### ANNUAL BARNUAL BARNUAL



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.

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 provide underpinning scientific input to policymaking.
- Funds and implements projects and workshops to develop the capacity of individuals and organisations 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.

### **FISCAL YEAR 2021 AT A GLANCE**

#### **RESEARCH & CAPACITY DEVELOPMENT**

12

Projects completed, implemented by 64 persons, including project leaders and collaborators.

#### **EXTENSIVE NETWORK**

3,800+

Researchers, government officials, community members and practitioners directly involved in projects.

### 4,900+

Active subscribers to the APN mailing list.

INVOLVING EARLY-CAREER PROFESSIONALS

75%

Percentge of projects that reported involvement of early-career professionals.

#### KNOWLEDGE MANAGEMENT

2,004

Outputs in the Publications <u>Library.</u> 89,684 Page views of APN projects and publications.

# Climate

### Study of historical GHG emissions in Asian megacities provides insight for sustainability policies towards low carbon pathways



**ASIA HAS SEEN** a rapid increase in energy demand over the last few decades due to rapid urbanisation, resulting in a dramatic rise in the share of global greenhouse gas (GHG) emissions in the region. From 1990 to 2010, the number of urban residents in Asia grew by over 800 million, increasing its share of the global urban population from 45% to 52%, while Asian  $CO_2$  emissions increased from 6 Gt to 14 Gt, increasing its share of global GHG emissions from 39% to 54%.

The Paris Agreement adopted in 2015 has drawn attention to the dramatic actions necessary to keep emissions low. However, the application of mitigation policy for low-carbon cities is complicated due to the diverse development conditions (such as social, physical, economic and political). To address this challenge, the project identified key driving forces of change in energy use and GHG emissions by developing and analysing historical sub-city level energy and GHG inventories in Bangkok, Beijing, Seoul, Taipei and Tokyo.

Consequently, the project identified the building of cities, vehicle use, industrial manufacturing and processes, and growing residential consumption as key activities contributing to emissions growth. The project also found that while Asian megacities are leading the efforts in meeting the Paris Agreement in the region, all cities need to reduce emissions by cutting back passenger car use and regulating industries contributing to economic wealth, and highlighted the importance of urban planning, enhanced laws and regulations, sharing economy and circular economy.

PROJECT Tracking influences of Asian urban GHG emissions for sustainability policies: Identifying low carbon pathways to meet the Paris Agreement PROGRAMME Collaborative Regional Research Programme PROJECT LEADER Dr Peter Marcotullio, The City University of New York, United States of America ORGANISATIONS INVOLVED Chinese Academy of Sciences, China; National Taipei University, Taipei, China; The University of Tokyo, Japan; Green Digital Research Institute, Republic of Korea; Asian Institute of Technology, Thailand; The City University of New York, United States of America GRANT DOI https://doi.org/10.30852/p.4574

The project engaged six students, of which two students utilised project findings to complete their graduate theses. A policy engagement conference was held at The University of Tokyo bringing together academics and urban practitioners.



▶ Fifty-nine early-career professionals were trained at an online workshop on extremes in climate prediction ensembles from 25–27 October 2021 under the auspices of the World Climate Research Programme. The workshop focused on improving the understanding and prediction of extreme weather and climate events using short- to long-term prediction ensembles.

PROJECT LEADER Dr Jin Ho Yoo, APEC Climate Center, Republic of Korea GRANT DOI https://doi.org/10.30852/p.14063



# Air, land, coasts and oceans

### Integrated approach enhances understanding of local and regional biomass burning sources and their contribution to air pollution in Southeast Asia



**SOUTHEAST ASIA** is one of the largest sources of biomass burning in the world, resulting in the formation of the "Asian Brown Cloud" almost every year, a regional haze that impacts human health, the environment and global climate variations. However, in most countries in Southeast Asia where economic development depends heavily on the agricultural sector, actions to slow the adverse impacts of deteriorating air quality caused by increased biomass burning are stalling in the face of economic imperatives and pace of development.

To map and assess the contribution of local and regional sources of biomass burning to air pollution in Vietnam and Thailand, the project developed an integrated approach that combines in-situ measurement, modelling techniques and advanced satellite remote sensing. Additionally, the project conducted one-year field measurement campaigns concurrently at the study sites in Hanoi, Vietnam, and Chiang Rai, Thailand, to determine the concentrations of PM2.5, water-soluble ions, elements and carbonaceous species to understand air quality measured during the high season (intensive biomass burning period) and low season (less biomass burning period).

