United Nations University Institute of Advanced Studies
USGCRP	United States Global Change Research Program
WCRP	World Climate Research Programme
WMO	World Meteorological Organization

APN
Asia-Pacific Network for Global Change Research

THE ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH (APN) IS A NETWORK OF 22 MEMBER COUNTRY GOVERNMENTS THAT PROMOTES GLOBAL CHANGE RESEARCH IN THE REGION, INCREASES DEVELOPING COUNTRY INVOLVEMENT IN THAT RESEARCH, AND STRENGTHENS INTERACTIONS BETWEEN THE SCIENCE COMMUNITY AND POLICY-MAKERS.

Ministry for the Environment
Manatū Mō Te Taiao

MINISTRY OF ENVIRONMENT
환경부

NSF

United States Global Change Research Program