ANNUAL REPORT 2015-2016

APN
ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

APN Annual Report 2015–2016
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Message from the Director

Hiroshi Tsujihara
Director
APN Secretariat

It is my pleasure to present you the APN Annual Report 2015-2016.

As a regional network, APN continues its mission to enable countries in the Asia-Pacific region to collectively address the challenges of global change by working towards improving the understanding of the Earth's systems and its interactions with human societies, improving predictions of long-term causes and trends of climate change, and preparing nations for future events by applying effective management tools of disaster risk reduction.

During the reporting period, which runs from April 2015 to March 2016, we have directly engaged with over 90 project leaders and more than 500 collaborators across the Asia-Pacific regions in regional collaborative global change research and scientific capacity development activities. Almost 75% of these individuals are based in developing countries.

In fiscal year 2015, APN has supported various multi-country research and assessments aiming to increase resilience to global change by enhancing the knowledge base for better decision making, particularly in areas of low carbon development, climate change adaptation, and the conservation and use of biodiversity and ecosystem services.

Our capacity development projects and workshops have enhanced the knowledge of hundreds of young and early career researchers, governmental officials, as well as stakeholders at the community level.

In addition to the knowledge outputs, these activities have also established or strengthened the connection among scientists and policy makers from different countries, and enabled them to collectively address matters of common interest.

I take this opportunity to express my sincere gratitude to all APN members, invited experts and external reviewers for contributing their time, knowledge and expertise to advance the work of APN. My deep appreciation also goes to all project leaders, collaborators and partners in the global change community, who worked very hard to ensure a better understanding of and response to the challenges of global change.

Contents

About APN

Established in 1996, the Asia-Pacific Network for Global Change Research (APN) is an intergovernmental network committed to working towards an Asia-Pacific region that is successfully addressing the challenges of global change and sustainability.

What we do

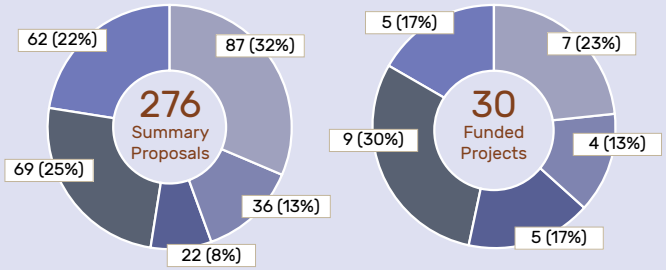
- We support multi-country, transdisciplinary research that provides scientific input to policy making.
- We develop and enhance the capacity of individuals and organisations in conducting global change research.
- We foster and strengthen interactions between the science and policymaking communities, with the aim of producing actionable science and informed decision-making.

Where we work

APN supports and implements research, capacity building and science-policy interaction activities in 22 member countries spanning the Asia-Pacific region, from South Asia, Southeast Asia and Temperate East Asia to Oceania and North America (USA).

Fiscal year 2015 at a glance

Thematic distribution of summary proposals received in 2015 (left) and approved proposals for funding (right), ARCP and CAPaBLE programmes combined



- Climate Change and Climate Variability
- Ecosystems and Biodiversity
- Changes in Atmospheric, Terrestrial and Marine Domains
- Resource Utilisation and Pathways for Sustainable Development
- Risk Reduction and Resilience

97

NUMBER OF COMPLETED AND ONGOING PROJECTS, FY2015

74.7%

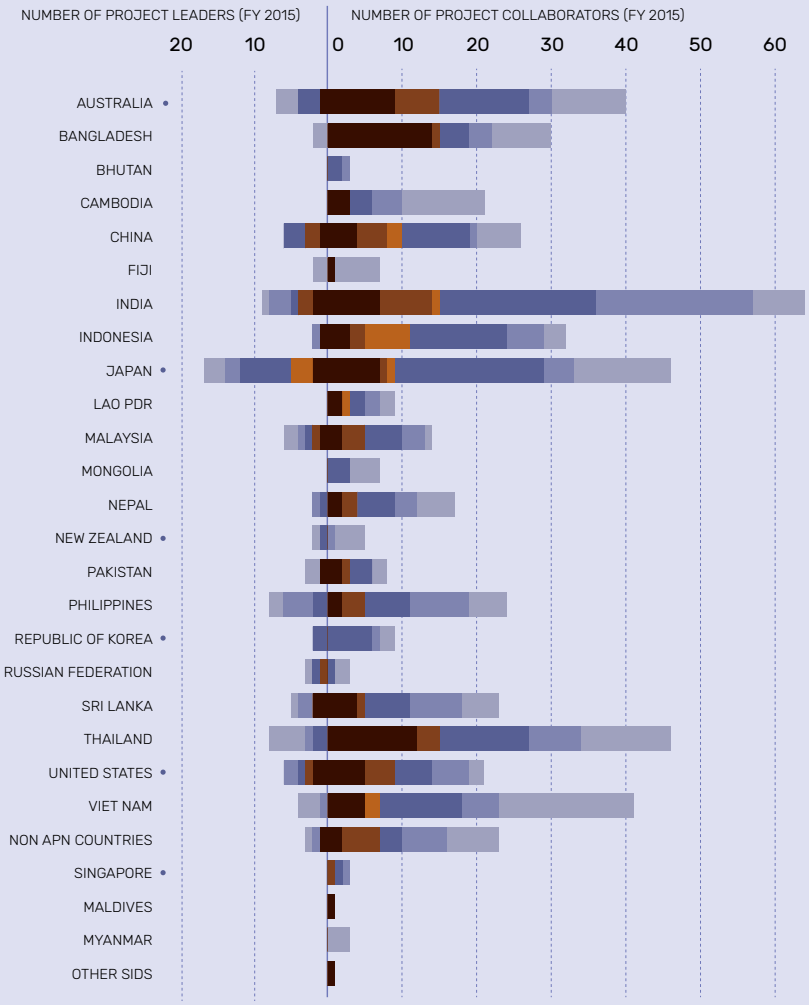
PERCENTAGE OF RESEARCHERS BASED IN DEVELOPING COUNTRIES

624

NUMBER OF PEOPLE ENGAGED AS PROJECT LEADERS OR COLLABORATORS

3.64M

AMOUNT (IN USD) ALLOCATED FOR SCIENTIFIC ACTIVITIES



Figures for each country indicate the number of project leaders/collaborators whose organisation is based in that country. They do not indicate nationality.

ONGOING PROJECTS
- Focused activities/frameworks
- Scientific capacity development
- Regional collaborative reserach

COMPLETED PROJECTS (FY 2015)
- Focused activities/frameworks
- Scientific capacity development
- Regional collaborative research

• Indicates a developed member country

Regional Research

Up-to-date estimates of greenhouse gas budgets in South Asia and Southeast Asia provide support for national mitigation strategies

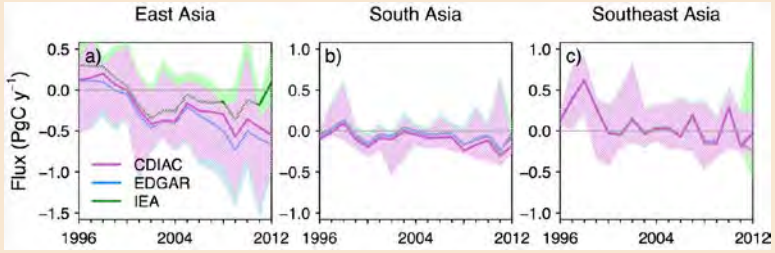
http://www.apn-gcr.org/resources/items/show/1592

The lack of high-quality estimates of greenhouse gas fluxes in and out of natural and managed ecosystems has been a great impediment for countries to determine their voluntary mitigation commitments under the United Nations Framework Convention on Climate Change.

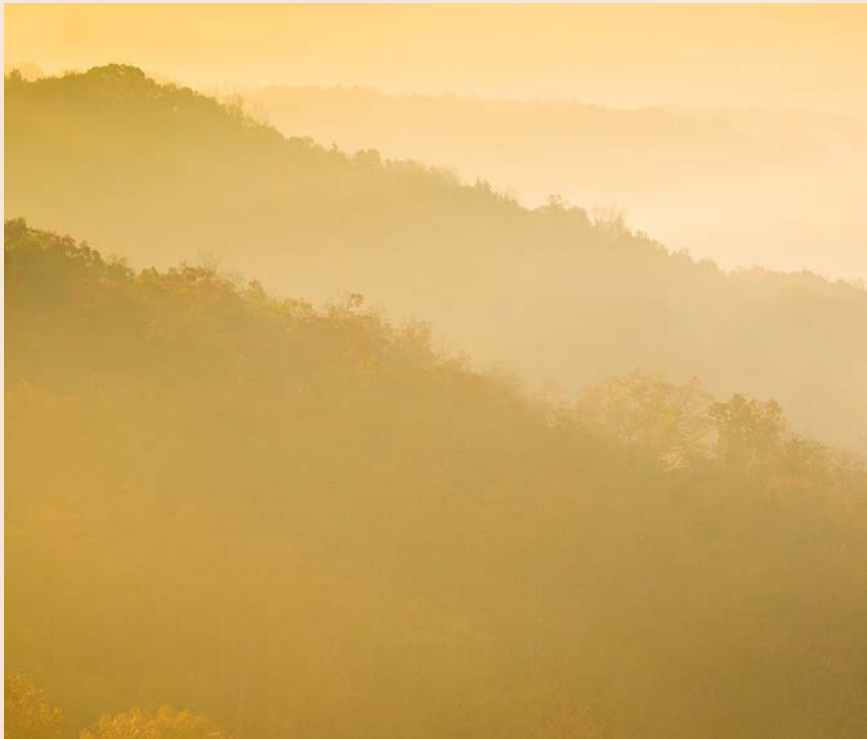
To address this gap, an ambitious effort was conducted by researchers from the Japan Agency for Marine-Earth Science and Technology and the Commonwealth Scientific and Industrial Research Organisation. Global and regional data sets and model outputs were used to constrain regional greenhouse gas budgets in South Asia and Southeast Asia where greenhouse gas fluxes have large uncertainties.

Drawing information from multiple sources to better understand the role of climate-human systems in greenhouse gas emissions, the project provided **estimates of the sources and sinks of carbon dioxide and methane from anthropogenic and natural sources**, and supported the analysis of **sea-air carbon dioxide exchange over the Indian Ocean**. Three international workshops were conducted to share relevant information, which has led to various research papers published in international journals.

Outputs from the research were used in the IPCC Fifth Assessment Report by contributing to the physical science basis for the assessments. The project also **led to the commencement of a greenhouse gases observation initiative** in collaboration with Dhaka University and the Bangladesh Meteorological Department. Most importantly, an international network of collaborators was established to work beyond the scope of this project to develop more robust and comprehensive greenhouse gas budgets.

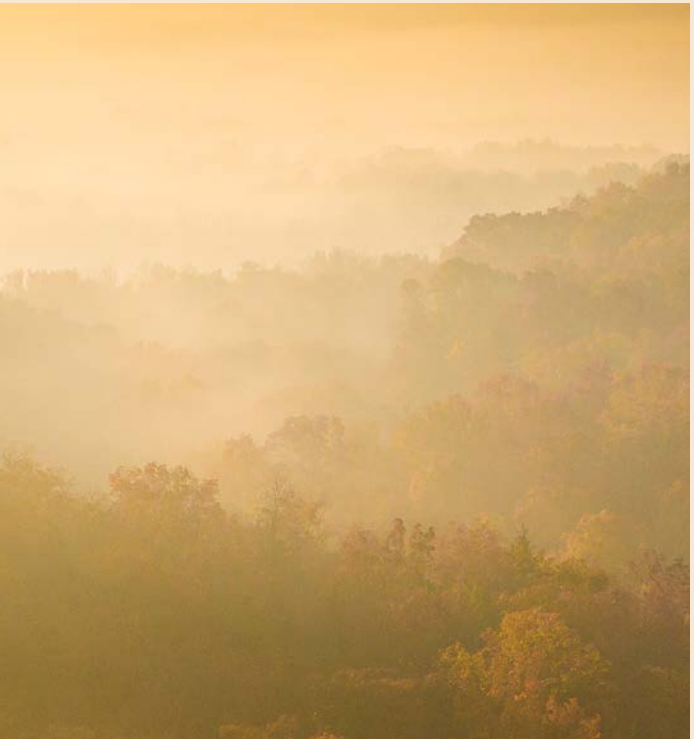


▲ Trends in the inverted land biosphere fluxes (Negative NEE indicates a carbon sink) (adapted from Thompson et al., 2016). The land biosphere fluxes (PgC per year) are shown as annual means for East Asia (a), South Asia (b) and Southeast Asia (c). The fluxes are calculated using FFC emission estimates from CDIAC (purple), EDGAR (blue) and IEA (green), the solid line shows the median and the shading indicates the range of the inversion ensemble.



