About APN

The Asia-Pacific Network for Global Change Research (APN) is an intergovernmental network of 22 countries working towards an Asia-Pacific region that is successfully addressing the challenges of global change and sustainability.

Fiscal year 2018 at a glance

To achieve its mission, a set of programmes and activities are conducted.
- Funds regional, multi-country and transdisciplinary research projects on global change and sustainability that provides underpinning scientific input to policymaking.
- Funds and implements projects and workshops to develop the capacity of individuals and organizations to conduct high quality research on global change and sustainability.
- Fosters and strengthens interactions between the science and policymaking communities to produce actionable science and informed decision-making.

RESEARCH & CAPACITY DEVELOPMENT

17 projects completed, involving 109 project leaders and collaborators.

EXTENSIVE NETWORK

3,100+ researchers, government officials, community members and practitioners directly involved in projects.
3,815 active subscribers to the APN mailing list.

INVOLVING YOUNG SCIENTISTS

350+ young scientists directly involved in projects.
88% of projects reported involvement of young scientists.

KNOWLEDGE MANAGEMENT

798 publications produced and shared through the APN E-Library.
19,661 page views on the APN E-Library.
Due to rapid climate change, peripheral communities in the Pacific Islands urgently need to adapt to its impacts. To understand the current capacities of these communities, research was conducted in 73 communities in 18 islands, covering Fiji and the Federated States of Micronesia.

The project found that many communities heavily depend on foreign financial aid to cope with the impacts of climate change, which is a “one-size-fits-all” approach that is ineffective and unsustainable. On the contrary, the project revealed that communities that are located further from urban areas tend to demonstrate a diverse mechanism to cope with the impacts of climate change built on traditional knowledge. Additionally, these communities were observed to recover faster after a disaster event and to have greater self-belief as a result of the close-knit relationship among community members.

Based on the findings, the project developed an easy-to-use tool to evaluate and understand the challenges that peripheral communities face, and the diverse coping capacities of these communities in the Pacific Islands and other peripheral communities in the Asia-Pacific region.

The tool is available in the final report of the project deposited in the APN E-Library.
Climate

Climate scenarios deepen the understanding of future climate change in Southeast Asia

TO UNDERSTAND HOW future climate change could affect areas such as food safety and food security at regional and local levels, high-resolution, robust and multi-model regional scenarios are necessary. These scenarios are produced by dynamical climate downscaling, a method that is useful in regions that lack long term high-quality observed data; however, the method is also technically challenging, costly and time-consuming to perform.

Trained more than 40 early-career scientists in eight workshops, producing nine research papers and 30 regional climate simulations.

To address the situation, the Southeast Asia Subregional Climate Downscaling (SEACLID) project was established to share tasks, expertise and computing resources to respond to the growing demands of climate information in the region. SEACLID was then incorporated into the Coordinated Regional Climate Downscaling Experiment (CORDEX) and produced a large compilation of high-quality simulations that contributed to enhancing the understanding of future climate changes in Southeast Asia. The key findings include significant changes in rainfall and drought patterns in parts of Myanmar, and extremely drier periods in Indonesia, in particular when coupled with the influences of El Niño.

Further downscaling work, including bias-correction, data upload and documentation work are expected to be conducted in a separate initiative.

Studies conducted in China, Thailand and Viet Nam showed extreme heat events contribute significantly to morbidity and mortality. The findings shed new light on the importance of developing climate adaptation strategies that are tailored to each region.

Enhanced multidisciplinary capacity and networking promotes understanding of loss and damage

DUE TO DRAMATIC changes in intensity and patterns of climate events caused by global warming, the importance of scientific research to document and report loss and damage is increasing, particularly in...
Southeast Asia. However, this remains a challenge as knowledge gaps are hindering the implementation.

To address these gaps, this project examined the links between climate change adaptation and disaster risk reduction in the context of loss and damage, and how the two can be integrated to address emerging challenges such as droughts, floods and saline intrusion due to slow-onset processes.

The project conducted pilot activities in Cambodia, Malaysia, Myanmar, Philippines and Viet Nam to identify: key issues related to slow-onset processes; potential risk-based approaches to address adaptation and disaster risk reduction; methods to evaluate prospective loss and damage; and policy strategies to integrate climate change adaptation, disaster risk reduction, and loss and damage.