Combined with the results of backward air mass trajectory analysis and satellite observation data for fire activities, the project found that during the high season, biomass burning activities significantly influenced the measured PM2.5, especially in the study site in Chiang Rai, Thailand. It is hoped that the project findings can provide an improved platform for evidence-based policymaking and identify prioritised areas and actions for reducing open biomass burning and associated air pollution in Vietnam and Thailand.



**PROJECT** Integrated approach of in-situ measurement, modelling techniques, and advanced satellite remote sensing for mapping and quantifying contribution of local and regional biomass burning sources to air pollution in Southeast Asian countries **PROGRAMME** Collaborative Regional Research Programme **PROJECT LEADER** Dr Duc Luong Nguyen, National University of Civil Engineering, Vietnam **ORGANISATIONS INVOLVED** Korea Institute of Science and Technology, Republic of Korea; Suranaree University of Technology, Thailand; Thammasat University, Thailand; National University of Civil Engineering, Vietnam **GRANT DOI** https://doi.org/10.30852/p.4611

# Biodiversity and ecosystems

### Ecosystem services monitoring tools contributes to sustainable forest management in Aceh Indonesia

**IN INDONESIA,** the decentralisation of forest management is promoted to improve forest management by focusing on sustainability, biodiversity, livelihoods and climate change. Forest Management Units (Kesatuan Pengelolaan Hutan, KPH) were introduced to enhance the state of forest management and act as intermediaries between local stakeholders and local and national government agencies. However, progress is slow due to the lack of technical expertise and experienced staff.

The project developed three Forest Ecosystem Services Measurement Tools on forest carbon, tree biodiversity, and forest integrity and health. Additionally, the project organised a three-phased training programme to build the capacity of KPH staff, social forestry community members, and national park and government agency representatives in Aceh province to measure, monitor and report on forest ecosystem services by using the tools, and to use the data and information to support local-level sustainable forest management. Thirty-nine people participated in phase 1 and 2 training sessions, and 41 people in the phase 3 training session.

Eighteen university students were trained on Forest Ecosystem Services Measurement Tools and applied the knowledge and field data to their academic programmes.

Consequently, the project disseminated research findings at two international conferences, including the 13th Meeting of the Research Dialogue of the UNFCCC SBSTA. Additionally, the project developed two survey briefs on forest ecosystem services of two urban forest areas and distributed them to local government agencies in two cities in Aceh province.

PROJECT Ecosystem-services measurement and monitoring tools supporting KPH and community forest management in Aceh, Indonesia PROGRAMME Scientific Capacity Development Programme PROJECT LEADER Mr Jay Samek, Michigan State University, United States of America ORGANISATIONS INVOLVED INSTIPER Yogyakarta, Indonesia; Syiah Kuala University, Indonesia; Michigan State University, United States of America GRANT DOI https://doi. org/10.30852/p.13876



▶ An improved conflict management model was developed to enhance interactions of local stakeholders in protected areas in Central Vietnam to facilitate sustainable community-based tourism. Field trips, surveys and interviews were conducted to collect information and data on the status of community-based tourism, its effectiveness on the livelihoods of local people and environmental resource protection.

PROJECT LEADER Dr Ha Dung Hoang, Hue University of Agriculture and Forestry, Vietnam GRANT DOI https://doi.org/10.30852/p.4613

# Food, water and energy

# Strengthening capabilities for climate smart agriculture in Pakistan

**THE ECONOMY OF PAKISTAN** significantly depends on the performance and growth of its agriculture sector. However, climate change and its impacts on current crop and animal production practices such as monocropping, excessive tillage, intensive cultivation, poor on-farm water management, misuse of fertilisers and pesticides, outdated cropping patterns etc., have led to lower agricultural productivity, resulting in reduced gross domestic product.

Based on the understanding that climate smart agriculture (CSA) can reduce the impacts of climate change, the project developed a ready-to-use resource kit comprised of CSA practices and technologies, including crop and enterprise diversification, low delta crops, stress-tolerant crop varieties and animal breeds, etc., in the local language, and provided it to district agriculture officers and farmers. Furthermore, the project organised two professional learning programmes on CSA in two provinces to enhance the capacities of provincial institutions that deliver agriculture services to make social and economically viable choices in farming and recommendations to farmers.

