



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 organizations to conduct high quality research on global change and sustainability.

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Fosters and strengthens interactions between the science and policymaking communities to produce actionable science and informed decision-making.

FISCAL YEAR 2020 AT A GLANCE

RESEARCH & CAPACITY DEVELOPMENT

24

Projects completed, involving 169 project leaders and collaborators.

EXTENSIVE NETWORK

8,100+

4,195 Active subscribers to the APN mailing list.

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

INVOLVING EARLY-CAREER SCIENTISTS

370+

Early-career scientists directly involved in projects.

KNOWLEDGE MANAGEMENT

1,717

Outputs in the Publications Library. Percentge of projects that reported involvement of early-career scientists.

90/0

30,019 Page views of APN projects and publications.

Climate

Participatory action research enhances disaster risk awareness and preparedness in Cambodia and Fiji



THE PROJECT EXPLORED how rural communities living in flood-prone river basins of Cambodia and Fiji respond to the increasing variability of floods and other natural hazards under the influence of climate change.



The project collected qualitative data through talanoa-style research conversations and interviews to examine local governance of excess water and perceived causes, impacts, preventive measures, and responses at individual, family and community levels. Additionally, the project collected quantitative data such as topographic and hydrological data, information on land use and farming systems, socioeconomic conditions and local water management systems. Remote sensing techniques were also employed to derive information on soil characteristics, and land and vegetation cover in target basins.

The project found that communities in both study sites have developed a range of effective coping mechanisms and adaptation strategies; however, the occurrence of multiple risks is posing increasing challenges to the adaptive capacity of villagers. Additionally, the project found a high level of synergy between the flood extent identified by communities and satellite-derived data, which confirms previous findings that greater risk perception exists in areas with moderate or substantial flood hazards.

Subsequently, the project organized four workshops in Cambodia and Fiji to disseminate research findings where over 150 people participated from national and regional governments, local and international NGOs, local



communities and small businesses. Furthermore, the project enhanced the awareness and preparedness towards disaster risk in at least eight communities in Cambodia and Fiji. ■

PROJECT Climate change adaptation in post-disaster recovery processes: Flood-affected communities in Cambodia and Fiji PROGRAMME Climate Adaptation Framework PROJECT LEADER Prof. Andreas Neef, The University of Auckland, New Zealand ORGANIZATIONS INVOLVED The University of Sydney, Australia; The University of Western Australia, Australia; Ministry of Environment, Cambodia; Ministry of Rural Development, Cambodia; Royal University of Phnom Penh, Cambodia; The University of the South Pacific, Fiji; The University of Auckland, New Zealand WEBSITE https://www.apn-gcr.org/?p=4536

▶ A comprehensive list of smart city indicators was developed through investigations on actual and/or potential contributions to smart city initiatives by designing and implementing a science-based and policy-relevant toolkit. The project also identified the effectiveness of ICT-based solutions to enhance resilience and explore context-specific prioritized actions.



PROJECT LEADER Dr Ayyoob Sharifi, National Institute for Environmental Studies, Japan WEBSITE https://www.apn-gcr.org/?p=4603



• Twenty-one early-career researchers from nine countries participated at the International Conference on Regional Climate-CORDEX 2019 held in October 2019 in China. The researchers presented their work and selected researchers engaged in sessions as coordinators and assistant rapporteurs, which enhanced their involvement at international academic events and science communication.

PROJECT LEADER Dr Shuyu Wang, Nanjing University, China WEBSITE https://www.apn-gcr.org/?p=4619

Air, land, coasts and oceans

Remote sensing database contributes to better understanding of changes in marine and coastal ecosystems



GLOBAL WARMING IS influencing basinscale climate variations such as the El Niño Southern Oscillation and Indian Ocean Dipole, and is increasingly pressuring marine and coastal ecosystems surrounding the densely populated Asia-Pacific region, resulting in industrial damages, ecosystem destruction and economic losses. Needless to say, it is crucial to identify vulnerable areas and understand the underlying mechanisms of climate change when developing integrated measures and policies to tackle its adverse impacts.