Based on the activities, eight workshops were organized to: enhance multidisciplinary capacities of researchers; establish connections among researchers, policymakers and practitioners at the local, national and regional levels; and develop a network of experts from diverse backgrounds. It is hoped that the findings of the project will assist the development of the IPCC Sixth Assessment Report.

Waste disposal guidelines assist local governments and urban residents in reducing flood occurrence in Thailand and Viet Nam

One of the causes of prevalent floods in cities in Asia is the blockage of drainage due to inappropriate disposal of waste. To address the issue, factors for preventing inappropriate waste disposal need to be identified, both from physical and social perspectives, and removed.

The project aimed to formulate a strategy to reduce the risk of urban flood caused by drainage problems in Bangkok, Thailand, and Hue, Viet Nam. This was done by identifying solid debris produced from waste collection, and anthropogenic and natural activities through local administrative services during sewage and drainage clearing. The composition of solid debris was analyzed, the drainage system was investigated, and a survey was conducted to understand the drainage capacity under normal conditions and during a flood event, as well as the type of materials that obstruct the drainage system. Additionally, the behaviour of residents with regard to waste disposal was analyzed.

Ninety-five officers of the Bangkok Metropolitan Administration and practitioners joined five capacity development workshops and inter-department task force meetings.

Based on the findings, a model for debris clogging was developed, and a series of workshops and meetings were organized to formulate a strategy for improved solid waste management in drainage systems and canals. Consequently, the strategy was taken up by the local authorities and is currently being implemented in the two cities.

An illustrated training manual titled “Grey Building Handbook” was developed to provide guidance for increased disaster resilience in the informal building sector in South Asia. The handbook is available in Bengali, Nepali and English.
Biodiversity and ecosystems

Applying management strategy evaluation to assist decision-making for sustainable fishery resource

FOR THE SUSTAINABLE AND EFFECTIVE use of fishery resources, Management Strategy Evaluation (MSE) is becoming a standard tool used across various fishery management organizations. MSE is a model aimed at evaluating the robustness of a potential plan by examining the objectives, costs and constraints, and assisting in determining which kind of plan will perform the best in achieving the management objectives for the fishery.

To assist IMBIZO*, a gathering to progress the implementation of the Science Plan of the Integrated Marine Biosphere Research (IMBeR), a workshop was organized for early-career scientists and students to share knowledge on the design and implementation of MSE, and on the importance of effective communication among the parties.

* Imbizo is a Zulu word for gathering.

The workshop contributed to strengthening IMBeR by enhancing international networks of social and natural scientists in the Asia-Pacific region. Consequently, based on the improved understanding of MSE and its best practices, the project developed a synthesis report on the implementation of MSE with a focus on small scale fisheries.
The vulnerability of urban water under the influence of climate change, and rapid urbanization and industrialization should not be overlooked. The project assessed the vulnerability of drinking water in Guwahati, India, and Colombo, Sri Lanka, by analyzing the concurrence of pharmaceuticals and personal care products, antibiotic-resistant bacteria, metal, faecal contamination etc., and long-term changes in precipitation and temperature of the Brahmaputra River and Kelani River, respectively.

The assessment identified that both rivers contain a variety of contaminants and stressors. High levels of theophylline and caffeine were detected in the Brahmaputra River indicating the negative impact of urbanization. The prevalence of a high level of *E. coli* from upstream of the Kelani River, especially at Seethawaka EPZ, suggests poor quality of treated industrial wastewater. Furthermore, in addition to water testing, people’s perception on the future of drinking water and its health risks was also collected.

The project concluded with a roundtable discussion where more than 30 experts from the state government, academia, industry, NGOs and the agricultural sector participated. Valuable information was collected including new treatment plants in industrial areas to control water contamination at source, water harvesting and pollution measurement methods, etc. Consequently, a new policy implementation framework for sustainable water management was developed and proposed for the two countries.

Framework developed for sustainable water management under the influence of climate change, rapid urbanization and industrialization

**Assessments on long-term water availability of the Ganges Basin, and its water supply-demand balance under the influence of climate change and increased number of power plants were conducted in India, Bangladesh and Nepal.**

**Studies on the impact of organic amendments on productivity and soil properties in India and Sri Lanka show an increase of crop yields at the cost of higher level greenhouse gas emissions.**
Improved skills promote sustainable watershed management practices in South Asia

**THE RAPID DEPLETION** of freshwater resources, and frequent occurrence of watershed flood and drought caused by climate change, pose serious threats to the sustainability of agriculture in South Asia. However, traditional practices and skills have failed to respond to these threats, leading to an increased level of food insecurity and poverty.