"The information resulting from this project is of strategic value to countries to determine those contributions including the possible role of land-based options as part of their mitigation portfolios."

Prabir K. Patra (project leader), JAMSTEC, Japan



AWARDS & HONOURS

The project leader Dr. P. K. Patra received the Horiuchi Award (2016) from the Meteorological Society of Japan for his significant contribution on interdisciplinary research in atmospheric sciences.

ORGANISATIONS INVOLVED

Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan

Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Chinese Academy of Meteorological Sciences, China

Peking University, China

Bogor Agriculture University, Indonesia

National Bureau of Soil Survey and Land Use Planning, India

National Institute for Environmental Studies, Japan

Meteorological Research Institute, Japan

Research Institute for Global Change, Japan

Tohoku University, Japan

Norsk Institutt for Luftforskning (NILU), Norway

University of Colombo, Sri Lanka

University of Sri Jayewardenepura, Sri Lanka

Montana State University, USA

University of Illinois, USA

KEY PUBLICATIONS

Patra, P. K., Canadell, J. G., Houghton, R. A., Piao, S. L., Oh, N.-H., Ciais, P., ... Lasco, R. (2013). The carbon budget of South Asia. *Biogeosciences*, 10(1), 513–527. http://doi.org/10.5194/bg-10-513-2013

Thompson, R. L., Patra, P. K., Chevallier, F., Maksyutov, S., Law, R. M., Ziehn, T., ... Ciais, P. (2016). Top-down assessment of the Asian carbon budget since the mid 1990s. *Nature Communications*, 7, 10724. http://doi.org/10.1038/ncomms10724

Sarma, V. V. S. S., Lenton, A., Law, R. M., Metzl, N., Patra, P. K., Doney, S., ... Valsala, V. (2013). Sea–air CO2 fluxes in the Indian Ocean between 1990 and 2009. *Biogeosciences*, 10(11), 7035–7052. doi:10.5194/bg-10-7035-2013

Synthesis of global environment change and sustainable development of least developed countries in Asia and Oceania opens new scope for inclusive research for long-term solutions

http://www.apn-gcr.org/resources/items/show/1597

KEY PUBLICATIONS

Dube, O.P., & Sivakumar, M.V.K. (Eds). Weather and Climate Extremes, 7, 1-116, SI: IGBP-APN

Dube, O. P., Lubick, N., & Smyth, K. (2016). *Policy Brief Sustainable Development in Bangladesh: Facing Global Environmental Change*. DOI: 10.13140/RG.2.1.3270.5686

Led by the International Geosphere Biosphere Programme (IGBP), scientists from Asia and Small Island Developing States (SIDS) in Oceania conducted a synthesis on global environmental change and sustainable development in the Asia-Pacific and least developed SIDS.

The synthesis was part of the second major international synthesis of IGBP on key policy relevant areas within global environmental change research that commenced in 2009. The synthesis focused on natural hazards and disasters, human health and environment, and the role of indigenous knowledge systems. It covered marine environment, coastal zone management, climate change extremes and the potential role of indigenous knowledge systems in addressing these challenges.

The synthesis led to the publication of **a special issue in Weather and Climate Extremes, policy briefs and an information dissemination workshop** in Dhaka, Bangladesh. The findings were further shared nationally and internationally in various conference and workshops involving scientists and policy makers.

The synthesis activities **enhanced the capacity of science research, reporting and peer review process for scientists in least developed countries**, and provided them with **exposure to a regional and global environmental change knowledge base**. The project has also opened new scope for future research, for example by integrating traditional and conventional practice for long term solutions to climate extremes.

Research on sea-air interactions on the Indian Ocean cited by IPCC Assessment Report fosters regional marine cooperation

http://www.apn-gcr.org/resources/items/show/1898

The Indian Ocean Dipole (IOD), an ocean-atmospheric phenomenon similar to El Niño in the Pacific, exerts great impacts on climate variability in various regions including South Asia and East Asia. Better understanding of the dynamics associated with IOD would significantly improve global climate simulation outputs and provide more reliable information for the decision-making process.

Led by Dr Lin Liu of the First Institute of Oceanography, State Oceanic Administration, China, in collaboration with researchers from six countries across the Asia-Pacific region, a project was conducted to **examine and assess the variability of the sea-air interactions associated with IOD** under global warming scenarios. Research activities were conducted based on World Climate Research Programme CIMP5 outputs. The study shows that **IOD simulations with CMIP5 have not improved significantly compared to CMIP3, although ensemble averaged IOD strength in CMIP5 is closer to observations**.

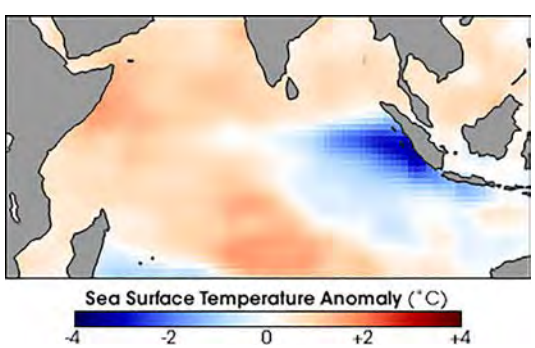
The results were cited by the IPCC Fifth Assessment Report, which is published to provide a scientific basis for governments at all levels to develop climate related policies. The **research also helped establish a marine cooperation** between China, Indonesia and Maldives. As a follow-up on this project, a new investigation on the java upwelling dynamic and relevant ecosystem variations was supported by the State Oceanic Administration of China.

"This project helped establish marine research cooperation between China, Maldives, and Indonesia."

Lin Liu (project leader),
First Institute of Oceanography,
State Oceanic Administration, China

KEY ORGANISATIONS INVOLVED

- State Oceanic Administration, China
- National University of Malaysia, Malaysia
- University of Hawaii, USA
- Phuket Marine Biological Center, Thailand
- Global Change Impact Studies Centre, Pakistan
- Maldives Meteorological Service, Maldives
- Research and Development Centre for Marine and Coastal Resources, Indonesia



▲ Surface temperature abnormalities during the Indian Ocean Dipole in November of 1997. (Image by NASA based on data from the IRI/LDEO Climate Data Library)

Nutrient and elemental analyses in the Sundarbans provide support for integrated management for mangrove conservation

http://www.apn-gcr.org/resources/items/show/1598

KEY ORGANISATIONS INVOLVED

Jawaharlal Nehru University, India

Khulna University, Bangladesh

Indian Institute of Sciences, India

University of Maryland, USA

In addition to the ecological, economic and cultural functions and services, mangroves also support important biogeochemical processes. They act as physical and biogeochemical barriers for pollutants from agricultural runoff, industrial effluents and domestic sewage. However, human activities such as damming and land use change have led to the loss and deterioration of mangroves. Such environments, including the Sundarbans, the largest conglomerate of mangrove vegetation on earth, are increasingly exposed to anthropogenic stress.

Based on sampling and analyses of sediment from seven sites in India and Bangladesh, this study highlights the status of nutrients, trace metals and organic matter, and their driving forces behind the nutrient dynamics and biogeochemical variability in the Sundarbans.

The activities led to a **comprehensive documentation of trace metals, sedimentary nutrients, and elemental and isotopic composition of carbon and nitrogen in the Sundarbans,** which spans India and Bangladesh. A digital repository of the data set was prepared and disseminated among the research community.

The study finds that **global climate change and coastal urbanisation have altered the structure and function of the highly vulnerable mangrove ecosystems**. It also suggests that an **integrated assessment is required** to delineate the driving forces behind coastal environmental changes and to contribute in designing sustainable management policies to protect mangroves for future generations.

KEY PUBLICATION

Kumar, A., Ramanathan, A., Prasad, M. B. K., Datta, D., Kumar, M., & Sappal, S. M. (2016). Distribution, enrichment, and potential toxicity of trace metals in the surface sediments of Sundarban mangrove ecosystem, Bangladesh: a baseline study before Sundarban oil spill of December, 2014. *Environmental Science and Pollution Research*, 23(9), 8985–8999. http://doi.org/10.1007/s11356-016-6086-6

Impact and vulnerability assessment of mangrove ecosystems in Bangladesh, Pakistan and Sri Lanka highlights role of policy intervention

http://www.apn-gcr.org/resources/items/show/1595

In South Asia, mangrove ecosystems are faced with constant risks of disintegration due to human activities such as land reclamation and urban development. The outlook for mangrove ecosystems is even grimmer as the trends of global warming continues.

To establish the impact of climate change on the health of mangrove ecosystems and the wellbeing of agricultural and fishing communities whose livelihoods depend on these ecosystems, this project **examined different climatic and hydrological factors under climate change scenarios, analysed their linkages and interactions on mangrove ecosystems and assessed socio-economic factors** that affect mangrove ecosystems.

In addition to the impact and vulnerability assessments on mangrove ecosystems from study sites in Bangladesh, Pakistan and Sri Lanka, the project team analysed the role of institutions in the conservation of mangroves and provided **a set of recommendations for policy intervention**.

The studies conducted have led to publications in Regional Studies in Marine Science and Ocean and Coastal Management **that provide new insights for related discussions**. They have also paved the way for **more advanced scientific modelling techniques for detailed impact assessments** that will contribute to better informing the research community, academia, civil society, and local and national policy makers in these countries.

KEY ORGANISATIONS INVOLVED

Sustainable Development Policy Institute, Pakistan

Institute of Water Modelling, Bangladesh

IUCN Sri Lanka Country Programme, Sri Lanka

Louisiana State University, USA

KEY PUBLICATIONS

Salik, K. M., Hashmi, M. Z.-R., Ishfaq, S., & Zahdi, W.-Z. (2016). Environmental flow requirements and impacts of climate change-induced river flow changes on ecology of the Indus Delta, Pakistan. *Regional Studies in Marine Science*, 7, 185–195. http://doi.org/10.1016/j.rsma.2016.06.008

Salik, K. M., Jahangir, S., Zahdi, W. ul Z., & Hasson, S. ul. (2015). Climate change vulnerability and adaptation options for the coastal communities of Pakistan. *Ocean & Coastal Management*, 112, 61–73. http://doi.org/10.1016/j.ocecoaman.2015.05.006

Review of coral reef and marine water status in the east Gulf of Thailand makes strong case for transnational co-management

http://www.apn-gcr.org/resources/items/show/1753

Coral reef ecosystems provide essential goods and services to millions of people around the world. In Southeast Asia, their gross value is estimated to be around USD 37 billion. However, the sustainability of their social and economic benefits has been undermined by factors such as rapid urbanisation, population growth, coastal development and overfishing.

Through a combination of underwater surveys, water quality and desktop assessments, a team comprising researchers from Australia, Cambodia and Thailand provided baseline information on the status and health of coral reefs in the east Gulf of Thailand to understand the level of variability between location and sites in the area studied.

The research produced **baseline data on the status and health of coral reefs, identified marine water quality parameters at coral reef sites, data on the trends of fishing gear and fisheries catch**, and information on local fishing community's **perceptions of the status and health of local fisheries and coral reefs** between 2003 and 2013.

Comprehensive information on the health and status of coral reefs assists in the decision-making process for future management measures. The present research **made a case for transnational co-management**, particularly in areas identified as critical marine resource habitats along the coast of the east Gulf of Thailand.

"This project has given impetus to ensuring Cambodia's reefs are protected as valuable assets for tourism and the community"

Dr Thong Khon
Cambodian Minister of Tourism

43

The number of sites surveyed in Cambodia, Thailand and Viet Nam

22 vs 217

The mean number of predatory fish species per site found on inshore reefs (22) versus found on offshore reefs (217).

KEY ORGANISATIONS INVOLVED

University of the Sunshine Coast, Australia

Kasetsart University, Thailand

Ministry of Tourism, Cambodia

Guidelines for rapid assessment of wetland biodiversity and ecosystem services developed for wetland managers

http://www.apn-gcr.org/resources/items/show/1941

Wetlands provide water, food and many other resources, and regulate water regimes, water quality and climate. They are also the hubs of cultural and recreational activities. Yet, they are threatened by changes in land use and land cover, inappropriate water resources management and climate change. The changes stem largely from the poor understanding of their benefits, the general lack of capacity for and complexities in assessing the biodiversity of wetlands, and linking it to various ecosystem services.

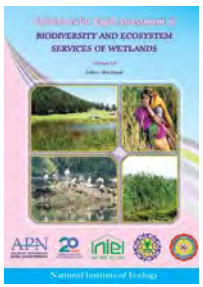
To build the capacity of relevant stakeholders, including policy makers, for **rapid assessment of biodiversity and ecosystem services of wetlands** in the Ganga-Brahmaputra basin, three workshops were organized in Kolkata, Guwahati and Kathmandu. **Guidelines for rapid assessment of major groups of biodiversity and main ecosystem services** were prepared, and a **policy brief highlighting the ecosystem services** of different wetlands and their relationship with biodiversity was disseminated at the concluding workshop with the participation of senior policy makers.