Subsequently, the project organised a consultation workshop to build the capacity to mainstream CSA at the national level. The workshop brought



together academics, researchers, policymakers and key stakeholders, and clarified issues, shared knowledge, resources and project experiences, and provided access to provincial institutions and other organisations that work to advance agriculture.

**PROJECT** Pathways to strengthening capabilities for climate smart agriculture in Pakistan **PROGRAMME** Scientific Capacity Development Programme **PROJECT LEADER** Dr Bashir Ahmad, Pakistan Agricultural Research Council, Pakistan **ORGANISATIONS INVOLVED** The Government of Balochistan, Pakistan; Leadership for Environment and Development, Pakistan; The University of Agriculture Peshawar, Pakistan **GRANT DOI** https://doi.org/10.30852/p.4618

### Fostering innovative "food system analysts" in Indonesia and the Pacific for food system resilience

**FOOD AND NUTRITION SECURITY** is a major aspect of the SDG research agenda, especially in the context of climate change. Food security involves many disciplines, sectors and scales that require practitioners in the food, agriculture, environment and health communities to see the food system as a whole. This food systems approach is a relatively new concept that requires further development and application. In this context, training is essential in introducing the philosophy, methodology and practice of food systems research and development.

The project built the capacity of graduate students and young practitioners working across food systems in Fiji, Indonesia, Samoa, Solomon Islands and Vanuatu, and created a cohort of innovative "food system analysts" equipped with necessary knowledge and skills to design and implement research and interventions for the development of resilient food systems.

The project conducted three one-week workshops in Fiji, Indonesia and Vanuatu, and trained 87 participants on the concept of resilient food systems and soft system methodologies, and provided professional development, such as strengthening communications, teamwork and leadership skills. In addition to the workshops, pre-workshop planning visits were undertaken in Fiji, Samoa, Solomon Islands and Vanuatu, to localise the workshop programme in each country and to raise awareness among senior academics at universities and government officers working on food systems.

Mi

**PROJECT** Enhancing capacity of scientists and practitioners for promoting resilient food systems in Indonesia and the South Pacific **PROGRAMME** Scientific Capacity Development Programme **PROJECT LEADER** Dr William Douglas Bellotti, The University of Queensland, Australia **ORGANISATIONS INVOLVED** The University of Queensland, Australia; The University of the South Pacific, Fiji; WorldFish, Malaysia; The Pacific Community, Fiji; IPB University, Indonesia **GRANT DOI** https://doi. org/10.30852/p.4584



### **Regional scale drought monitoring tool** contributes to adaptation measures in South Asia



THE RECENT DECLINE in agricultural production in South Asian countries, such as Bangladesh, India, Nepal and Pakistan, has depressed the rural economy, increasing widespread hunger and urban migration. The changing climatic condition in South Asia is considered as one of the causes, where drought has emerged as a source of vulnerability against rainfed agriculture. Drought monitoring and assessment tools can predict drought, help identify drought-prone areas and contribute to the development of measures to minimise the impact on food production and water resources. However, such tools are not available at the regional scale in most of the aforementioned countries.

The project developed a drought monitoring method at the regional scale using freely available satellite data sets and products in Bangladesh, India, Nepal and Pakistan, verified the results with the Drought Severity Index (DSI) and confirmed the suitability of DSI in monitoring drought in the region. Additionally, the project recorded the impacts of drought on food and water resources, and documented traditional coping mechanisms by farmer groups during drought periods.

Consequently, the project developed a "drought atlas" covering Bangladesh, Nepal and Pakistan that comprises information on DSI of different countries with values and maps from 2000 to 2020, a manual to use DSI to calculate drought and an awareness booklet on drought in Nepalese.

The project organised three workshops and trained 15 researchers on using satellite remote sensing DSI to monitor drought.