To pursue sustainable watershed management practices, the project developed an easy-to-use rating method to assess the level of climate risk of a particular watershed. Subsequently, by using the method, 47 improved watershed management practices were developed that include: rainwater harvesting at watersheds, farms and households; soil erosion control measures; and potential use of harvested rainwater for groundwater recharge, etc.

Three workshops were organized in Pakistan, Nepal and Sri Lanka to build the capacity of 20-25 professionals including climate scientists, agriculturalists and community workers. The workshop provided updated information on climate change, climate resilience and food security, and streamlined the 47 improved watershed management practices in line with local climate scenarios.

Consequently, brochures recommending the top four watershed management practices were developed and disseminated to 100 farmers and service providers in Pakistan, Nepal and Sri Lanka. Furthermore, feedback and recommendations for follow-up programmes were collected and reported to the concluding policy workshop held in Pakistan.

**Identification of local adaptation measures of rice-farming households against saltwater intrusion**

**SALTWATER INTRUSION** is a consequence of sea-level rise caused by climate change. This is posing a serious concern on coastal and farming communities, as the slow onset events continue to contaminate water resources, affect agricultural production and threaten the livelihoods of people.

The capacity of communities to adapt to saltwater intrusion greatly depends on local adaptation measures and penetration of knowledge at the household level. The project aimed to understand knowledge gaps in rural rice-farming households in the Philippines and Viet Nam by developing and testing an adaptation index. The index accounted for climate change exposure, susceptibility, and resolution process. Results revealed that adaptation takes place at four different levels: (1) propensity to adapt; (2) adoption of adaptation measures; (3) implementation of adaptation measures; and (4) varying levels of saltwater intrusion.

Based on the findings, the project concluded that the level of adaptation to saltwater intrusion is largely influenced by the economic capacity of farmers, which is crucial in optimizing the adaptation measures employed. Additionally, the project results suggest that means of securing livelihoods of these farmers should be considered and designed in a way that they can diversify their income by continuing rice production and engaging in off-farm work.
Proposal development training workshop in Temperate East Asia

In September 2018, APN and The University of Tokyo jointly organized a proposal development training workshop in Japan on the effective management of water resources in line with the Sendai Framework for Disaster Risk Reduction and the Paris Agreement. Twenty-one early-career scientists from China, Japan, Mongolia, Republic of Korea and Russia participated. The scientists formed four groups and developed research proposals on: (1) flood control; (2) water quality and water availability; (3) water resources management; and (4) water-food-energy nexus, with the aim of submitting to the APN call for proposals. The workshop was partially funded by the Kurita Water and Environment Foundation in Japan.

Interactive session on enhancing community resilience to climate change

In October 2018, APN organized an interactive session on “The role of science tools and indigenous knowledge practices to enhance community resilience” at the 6th Asia-Pacific Climate Change Adaptation Forum in the Philippines. Four speakers from Australia, Philippines and Viet Nam presented their project outcomes on: enhancing community resilience through developing a resilience toolkit in India; conducting a community resilience project in Cambodia and Viet Nam; working with local government units on Local Climate Change Action Plan in the Philippines; and integrating indigenous knowledge into policy planning process in Viet Nam. Subsequently, discussions were held on participatory tools and resilience strategies, and adaptation planning and practices.

Activities supported by the Hyogo Prefectural Government, Japan

In November 2018, APN supported the attendance of a former project leader and a collaborator of two APN-funded projects to present their project outcomes at the 12th International Conference on the Environmental Management of Enclosed Coastal Seas in Thailand. The presentations focused on the effects of wastewater degrading coral reefs at multiple levels of ecological organization in the eastern Andaman Sea. The presentations also recommended the use of sediment control measures, deep-water marine outfalls, and secondary and tertiary water treatment, and urged national and local governments, and the tourist industry to commit to the conservation of coral reefs.