The three capacity building workshops brought together more than **170 policy makers, government organisations, senior scientists and experts, wetland managers, NGO representatives and young researchers** to understand and discuss issues related to wetland biodiversity and ecosystem services in relation to various management problems, particularly in the wake of global change.

An online network was set up for interested parties to join and interact with experts and institutions working on different biota and wetlands. Outputs of this project were also disseminated through this network which resulted in international attention.

KEY ORGANISATIONS INVOLVED

- National Institute of Ecology, India
- Central Inland Fisheries Research Institute, India
- Kathmandu University, Nepal
- Conservation Sciences, India



140

The number of young researchers trained in rapid assessment of wetland biodiversity and ecosystem services.

KEY ORGANISATIONS INVOLVED

Universiti Putra Malaysia Bintulu Sarawak Campus, Malaysia

Institute of Marine Sciences and Fisheries/Bangladesh Nature, Bangladesh

Centre for Environment and Economic Development, India

University of the Philippines, Philippines

Hue University, Vietnam

Prince of Songkla University, Thailand

Hokkaido University, Japan

Seagrass and saltmarsh ecosystem assessments point to adaptation and mitigation pathways for Indo-Pacific coasts

http://www.apn-gcr.org/resources/items/show/1758

Saltmarsh and seagrass ecosystems are least studied despite being one of the most productive ecosystems in the world. They provide shelter, food and habitat for fisheries, support marine productivity by reducing coastal suspended pollutants, and are found to be an effective line of defence against impacts of climate change.

A team of researchers from Bangladesh, India, Japan, Malaysia, Philippines, Viet Nam and Thailand worked together to gather potential evidence of changes, review the previous body of research and lay a solid foundation for future collaborative work in informing various stakeholders of specific adaptation and mitigation options for seagrass and saltmarsh ecosystems.

The team developed a **common framework for identifying and measuring impacts of climate change on seagrass and saltmarsh ecosystems**, conducted an extensive desktop study and field surveys on selected sites in seven project countries across the Indo-Pacific area. The results were shared and discussed at a workshop held in Malaysia in December 2014, in which a group of young scientists from Universiti Putra Malaysia were involved.

The research identified **clear pathways for adaptation and mitigation for seagrass and saltmarsh ecosystems, and the fishermen communities which rely on those ecosystems**. A network of like-minded scientists was developed as a result of this project, which already resulted in further collaborative initiatives in Southeast Asia and South Asia.

Assessment of nutrient dynamics of the Tonle Sap and Mekong River supports development decisions in the Mekong Basin

http://www.apn-gcr.org/resources/items/show/1756

Tonle Sap, the largest freshwater lake in Southeast Asia, supports one of the world's most diverse and productive ecosystems and is home to millions of people, whose livelihoods depend on the essential resources provided by this seasonal floodplain. Understanding how the movement of water and the fluxes of nutrients interact with Tonle Sap and the Mekong River system is important to key development decisions concerning Mekong Basin development.

Detailed sampling of Tonle Sap and the Mekong River was conducted by a team of researchers from Cambodia, Lao PDR, Thailand and the USA. The data collected was used to **measure key environmental parameters for developing models that evaluate the dynamics of nutrients in the hydrological cycles of Tonle Sap and the Mekong River system**.

Outputs of the project will benefit national policy makers and the Mekong River Commission in assessing potential changes in nutrient budgets. This will be **important for many policy decisions to be made in the coming years concerning Mekong Basin development**, including dams and other diversions. The project developed **a new methodology for assessing the impact on nutrient budgets caused by natural and anthropogenic changes in river flow.** Further, as a broader result of the project, scientists and students in Cambodia, Thailand and Laos enhanced their research capacity through hands-on research activities.

130

The number of samples collected/analysed for nutrients, P-speciation, chl-a

494 km

The extent surveyed for continuous radon and conductivity measurements

KEY ORGANISATIONS INVOLVED

Florida State University, USA

Chulalongkorn University, Thailand

Ministry of Environment, Cambodia

National University of Laos, Lao PDR

KEY PUBLICATION

Burnett, W.C., Wattayakorn, G., Sioudom, K., & Kum, V., (2016). Groundwater discharge and phosphorus dynamics in a flood-pulse system: Tonle Sap Lake, Cambodia. Journal of Hydrology, submitted.

New forest biomass monitoring approach developed to support climate change mitigation through community-based forest management

http://www.apn-gcr.org/resources/items/show/1707

Sustainable forest management contributes to climate change mitigation and sustainable development goals as associated with biodiversity conservation, combatting desertification, food and energy security, disaster risk reduction and climate change adaptation. Parties to the United Nations Framework Convention on Climate Change have devised a global scheme known as REDD+ that provides payments to developing countries to protect and enhance their forest carbon stocks. Monitoring, reporting and verification (MRV) are at the core of this mechanism since developing countries receive payments from REDD+ based on the emission reductions they have achieved.

This project **developed the concept of community-based forest biomass monitoring through intense action research** conducted with local partners in Indonesia, Lao PDR, Cambodia and Viet Nam. Approaches for engaging communities in forest carbon stock monitoring were developed, tested and refined at each research site. Furthermore, the findings were reflected in a comprehensive **manual on community-based forest biomass monitoring**, as well as disseminated at national, regional and international workshops, seminars and side events.

By developing and testing approaches to engage communities in monitoring for forest carbon stock assessment, the project identified **good practice and demonstrated that community-based forest biomass monitoring can produce reliable data and be a cost-effective alternative to conventional surveys**. The project **built the capacity of supporting organisations, local governments, line agencies, researchers and communities** on the concept and practice of community-based forest biomass monitoring.

KEY PUBLICATION

Edwards, K., Scheyvens, H., Stephenson, J., & Fujisaki, T. (2014). Community based forest biomass monitoring: A manual for training local level facilitators (Research Report 2014/3.). Hayama: IGES.

KEY ORGANISATIONS INVOLVED

Institute for Global Environmental Strategies, Japan

National Forestry Council of Indonesia, Indonesia

Viet Nam Forestry University, Viet Nam

National University of Laos, Lao PDR

Wildlife Conservation Society, Cambodia

RECOFTC – The Centre for People and Forests, Thailand

"The project demonstrates how local communities can contribute to the success of national and subnational REDD+ strategies by monitoring forest biomass, biodiversity and other forest values."

Dr. Henry Scheyvens (project leader), Institute for Global Environmental Strategies

Study on sulphur dynamics in forest ecosystems fills research gap in Japan, Malaysia and Thailand

http://www.apn-gcr.org/resources/items/show/1757

Effect of sulphur deposition on forest ecosystems is still one of the important issues to be investigated in Asia, especially in tropical countries. Better understanding of sulphur dynamics within forest ecosystems will clarify possible effects of the atmospheric inputs on biogeochemical processes.

Scientists from Japan, Malaysia and Thailand from the community of Acid Deposition Monitoring Network in Asia (EANET) worked together to investigate the sulphur dynamics and evaluate their effects on forests in East Asia via field surveys and data analyses in four forest sites in these countries. This is **the first project that utilized isotopic analysis to investigate the sulphur dynamics in Asian forests**. The project accumulated **important data sets on sulphur fluxes in the ecosystems and their isotopic information**. A scientific paper was published in the Journal of Tropical Ecology and several papers are under submission or preparation for publication.

The scientific knowledge obtained in the project was shared with the EANET community as well as governmental officials from relevant agencies in Malaysia and Thailand. In addition, young scientists gained research experience by involvement in the project activities. A new scientific community was formed as a result of the project, which has already led to further joint investigations in Malaysia and Japan.

KEY PUBLICATION

Yamashita, N., Sase, H., Kobayashi, R., Leong, K.-P., Hanapi, J. M., Uchiyama, S., ... Elsenbeer, H. (2014). Atmospheric deposition versus rock weathering in the control of streamwater chemistry in a tropical rain-forest catchment in Malaysian Borneo. *Journal of Tropical Ecology*, 30(5), 481–492. http://doi.org/10.1017/S0266467414000303

KEY ORGANISATIONS INVOLVED

Asia Center for Air Pollution Research, Japan

Royal Forest Department, Thailand

Environmental Research and Training Centre, Thailand

Universiti Putra Malaysia, Malaysia

Joint study in China, Indonesia and Japan informs smart investment in infrastructure for low-carbon cities

http://www.apn-gcr.org/resources/items/show/1919

The Asia-Pacific region, home to countries at contrasting levels of development and the world's largest population, can demonstrate the global impact of sustainable development through pursuing a green economy for sustainable development and poverty reduction. The United Nations predicts that by 2030, 60% of the world's population will live in cities. A low carbon setting will be a starting point for inclusive, safe, resilient and sustainable human settlements in line with the 17 Sustainable Development Goals.

With this background, this project explored a new funding mechanism with the engagement of various stakeholders such as public-private partnerships. This study primarily **looked at the role of a new business model to sustainably scale up green infrastructure and raise the importance of local governance to facilitate low-carbon city development** through technology transfer, foreign investments, and innovative entrepreneurship. The study examined the problems, actors, institutions and networks, and provides policy recommendations to scale up the creation of low-carbon cities. It also provides **recommendations on how cities in selected countries can stimulate growth through smart investment in urban infrastructure**, thereby play a key role in the green growth agenda.

The project is expected to contribute to policymaking and will bring added value to other stakeholders, such as communities, industries and academics on **how to pursue green investment at the city level**. This study not only produced important research which helps policy makers design inclusive and low-carbon cities but also fostered closer collaboration between partnering institutions in countries across Asia.

KEY PUBLICATION

Jupesta, J., & Wakiyama, T. (Eds.). (2016). Low Carbon Urban Infrastructure Investment in Asian Cities. London: Palgrave Macmillan UK. http://doi.org/10.1057/978-1-137-59676-5

KEY ORGANISATIONS INVOLVED

United Nations University-Institute for Advanced Studies of Sustainability, Japan

Institute for Global Environmental Strategies, Japan

Fudan University, China

Chinese University of Hong Kong, China

Bogor Agriculture University, Indonesia

Bandung Institute of technology, Indonesia

Country-based study brings together natural and social science perspectives towards achieving sound material-cycle societies in Asia

http://www.apn-gcr.org/resources/items/show/1710

KEY ORGANISATIONS INVOLVED

Kyoto University, Japan

United Nations University Institute for Sustainability and Peace, Japan

Hue University, Viet Nam

School of Planning and Architecture, India

"Sound material cycle society" and "material flow" largely remains an alien concept for most cities in developing countries in Asia. Countries are routinely struggling to manage increasing daily waste within their municipal limits. However, the increasing the number of citizens that is fuelling the growth of these cities has its own frugal ways and modest means, making them the most environment-friendly habitants.

To understand this diverse reality, a multi-country research project reviewed **urban expansion and economic growth against time series analysis of lifestyles** to ascertain changing material flows in domestic and industrial sectors in selected case study cities in India, Japan, Indonesia and Viet Nam. The study also examined the prevailing reuse and recycle practices that may be considered as a precursor to establishing a sound material-cycle society.

The project contributed to **stimulating multidisciplinary, context-based and participatory approaches to advancing sound material-cycle society in selected countries of Asia**. It substantiates scientific research on sound material-cycle societies by combining **inputs from natural and social science practitioners**. The project also identified, analysed and documented **modest, frugal and green living practices of citizens in Asia**, and identified the challenges for these practices to be promoted. Finally, the project successfully drew the interest of various local stakeholders by organising consultation meetings, providing better scientific information, sharing perspectives from Japan and progress from other case study areas for knowledge sharing, thereby providing policy-relevant information for national and regional policies.

Research on biochar systems in Nepal, Sri Lanka and Thailand highlights sustainability potentials and policy opportunities

http://www.apn-gcr.org/resources/items/show/1759

Research on biochar has shown great potential in sequestrating carbon and improving soil productivity by altering the chemical properties, moisture retention and nutrient availability of soils to which biochar is applied. Biochar also contributes to reducing bioavailability and phytotoxicity of heavy metals, and contributes to greater carbon abatement when applied in energy production.

However, using traditional biochar production methods may result in significant emissions of black carbon and other particulates, which could reduce the climate benefits achievable by the biochar produced. This is further complicated by the types of feedstock and the socioeconomic status in different communities and countries.

A joint research project was conducted by scientists from Nepal, Sri Lanka and Thailand to **assess the availability and suitability of feedstocks for biochar production under different sustainability criteria,** and to **explore and select suitable production technologies**. Through trial projects and life cycle analyses, the study team evaluated the **agronomic benefits of biochar for a range of crops, soil types and growing condition**. The team also conducted an economic and environmental evaluation of biochar systems used in these countries.