**PROJECT** Improving assessment of drought and mitigating its impact on food and water in Nepal and adjoining parts of India PROGRAMME Collaborative Regional Research Programme PROJECT LEADER Dr Hemu (Kharel) Kafle, Kathmandu Institute of Applied Sciences, Nepal **ORGANISATIONS INVOLVED** Khulna University, Bangladesh; Gorakhpur Environmental Action Group, India; Sikkim University, India; Japan Aerospace Exploration Agency, Japan; Nagoya University, Japan; Kathmandu Institute of Applied Sciences, Nepal; Nepal Water Conservation Foundation, Nepal; Nepal Academy of Science and Technology, Nepal; Tribhuvan University, Nepal; COMSATS University, Pakistan **GRANT DOI** https://doi.org/10.30852/p.4587

▶ An intergovernmental framework of relevant stakeholders, the Platform on Water Resilience and Disasters, was established in Indonesia, Myanmar, Pakistan, Philippines and Sri Lanka by involving researchers and government officials to minimise water-related disaster risks by sharing data, information, knowledge, products and services. Training was conducted in each country and a one-month e-learning workshop was held in the Philippines to interlink the science community and local society.

PROJECT LEADER Prof. Toshio Koike, International Centre for Water Hazard and Risk Management under the auspices of UNESCO, Japan GRANT DOI https://doi.org/10.30852/p.4588



# **Human dimensions**

### Micro-level cropping calendar maps and mobile application prevents agrarian risks in Bangladesh and India



By incorporating traditional knowledge and scientific measures of crop cycling, the project established a Climate Information Network (CIN) and provided information on real-time contingency measures, weather data alert systems, climate preparedness and collective planning to improve climate literacy among marginal farmers. The project introduced CIN to approximately 2,000 farmers and developed participatory crop calendars based on market demands and local needs in four contrasting agro-climatic zones for local usage in Shyamnagar, Bangladesh, and Purulia, India. Subsequently, the project developed a CIN-based android application to ensure equitable access to climate information and marketplace dynamics, and built the capacity of approximately 400 farmers on how to use the application, evading the "digital divide" among farmers.

Consequently, the hands-on training to develop location-specific crop calendars and the CIN-based android application prevented untimely distributions of seeds, fertilisers and other input factors. Additionally, it was used by development-aid workers in seed relief and rehabilitation activities following recent natural disasters in coastal areas. It is hoped that the outputs will further strengthen the sustainability of primary productivity and reassure food and livelihood security.



The project developed the capacity of 27 scientists and young scholars in contingency planning, and 42 stakeholders from government line departments, civil society organisations and private enterprises were engaged in the evaluation.

**PROJECT** Strengthening adaptive capacities of South Asian agrarian communities by developing Climate Information Network (CIN)-based scientific cropping calendar towards preparedness for weather extremes **PROGRAMME** Scientific Capacity Development Programme **PROJECT LEADER** Mr Udita Ghosh Sarkar, South Asian Forum for Environment, India **ORGANISATIONS INVOLVED** University of Dhaka, Bangladesh; South Asian Forum for Environment, India; Indian Council of Agricultural Research, India **GRANT DOI** https://doi.org/10.30852/p.4621



# **Capacity development**

# Enhancing adaptive capacity of rural farming communities in Southeast Asia

**THE AGRICULTURAL SECTOR** in developing countries, particularly smallholder farmers, is considered the most vulnerable to climate change impacts due to their limited technical, social and financial capacities, and geographical locations. Additionally, numerous studies have identified the need to build and enhance the adaptive capacity and resilience of smallholder farmers to adapt to climate change.

To build and enhance the adaptive capacity of smallholder farmers in Southeast Asia, the project selected ten APN capacity development projects and organised a webinar "Enhancing Adaptive Capacity of Rural Farming Communities in Southeast Asia: Best Practices and Lessons Learned". The webinar brought together 260 people from academic institutions, research institutions, local government units and national government agencies to communicate best practices, lessons learned and outcomes of these projects.

Additionally, the project produced a video to disseminate outputs of the ten projects by highlighting their main features, as well as testimonies from local partners, including universities, farming communities and local government units, on the contributions these projects made in enhancing their capacities in climate change adaptation and building community resilience.

Subsequently, the project developed a 70-page publication comprising



prominent features, significant contributions, best practices and lessons learned from the selected projects, and distributed it to various stakeholders in the region. It is hoped that this publication will serve as a reference to communicate and replicate capacity development activities to enhance the adaptive capacity of rural farming communities.