In November 2018, APN and the Hyogo Prefectural Government jointly organized the Fifth Hokusetu SATOYAMA International Seminar in Japan. Three speakers from Japan, New Zealand and Bhutan gave presentations. Mr Mitsuhiko Imamori, a nature photographer, shared his fascination on the various forms and shapes created by nature. Mr Pataka Moore from Te Wānanga o Raukawa (university) presented on the Maori worldview that acknowledges the interconnection between nature and humans, and how traditional knowledge is passed down to the younger generation in the community. Mr Jamba Tobden from the Royal University of Bhutan introduced the “Bhutan for Life” programme that focuses on ensuring the stability of protected areas through a new funding approach.

Science-policy dialogue on the IPBES Asia Pacific Regional Assessment Report

In February and April 2019, APN and the Institute for Global Environmental Strategies jointly organized two science-policy dialogues on the IPBES Asia-Pacific Regional Assessment Report in Nepal and Australia, respectively. The main focus of the dialogues was to strengthen the science-policy interface by increasing the understanding of the Report that provides valuable information on: (1) the status and threats to biodiversity and ecosystem services; (2) the contribution of nature to humans; and (3) appropriate response options. The dialogues were part of the “Capacity building project for the implementation of IPBES Asia Pacific Regional Assessment” funded by the Japan Biodiversity Fund under the Secretariat of the Convention on Biological Diversity.
Projects

APPROVED PROJECTS

Assessment of the feasibility of applying payment for forest ecosystem services in Viet Nam and Bangladesh mangrove forests • Prof. Richard J. Harper, Murdoch University, Australia

Enhancing the capacity of scientists and practitioners for promoting resilient food systems in Indonesia and the South Pacific • Prof. William Bellotti, The University of Queensland, Australia

Water-food-energy nexus in East Asia: Insights from changes in consumption patterns • Dr Jingli Fan, China University of Mining and Technology, China

The health and restoration of economically and culturally important rivers of India using biological indicators found in Kerala streams, within the context of climate change impacts and sustainable development • Prof. G. Achuthan Nair, Environmental Resources Research Center, India

Climate smart actions “Saung Iklim” for smallholder farmers in Subang District, West Java, Indonesia • Dr Perdiana, Bogor Agricultural University, Indonesia

Understanding space-time variability of climate extremes for societal resiliency in Indonesia and India • Dr Yanto, Jenderal Soedirman University, Indonesia

Capturing sustainable development innovations from the ground, towards strategic advocacy and mainstreaming for SDGs policy across the ASEAN region • Mr Mochamad Indrawan, University of Indonesia, Indonesia

STRENGTHENING INTER-SECTORAL COORDINATION AND GOVERNANCE FOR THE EFFECTIVE IMPLEMENTATION OF NEPAL’S NDCs BASED ON A VOLUNTARY NATIONAL QUALITY-OF-GOVERNANCE STANDARD FOR FOREST SECTOR ACTIVITIES AND PROGRAMMES • Dr Federico Lopez-Casero, Institute for Global Environmental Strategies, Japan

IMPLEMENTING SCIENCE AND TECHNOLOGY IN SOCIETY FOR WATER-RELATED DISASTER RISK REDUCTION • Prof. Toshiro Kikue, International Centre for Water Hazard and Risk Management, Japan

INTEGRATING HEALTH INTO URBAN PLANNING TOWARDS SUSTAINABLE DEVELOPMENT GOALS IN DEVELOPING COUNTRIES • Dr Soo Chen Kwan, Kyoto University, Japan

Capacity development training workshop on crop simulation modelling and effects of climate risks on agricultural production systems in Southeast Asia • Dr Mohan Geetha, The University of Tokyo, Japan

Plausible alternative futures of island mangroves in the Asia-Pacific: Scenario-based analysis and quantification of mangrove ecosystem services in coastal hazard mitigation and climate change adaptation • Dr Shizuka Hashimoto, The University of Tokyo, Japan

Potential impact of climate change on norovirus incidence and seasonality: Water ecology and human health • Dr Jian Pu, The University of Tokyo, Japan

IMPROVING ASSESSMENT OF DROUGHT AND MITIGATING ITS IMPACT ON FOOD AND WATER IN NEPAL AND ADJOINING PARTS OF INDIA • Dr Hemu (Khareli) Kafle, Kathmandu University of Applied Sciences, Nepal