The study produced a detailed analysis based on the socioeconomic survey and trials conducted. A **compilation of laws and regulations relevant to biochar production** was also created as a useful tool for linking the research undertaken with the policymaking community. Outputs of the study will provide valuable insights in the development of agricultural and environmental policy and regulations in Nepal, Sri Lanka and Thailand.

KEY ORGANISATIONS INVOLVED

Practical Action Consulting, Sri Lanka

Practical Action Consulting, Nepal

Earth Net Foundation, Thailand

Changing risks to coastal ecological functions offers insight for policy intervention in building resilient South Asian coastal communities

http://www.apn-gcr.org/resources/items/show/1751

Human interactions with aspirations for higher income have brought enormous changes to the different coastal ecosystems in South Asia. This is expected to worsen with the rising coastal population density, changing economic activities, impacts of climate change and extreme climatic events. Therefore, it is important to understand the threats and opportunities of sustaining the wellbeing of coastal communities caused by the rising risks on coastal ecosystems associated with human activities and climate change.

A common framework was used to develop and inventorize ecological functions and economic activities in selected study sites in four coastal countries in South Asia – Bangladesh, China, India, and Sri Lanka. The information was used in risk and vulnerability assessments, and model estimates for future scenarios. For the collaborating country study sites, stakeholder risk perception and behaviour analyses were undertaken using an ecology–economy interaction framework.

The study prepared **an inventory of economic activities with corresponding ecosystem service flows**. The most vulnerable coastal system-based economic activities in each country were identified through interactions with scientists, policymakers and other stakeholders. It identified traditional and new economic activities and actors along the coastline, and the changing pattern through first hand recall method and mapped them to ecosystem services. This study also examined the **vulnerability of major economic activities, defined in terms of exposure and sensitivity to threats to coastal ecosystems**. Drivers of threats were categorized into natural and anthropogenic. The risks of each economic activity were determined to understand resilience to threats. In addition, **future projections for changes in rainfall and temperature patterns** were made using PRECIS data on precipitation, maximum and minimum temperature, and the CORDEX model outputs. Finally, the connection between possible indications of impacts of projected changes in temperature and rainfall, and the changing patterns of major economic activities were explored.

"The main highlight of this project is extensive consultation with policy makers and stakeholders in all countries where studies were undertaken."

Prof. Joyashree Roy (project leader)
Global Change Programme, Jadavpur University, India

KEY ORGANISATIONS INVOLVED

Global Change Programme, Jadavpur University, India

Integrated Natural Resource Management Consultants Pvt. Ltd., New Delhi, India

Basanti Devi College, Kolkata, India

Seafood Exporters' Association of India, India

Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh

First Institute of Oceanography, Qingdao, China

Ocean University of China, China

National Committee of IGBP, Sri Lanka

Marine Environment Protection Authority, Colombo, Sri Lanka

Ministry of Sports and Rural Affairs, Southern Provincial Council, Sri Lanka

IUCN Sri Lanka Country Programme, Sri Lanka

Characterisation of private and public adaptation measures gives unique insights for long-term adaptation planning for Asian megacities

http://www.apn-gcr.org/resources/items/show/1897

"Local government officials and private stakeholders have worked closely with the study team throughout the study."

Archana Patankar (project leader), Regional Centre for Urban and Environmental Studies, All India Institute of Local Self Government, India

Megacities of South and Southeast Asia frequently face extreme weather events resulting in flash floods, loss of life and property, heavy damages to infrastructure and disruption of economic and social services. How effective are the adaptation measures used by the public and private sectors, and what are the costs and burdens they have on stakeholders from these sectors? Better understanding of these questions is important for the design and implementation of long-term adaptation interventions for policy makers, development planners, private businesses and households.

Using data collected from primary and secondary sources for Mumbai, Bangkok and Manila, this study has **characterized public and private adaptation measures** by using recent flood events and analysed the **costs, benefits, effectiveness, interlinkages between public and private adaptation, and private participation in providing public adaptation goods**.

The study builds on existing typology of adaptation measures and introduces new dimensions in terms of effectiveness, frequency and financing, giving a unique insight into adaptation options used by public and private stakeholders.

The project has **improved the understanding of human dimension to climate change**. It has led to **improved characterisation of public and private adaptation measures**, which will provide input for long-term resilience in Asian megacities.

KEY ORGANISATIONS INVOLVED

All India Institute of Local Self-Government, India

University of Maryland, USA

Thammasat University, Thailand

Ateneo de Manila University, Philippines

KEY PUBLICATION

Patankar, A., & Patwardhan, A. (2016). Estimating the uninsured losses due to extreme weather events and implications for informal sector vulnerability: a case study of Mumbai, India. *Natural Hazards*, 80(1), 285–310. http://doi.org/10.1007/s11069-015-1968-3

Capacity Development

First WCRP-ICTP summer school on extreme climate events enhances research capacity for resilience and sustainability

http://www.apn-gcr.org/resources/items/show/1992

A summer school on "Attribution and Prediction of Extreme Events" was organized by the International Centre for Theoretical Physics (ICTP) in collaboration with the World Climate Research Programme (WCRP) and eight other international co-sponsors, on 21 July – 1 August 2014 in Trieste, Italy.

The summer school was attended by 10 students from Asia-Pacific countries funded by APN and 25 international students from other regions of the world. The Centre for Global Sustainability Studies, Universiti Sains Malaysia facilitated the selection and participation of the Asia-Pacific participants.

The programme included skill enhancement to develop key data resources that are used to place current extremes into a historical context, thus providing insights into some near-term prediction of the likelihood of flooding, drought, heat wave and other climatic events, enabling improved planning and response to climate disasters. The need to manage this disaster risk for a resilient and sustainably developing society was an integral larger theme.

The lecture material was consolidated through structured tutorials, and its practical application was accomplished through a suite of research problems that formed the core of the school and are an important part of the school's long-term legacy. The teams have continued to work on their research developed at the summer school with the support of their mentors. A special issue of the Elsevier journal "Weather and Climate Extremes" was published with seven papers submitted by each research project group. The special issue is available online at http://www.sciencedirect.com/science/journal/22120947/9.

The course material and lecture videos are freely available on the WCRP website. The analysis tools were purposely developed with open source software. Lasting relationships with the faculty and other participants were developed through the school.

Professor K. Koshy, the leader of this project was among the 12 resource persons and attended the summer school for three days and lectured on "Disaster risk management for sustainable development", highlighting climatic extremes as a major development challenge for which practical and cost effective sustainable pathways were also suggested to progressively reduce risk and disaster. According to the co-chairs, Francis Zwiers, Canada and Sonia Seneviratne, Switzerland, this was a fitting conclusion to the school.

"The advanced techniques and concepts will help me and my colleagues find a suitable method for analysing observed and future changes of climate extremes in China."

Siyan Dong, assistant researcher in National Climate Centre, China Meteorological Administration

KEY ORGANISATIONS INVOLVED

Universiti Sains Malaysia, Malaysia

Centre for Global Sustainability Studes, USM, Malaysia

World Climate Research Programme, Switzerland

International Centre for Theoretical Physics, Italy

KEY PUBLICATION

Alexander, L. V., Kumar, A., Naveau, P, Seneviratne, S. I., Sivakumar, M. V. K., Zhang, X., & Zwiers, W. (2015). The World Climate Research Program Grand Challenge on Extremes – WCRP-ICTP Summer School on Attribution and Prediction of Extreme Events [Special issue]. *Weather and Climate Extremes*, 9

LINK

All course materials, data and information are available on the summer school website:

https://www.wcrp-climate.org/ictp2014-about

35

The number of participants of the summer school, 10 out of which are from the Asia-Pacific region.

8

The number of research articles published in the special issue as a result of the summer school.

KEY ORGANISATIONS INVOLVED

State Key Laboratory of Estuarine and Coastal Research (SKLEC), East China Normal University, China

Fisheries and Oceans Canada, Canada

East China Sea Fisheries Research Institute, China

University of the Philippines Marine Science Institute, Philippines

Commonwealth Scientific and Industrial Research Organisation, Australia

McGill University, Canada

National Marine Fisheries Service, USA

Universität Bremen, Germany

South China Sea Fisheries Research Institute, China

University of Tasmania, Australia

University of British Columbia, Canada

IMBER summer school helps develop next generation of multidisciplinary marine researchers worldwide

http://www.apn-gcr.org/resources/items/show/1937

The Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) project is a multidisciplinary, international project that seeks to identify the mechanisms of global change and anthropogenic forcing influence on marine biogeochemical cycles and marine food webs, and how they in turn influence marine ecosystems and human society. To this end, IMBER focuses on fostering research at the interface of natural and human systems.

In August 2014, IMBER held its forth ClimEco (Climate and Ecosystems) Summer School at the East China Normal University in Shanghai, China. Entitled "Delineating the issues of climate change and impacts to marine ecosystems: Bridging the gap between research, assessment, policy and management", ClimEco4 brought together 50 participants and 10 leading researchers from 26 countries across five continents. It provided an opportunity to contribute to the community of interdisciplinary marine researchers who work at the interface of natural and human systems, a community that is only now starting to develop.

A total of 24 lectures, which were live-streamed, included a climate change primer, general information on databases, statistical data analysis using indicators with ecosystem and socio-economic models, and criteria and use of indicators for informing marine management and policy. Each afternoon, practical sessions with example databases, indicators and models provided applications of the concepts covered in the lectures, enabling participants to source, analyse and transform data into usable products, tools or advice. Participants also had the opportunity to showcase their own research during a poster session.

Through interactions with people involved with management, analysis, and reuse of ecological and socio-economic data with a focus on understanding the effects of climate change, participants expanded their international and interdisciplinary networks and created opportunities for collaboration in the future.

International training transfers knowledge and skills on advanced climate-ecosystems research to young researchers in Asia

http://www.apn-gcr.org/resources/items/show/1942

Meeting the challenges of changing land cover and ecosystem services in rapidly developing Asia requires a better understanding of the physical science basis of interactive changes of regional climate and ecosystems, consideration of their impacts on all spheres of human activity, and development of policy strategies and actions.

Young researchers and practitioners need to enhance their knowledge and skills to actively contribute to the process of climate change adaptation-related ecosystem management in their home countries and subregions. For this purpose, a 12 day training programme and science-policy dialogue were organized by the Chinese Academy of Sciences in Beijing, China, to support the enhancement of knowledge and research capacity related to climate-ecosystem interactions.

Sixteen international young scholars from 14 countries and 10 participants from China, all coming from a diverse background of science and policy dimensions, participated in the training activity. Training included lectures, hands-on training on numerical simulation, and site visits and science-policy dialogues. Topics of the lectures included regional climate change theory and data analysis, field and satellite observation technologies, land surface and climate modelling, and impacts and adaptation.

The training activity enhanced the capacity of participants in analysing climate change and its impacts on ecosystems, especially with the use of regional models, and in better understanding coupled land surface and climate change issues. A sustained network of young scholars in regional ecosystem and climate change was established as a result of the project.

KEY ORGANISATIONS INVOLVED

- Chinese Academy of Sciences, Institute of Atmospheric Physics, China
- Chinese Academy of Sciences, Bureau of International Cooperation, China
- International START Secretariat, USA
- The Oscar M. Lopez Center for Climate Change, Philippines
- University of Virginia, USA
- Global Change Impact Studies Centre, Pakistan

"Seeing the great success of this training, we plan to organize more training programmes in the coming years."

Dr. Gensuo Jia (project leader), CAS Institute of Atmospheric Physics, China

Inaugural Pan-Asia Risk Reduction fellowship programme strengthens individual and institutional capacity, and fosters south-south cooperation

http://www.apn-gcr.org/resources/items/show/1979

KEY ORGANISATIONS INVOLVED

- International START Secretariat, USA
- The Oscar M. Lopez Center, Philippines
- Kyoto University, Japan
- Manila Observatory, Philippines
- National Science and Technology Center for Disaster Reduction, Taiwan
- Thammasat University, Thailand

The Pan-Asia Risk Reduction (PARR) Fellowship Program offers unique research, training and educational opportunities to Asian researchers, practitioners and policy makers to enhance their capabilities for advancing and applying knowledge on critical issues of global environmental change and risk reduction in the Asia-Pacific region. PARR fulfills the needs of the region for researchers, practitioners, and policy makers who are able to plan with foresight to address the increasingly complex challenges of global environmental change, and risk reduction and management. The Program establishes a knowledge to action network of people and institutions capable of developing and implementing innovative approaches to planning and action at local, national and regional levels.

The inaugural round of the PARR combined the PARR Research and Practice-Policy Fellows into teams of two for a six-month fellowship experience, including one month at a host institution. The theme of the 2014 PARR Fellowship Program was urban disaster risk and vulnerability under global environmental change. The program comprized a fellowship residence where fellows learned from the experiences and skills of their host institution in a cross-cultural and cross-institutional setting. Meetings involving all fellows and

host institution representatives were held at the start and end of the program to develop collaborations and share experiences.