**PROJECT** Enhancing local adaptive capacity of rural farming communities in Southeast Asia: Best practices and lessons learned for scaling up **PROGRAMME** Early-Career Science Communicators Programme **PROJECT LEADER** Dr Leila Landicho, University of the Philippines Los Baños, Philippines **ORGANISATIONS INVOLVED** University of the Philippines Los Baños, Philippines **GRANT DOI** https://doi. org/10.30852/p.16143

### Site-specific agroforestry farming enhances climate change adaptation in the upstream catchment area of the Da River



VIETNAM IS RECOGNISED AS one of the countries most vulnerable to the impacts of climate change. To understand the local situation in relation to climate change and agricultural activities, the project conducted interviews with 33 representatives on the most pressing issues, challenges, plans and expectations. These representatives are from farmer communities and local government authorities in eight villages in the upstream catchment area of the Da River. Additionally, the project conducted field research in three locations to understand major agroforestry systems in two communes.

Subsequently, the project developed guidance material in Vietnamese and Hmong that explains the concept of climate change, and provides adaptation and mitigation strategies for agricultural and forestry activities for policymakers at the local level and farmers in local communities who are mainly ethnic minorities of Hmong, Thai and Muong. Furthermore, the project organised a workshop where 30 local government officials and farmers deepened their understanding of climate change and discussed suitable adaptation and mitigation strategies. It is expected that the information provided in the guidance material and workshop will be incorporated into local farming practices and used to train local government officials.

PROJECTClimate change adaptation through<br/>site-specific agroforestry farming for communities<br/>and household in upstream catchment area of<br/>the Da River—A practical guidancePROGRAMME<br/>Early-Career Science Communicators Programme<br/>PROJECT LEADERMs<br/>Thi Thanh Ha Do,<br/>Vietnamese Academy of Forest Sciences, Vietnam;<br/>Ms Hong Bui, Southern Cross University, Australia<br/>ORGANISATIONSINVOLVED<br/>Vietnamese<br/>Academy of Forest Sciences, Vietnam;<br/>Southern<br/>Cross University, Australia<br/>GRANT DOI https://doi.<br/>org/10.30852/p.13776

# Stakeholder engagement



#### UNFCCC

In December 2021, APN participated in a COP26 side event titled "Development and utilization of information platforms towards climate-resilient societies in the Asia-Pacific region," co-organised by APN, the National Institute for Environmental Studies, Japan, Ministry of the Environment of Japan and the Institute for Global Environmental Strategies (IGES), in the United Kingdom. The session explored the role of information platforms for climate-resilient societies in the Asia-Pacific region. APN presented its role in bridging science-stakeholder communities for a climate-resilient Asia-Pacific region by emphasising the importance of networking with other networks and platforms on adaptation, and sharing knowledge and understanding of the needs of a range of stakeholders.



#### **Gobeshona Global Conference**

In March 2022, APN and IGES jointly organised a session titled "Localization of NDCs through community-led "adaptation innovation" in the Asia-Pacific region: needs and pathways" at the Gobeshona Global Conference 2. The session comprised: seven presentations; audience engagement with Mentimeter; breakout sessions responding to questions on challenges for mainstreaming commitments of NDC down to the local level, and capacity gaps in and challenges at the local level for implementing adaptation actions; and a panel discussion.



#### SBSTA 58

In June 2022, APN presented two APN projects at the poster session of the 14th Meeting of the Research Dialogue of UNFCCC SBSTA in Germany. The presentations responded to one of the topics of the research dialogue "integrated solutions for adaptation and resilience" by introducing case studies on the usage of indigenous knowledge to enhance community resilience to climate change in the mountainous region of Vietnam, and risk and resilience in the Pacific and the influence of peripherality on exposure and responses to global change.



#### **IPBES 9 Plenary**

In July 2022, APN presented a poster at the IPBES9 Stakeholder Day in Germany to showcase two science-policy dialogues that were jointly organised with IGES to facilitate the understanding of findings of the IPBES Regional Assessment Report on Biodiversity and Ecosystem Services for Asia and the Pacific. The poster also highlighted an APN research project on assessing land use functions for sustainable land management in Asian countries and an APN capacity building project to support sustainable management and governance of coastal ecosystems.

#### STAKEHOLDER ENGAGEMENT





#### **Hyogo activities**

In December 2021, APN and the Hyogo Prefectural Government jointly organised a forum titled "Thinking about SDG, climate change and food loss from global and familiar perspectives" in Japan. The forum comprised five presentations, including the introduction of efforts made by the Hyogo Prefectural Government in addressing global warming and achieving a carbon neutral society by 2050. The forum provided an opportunity for participants to think about SDGs and climate change, and their relation to food loss from global and familiar perspectives. At the venue, a food drive was organised as part of an effort to reduce food loss.