The project developed a remote sensing database of low-trophic level organisms across the Asia-Pacific region, and built research capacity to understand the impacts of basinscale climate variations on marine and coastal ecosystems in the region. Consequently, the project published The project developed the research capacity of ten postgraduate students and early-career scientists by engaging them throughout the implementation of its activities.

19 peer-reviewed scientific papers providing evidence-based information on how climate change impacts low- and high-trophic level organisms in the region. Additionally, the project developed a web-based data distributing platform and organized



six workshops, which strengthened collaboration in regional research and improved research capacity to monitor the impacts of climate change on marine and coastal ecosystems.

PROJECT Developing high spatiotemporal resolution datasets of low-trophic level aquatic organisms 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 **PROGRAMME** Climate Adaptation Framework **PROJECT LEADER** Dr Eko Siswanto, Japan Agency for Marine-Earth Science and Technology, Japan ORGANIZATIONS INVOLVED Rajshahi University, Bangladesh; IPB University, Indonesia; University of Sriwijaya, Indonesia; Japan Agency for Marine-Earth Science and Technology, Japan; Nagoya University, Japan; Korea Institute of Ocean Science and Technology, Republic of Korea; Burapha University, Thailand; Nha Trang Institute of Oceanography, Viet Nam WEBSITE https:// www.apn-gcr.org/?p=4539



• Qualitative and quantitative approaches assessed the current situation of microplastics pollution in Chao Phraya River (Thailand), Saigon River (Viet Nam) and Citarum River (Indonesia). By building capacity and promoting networking among collaborating countries, the project increased the awareness of scientists and policymakers on microplastics contamination and appropriate response measures in each country.

PROJECT LEADER Prof. Sandhya Babel, Thammasat University, Thailand WEBSITE https://www.apn-gcr.org/?p=4589

▶ Investigations of the linkages among pollution sources, water quality and environmental capacity response in China, Thailand and Viet Nam led to the development of a multi-scale, multi-sector waste load allocation framework that can be used to produce optimal allocation of pollutant load quotas at multiple scales.

PROJECT LEADER Prof. Jiaping Wu, Zhejiang University, China WEBSITE https://www.apn-gcr.org/?p=4512



Biodiversity and ecosystems

Elaborating the importance of science-based tools and approaches in monitoring and conserving marine ecosystems



THE SOUTH CHINA SEA is home to rich coral reefs and mangroves that produce high rates of primary and secondary protein. That said, the waters are surrounded by countries that are currently at the helm of rapid economic growth. The enhanced technological capabilities of humans have brought pollution, eutrophication, coastal urbanization and overfishing, etc., and have accelerated the rate of change of these life-supporting ecosystems.

The project brought together the expertise of scientists, academics, marine coastal managers and policymakers from Russia, China, the Philippines and Viet Nam, and addressed questions in two areas: enhancing the operation of fishing restrictions to conserve and restore coral reefs and designing marine protected areas; and developing national strategies to rationally use coastal marine ecosystems, including science-based options for sustainable marine farming, catch quantity and ecotourism.

To identify impacts induced by environmental change, the project collected and synthesized existing data on physical environments in central Viet Nam and the Philippines with emphasis on coral reefs in the west and east parts of the South China Sea as model marine ecosystems. The project also conducted field surveys during the dry and wet seasons in central Viet Nam to fill data gaps on physical environments. The data was analyzed with information on the biodiversity and reproductive potential of key groups of marine organisms. Consequently, the project developed an integrative assessment on life-supporting ecosystems and adaptivity to environmental change, and disseminated research findings at two international workshops and in eight peer-reviewed papers.