The PARR fellows focused their research on social vulnerability to floods, science and risk communication, institutional and community adaptive capacity to floods, and flood loss and damage. Upon completion of the Program, fellows were offered opportunities to apply for small grants to further develop their research and skills gained from the residence via follow-up projects in their home countries.

In addition to furthering their research, the follow-on grant experience allowed the fellows' exposure to managing grants, including reporting and contracts. By engaging a spectrum of regional institutions, the Program also strengthened institutional capacity to engage in South-South cooperation and provide relevant opportunities for inter- and transdisciplinary research, education and application.

"The PARR fellowship experience enhanced my skills and built my capacity to be an outstanding scientist, especially in bridging science into practice to build safer and resilient communities."

Rina Suryani Oktari (Okta), PARR Fellow

13	The number of fellows supported under the PARR Programme
4	The number of host institutions involved in the programme
11	The number of home institutions involved in the programme
4	The number of follow-on grants resulting from the programme

KEY PUBLICATIONS

Abedin, M. A., & Shaw, R. (2015). The role of university networks in disaster risk reduction: Perspective from coastal Bangladesh. *International Journal of Disaster Risk Reduction*, 13, 381–389. http://doi.org/10.1016/j.ijdrr.2015.08.001

Oktari, R. S., Shiwaku, K., Munadi, K., Syamsidik, & Shaw, R. (2015). A conceptual model of a school–community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia. *International Journal of Disaster Risk Reduction*, 12, 300–310. http://doi.org/10.1016/j.ijdrr.2015.02.006

Workshop series on coral bleaching fills knowledge gap and builds tourism operator capacity in Malaysia, Thailand and Indonesia

http://www.apn-gcr.org/resources/items/show/1904

KEY ORGANISATIONS INVOLVED

- National Oceanic & Atmospheric Administration, USA
- Commonwealth Scientific and Industrial Research Organisation, Australia
- Queensland University of Technology, Australia
- University of Sydney, Australia
- Coral Reef Alliance, Indonesia
- Reef Check Malaysia, Malaysia
- University of Malaya, Malaysia
- Universiti Malaysia Terengganu, Malaysia
- Prince of Songkla University, Thailand
- World Wide Fund for Nature (WWF) Thailand, Thailand
- University of Aberdeen, UK

"Through this workshop, I realized that the conservation of coral reefs involves more than just science, but society and economics as well."

Derta Purwita, Reef Check Indonesia

It is projected that up to half of the world's coral reefs will experience severe bleaching events in the coming decades under current global emission trends. This will result in the loss of a significant ecosystem service which is the foundation of a thriving tourism industry, extensive fisheries and a broad range of regulating services.

Existing research focuses on assessing economic losses during bleaching events, with little scientific work examining adaptation strategies for dive operators or longer-term consequences of bleaching for the dive industry, the broader economy, the well-being of dependent coastal communities and government policy.

In response to this situation, a series of seven multi-stakeholder learning workshops were held across Malaysia, Thailand and Indonesia to fill gaps in scientific knowledge and build capacity for supporting social and ecological resilience to future bleaching events.

Workshop findings were published in peer-reviewed journals such as Marine Policy and Galaxea, Journal of Coral Reef Studies. A training package was developed to raise awareness among dive operators on the ecological and socioeconomic impacts of coral bleaching, and actions to support reef resilience.

Having directly engaged over 150 participants from industry, government, academia and civic organisations, the workshops contributed in raising awareness, strengthening multi-stakeholder interactions, providing scientific input on bleaching responses, building the capacity of dive operators and enhancing the research capacity of partners involved in the project.

International scoping workshop strengthens interagency linkage in designing research activities for salinity management in South Asia

http://www.apn-gcr.org/resources/items/show/1973

Low-lying coastal areas in South Asia are subject to sea level rise as a major impact of climate change. Although certain management practices have been adopted in facing sea level rise and salinity impacts on agriculture, how these management practices compare and how they contribute to feedbacks to the climate are not sufficiently studied.

In view of this situation, an international scoping workshop was organized by the University of Colombo, Sri Lanka, to share the experiences among Bangladesh, India, Sri Lanka and Pakistan to conceptualize a regional project that would help farmers and policy makers in these countries make climate-compatible decisions on agricultural management in salinity affected areas.

A highlight of the workshop was the involvement of stakeholders from different government agencies, academia, private research institutes and non-profit organisations as early as in the design phase. Local stakeholders had the opportunity to interact and brainstorm with participating foreign scientists from India, Bangladesh, Pakistan, Japan and USA.

The strong interagency and personal relationships developed ensured effective communications and knowledge sharing among international participants. This led to a two year project proposal submitted to and awarded by APN. The project started in 2016.

KEY ORGANISATIONS INVOLVED

University of Colombo, Sri Lanka

Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Bangladesh

Banaras Hindu University, India

National Agricultural Research Center (NARC), Pakistan

Rice Research and Development Institute (RRDI), Sri Lanka

Janathakshan Limited, Sri Lanka

Colorado State University, USA

Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan

Scoping workshop series improves multi-stakeholder research methodology for assessing health effects of extreme temperatures and designing adaptation strategies

http://www.apn-gcr.org/resources/items/show/1967

Temperature-related health effects have become a matter of increasing public health concern, especially considering global climate change. An increase in the frequency and magnitude of extreme events, along with reduced water and food security as well as degrading ecosystems, will have a significant impact on human health.

Two scoping workshops were held in Guangzhou, China, with the purpose of broadening partnerships to develop regional activities that investigate the health effects of extreme temperatures and climate change, and to formulate local adaptation strategies for dealing with temperature-related health risks and reduce vulnerability.

Preliminary research was conducted in China and Viet Nam, which looked at heat related illness in China during the summer of 2013, and the role of temperature in hospitalisation of young children in the Mekong Delta area of Viet Nam, respectively. Preliminary studies found strong evidence of temperature-related adverse health impacts, and highlighted the need to improve the monitoring framework and investigate the underlying mechanisms of these effects for governments to design and implement adaptation programmes.

The workshops have built strong international collaboration involving researchers from Australia, Bangladesh, China and Viet Nam, and connecting local governments and research institutions. As a result of the scoping work, a new regional collaborative research project was developed and implemented from 2016 with funding from APN.

"All people will be exposed to the potential impacts of climate change, which will depend ... on the adaptive capacity to manage the health effects of climate change."

Final Report, ARCP2014-23NSG-Huang

KEY ORGANISATIONS INVOLVED

- Griffith University, Australia
- Sun Yat-sen University, China
- Guangdong Center for Disease Control and Prevention, China
- Ministry of Health, Viet Nam
- International Centre for Diarrhoeal Disease Research, Bangladesh
- Queensland University of Technology, Australia
- Commonwealth Scientific and Industrial Research Organisation, Australia

Training on participatory flood modelling enhances adaptive governance capacity in rural and urban India

http://www.apn-gcr.org/resources/items/show/1908

In view of the complex interlinkages between society, ecosystems and future uncertainty, there is a need for better interfacing among science, policy and practice by introducing principles of learning and flexibility in public policy process.

A series of three workshops were organized to highlight the importance of co-management and offered hands-on training on participatory modelling to multidisciplinary and multisectoral groups of stakeholders to delineate drivers of flood, design responses and negotiate solutions.

Fifty eight participants ranging from government officials, civil society members, university scholars, think tank researchers and PhD students received hands-on training on conceptual systems modelling using causal loop diagrams and on using software for modelling systems dynamics.

The trends of land use land cover change between the 1990s and 2014 were estimated for four vulnerable villages in Lakhimpur district, Assam. For Bangalore city, the trends between the 1970s to 2014 were estimated.

Findings were presented at Resilience 2014, an international conference organized in Montpellier, France, and information products were widely shared within and outside the organising institute.

The process led to the understanding of the role of key factors like diagnosis, coordination and trust for triggering change in management approaches.

KEY ORGANISATION INVOLVED

The Energy and Resources Institute, India

Annual proposal development training prepares for next generation local leaders in global change research

Twenty one young scientists from the Temperate East Asia region participated in APN's annual Proposal Development Training Workshop (PDTW) organized by APN in Ulaanbaatar, Mongolia on 5-7 November 2015. Participants were trained to better prepare for and develop competitive and well-designed research proposals to address their needs for resources and international cooperation in their research. As of April 2016, 283 young scientists have been trained in PDTWs organized in countries across the Asia-Pacific region, resulting in 15 successful projects funded by APN.

Mitra Award recognizes Chinese scientist for contributing to forest carbon accounting

The Mitra Award for Global Change Research was created in 2010 to recognize outstanding young scientists conducting global change research in the Asia-Pacific region. The Award was launched in memory of Dr. Ashesh Proshad Mitra, former SPG Member for India, a doyen in atmospheric research and recipient of the prestigious Padma Bhushan award conferred by the Indian government.

The 2016 Mitra Award was awarded to Dr. Lu Heli, College of Environment and Planning, Henan University, China, for his outstanding work on "A spatially explicit modelling framework of cost-benefit and carbon emissions from land use coverage changes for implementing REDD+ in Southeast Asia."

Connecting **Science & Policy**

Inter-Governmental Meeting in China discusses future development strategies and facilitates regional information exchange on adaptation strategies

The 21st Joint Inter-Governmental Meeting and Scientific Planning Group Meeting (IGM/SPG) of APN was held in Zhengzhou, China, on 18–21 April 2016. The event was hosted by the Ministry of Science and Technology of China supported by The Administrative Centre for China's Agenda 21 (ACCA21) and the Department of Science and Technology, Henan Province.

The IGM approved the work programme and budget plan for fiscal year 2016, as well as funding for research and capacity building projects to be undertaken in the new fiscal year. The IGM also considered and approved other activities, including a scoping workshop on technology transfer related to global environmental change. Members discussed strategies to scale up and develop innovative partnerships with member countries, international agencies and research institutions based in developed and developing countries.

A session on climate change adaptation strategies in China was organized as an interactive component of the IGM, where participants were presented with reports and presentations on state level adaptation strategies and related case studies from scientists and researchers from ACCA21, and other research institutions in China.

Country members take active role at subregional meetings

The 8th Southeast Asia Sub-Regional Committee Meeting was held back-to-back with the kick-off meeting of the SEA project "Building Capacity for Urban Climate Change Adaptation in Southeast Asia". Mountain Research Initiative (MRI) joined the meeting to explore the forging of collaborative work in forming a Southeast Asia APN-MRI initiative.

The first Temperate East Asia Sub-Regional Committee meeting was held in November 2015 in Ulaanbaatar, Mongolia. Members discussed the outcomes of the 3rd Science-Policy Dialogue and identified main outcomes of the dialogue. Considering the active participation of young scientists at the dialogue, members emphasized the need for continuing capacity development activities for young scientists in the subregion.

Science-Policy Dialogue brings land use and land cover change to the centre stage in Temperate East Asia

Over 60 policy and decision makers from five Temperate East Asian countries, international experts on land use and land cover change, media representatives, young scientists, local organisational representatives and experts from Mongolia joined the third APN sub-regional Science-Policy Dialogue. The dialogue was jointly organized by the Mongolia Ministry of Environment, Green Development and Tourism, The Mongolian Academy of Sciences, Dryland Sustainability Institute, Mongolia, and APN.

The Dialogue provided an environment for participants to provide scientific input to policy and decision-making and to feed policy perspectives into scientific research on issues related to and land management, and its social, economic and ecological implications to countries in the region.

The discussion centred on enhancing research, policy tools and actions for sustainable land management at a time when, according to scientific studies, over 50% of the Earth's ice-free land surface has been directly modified by human actions, resulting in indirect consequences that affect every corner of the Earth. These consequences include contribution to greenhouse gas emissions, introduction of invasive species, impacts on natural water cycles, and the loss of biodiversity and ecosystem services, which will adversely impact the Earth's people, societies and organisms.

International symposium shares knowledge on wild boar management in urban areas

An international symposium on Wild Boar Management in Urban Areas was jointly organized by APN and the Hyogo Prefectural Government at the Hyogo House, Kobe City, Japan. The symposium featured four presentations on wild boar management particularly highlighting the issue of human-wildlife conflict. The symposium was attended by around 300 participants.

Hokusetsu Satoyama international workshop raises awareness on sustaining Satoyama ecosystems

The Hokusetsu Satoyama International Workshop jointly organized by the Hyogo Prefectural Government and APN was held in Takarazuka city and Itami city, Japan. The Workshop consisted of two separate sessions: (1) International Workshop on Satoyama and (2) International Open Seminar on Satoyama, which aimed to raise the awareness and efforts in sustaining Satoyama like ecosystems.

APN shares best practices in research capacity building in developing countries at the SBSTA Research Dialogue

At the SBSTA42 Seventh Research Dialogue held in June 2015 in Bonn, Germany, APN shared its experience in capacity development in the Asia-Pacific region and highlighted major issues from the perspective of developing countries.