EXTREME EVENTS RELATED TO MONSOON AND CLIMATE CHANGE • Dr Shaukat Ali, Global Change Impact Studies Centre, Pakistan

POLICY GAPS AND NEEDS ANALYSIS FOR THE IMPLEMENTATION OF NDCs ON ADAPTATION, AND LOSS AND DAMAGE IN BANGLADESH, NEPAL AND SRI LANKA • Ms. Vositha Wijenayake, SLYCAN Trust, Sri Lanka

INVESTIGATIONS ON MICROPLASTICS POLLUTION IN THE AQUATIC ENVIRONMENT IN SELECTED DEVELOPING COUNTRIES FROM SOUTHEAST ASIA • Prof. Sandhya Babel, Sirindhorn International Institute of Technology, Thammasat University, Thailand

MAPPING GROUNDWATER RESILIENCE TO CLIMATE CHANGE AND HUMAN DEVELOPMENT IN ASIAN CITIES • Dr Sangam Shrestha, Asian Institute of Technology, Thailand

CAPACITY BUILDING PROGRAMME ON DEVELOPING PROJECT PROPOSALS FOR CLIMATE CHANGE ADAPTATION FOR NORTHEAST THAILAND • Dr Lyan Baybay Villacorta, Asian Institute of Technology, Thailand

INTEGRATED HIGHLAND WILDFIRE, SMOKE AND HAZE MANAGEMENT IN THE UPPER INDOCHINA REGION • Dr Kolosak Wantchonghai, Kasetsart University, Thailand

CONSUMER’S PERCEPTION OF FOOD SAFETY RISK AND ITS IMPACT ON THE WILLINGNESS TO PAY FOR ORGANIC FOOD IN SOUTHEAST ASIA • Dr Thich Nguyen Van, Banking University of Ho Chi Minh City, Viet Nam

COMPLETED PROJECTS

Managing organic amendments to reduce greenhouse gas emissions and supplement fertiliser nitrogen inputs in tropical Indian and Sri Lankan agricultural soils • Dr David Rowlings, Queensland University of Technology, Australia

UNDERSTANDING THE OPPORTUNITIES AND CHALLENGES OF COMPLIANCE TO BUILDING CODES FOR DISASTER RESILIENCE IN SOUTH ASIA: THE CASES OF BANGLADESH AND NEPAL • Dr Jeevan Ahmed, University of Newcastle, Australia

Risk and resilience in the Pacific: Influence of peripherality on exposure and responses to global change • Prof. Patrick D. Nunn, Technology, Australia

IDENTIFICATION OF WETLAND TYPES IN BHUTAN WITH DETAILED DOCUMENTATION OF CARBON RICH WETLANDS • Mr Kuenzang Tshering, Royal Thimphu College, Bhutan

ASSESSING LAND USE FUNCTIONS FOR SUSTAINABLE LAND MANAGEMENT IN ASIA COUNTRIES • Prof. Lin Zhen, Chinese Academy of Sciences, China

ASSESSING THE HEALTH EFFECTS OF EXTREME TEMPERATURES AND THE DEVELOPMENT OF ADAPTATION STRATEGIES TO CLIMATE CHANGE IN THE ASIA-PACIFIC REGION • Prof. Cunrui Huang, Sun Yat-sen University, China

DEVELOPMENT OF NEW WATER SUPPLY STRATEGIES IN TWO WATERSHEDS OF INDIA AND SRI LANKA IN THE CONTEXT OF CLIMATE CHANGE, RAPID URBANIZATION AND POPULATION GROWTH: A VULNERABILITY ASSESSMENT APPROACH • Dr Manish Kumar, Tezpur University, India

ASSESSMENT OF CLIMATE-INDUCED LONG-TERM WATER AVAILABILITY IN THE GANGES BASIN AND IMPACTS ON ENERGY SECURITY IN SOUTH ASIA • Dr Xin Zhou, Institute for Global Environmental Strategies, Japan

APPROPRIATE SOLID WASTE MANAGEMENT TOWARDS FLOOD RISK REDUCTION THROUGH RECOVERY OF DRAINAGE FUNCTION OF TROPICAL ASIAN URBAN CITIES • Dr Tomonori Ishigaki, National Institute for Environmental Studies, Japan