PROJECT Developing life-supporting marine ecosystems along the Asia-Pacific coasts—a synthesis of physical and biological data for science-based management and socio-ecological policy making **PROGRAMME** Climate Adaptation Framework **PROJECT LEADER** Dr Tatiana N. Dautova, A.V. Zhirmunsky National Scientific Center of Marine Biology, Russian Federation **ORGANIZATIONS INVOLVED** Vietnam Academy of Science and Technology, Viet Nam; Chinese Academy of Sciences, China; University of the Philippines Visayas, Philippines **WEBSITE** https:// www.apn-gcr.org/?p=4540



▲ Case studies conducted in Viet Nam and Bangladesh identified the feasibility of establishing a Payment for Forest Ecosystem Services mechanism for blue carbon sequestration services in community mangroves and protected mangrove ecosystems, and assisted countries to access self-operated payments under the lack of an international carbon market.

PROJECT LEADER Prof. Richard J. Harper, Murdoch University, Australia WEBSITE https://www.apn-gcr.org/?p=4585

Food, water and energy

Enhancing the capacity and awareness of producing renewable energy from livestock waste



VIET NAM AND OTHER countries in Southeast Asia are severely affected by climate change, where the production of renewable energy from livestock waste (PREW) is considered as one of the solutions. Based on this understanding, the project strengthened the capacity of local communities in Viet Nam to produce renewable energy from livestock waste, adapt to climate change and achieve green growth.

This was conducted through three modules: (1) evaluating public awareness on PREW and identifying key groups to be involved in its implementation; (2) developing the capacity and raising the awareness of stakeholders such as local farmers and managers, and sharing project results at universities in Viet Nam and Thailand; and (3) developing a policy brief and assessment report, and organizing workshops to disseminate project findings and promote policies to encourage PREW to policymakers, academics and other stakeholders.



Consequently, the project trained and raised the awareness of 80 farmers and local managers on the benefits of PREW, and developed the capacity of 400 farmers through the distribution of communication materials. Additionally, the project developed and distributed a policy brief to four national ministries, ten provincial governments, 20 environmental and development NGOs and research institutes in Viet Nam, and published five peer-reviewed papers.

PROJECT Enhancing capacity for public communities in renewable energy producing from livestock wastes adapting climate change **PROGRAMME** Scientific Capacity Development **PROJECT LEADER** Dr Thu Nga Do, Electric Power University, Viet Nam **ORGANIZATIONS INVOLVED** Institute for Global Environmental Strategies, Japan; National Economics University, Viet Nam; Ministry of Industry and Trade, Viet Nam; Naresuan University, Thailand **WEBSITE** https:// www.apn-gcr.org/?p=4616





• Climate change scenarios of temperature and precipitation developed by using state of the art statistical downscaling approaches projected the spatial and temporal impact on cereal production, a dietary staple for people in South Asia. It is hoped that the assessment will contribute to developing policies to build resilience in water-efficient agriculture and food security.

PROJECT LEADER Ms Nuzba Shaheen, Global Change Impact Studies Centre, Pakistan WEBSITE https://www.apn-gcr.org/?p=4532

▲ Forty-five upland farmers in the Philippines were trained on agroforestry, and soil and water conservation. Eleven rainwater harvesting facilities were established, and a monitoring tool to assess the performance of the facility and a manual introducing lessons and experiences from establishing the facility were developed. Project accomplishments were also reported to local government units.

PROJECT LEADER Dr Leila Landicho, University of the Philippines Los Baños, Philippines WEBSITE https://www.apn-gcr.org/?p=4612

Risk and resilience

Building climate-resilient farming systems in the hilly areas of South Asia



SOUTH ASIA IS home to around one quarter of the world's population, where a considerable number of people suffer from hunger and malnutrition. While the agricultural sector continues to grow to enhance food security, climate change is casting a shadow by affecting crop growth and yield, hydrologic balances, supplies of inputs and other components to manage agricultural systems, resulting in changes in food prices, markets and supply chain infrastructure.



To identify best farming practices to minimize resource degradation while ensuring environmental sustainability and enhancing food security and resilience in South Asia, the project characterized adaptive capacities of diverse farming systems in the hilly areas of Bangladesh, Nepal and Sri Lanka, and assessed its resilience against five indices: climate vulnerability; social vulnerability; food nutrition and health vulnerability; adaptability; and climate resilience.