The Research Dialogue was attended by over 80 participants, mostly from the policy maker community. In a session entitled "Lessons learned and good practices for knowledge and research capacity building, in particular in developing countries", APN shared its experience in developing research and policymaker capacity in the Asia-Pacific region, underlining the need to respect cultural differences when engaging and informing local communities.

APN side event demonstrates effective science-policy interaction at Regional Forum on Climate Change

APN organized a side event at the Regional Forum on Climate Change themed "Low carbon and climate resilient societies: bridging science, practice and policy" held at the Asian Institute of Technology (AIT) in Thailand. The event was attended by international climate change researchers, scientists, representatives of civil society groups, governments and the private sector.

The side event titled "Scientific research and capacity development initiatives to address adaptation, mitigation and climate resilience in Southeast Asia" was held on 1 July 2015, where six project leaders presented how science paves the way for a better understanding of climate change issues among policy makers, and how outcomes of APN projects were mainstreamed into policy planning, implementation and evaluation.

Engaging with the International Science-Policy Platform on Biodiversity and Ecosystem Services to promote regional activities

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) organized its first capacity building forum in Dehradun on 19–22 October 2015. The forum was intended to create dialogue among funders, receivers and implementers of capacity building activities in the field of biodiversity and ecosystem services.

APN also participated in the Fourth Plenary of IPBES and the preceding Stakeholder Day, with the objectives to strengthen the presence of APN in the IPBES stakeholder community, to understand how APN could become more involved in the IBPES process as a stakeholder and to seek potential cooperation opportunities with other stakeholders. It is expected that the engagement of APN in IBPES could led to potential cooperation in areas of capacity development, regional assessment and science-policy dialogues in the coming years.

APN side event highlights capacity building in responding to climate change

APN joined a group of global change researchers, scientists, and climate change policy and decision-makers in the international conference "Our common future under climate change", a major international scientific conference leading up to the Paris climate talk.

Building on the findings of the IPCC 5th Assessment Report, the conference aimed to present updated knowledge and address key issues concerning climate change in the broader context of global change. APN organized a side event entitled "Responding to climate change by capacity building in the Asia-Pacific", which took place on 9 July 2015.

The side event highlighted outputs and ongoing research activities in the region, particularly related to the linkages between climate change adaptation, disaster risk reduction and the concept of loss and damage from a scientific perspective.

Showcasing 20 years of developing capacity for action-oriented collaborative regional research at AGU Fall Meeting

APN representatives at the 48th AGU Fall Meeting shared the work on the institution's 20 years of experience in contributing to research outputs that are policy-relevant, action-oriented and applicable to multiple countries in the region.

Regional 3R workshop brings together science, policy and the private sector to promote waste management

Co-hosted by the Ministry of the Environment of Japan and the Ministry of Natural Resources and Environment of Viet Nam, APN organized the 1st International Workshop on Waste Management and the 3Rs on 11 March 2016 in Hanoi, Viet Nam. The Workshop received the participation of approximately 60 people from governments, universities and private companies in Indonesia, Japan, Myanmar, Thailand and Viet Nam. The Workshop was composed of presentations on waste management and recycling from each participating country. The Workshop also provided a platform for participants to frankly discuss and share best practices to promote proper waste management, and to introduce possible technologies to achieve a sustainable society.

Communication and Outreach

L. B. Brown Memorial Photo Contest pays tribute to former member

APN organized a photo contest in memory of the late Mr. L. B. Brown, former national Focal Point for the USA and Steering Committee member, and in celebration of the power of photography in raising public awareness on global change issues. Between May and December 2016, a total of 100 entries were submitted by photographers from 14 countries to the monthly contests under different themes. Nine winners of the monthly contests were selected based on reviews from APN members and external judges, and the top winner was selected at the 21st IGM/SPG Meeting held in Zhengzhou, China, in April 2016.

Mr. Mohammad Rakibul Hasan, a documentary photographer based in Dhaka, Bangladesh, was awarded the L. B. Brown Memorial Award for his photograph submitted under the theme of "Water for Sustainability".

"Water is one of the basic needs for human life. Sustainable development of human society depends on maintaining the sustainable use of water."

Hiroshi Tsujihara, Director, APN Secretariat

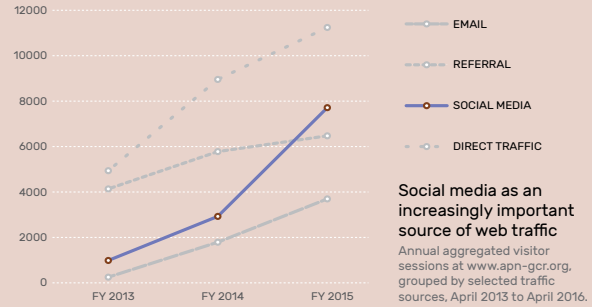
New content and tools for stronger engagement in the global change discourse

In line with the implementation of its fourth Strategic Phase, APN has stepped up efforts in developing appropriate tools and contents for various types of audiences.

New types of content and tools were put in place to ensure the outputs and results of APN activities reach the right stakeholder group in the right format. They were delivered in the form of technical reports, policy briefs, information sheets, media advisory and press releases, using various tools such as web pages, mailing lists, print media, and social media.

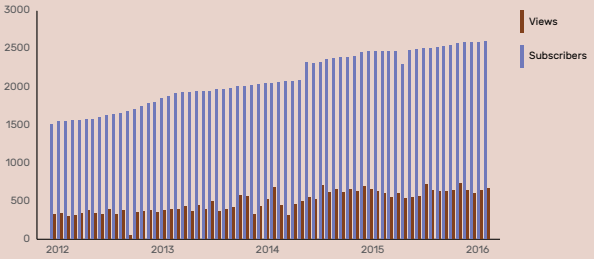
Our stories appeared in The Conversation (Australia), The Hindu (India), Mint (India) and other news outlets. Social media has gained increased momentum as the digital world moves towards hand-held devices.

A new online platform named “Friends of APN” was developed to engage young researchers and practitioners to join the global change research community.



Social media as an increasingly important source of web traffic

Annual aggregated visitor sessions at www.apn-gcr.org, grouped by selected traffic sources, April 2013 to April 2016.



Number of mailing list subscribers and campaign views

2012–2016

In-house publications

Selected publications

CLIMATE CHANGE AND CLIMATE VARIABILITY

Avila, F. B., Dong, S., Menang, K. P., Rajczak, J., Renom, M., & Donat, M. G. (2015). Systematic investigation of gridding-related scaling effects on annual statistics of daily temperature and precipitation maxima: A case study for south-east Australia. *Weather and Climate Extremes*, 9, 6–16.

Bador, M., Gilleland, E., Castellà, M., & Arivelo, T. (2015). Spatial clustering of summer temperature maxima from the CNRM-CM5 climate model ensembles & E-OBS over Europe. *Weather and Climate Extremes*, 9, 17–24.

Bellprat, O., Lott, F. C., Gulizia, C., Parker, H. R., Pampuch, L. A., Pinto, I., ... Stott, P. A. (2015). Unusual past dry and wet rainy seasons over Southern Africa and South America from a climate perspective. *Weather and Climate Extremes*, 9, 36–46.

Mueller, B., Hauser, M., Iles, C., Rimi, R. H., & Wan, H. (2015). Lengthening of the growing season in wheat and maize producing regions. *Weather and Climate Extremes*, 9, 47–56.

Pepler, A. S., Díaz, L. B., Prodhomme, C., & Doblas-Reyes, F. J. (2015). The ability of a multi-model seasonal forecasting ensemble to forecast the frequency of warm, cold and wet extremes. *Weather and Climate Extremes*, 9, 68–77.

Salik, K. M., Jahangir, S., Zahdi, W. ul Z., & Hasson, S. ul. (2015). Climate change vulnerability and adaptation options for the coastal communities of Pakistan. *Ocean & Coastal Management*, 112, 61–73.

Sippel, S., Mitchell, D., Black, M. T., Dittus, A. J., Harrington, L., Schaller, N., & Otto, F. E. L. (2015). Combining large model ensembles with extreme value statistics to improve attribution statements of rare events. *Weather and Climate Extremes*, 9, 25–35.

BIODIVERSITY AND ECOSYSTEM SERVICES

Gopal, B. (Ed.). (2015). Guidelines for rapid assessment of biodiversity and ecosystem services of wetlands. New Delhi: National Institute of Ecology.

Salik, K. M., Hashmi, M. Z.-R., Ishfaq, S., & Zahdi, W.-Z. (2016). Environmental flow requirements and impacts of climate change-induced river flow changes on ecology of the Indus Delta, Pakistan. *Regional Studies in Marine Science*, 7, 185–195.

CHANGES IN THE ATMOSPHERIC, TERRESTRIAL AND MARINE DOMAINS

Calle, L., Canadell, J. G., Patra, P., Ciais, P., Ichii, K., Tian, H., ... Yang X, R. T. K. and J. A. K. (2016). Regional carbon fluxes from land use and land cover change in Asia, 1980–2009. *Environmental Research Letters*, 11(7), 74011.

Dhame, S., Kumar, A., Ramanathan, A., & Chaudhari, P. (2016). Elemental composition, distribution and control of biogenic silica in the anthropogenically disturbed and pristine zone inter-tidal sediments of Indian Sundarbans mangrove-estuarine complex. *Marine Pollution Bulletin*, 111(1–2), 68–85.

Kumar, A., & Ramanathan, A. (2015). Speciation of selected trace metals (Fe, Mn, Cu and Zn) with depth in the sediments of Sundarban mangroves: India and Bangladesh. *Journal of Soils and Sediments*, 15(12), 2476–2486.

Kumar, A., Ramanathan, A., Prasad, M. B. K., Datta, D., Kumar, M., & Sappal, S. M. (2016). Distribution, enrichment, and potential toxicity of trace metals in the surface sediments of Sundarban mangrove ecosystem, Bangladesh: a baseline study before Sundarban oil spill of December, 2014. *Environmental Science and Pollution Research*, 23(9), 8985–8999.

Thompson, R. L., Patra, P. K., Chevallier, F., Maksyutov, S., Law, R. M., Ziehn, T., ... Ciais, P. (2016). Top-down assessment of the Asian carbon budget since the mid 1990s. *Nature Communications*, 7, 10724.

Whan, K., Zscheischler, J., Orth, R., Shongwe, M., Rahimi, M., & Asare, E. O. (2015). Impact of soil moisture on extreme maximum temperatures in Europe. *Weather and Climate Extremes*, 9, 57–67.

RESOURCES UTILISATION & PATHWAYS FOR SUSTAINABLE DEVELOPMENT

Jupesta, J., & Wakiyama, T. (Eds.). (2016). Low Carbon Urban Infrastructure Investment in Asian Cities. London: Palgrave Macmillan UK.

RISK REDUCTION AND RESILIENCE

Abedin, M. A., & Shaw, R. (2015). The role of university networks in disaster risk reduction: Perspective from coastal Bangladesh. *International Journal of Disaster Risk Reduction*, 13, 381–389.

Oktari, R. S., Shiwaku, K., Munadi, K., Syamsidik, & Shaw, R. (2015). A conceptual model of a school–community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia. *International Journal of Disaster Risk Reduction*, 12, 300–310.

Patankar, A., & Patwardhan, A. (2016). Estimating the uninsured losses due to extreme weather events and implications for informal sector vulnerability: a case study of Mumbai, India. *Natural Hazards*, 80(1), 285–310.