INTEGRATING CLIMATE CHANGE ADAPTATION, DISASTER RISK REDUCTION AND LOSS AND DAMAGE TO ADDRESS EMERGING CHALLENGES DUE TO SLOW ONSET PROCESSES • Prof. Joy Jacqueline Pereira, Universiti Kebangsaan Malaysia, Malaysia

SOUTHEAST ASIA REGIONAL CLIMATE DOWNSCALING PROJECT (SEACLI) • Prof. Fredolin Tangang, University Kebangsaan Malaysia, Malaysia

IMPROVING SKILLS FOR PROMOTING SUSTAINABLE WATERSHED MANAGEMENT PRACTICES IN SOUTH ASIA • Dr Ghami Akbar, Climate Change, Alternate Energy and Water Resources Institute, Pakistan

MULTIDIMENSIONAL INDICATORS OF ADAPTIVE CAPACITY OF RICE FARMING HOUSEHOLDS TO ADDRESS SALT WATER INTRUSION IN THE PHILIPPINES AND VIET NAM • Dr Catherine Roweew C. Almadaen, Xavier University – Ateneo de Cagayan, Philippines

MASTERTREAMING WEATHER AND CLIMATE INFORMATION APPLICATION FOR AGRO-ECOSYSTEM RESILIENCE IN A CHANGING CLIMATE • Dr Rishiraj Dutta, Asian Disaster Preparedness Center, Thailand

UNDERSTANDING URBAN HEAT ISLAND EFFECT AND ITS IMPLICATIONS TO CLIMATE CHANGE ADAPTATION STRATEGIES IN MAJOR SOUTHEAST ASIAN CITIES • Dr Sigp D. Arifwidodo, Kasetsart University, Thailand

IMBER IMBIZO V WORKSHOP: MANAGEMENT STRATEGY EVALUATION: ACHIEVING TRANSPARENCY IN NATURAL RESOURCES MANAGEMENT BY QUANTITATIVELY BRIDGING SOCIAL AND NATURAL SCIENCE UNCERTAINTIES • Prof. Eileen E. Hofmann, Old Dominion University, United States of America

CLIMATE CHANGE RISK ASSESSMENT AND ADAPTATION FOR LOSS AND DAMAGE OF URBAN TRANSPORTATION INFRASTRUCTURE IN SOUTHEAST ASIA • Dr Lam Vu Thanh Noi, Southern Institute of Water Resources Research, Viet Nam

APRIL-SEPTEMBER
**Finances**

APN receives financial contributions from: The Ministry of the Environment, Japan; Hyogo Prefectural Government, Japan; Ministry of Environment, Republic of Korea; and The Ministry for the Environment, New Zealand. In addition to direct financial contributions, APN receives significant in-kind contributions from member countries, in particular the Hyogo Prefectural Government, Japan.

**FINANCIAL RESOURCES OF FY 2018 (USD)**

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<th>Donor contributions FY 2018</th>
<th>Ministry of the Environment, Japan</th>
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<td></td>
<td>Hyogo Prefectural Government, Japan</td>
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<td>Ministry of Environment, Republic of Korea</td>
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<td>Ministry for the Environment, New Zealand</td>
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<td>Balance brought forward from FY 2017 (including committed funds for multi-year projects)</td>
<td>980,174</td>
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<td>Returned funds from completed projects and adjustments</td>
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<td>Total</td>
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**USE OF RESOURCES IN FY 2018 (USD)**

| Personnel, administration and operational costs | 610,764 |
| Frameworks | 176,026 |
| Other scientific and policy activities | 183,355 |
| Institutional activities | 165,403 |
| Total | 3,083,997 |

**NATIONAL FOCAL POINTS**

**BANGLADESH**
- Billal Hossain: Ministry of Environment, Forest and Climate Change
- Md. Giasuddin Miah: Bangabandhu Sheikh Mujibur Rahman Agricultural University
- Jambal Tobden: Royal University of Bhutan
- Veasna Kum: Pannasastra University of Cambodia
- Wenjie Dong: Sun yat-sen University
- Hemant Borgaonkar: Indian Institute of Tropical Meteorology

**CAMBODIA**
- Roath Sith: Ministry of Environment
- Fariza Yunus: Ministry of Environment and Emerging Sciences University of Otago

**CHINA**
- J. R. Bhatt: Ministry of Environment, Forest and Climate Change
- Nairobi Prakash: Ministry of Economy
- Subramanian Moten: Royal University of Bhutan
- Kanayathu Chacko Koshi: Chinese Academy of Sciences, China