The project found that the farming systems in the three countries differ in size, composition, resource utilization and sustainable management practices adopted by farmers. Additionally, the project revealed that the farming system in Bangladesh is most vulnerable to climate change with low adaptivity, resilience and security of food, nutrition and health, whereas the farming system in Sri Lanka was least vulnerable to climate change with the ability to expect, overcome, resist and recover from impacts of natural hazards.

It is hoped that the findings of the project can contribute to identifying climate-resilient farming systems in the hilly areas of South Asia.

PROJECT Building climate resilience in farming systems in sloping lands of South Asia **PROGRAMME** Climate Adaptation Framework **PROJECT LEADER** Prof. Buddhi Marambe, University of Peradeniya, Sri Lanka **ORGANIZA-TIONS INVOLVED** Department of Agriculture, Sri Lanka; University of Peradeniya, Sri Lanka; Department of Meteorology, Sri Lanka; University of Colombo, Sri Lanka; Pakistan Agricultural Research Council, Pakistan; Commonwealth Scientific and Industrial Research Organisation, Australia; Bangabandhu Sheikh Mujibur Rahman Agricultural University, Bangladesh; The Small Earth Nepal, Nepal **WEBSITE** https://www. apn-gcr.org/?p=4542

✓ Hydroclimate data were obtained and analyzed to understand spatial and temporal variability of rainfall and temperature in Indonesia and India. Additionally, a web-based Graphical User Interface (GUI) visualization tool was developed to assist policymakers and other relevant stakeholders in understanding hydrologic extremes as well as their linkages with social resilience.

PROJECT LEADER Dr Yanto, Jenderal Soedirman University, Indonesia WEBSITE https://www.apn-gcr.org/?p=4586





▲ Thirty women climate communicators trained in the community built the capacity of 3,000 women farmers from 35 villages in South India to understand climate information, including weather forecast and climate change-related issues, and access suitable agricultural advisories to identify best adaptation practices and make informed decisions.

PROJECT LEADER Dr Rengalakshmi Raj, M. S. Swaminathan Research Foundation, India WEBSITE https://www.apn-gcr.org/?p=4567

Human dimensions

Capacity development on water-food-energy nexus contributes to the understanding of efficient management of resources



OVER THE LAST DECADE, the interconnection among water, food and energy has attracted global attention. The so-called water-food-energy (WFE) nexus is regarded as highly important in terms of the efficient management of resources, which ultimately leads to climate change adaptation and sustainable development.

The project aimed to enhance the capacity of WFE nexus management from the perspective of consumption across policy, scientific and public communities in countries in East Asia and other regions. This was done by establishing a database of the life cycle of water, food and energy, from its production to final use in consideration of socioeconomic characteristics in each country. Based on the database, the project developed an

environmentally expanded global multiregional input-output model.

Early-career scientists were trained on the WFE nexus, data collection and processing, and their ability was enhanced to conduct individual research.

Additionally, the project explored household consumption characteristics, identified the impacts of dietary consumption of people with different dietary consumption patterns on carbon emissions and water consumption, and investigated potentials of water-saving and carbon-reducing food consumption in colleges and universities in Beijing, China.

Consequently, the project organized workshops with the participation of

national policymakers and experts from universities to introduce project outputs, which could enhance decision-making of various government departments. The project also disseminated project outputs through international conferences, seminars, publications and virtual platforms.

This project was co-funded by the Administrative Centre for China's Agenda 21, Ministry of Science and Technology, China. ■

PROJECT Water-food-energy nexus in East Asia: Insights from changes in consumption pattern PROGRAMME Scientific Capacity Development PROJECT LEADER Dr Jingli Fan, China University of Mining and Technology-Beijing, China ORGANIZATIONS INVOLVED The Administrative Centre for China's Agenda 21, China, Ministry of Science and Technology WEBSITE https://www. apn-gcr.org/?p=4600



In the edited volume and two policy briefs that introduce the perspectives of non-state actors in enhancing policies on SDGs by highlighting civil society experiences, innovative approaches and promising practices within and beyond ASEAN, offered new perspectives and options to policymakers, and promoted inclusive and participatory processes that will lead to transformative learning among key stakeholders.