In February 2022, APN, the Asian Disaster Reduction Center, Japan International Cooperation Agency Kansai Center and the University of Hyogo, jointly organised a forum titled "Thinking about sustainable recovery in the context of SDGs" in Japan. The forum discussed various forms and examples of sustainable recovery in the context of SDGs based on national and local case studies in Japan and abroad. The forum also clarified issues, challenges and key solutions in building and supporting disaster risk resilience aligned with elements of SDGs, and highlighted the need for collective efforts by all institutions and the involvement of local communities and stakeholders.



#### ANSO

In January 2022, APN and the Alliance of International Science Organizations (ANSO) held their first scoping workshop to discuss collaboration between the two institutions. The workshop discussed the scope and modality of the collaboration, potential collaborative activities and the development of a memorandum of understanding.





### PICES

In February 2022, APN and the North Pacific Marine Science Organization (PICES) study group for scientific cooperation held their first meeting to discuss common priorities and identify possible synergies that can pave the way for establishing a framework for future cooperation to improve the ability to generate new knowledge and understanding of sustainability challenges in the Pacific, especially in line with the UN Decade of Ocean Science for Sustainable Development (2021–2030). In May 2022, the study group held their second meeting and agreed to continue discussing possible common themes for collaboration.

#### **Regional Circular and Ecological Sphere**

APN and IGES have planned to hold three scoping workshops in Southeast Asia to examine the applicability of the concept of Regional Circular and Ecological Sphere (R-CES) in the country context and discuss how R-CES can be used to enhance the realisation of SDGs. In February 2022, APN, IGES and the University of the Philippines Los Baños jointly organised the first scoping workshop.

APN contributed a book chapter titled "Supporting regional circular and ecological sphere through sustainably managed lands and resilient communities: case studies in Asia-Pacific on socio-ecological systems in the spirit of Satoyama" to an IGES-led book "Circulating and ecological sphere: concept and applications". The chapter links the R-CES concept with activities held in collaboration with the Hyogo Prefectural Government on Satoyama from 2013 to 2018.

# More than 100 APN publications cited in IPCC landmark report

The Intergovernmental Panel on Climate Change (IPCC) published its Sixth Assessment Report in three installments in August 2021, February 2022 and April 2022. The report presents the latest understanding of the climate system and climate change, assesses the impacts of climate change at global and regional levels and reviews the progress and available options in limiting greenhouse gas emissions.

A stocktake of APN publications shows that more than 100 publications from APN projects and activities have been cited in the IPCC Sixth Assessment Report. The cited publications are generated from over 60 APN projects and activities conducted between 2007 and 2018, and led by researchers and practitioners based in 15 of APN's member countries.

In the Working Group I contribution, Climate Change 2021: The Physical Science Basis, APN publications are most cited in Chapter 11, which reviewed the latest scientific knowledge on weather and climate extreme events in a changing climate.

I am very pleased to see APN's significant contribution to the IPCC AR6 cycle. I am aware that this achievement is the result of collaborative projects and activities among researchers and practitioners, including many early-career scientists, in the Asia-Pacific region. I hope that APN, in the era of climate crisis, will make further contributions as a network that unites researchers and practitioners in the region toward the realisation of a decarbonised and

climate resilient economy and society."





The impressive contribution that APN has made to AR6 demonstrates the significant achievements of the network across the science-policy interface. The research cited in all three AR6 Working Groups includes over APN 60 projects and activities during the reporting period, undertaken by teams utilising cutting-edge holistic and transdisciplinary approaches. This is just the latest example of how APN supports the active engagement of researchers, policymakers, practitioners, and civil society across all member countries. Certainly, this recognition by AR6 highlights the continuing importance of APN's work to the international agenda on global change and sustainability.



In the Working Group III contribution, Climate Change 2022: Mitigation of Climate Change, APN publications are cited the most in Chapter 17, "Accelerating the transition in the context of sustainable development".

The cited publications cover a variety of topics ranging from climate, ecosystems, health, the food-water-energy nexus, and risk and resilience to sustainable development, spanning the full spectrum of the thematic focus of APN in recent years.