Ongoing projects

Regional research (ARCP)

ARCP2013-02CMY-FORTES

Seagrass-mangrove ecosystems: Bioshields against biodiversity loss and impacts of local and global change along Indo-Pacific coasts

Prof. Miguel Fortes, University of the Philippines, Philippines

ARCP2013-03CMY-HERATH

Developing ecosystem based adaptation strategies for enhancing resilience of rice terrace farming systems against climate change

Prof. Anura Srikantha Herath, United Nation University, Japan

ARCP2013-08CMY-DECOSTA

A study on loss of land surface and changes to water resources resulting from sea level rise and climate change

Dr. G. S. DeCosta, Unitec Institute of Technology, New Zealand

ARCP2013-10CMY-YOO

Toward a fire and haze early warning system for southeast Asia

Dr. Jin Ho Yoo, APEC Climate Center, Republic of Korea

ARCP2013-24NSY-FIDELMAN

Supporting governance institutions for adaptive capacity to environmental change

Dr. Pedro Fidelman, University of the Sunshine Coast, Australia

ARCP2014-01CMY-MEINKE

Improving the robustness, sustainability, productivity and eco-efficiencies of rice systems throughout Asia

Prof. Holger Meinke, University of Tasmania, Australia

ARCP2014-08CMY-PRABHAKAR

Assessing community risk insurance initiatives and identifying enabling policy and institutional factors for maximising climate change adaptation and disaster risk reduction benefits from risk insurance

Dr. S.V.R.K. Prabhakar, Institute for Global Environmental Strategies, Japan

ARCP2014-09CMY-GOMBOEV

Boreal and tropical forest and forest-steppes in East Asia: A comparative study on climate impacts and adaptation

Prof. Bair O. Gomboev, Russian Academy of Sciences, Russian Federation

ARCP2014-10CMY-SHRESTHA

Runoff scenario and water based adaptation strategies in South Asia

Dr. Madan Lall Shrestha, The Small Earth Nepal, Nepal

ARCP2014-11CMY-YAMADA

Adaptation of solid waste management to frequent floods in vulnerable mid-scale Asian cities

Dr. Masato Yamada, National Institute for Environmental Studies, Japan

ARCP2014-12CMY-SELLERS

Mega-regional development and environmental change in China and India

Associate Professor Jefferey M. Sellers, University of Southern California, United States of America3

ARCP2014-13CMY-STHIANNOPKAO

Developing scientific and management tools to address impacts of changing climate and land use patterns on water quality in East Asia's river basins

Assistant Prof. Suthipong Sthiannopkao, Dong-A University, Republic of Korea

ARCP2015-01CMY-MIYATA

Toward CarboAsia: Integration and syntheses of terrestrial ecosystem flux data in tropics/subtropics and croplands in Asia by activating regional tower-based observation networks

Dr. Akira Miyata, National Institute for Agro-Environmental Sciences, Japan

ARCP2015-02CMY-AILIKUN

Coordinated regional climate downscaling experiment (CORDEX) in monsoon Asia

Dr. Ailikun, Chinese Academy of Sciences, China

ARCP2015-03CMY-LI

Assessing spatiotemporal variability of NPP, NEP and carbon sinks of global grassland ecosystem in response to climate change in 1911-2011

Prof. Jianlong Li, Nanjing University, China

ARCP2015-04CMY-TANGANG

Southeast Asia regional climate downscaling project (SEACLID)

Prof. Fredolin Tangang, University Kebangsaan Malaysia, Malaysia

ARCP2015-07CMY-BABEL

Developing an operational water security index, and its application in selected diverse regions of Asia

Prof. Mukand S. Babel, Asian Institute of Technology, Thailand

ARCP2015-08CMY-DEY

Impacts of crop residue removal for biomass energy on soil function: studies to recommend climate adaptive agricultural waste management

Dr. Dipayan Dey, South Asian Forum for Environment, India

ARCP2015-09CMY-HEATH

Development of an evidence-based climate change adaptation toolkit to help improve community resilience to climate change impacts in Uttarakhand, India

Dr. Lance Clive Heath, Australian National University, AUSTRALIA

ARCP2015-10CMY(B&ES)-LIANG

Coastal forest management in the face of global change based on case studies in Japan, Myanmar and the Philippines

Mr. Liang Luohui, United Nations University, Japan

ARCP2015-11CMY-MISHRA

Climate change adaptation through optimal stormwater capture measures: Towards a new paradigm for urban water security

Binaya Kumar Mishra, United Nations University, Japan

ARCP2015-12CMY-SHARP

Integrated solid waste management system leading to zero waste for sustainable resource utilisation in rapid urbanized areas in developing countries

Dr. Alice Sharp, Thammasat University, Thailand

ARCP2015-13CMY-ZHOU

Assessment of climate-induced long-term water availability in Ganges basin and impacts on energy security in South Asia

Dr. Xin Zhou, Institute for Global Environmental Strategies, Japan

ARCP2016-01CMY(B&ES)-SALMO

Influence of mangrove biodiversity on accumulation of carbon and resilience to sea level rise: A comparative assessment among disturbed, restored and intact mangrove systems

Dr. Severino G. Salmo III, Ateneo de Manila University, Philippines

ARCP2016-02CMY-WU

Comparative analysis of pollution sources at the Hangzhou Bay and Mekong River mouths

Dr. Wu Jiaping, Zhejiang University, China

Capacity development (CAPaBLE)

CBA2015-02NMY-PUSHPAKUMARA

Scientific capacity development to strengthen informed-decision making for improved climate policy formulation and implementation in South Asian countries

Prof. Gamini Pushpakumara, University of Peradeniya, Sri Lanka

CBA2015-03NMY-ADININGSIH

Building capacity for urban climate change adaptation in Southeast Asia

Dr. Erna Sri Adiningsih, Indonesian National Institute of Aeronautics and Space, Indonesia

CBA2015-04NSY-AVTAR

Developing a training module to monitor forest cover and deforestation using advanced remote sensing techniques under UN-CECAR Framework in support of REDD+ MRV system

Dr. Ram Avtar, United Nations University, Japan

CBA2015-05NSY-SEITZINGER

International Geosphere-Biosphere Programme landmark synthesis

Dr. Sybil Putnam Seitzinger, International Geosphere-Biosphere Programme, Sweden

CBA2015-06NSY-SILVA

Escalating small hydro-power development and aquatic biodiversity of mountain streams in Sri Lanka

Prof. E.I.L Silva, Water Resources Science and Technology, Sri Lanka

CBA2015-07NSY-PRASAD

Biodiversity conservation in Western Ghats, India: Capacity building in harnessing geospatial data management

Dr. S. Narendra Prasad, International Institute of Information Technology, India

CBA2015-09NSY-COMIA

On-the-ground promotion of climate change adaptation strategies via establishment of local agroforestry learning laboratories in Southeast Asia

Dr. Reynaldo A. Comia, UPLB Institute of Agro-forestry, Philippines

Frameworks

CAF2013-01SY-L+D(F)-HUQ

Asia Pacific Forum on Loss and Damage

Dr. Saleemul Huq, International Institute for Environment and Development (IIED), United Kingdom

CAF2014-CD04-NSY-SHARMA

Can traditional livelihoods and mining co-exist in a changing climate: strengthening public-private partnerships in Mongolia to reduce risk and address loss and damage

Dr. Vigya Sharma, The University of Queensland, Australia

CAF2014-CD05-NSY-HOLLAND

Capacity Building for Resilience Planning in Fiji: Bridging the science-policy-practice interface in Climate Change Adaptation (CCA), Disaster Risk Reduction (DRR) and Loss and Damage (L+D)

Prof. Elisabeth Holland, University of the South Pacific, Fiji

CAF2015-RR01-CMY-BASNAYAKE

Developing climate inclusive potential loss and damage assessment methodology for flood hazards

Dr. Senaka Basnayake, Asian Disaster Preparedness Center, Thailand

CAF2015-RR02-CMY-SINGH

Developing and promoting a people-centred approach to assess and address impacts of climate change induced loss and damage

Harjeet Singh, ActionAid International, India

CAF2015-RR03-CMY-PEREIRA

Integrating CCA, DRR and L+D to Address Emerging Challenges due to Slow Onset Processes

Professor Joy Jacqueline Pereira, Universiti Kebangsaan Malaysia, Malaysia

CAF2015-RR04-CMY-THOMALLA

An analysis of longer-term (5-10 years) recovery following major disasters in the Asia Pacific Region: Lessons for resilient development

Dr. Frank Thomalla, Stockholm Environment Institute, Thailand

CAF2015-RR05-CMY-LASCO

Assessing the linkages between climate change adaptation (CCA), disaster risk reduction (DRR), and loss and damage (L&D): Case studies in the low-lying coastal cities of Cambodia, Indonesia, Philippines, Thailand and Viet Nam

Dr. Rodel A. Lasco, The OML Center, Philippines

CAF2015-RR06(ARCP)-CMY-WANG

Integrated flood modelling and pre-disaster loss estimation in Asian countries

Dr. Yi Wang, United Nations University, Japan

CAF2015-RR07-CMY-LOTIA

Methods toolbox for assessing loss and damage at local level

Ms. Hina Lotia, LEAD Pakistan, Pakistan

CAF2015-RR08-CMY-CHIBA

Addressing non-economic losses and damages associated with climate change: Learning from the recent past extreme climatic events for future planning

Mr. Yohei Chiba, Institute for Global Environmental Strategies, Japan

CAF2015-RR09-CMY-HUONG

Climate change risk assessment and adaptation for loss and damage of urban transportation infrastructure in Southeast Asia

Ms. Cao Thi Thu Huong, Transport Sustainable Development and Environment Research Institute, Viet Nam

CAF2015-CD01-CMY-WIJENAYAKE

Enhancing capacity of policy makers and practitioners in India, Sri Lanka and Nepal on loss and damage related to slow onset events in the region

Ms. Vositha Wijenayake, Climate Action Network South Asia, Bangladesh

CAF2015-CD02-CMY-NHAT

Capacity building for national, provincial stakeholders and local communities on loss and damage related to disaster risk reduction and climate change adaptation

Dr. Le Minh Nhat, Department of Meteorology Hydrology and Climate Change, Viet Nam

CAF2015-CD03-CMY-IBRAHIM

Building Capacity for Reducing Loss and Damage Resulting from Slow and Rapid Onset Climatic Extremes through Risk Reduction and Proactive Adaptation within the Broader Context of Sustainable Development

Prof. Kamarulazizi Ibrahim, Universiti Sains Malaysia, Malaysia

CAF2015-RR10-NMY-NEEF

Climate change adaptation in post-disaster recovery processes: Flood-affected communities in Cambodia and Fiji

Professor Andreas Neef, University of Auckland, New Zealand

CAF2015-RR11-NMY-SISWANTO

Developing high spatiotemporal resolution datasets of low-trophic level aquatic organism and land-use/land-cover in the Asia-Pacific Region: Toward an integrated framework for assessing vulnerability, adaptation, and mitigation of the Asia-Pacific ecosystems to global climate change

Dr. Eko Siswanto, Japan Agency for Marine-Earth Science and Technology, Japan

CAF2015-RR12-NMY-SHAHEEN

Climate-smart agriculture through sustainable water use management: Exploring new approaches and devising strategies for climate change adaptation in South Asia

Ms. Nuzba Shaheen, Global Change Impact Studies Centre, Pakistan

CAF2015-RR13-NMY-DAUTOVA

Developing life-supporting marine ecosystems along the East Asia's coasts: A synthesis of physical and biological data regarding coral reef ecosystems for the science-based management and socio-ecological policy making in terms of global sustainability

Dr. Tatiana N. Dautova, Russian Academy of Sciences, Russian Federation

CAF2015-RR14-NMY-ODEH

Monitoring grassland degradation in North/Central Asia: Deciphering the impacts of climate change and government policies at different spatial-temporal scales using remote sensing and expert knowledge

Associate Prof. Inakwu Odeh, The University of Sydney, Australia

CAF2015-RR15-NMY-MARAMBE

Building climate resilience in farming systems in sloping lands of South Asia

Prof. Buddhi Marambe, University of Peradeniya, Sri Lanka

CAF2015-RR16-NMY-PHAM

Utilising geospatial technology to assess health vulnerability to climate change for rural population in Viet Nam and the Philippines

Dr. Pham Thi Thanh Nga, Viet Nam Academy of Science and Technology, Viet Nam

CAF2015-RR17-NMY-ARIFWIDODO

Understanding urban heat island effect and its implications to climate change adaptation strategies in major Southeast Asian cities

Dr. Sigit D. Arifwidodo, Kasetsart University, Thailand

CAF2015-RR18-NSY-JACOBSON

Optimising climate change adaptation through enhanced community resilience

Dr. Christine Jacobson, University of the Sunshine Coast, Australia

CAF2015-RR19-NSY-MONPRAPUSSORN

Integrated analysis of climate, land-use and water for resilient urban megacities: A case study of Thailand, Lao PDR and Viet Nam

Dr. Sathaporn Monprapussorn, Srinakharinwirot University, Thailand

CAF2015-CD04-NSY-RALULU

Assessment and mapping of the vulnerability of iTaukei (indigenous) communities in Fiji

Mr. Ovini Ralulu, Ministry of Finance, Fiji

LCI2013-01CMY(R)-VASHIST

Identification of Policy and Institutional Gaps, Drivers and Strategies to Scale-up Low Carbon and Energy Efficient Technology Application in the Construction and Infrastructure Sectors in South Asia

Dr. Sanjay Vashist, Climate Action Network South Asia (CANSA), Bangladesh

LCI2013-02CMY(R)-DHAKAL

Understanding and Quantifying the Water-Energy-Carbon Nexus for Low Carbon Development in Asian Cities

Dr. Shobhakar Dhakal, Asian Institute of Technology, Thailand

LCI2013-03CMY(R)-MACANDOG

Integrated Sustainability Assessment of Bioenergy Potentials in Asia: An Application of a Hybrid Approach on Trade-offs and Pathway

Prof. Damasa B.M. Macandog, University of Philippines, Philippines

APN members

This setion contains a list of current APN members at the time of publication.