PROJECT LEADER Dr Mochamad Indrawan, Universitas Indonesia, Indonesia WEBSITE https://www.apn-gcr.org/?p=4594

▶ Twenty-nine early-career scientists from 17 countries participated in a two-week summer school "Institute of Advanced Studies in Climate Extremes and Risk Management" organized by WCRP in October-November 2019. The event provided an opportunity for participants to learn from each other, and a basis for collaborative research on topics such as climate risk reduction and management, and projections and predictions of extreme events.

PROJECT LEADER Dr Zhihong Jiang , Nanjing University of Information Science and Technology, China WEBSITE https://www.apn-gcr.org/?p=4623



Capacity development

Training to formulate Local Climate Change Action Plans enhances capacities of local government units in the Philippines



The project provided technical assistance to eight local government units (LGUs) in the province of Aurora to formulate their respective Local Climate Change Action Plans (LCCAP) through training on the Climate and Disaster Risk Assessment (CDRA) and the Participatory Risk and Vulnerability Assessment. In the process, the project developed adaptation strategies, including the requirement of infrastructure to enhance resilience, and conducted an assessment of vulnerability and risks associated with future climate scenarios.

Subsequently, the project organized a "Technical and Policy Forum" with key government agencies involved in preparing the CDRA and LCCAP, and developed unified policies and guidelines to accelerate the preparation of these science-based assessments and plans. This forum was the first of its kind in the Philippines. The project contributed to enhancing the capacities of municipal officers to acquire data, implement research, conduct land capability classification, assess vulnerability and risks associated with future climate scenarios and, as a consequence, increase the resilience of LGUs towards climate change and disaster.

PROJECT Enhancing climate risk resilience through human security development and capacity building in the province of Aurora, Philippines **PROGRAMME** Scientific Capacity Development **PROJECT LEADER** Prof. Juan M. Pulhin, University of the Philippines Los Baños, Philippines **ORGANIZATIONS INVOLVED** University of the Philippines Los Baños, Philippines **WEBSITE** https://www. apn-gcr.org/?p=4564

Suitability map for rainwater harvesting and mobile application increases adaptive capacity of local people in Nepal



NATURAL SPRINGS ARE the main source of water for domestic supply in rural communities in the hilly areas of the Himalayan region. However, over the past decade, a significant decline in spring discharge during the dry period in different drought-prone areas of the Himalayas has caused severe water shortages, and has affected human and ecological health in the region.

To reduce the impacts of climate change on water resources, the project conducted the following: collected a variety of data related to runoff estimation, such as satellite images for land use classes, digital elevation model, soil map and precipitation data; identified appropriate locations for rainwater harvesting to maximize groundwater recharge; and developed a site suitability map for end-users and policymakers.

Five early-career researchers engaged in the project from the beginning, and 20 students trained on hydrogeology.

Additionally, the project developed an android-based, free of charge and userfriendly mobile application to calculate the optimal household tank size, and obtain other technical and financial aspects of rainwater harvesting systems. The application incorporates information on local precipitation patterns, roof types and dimensions, and runoff coefficients including water requirements of households.

Consequently, the project organized a series of meetings and seminars to disseminate project outputs to various stakeholders from local villagers to policymakers at the national level.

PROJECT Rainwater harvesting for mitigating drought in western Nepal PROGRAMME Collaborative Research for Young Scientists PROJECT LEADER Mr Jeeban Panthi, The Small Earth Nepal, Nepal ORGANIZATIONS INVOLVED Michigan State University, United States of America; TERI School of Advanced Studies, India; Tribhuvan University, Nepal; University of Saskatchewan, Canada WEBSITE https://www. apn-gcr.org/?p=4568

Stakeholder Engagement

APAN

In March 2021, APN organized a session titled "Linking Adaptation and Mitigation" at the 7th Asia-Pacific Climate Change Adaptation Forum. The session explored the role of national adaptation plans in implementing nationally determined contributions under the Paris Agreement by focusing on challenges and solutions in South Asia and Southeast Asia. Subsequently, APN organized a side event and explored challenges and opportunities to harmonize science information and knowledge to enable adaptation at the regional level. Additionally, APN shared its recent research and capacity development activities related to water at the session that explored best practices and challenges in existing technologies and practices for different water-based ecosystems.