APN congratulates the authors of these publications for their contributions to a better and most up-to-date understanding of the impacts of climate change on ecosystems, biodiversity and human communities of our planet, as well as identifying the vulnerabilities, capacities and limits of human society and nature to adapt to climate change, thereby providing the fundamental scientific basis for informed policy- and decision-making.

# Approved projects

Integrated assessment of existing practices and development of pathways for the effective integration of nature-based water treatment in urban areas in Sri Lanka, the Philippines and Vietnam • Prof. Veeriah Jegatheesan, RMIT University, Australia

Advancing local flood decision-making for disaster risk reduction • Dr Aaron Opdyke, The University of Sydney, Australia

**Transboundary microplastics contaminations in fish and aquatic food chain along Brahmaputra River •** Prof. Harunur Rashid, Bangladesh Agricultural University, Bangladesh

Development of smart greenhouse (SGH) for temperate and alpine regions to enhance agriculture farming for future food sustainability • Mr Gom Dorji, Royal University of Bhutan, Bhutan

Building capacity of extension officers to help farmers better adapt to climate change in the coastal area of Cambodia • Mr Dara Sum, Ministry of Environment, Cambodia

**Building future expertise in climate change research for agricultural universities and institutions in Cambodia •** Mr Sopheak Thav, Royal University of Agriculture, Cambodia

Capacity development programme on-site suitability mapping for managed aquifer recharge (MAR) under varying climatic conditions using remote sensing and machine learning-based hydrological modelling tools • Dr Basant Yadav, Indian Institute of Technology Roorkee, India

Integrating heat action plans in the climate policy and guidelines for evolving gender sensitive heat adaptation plan in cities in South Asia • Mr Rohit Magotra, Integrated Research and Action for Development, India

Knowledge sharing and capacity building workshops for precision agriculture using UAVs techniques in the South and Southeast Asian region • Dr Ram Avtar, Hokkaido University, Japan

Impacts of river plume fronts on the distribution and the fate of plastic debris based on high-resolution observations, and implications for waste recovery • Dr Shiye Zhao, Japan Agency for Marine-Earth Science and Technology, Japan Impacts of the COVID-19 pandemic on air quality of the Monsoon Asia region: Cross-country assessment and facilitating policy • Prof. Mohd Talib Latif, The National University of Malaysia, Malaysia

The assessment of management strategies in marine protected areas of Southeast Asia for balanced biophysical and socioeconomic benefits with the application of agent-based models • Dr Khairunnisa Ahmad Kamil, Universiti Teknologi MARA, Malaysia

**Development of environmental DNA reference database for coastal resource management of Southeast Asian mangroves** • Dr Alison Wee, University of Nottingham Malaysia, Malaysia

Seasonal influence on transboundary mercury transport over the Himalayas: Implications for society • Mr Rukumesh Paudyal, Himalayan Environment Research Institute, Nepal

**Enhancing ecosystem based adaption to disaster risk** reduction in the Himalayan river basin: Integrating of traditional and local knowledge in disaster management plan in Nepal, India and Bangladesh • Dr Prakash Paudel, Kathmandu Institute of Applied Sciences, Nepal

Assessing the profitability of climate smart agriculture in the Ganges-Brahmaputra river basin of South Asia • Dr Shobha Poudel, Science Hub Nepal, Nepal

Floating treatment wetland system (FTWS) - Sustainable green technology to remediate polluted surface water bodies in the COVID-19 era • Prof. Sadhana Pradhanang Kayastha, The Small Earth Nepal, Nepal

Value chain mapping and capacity building of Pakistani government stakeholders to implement Basel Convention's amendments to enhance control of the transboundary movements of plastic waste • Mr Jabir Hussain Syed, COMSATS University Islamabad, Pakistan

Resilience-building among smallholder farmers of selected upland farming communities in the province of Isabela, Philippines • Ms Maria Theresa Nemesis Ocampo, University of the Philippines Los Baños, Philippines Resilience-building and future-proofing strategies in a multi-stressed scenario in the province of Albay, Philippines • Dr Juan Pulhin, University of the Philippines Los Baños, Philippines

Hazard assessment of glacial lake outburst floods in Russian, Mongolian, and Chinese Altai • Dr Pavel Borodavko, Siberian Branch of the Russian Academy of Sciences, Russian Federation