INTER-GOVERNMENTAL MEETING

NATIONAL FOCAL POINTS

BANGLADESH
Md. Ziaur Rahman
Ministry of Environment and Forests

BHUTAN
Karma Tshering
National Environment Commission

CAMBODIA
Roath Sith
Ministry of Environment

CHINA
Chengyong Sun
Ministry of Science and Technology

INDIA
J. R. Bhatt
Ministry of Environment, Forest and Climate Change

INDONESIA
Henry Bastaman
Ministry of Environment and Forestry

JAPAN
Akio Takemoto
Ministry of the Environment

LAO PDR
Virasack Chundara
Ministry of Natural Resources and Environment

MALAYSIA
Che Gayah Ismail
Ministry of Science, Technology and Innovation

MONGOLIA
Bayarbat Dashzeveg
Ministry of Environment and Green Development

NEPAL
Laxmi Kumari Basnet
Ministry of Population and Environment

PAKISTAN
Muhammad Irfan Tariq
Ministry of Climate Change

PHILIPPINES
Marcial C. Amaro Jr.
Department of Environment and Natural Resources

REPUBLIC OF KOREA
Beom-Sik Yoo
Ministry of Environment

RUSSIAN FEDERATION
Andrey V. Adrianov
Russian Academy of Sciences

SRI LANKA
Udaya R. Seneviratne
Ministry of Mahaweli Development and Environment

THAILAND
Monthip Sriratana
National Research Council of Thailand

UNITED STATES OF AMERICA
Luis M. Tupas
United States Department of Agriculture

SCIENTIFIC PLANNING GROUP

APPOINTED MEMBERS

BANGLADESH
Md. Giashuddin Miah
Bangabandhu Sheikh Mujibur Rahman Agricultural University

BHUTAN
Jamba Tobden
Royal University of Bhutan

CAMBODIA
Veasna Kum
Zaman University

CHINA
Wenjie Dong
Sun Yat-Sen University

INDIA
Hemant Borgaonkar
Indian Institute of Tropical Meteorology

INDONESIA
Erna Sri Adiningsih
National Institute of Aeronautics and Space

JAPAN
Kensuke Fukushi
The University of Tokyo

LAO PDR
Virasack Chundara
Ministry of Natural Resources and Environment

MALAYSIA
Fariza Yunus
Malaysian Meteorological Department

MONGOLIA
Tsogtbaatar Jamsran
Mongolian Academy of Sciences

NEPAL
Madan Lall Shrestha
Nepal Academy of Science and Technology

NEW ZEALAND
Andrew Tait
National Institute for Water and Atmospheric Research

PAKISTAN
Amir Muhammed
National University of Computer and Emerging Sciences

PHILIPPINES
Henry Adornado
Department of Environment and Natural Resources

REPUBLIC OF KOREA
Soojeong Myeong
Korea Environment Institute

RUSSIAN FEDERATION
Alexander Sterin
Russian Research Institute for Hydrometeorological Information-World Data Center

SRI LANKA
Lalith Chandrapala
Department of Meteorology

THAILAND
Jariya Boonjawat
Chulalongkorn University

UNITED STATES OF AMERICA
Luis M. Tupas
United States Department of Agriculture

VIET NAM
Kim Chi Ngo
Vietnam Academy of Science and Technology

INVITED EXPERTS

AUSTRALIA
Lance Clive Heath
Australian National University

CHINA
Ailikun
Chinese Academy of Sciences

INDIA
Kanayathu Chacko Koshy
Universiti Sains Malaysia (retired)

MALAYSIA
Subramaniam Moten
Malaysian Meteorological Department (retired)

STEERING COMMITTEE

ELECTED MEMBERS

BHUTAN
Karma Tshering
National Environment Commission

CHINA
Chengyong Sun
Ministry of Science and Technology

PAKISTAN
Muhammad Irfan Tariq
Ministry of Climate Change

PHILIPPINES
Marcial C. Amaro Jr.
Department of Environment and Natural Resources

RUSSIAN FEDERATION
Andrey V. Adrianov
Russian Academy of Sciences

DONOR MEMBERS

JAPAN
Akio Takemoto
Ministry of the Environment

REPUBLIC OF KOREA
Beom-Sik Yoo
Ministry of Environment

SPG CO-CHAIRS

BANGLADESH
Md. Giashuddin Miah
Bangabandhu Sheikh Mujibur Rahman Agricultural University

JAPAN
Kensuke Fukushi
The University of Tokyo

CO-OPTED MEMBERS

NEW ZEALAND
W. Andrew Matthews
National Commission for UNESCO, New Zealand (retired)

UNITED STATES OF AMERICA
Roland John Fuchs
East West Center, United States (retired)

HOST OF THE 22ND IGM

INDIA
J. R. Bhatt
Ministry of Environment, Forest and Climate Change

SPG SUB-COMMITTEE

SPG CO-CHAIRS

BANGLADESH
Md. Giashuddin Miah
Bangabandhu Sheikh Mujibur Rahman Agricultural University

JAPAN
Kensuke Fukushi
The University of Tokyo

ELECTED MEMBERS

MALAYSIA
Fariza Yunus
Malaysian Meteorological Department

MONGOLIA
Tsogtbaatar Jamsran
Mongolian Academy of Sciences

UNITED STATES OF AMERICA
Luis M. Tupas
United States Department of Agriculture

CAPACITY DEVELOPMENT COMMITTEE

SPG CO-CHAIRS

BANGLADESH
Md. Giashuddin Miah
Bangabandhu Sheikh Mujibur Rahman Agricultural University

JAPAN
Kensuke Fukushi
The University of Tokyo

SC CHAIR

CHINA
Chengyong Sun
Ministry of Science and Technology

DONOR MEMBER

JAPAN
Akio Takemoto
Ministry of the Environment

INVITED EXPERTS

NEW ZEALAND
W. Andrew Matthews
National Commission for UNESCO, New Zealand (retired)

PHILIPPINES
Juan Pulhin
University of the Philippines Los Baños

SRI LANKA
Srikantha Herath
United Nations University

UNITED STATES OF AMERICA
Roland John Fuchs
East West Center, United States (retired)

SECRETARIAT

Director
Hiroshi Tsujihara

Head, Division of Development and Institutional Affairs
Yukihiro Imanari

Head, Division of Communication and Scientific Affairs
Linda Anne Stevenson

Head, Division of Administrative Affairs
Shinichiro Oe

Administrative Officer
Chieko Kodama

Programme Officer for Science and Institutional Affairs
Dyota Condrorini

Programme Fellow for Communication and Scientific Affairs
Huong Long Dinh

Programme Officer for Development and Institutional Affairs
Rieko Tamura

Programme Officer for Communications and Development
Xiaojun Deng

Major events

A strong network enables APN to operate efficiently and effectively within the global change and sustainability communities. APN develops and maintains a strong network with key stakeholders by organising and participating in various meetings and events of these organisations. The following is a list of major events organized by APN or participated by an APN representative.

The Second 3Rs Conference on Waste Cycles and Waste Management
21-22 May 2015, Daejon, Republic of Korea

The 42nd Session of the Subsidiary Body for Scientific and Technological Advice (SBSTA)
1-11 June 2015, Bonn, Germany

The 23rd Conference of the Parties of the Inter-American Institute for Global Change Research (IAI)
24-25 June 2015, Lima, Peru

Regional Forum on Climate Change: Low Carbon and Climate Resilient Societies—Science, Policy and Practice
1-3 July 2015, Bangkok, Thailand

Our Common Future Under Climate Change—International Scientific Conference
7-10 July 2015, Paris, France

The 7th International Forum for Sustainable Asia and the Pacific (ISAP2015)
28–29 July 2015, Yokohama, Japan

International Symposium on Wild Boar Management in Urban Areas*
1 August 2015, Kobe, Japan

International Workshop on Land Cover/Land Use Change and Atmospheric Interactions
4-7 August 2015, Bogor, Indonesia

The 6th Regional 3R Forum in Asia and the Pacific
16-19 August 2015, Male, Maldives

The 8th APN Southeast Asia Sub-Regional Committee Meeting*
7-8 September 2015, Jakarta, Indonesia

The 8th GEOSS Asia-Pacific Symposium: Towards the Next Decade of GEOSS in the Asia-Pacific Region
9-11 September 2015, Beijing, China

The 31st APN Steering Committee Meeting*
17-18 September 2015, Kobe, Japan

The 2nd Temperate East Asia Sub-Regional Committee Meeting, Science-Policy Dialogue and Proposal Development Training Workshop*
2-7 November 2015, Ulaanbaatar, Mongolia

International workshop and open seminar on Satoyama*
27-28 November 2015, Takarazuka, Japan

The 4th Plenary Session of IPBES
22-28 February 2016, Kuala Lumpur, Malaysia

International Workshop on Waste Management and the 3Rs*
11 March 2016, Hanoi, Viet Nam

The 21st Inter-Governmental Meeting and Scientific Planning Group Meeting*
17-21 April 2016, Zhengzhou, China

** Events organized by APN*

Financial resources

APN receives financial contributions from the Ministry of the Environment of Japan; Hyogo Prefectural Government, Japan; Ministry of Environment, Republic of Korea; and Ministry for the Environment, New Zealand. In addition to direct financial support, APN receives significant in kind contribution from member country governments and the Hyogo Prefectural Government of Japan. The Ministry of Environment of Cambodia contributed USD 18,000 to the Proposal Development Training Workshop, held in Siem Reap, Cambodia in October 2015.

FINANCIAL RESOURCES FOR FY 2015 (USD)

Donor contributions, FY 2015	Ministry of the Environment of Japan	2,170,000
	Hyogo Prefectural Government, Japan	172,000
	Ministry of Environment, Republic of Korea	50,000
	Ministry for the Environment, New Zealand	22,200
Balance brought forward from FY 2014 (including committed funds for multiyear projects)		1,941,700
Returned funds from completed projects and adjustments		80,942
	Total	4,436,843

USE OF RESOURCES, FY 2015 (USD)

	Executed and committed
Core programmes	1,623,372
Frameworks	1,664,355
Other scientific and policy activities	187,681
Institutional activities	175,000
Personnel, administration and operational costs	776,088
Total	4,426,496

The figures include executed expenditures for old and new projects and activities, as well as committed resources for multi-year projects.

Acronyms

#

3Rs 43, 53
Reduce, reuse, recycle

A

ACAP 20
Asia Center for Air Pollution Research

ACCA21 40
The Administrative Centre for China's Agenda 21

AGU 43
American Geophysical Union

AIT 42
Asian Institute of Technology

B

BSMRAU 35
Bangabandhu Sheikh Mujibur Rahman Agricultural University

C

CAS 31
Chinese Academy of Sciences

CDC 52
Capacity Development Committee

CORDEX 24
Coordinated Regional Climate Downscaling Experiment

CSIRO 8, 9
Commonwealth Scientific and Industrial Research Organisation

E

EANET 20
Acid Deposition Monitoring Network in Asia

ECNU 30
East China Normal University

ERTC 20
Environmental Research and Training Centre, Thailand

G

GEOSS 53
Global Earth Observation System of Systems

I

IAI 53
Inter-American Institute for Global Change Research

ICTP 28
International Centre for Theoretical Physics

IGBP 10, 25
International Geosphere-Biosphere Programme

IGES 19
Institute for Global Environmental Strategies

IGM 40, 51
Inter-Governmental Meeting

IMBER 30
Integrated Marine Biogeochemistry and Ecosystem Research

IPBES 42, 53
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

IPCC 8, 11
Intergovernmental Panel on Climate Change

IUCN 13, 25
International Union for Conservation of Nature

J

JAMSTEC 8, 35
Japan Agency for Marine-Earth Science and Technology

M

MOST 40
Ministry of Science and Technology, China

MRI 40
Mountain Research Initiative

N

NARC 35
National Agricultural Research Center, Pakistan

NILU 9
Norsk Institutt for Luftforskning (NILU), Norway

P

PARR 32
Pan-Asia Risk Reduction fellowship

PDTW 38
Proposal Development Training Workshop

R

RECOFTC 19
Centre for People and Forests, Thailand

REDD+ 18, 38
Reducing emissions from deforestation and forest degradation

RFD 20
Royal Forest Department, Thailand

RRDI 35
Rice Research and Development Institute, Sri Lanka

S

SBSTA 42, 53
Subsidiary Body for Scientific and Technological Advice

SC 51
Steering Committee

SIDS 10
Small islands developing states

SKLEC 30
State Key Laboratory of Estuarine and Coastal Research, China

SPG 40, 52
Scientific Planning Group

START 31, 32
SysTem for Analysis, Research and Training

T

TERI 37
The Energy and Resources Institute

U

UPM 20
Universiti Putra Malaysia

USM 29
Universiti Sains Malaysia

W

WCRP 28
World Climate Research Programme

WWF 34
World Wildlife Fund

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