POPCCC

In October 2020, APN was engaged in the 2020 Pacific Ocean Pacific Climate Change Conference "Blue Pacific, Climate Action for Climate Resilience". The Secretariat and project leaders of APN-funded projects, Prof. Partick Nunn, University of Sunshine Coast, Australia, and Prof. Andreas Neef, University of Auckland, New Zealand, made four presentations under three side streams on themes "Partnerships: Climate change is everyone's business", "Traditional knowledge and science" and "Innovative responses and collaboration for enhanced resilience". The conference had over 300 attendees.



SLYCAN

In December 2020, APN was invited to participate at the Virtual Summit on Just Transition organized by SLYCAN Trust. The summit aimed to enhance the understanding of the concept of just transition and its inclusion in climate action at all levels. APN contributed to the discussion by introducing recent APN-funded projects at the grassroots level, including improving access of women to climate information in India, easy-to-use assessment tools for communities in Cambodia and public-private partnerships for herder communities in Mongolia.



PICES

In October 2020, APN participated in the annual meeting of the North Pacific Marine Science Organization (PICES). The participation of APN in this meeting and the participation of PICES at the 24th Intergovernmental Meeting of APN identified shared interests in supporting international cooperation in research and capacity development. This has led to the establishment of a joint study group that will explore possibilities to enhance collaboration between the two organizations in the Pacific, especially in line with the UN Decade of Ocean Science Sustainable for Development (2021-2030).

SBSTA

In June 2021, Mr Jay Samek, University of Michigan, USA, and Prof. Ryo Kohsaka, Nagoya University, Japan, presented their APN-funded projects at the poster session of the 13th Meeting of the Research Dialogue of UNFCCC SBSTA. The presentations focused on enhancing local capacity in sustainable forest management, and participatory monitoring and evaluation of blue carbon ecosystems, respectively, and highlighted how the co-creation of knowledge and local actions could contribute to the development and implementation of policies and measures on mitigation and adaptation.





IPBES

In June 2021, APN presented two videos at the IPBES8 Stakeholder Days E-Poster Session on its capacity development initiatives related to biodiversity and ecosystems: one focusing on the benefits that coastal forests offer and the other on highlighting the importance of building the capacity of individuals towards wetland conservation. Additionally, the "Policy Brief: Raising awareness of the IPBES Regional Assessment for Asia and the Pacific"co-authored by the Institute for Global Environmental Strategies (IGES) and APN, was acknowledged in a presentation made at the third session of the Stakeholder Days that focused on the importance of enhancing the uptake of assessment findings, reducing knowledge gaps and listening to local voices.



Hyogo Activities

In February 2021, APN, the Hyogo Prefectural Government and IGES jointly organized the "Regional Circular and Ecological Sphere (R-CES) Forum". The forum aimed to deepen the understanding of the concept of R-CES and its importance through efforts made by companies in Hyogo Prefecture and surrounding areas on renewable energy. Prof. Kazuhiko Takeuchi, President of IGES, gave a keynote speech and Prof. Rajib Shaw, Keio University, Japan, and project leader of an APN-funded project, gave an invited lecture.



In March 2021, APN and Kobe University jointly organized the seminar "Wonders and Challenges of Forests Nearby -thinking about the environment of forests in 30 years time-". Prof. Keiko Kuroda, Kobe University, Japan, Mr Daisuke Sakuma, Osaka Museum of Natural History, Japan, and Dr Evonne Yiu, United Nations University, made presentations on biodiversity, ecosystems, sustainable use of natural resources and societies in harmony with nature, etc.