Scientific capacity building in assessing the coastal dynamics (land use, biodiversity & ecosystem services) including the influence of climate change in the coastal zone – towards a locally adapted MSP Framework • Dr Md. Zakir Hossain, Asian Institute of Technology, Thailand **Capacity building for measuring multi-hazard livelihood security and resilience in the Lower Mekong Basin** • Dr Indrajit Pal, Asian Institute of Technology, Thailand

**Citizen science and co-experimentation for scaling up climate smart agriculture (CSA) in the northern mountainous region of Vietnam •** Dr Tuyet Truong, Thai Nguyen University of Agriculture and Forestry, Vietnam

An innovative capacity building mechanism for extension workers and farmers in the context of climate change • Ms Huong Hoang, Thai Nguyen University of Agriculture and Forestry, Vietnam

# Completed projects

Climate change adaptation through site-specific agroforestry farming for communities and household in upstream catchment area of the Da River—A practical guidance • Ms Thi Thanh Ha Do, Vietnamese Academy of Forest Sciences, Vietnam; and Ms Hong Bui, Southern Cross University, Australia

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

Strengthening adaptive capacities of South Asian agrarian communities by developing climate information network based scientific cropping calendar towards preparedness for weather extremes • Dr Udita Ghosh Sarkar, South Asia Institute for Environment, India

Implementing science and technology in society for waterrelated disaster risk reduction – Development of the platforms on water resilience and disasters in Myanmar, Pakistan, Philippines, Sri Lanka and Indonesia • Prof. Toshio Koike, International Centre for Water Hazard and Risk Management under the auspices of UNESCO, Japan

Improving assessment of drought and mitigating its impact on food and water in Nepal and adjoining parts of India • Dr Hemu (Kharel) Kafle, Kathmandu Institute of Applied Sciences, Nepal

Pathways to strengthening capabilities for climate smart agriculture in Pakistan • Dr Haroon Khan, The University of Agriculture, Peshawar, Pakistan

Enhancing local adaptive capacity of rural farming communities in Southeast Asia: Best practices and lessons learned for scaling up • Ms Leila Landicho, University of the Philippines Los Baños, Philippines

WCRP workshop on extremes in climate prediction ensembles
(ExCPEns), Busan, Korea, Fall 2021
Dr Jin Ho Yoo, APEC Climate Center, Republic of Korea

Ecosystem-services measurement and monitoring tools supporting KPH and community forest management **in Aceh, Indonesia •** Mr Jay Samek, Michigan State University, USA

Tracking influences of Asian urban GHG emissions for sustainability policies: Identifying low carbon pathways to meet the Paris Agreement • Prof. Peter Marcotullio, The City University of New York, USA

Creating a conflict management model as a tool for sustainable community-based tourism development in protected areas in Central-Vietnam: Lessons from experience in Japan • Mr Ha Dung Hoang, Hue University of Agriculture and Forestry, Vietnam

Integrated approach of in-situ measurement, modelling techniques, and advanced satellite remote sensing for mapping and quantifying contribution of local and regional biomass burning sources to air pollution in Southeast Asian countries • Dr Duc Luong Nguyen, National University of Civil Engineering, Vietnam

# Finances

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

### Members

#### NATIONAL FOCAL POINTS

BANGLADESH

Iqbal Abdullah Harun Ministry of Environment, Forest and Climate Change

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National Environment Commission Secretariat, Bhutan

FINANCIAL RESOURCES IN FY 2021 (USD)			
Donor contributions FY 2021	Ministry of the Environment, Japan		1,806,596
	Hyogo Prefectural Government, Japan		163,789
	Ministry of Environment, Republic of Korea		42,062
	Ministry for the Environment, New Zealand		21,522
Balance brought forward from FY 2020			
(including committed funds for multi-year projects)			1,332,656
Returned funds from completed projects and adjustments			460,089
		Total	3,826,714
USE OF RESOURCES IN FY 2021 (USD)		Executed and committed*	
Core programmes			2,420,427
Frameworks			46,800
Other scientific and policy activities			199,205
Institutional activities			193,489
Personnel, administration and operational costs			591,453
		Total	3,451,374

and Climate Change INDONESIA Henri Bastaman Ministry of Environment and Forestry JAPAN Gen'ichiro Tsukada Ministry of the Environment

Ministry of Environment, Forest

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