**NEPAL**
- Maheshwar Dhakal: Ministry of Forests and Environment
- Moujiruddin Ahmad: Ministry of Forests and Environment

**INDONESIA**
- Henry Bastaman: Ministry of Environment and Forestry
- Jalian Simon: Ministry of Energy, Science, Technology, Environment and Climate Change
- Bayarbat Dashzeveg: Ministry of Environment and Tourism

**NEPAL**
- Maheshwar Dhakal: Ministry of Forests and Environment
- Maryam Keshari: Ministry of Forests and Environment

**LAOS**
- Virasack Chundara: Ministry of Natural Resources and Environment

**MALAYSIA**
- Jaijan Simon: Ministry of Energy, Science, Technology, Environment and Climate Change
- Fariza Yunus: Ministry of Environment and Emerging Sciences

**MONGOLIA**
- Bayarbat Dashzeveg: Ministry of Environment and Tourism

**VIETNAM**
- Ngo Tuan Dung: Ministry of Natural Resources and Environment

**RUSSIAN FEDERATION**
- Andrey V. Adrianov: Russian Academy of Sciences
- Alexander Sterin: All-Russia Research Institute of Hydrometeorological Information—World Data Centre

**SRI LANKA**
- Anura Dissanyake: Ministry of Mahaweli Development and Environment
- Athula Karunanayake: Department of Meteorology

**THAILAND**
- Monthip Sriratana: National Research Council of Thailand

**UNIVERSITY OF AMERICA**
- Luis M. Tupas: United States Department of Agriculture

**VIETNAM**
- Kim Chi Ngo: Vietnam Academy of Science and Technology

**SCIENTIFIC PLANNING GROUP MEMBERS**

**BANGLADESH**
- Md. Giasuddin Miah: Bangabandhu Sheikh Mujibur Rahman Agricultural University
- Jambal Tobden: Royal University of Bhutan
- Veasna Kum: Pannasastra University of Cambodia

**CAMBODIA**
- Roath Sith: Ministry of Environment
- Fariza Yunus: Ministry of Environment and Emerging Sciences

**CHINA**
- Wenjie Dong: Sun Yat-Sen University
- Hemant Borgaonkar: Indian Institute of Tropical Meteorology
- Kanayathu Chacko Koshi: Chinese Academy of Sciences, China
- W. Andrew Matthews: New Zealand National Commission for UNESCO (retired), New Zealand

**NEPAL**
- Maheshwar Dhakal: Ministry of Forests and Environment
- Maryam Keshari: Ministry of Forests and Environment

**INDONESIA**
- Erna Sri Adiningrini: National Institute of Aeronautics and Space
- Kensisuke Fukushi: The University of Tokyo

**LAOS**
- Virasack Chundara: Ministry of Natural Resources and Environment

**MALAYSIA**
- Fariza Yunus: Malaysian Meteorological Department

**MONGOLIA**
- Tsogtbaatar Jamsran: Mongolian Academy of Sciences

**VIETNAM**
- Ngo Tuan Dung: Ministry of Natural Resources and Environment

**RUSSIAN FEDERATION**
- Alexander Sterin: All-Russia Research Institute of Hydrometeorological Information—World Data Centre
- Andrey V. Adrianov: Russian Academy of Sciences

**SRI LANKA**
- Anura Dissanyake: Ministry of Mahaweli Development and Environment

**THAILAND**
- Monthip Sriratana: National Research Council of Thailand

**UNIVERSITY OF AMERICA**
- Luis M. Tupas: United States Department of Agriculture

**VIETNAM**
- Kim Chi Ngo: Vietnam Academy of Science and Technology

**INVITED EXPERTS**

| Lance Clive Heath | Freelance Solutions, Australia
|-------------------|-----------------------------|
| Ailikun | Chinese Academy of Sciences, China
| Kanayathu Chacko Koshi | Environmental Resources Research Centre, India
| Subramanian Moten | Malaysia Meteorological Department (retired), Malaysia
| W. Andrew Matthews | New Zealand National Commission for UNESCO (retired), New Zealand
| Roland John Fuchs | East West Center, United States of America

* The list above contains current members of APN at the time of publication.

**FISCAL YEAR 2018**