Fifth Strategic Plan



The Fifth Strategic Plan was released in February 2021 after the approval of the Intergovernmental Meeting. The Plan sets out the overall goals of APN in 2020–2024 by placing importance on further strengthening partnerships and activities that promote and foster regional-based research and capacity building to contribute to global efforts to "build forward better" and to establish a post-COVID-19 world that is more resilient, sustainable, safe and equitable.

Goal 1: Research

Supporting regional and international cooperation in research on global change and sustainability issues particularly relevant to the Asia-Pacific region.

Goal 2: Capacity development

Enhancing capabilities to participate in research on global change and sustainability and to support science-based decision-making.

Goal 3: Science-policy interactions

Strengthening interactions between scientists, policymakers, practitioners and members of other societal groups, and providing sound scientific information for policymaking processes.

Goal 4: Community engagement

Continuing to enhance communication and collaboration with likeminded organizations and other stakeholder groups on issues of common interest.

Goal 5: APN and its operations

Enhancing the institutional, operational and financial base that is efficient, durable, equitable and able to support APN and its activities.

Case study of climate adaptation and disaster risk reduction projects assesses the contribution of APN to the Sendai Framework on Disaster Risk Reduction

APN encourages countries to work together to deepen the understanding of disaster risks, strengthen the capacity to manage those risks, and enhance preparedness and resilience. A study published in the journal Progress in Disaster Science examined the conceptual understanding of disaster risk reduction and climate change adaptation based on the work of 24 expert practitioners, and explored the potential contribution of their APN project outcomes to the Sendai Framework on Disaster Risk Reduction and their linkage with Sustainable Development Goals. The results present regional characteristics of risks, measures and approaches for climate change adaptation and disaster risk reduction, and lessons learned to integrate and mainstream climate change adaptation and disaster risk reduction within and across sectors relevant to Target E of the Sendai Framework on increasing national and local disaster risk reduction strategies. The open access publication is available online at https://doi.org/10.1016/j.pdisas.2021.100195.



Approved projects

Connecting women-led local realities with the global discourse on climate adaptation and DRR: Interrogating women's lived experiences in Cambodia and Vanuatu • Ms Michelle Higelin, ActionAid Australia, Australia

Enhancing local capacity for implementing transboundary revitalization policies for the Citarum river • Dr Wikke Novalia, Monash University, Australia

Protecting ecosystems and livelihoods of the Sundarbans, a World Heritage site: Assessing the impact of natural hazards on forestbased ecosystem services • Dr Sanjeev Srivastava, University of the Sunshine Coast, Australia

Urban water management and flood risk reduction: A platform to share integrated sustainable practices in Asian coastal countries • Prof. Bin He, Guangdong Academy of Sciences, China

Transboundary transport of microplastics through atmospheric and oceanic currents in East Asia • Prof. Lei Wang, Nankai University, China

Investigating the impacts of human activities and climate change on mangrove systems in East and Southeast Asia • Dr Loh Pei Sun, Zhejiang University, China

Integrated climate action planning (ICLAP) 2050 tool in Asia-Pacific cities • Dr Mahendra Sethi, Indian Society for Applied Research and Development, India

Building capacities among AP-PLAT partners in the "science of pricing ecosystem services" for enabling ecosystem-based adaptation for a sustainable future • Dr Dipayan Dey, South Asian Forum for Environment, India

Development of an adaptation communication framework mainstreaming indigenous and **local knowledge for the Hindu-Kush Himalayan Region •** Mr Osamu Mizuno, Institute for Global Environmental Strategies, Japan

Developing urban-rural partnerships framework to mitigate climateinduced water availability impacts on food, energy and water (FEW) security at the regional level • Prof. Rajib Shaw, Keio University, Japan

Integrated flood and sediment management in river basins for sustainable development (FSMART) • Dr Sameh Ahmed Kantoush, Kyoto University, Japan

Enhancing capacities of local stakeholders in Coral Triangle in managing blue carbon ecosystems for climate mitigation and adaptation • Dr Ryo Kohsaka, Nagoya University, Japan

Particulate matter source apportionment in Malaysia using source tagging modeling approach to quantify transboundary air pollution: A comparative analysis between haze and non-haze periods • Dr Norhaniza Amil, Universiti Sains Malaysia, Malaysia

Sustained capacity building among early-career researchers towards climate resilience by effective ocean monitoring through satellite remote sensing • Dr Nurul Hazrina Idris, Universiti Teknologi Malaysia, Malaysia

Sulphur isotopic approach on sources and production of urban atmospheric particulate matter in East Asia • Dr Soyol-Erdene Tseren-Ochir, National University of Mongolia, Mongolia

Influence of transboundary air pollutants into the atmosphere of Kathmandu, Nepal • Ms Jasmita Khadgi, Kathmandu Institute of Applied Sciences, Nepal

WCRP workshop on extremes in climate prediction ensembles (ExCPEns) • Dr Jin Ho Yoo, APEC Climate Center, Republic of Korea The impacts of Himalaya's glacier melting on arsenic mass balance and its mobility in Mekong and Salween sub-region groundwater • Dr Cary Seah Kah Yeah, Gwangju Institute of Science and Technology, Republic of Korea

Greenhouse gas emissions from paddy ecosystems (GREPEC): Critical windows of water and gas diffusivity • Dr Thuduwe Kankanamge Kelum Chamindu Deepagoda, University of Peradeniya, Sri Lanka

Building capacities for water security assessment in Asian cities • Prof. Mukand S. Babel, Asian Institute of Technology, Thailand

Climate change risk assessment for Southeast Asian lakes (CCRASEAL) • Dr Salvatore G.P. Virdis, Asian Institute of Technology, Thailand

Towards sustainable mangroveshrimp aquaculture through capacity building and partnerships in the Mekong River Delta • Dr Hue Le, Center for Environment and Community Assets Development, Thailand

Capacity development programme on air quality management and emission reduction of PM2.5 for ASEAN countries • Dr Ram Lal Verma, Regional Resource Centre for Asia and the Pacific, Thailand

Ecosystem services measurement and monitoring tools supporting KPH and community forest management in Aceh, Indonesia • Mr Jay Samek, Michigan State University, United States of America

Conservation of Indonesian endangered plant resources for human health: Enhancing scientific capacity and strengthening sciencebased policymaking in Indonesia • Dr Ilya Raskin, Rutgers University, United States of America

Completed projects

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

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

ICRC CORDEX 2019: Promoting involvement of early career scientists from the Asia-Pacific region in regional integrated and sustainable development through active participation and networking • Dr Shuyu Wang, Nanjing University, China

Facilitating the attendance, interaction and training of young and developing nation scientists from Asia-Pacific at the WCRP Institute of Advanced Studies in Climate Extremes and Risk Management • Prof. Zhihong Jiang, Nanjing University of Information Science and Technology, China

Comparative analysis of pollution sources at the Hangzhou Bay and Mekong River mouths • Prof. Jiaping Wu, Zhejiang University, China

Enhancing women farmer's adaptive capacity to address the challenges of climate change • Dr Rengalakshmi Raj, M. S. Swaminathan Research foundation, India

Integrated coastal landscape management: An adaptation related to climate change impacts • Dr Dewayany Sutrisno, Indonesian Society for Remote Sensing and Badan Informasi Geospasial, 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, Universitas Indonesia, Indonesia

Assessment of the actual and potential contributions of smart city projects to climate resilience in selected Asia-Pacific cities • Dr Ayyoob Sharifi, Hiroshima University, Japan

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

Fostering of the next generation of scientists for better understanding of air quality and regional climate change in Monsoon Asia and Oceania • Dr Hiroshi Tanimoto, National Institute for Environmental Studies, Japan

Climate change, biomass burning and biogenic emission impact on surface ozone and particulate matter in Southeast Asia • Dr Justin Sentian, Universiti Malaysia Sabah, Malaysia

Rainwater harvesting for mitigating drought in western Nepal • Mr Jeeban Panthi, The Small Earth Nepal, Nepal

Climate change adaptation in postdisaster recovery processes: Floodaffected communities in Cambodia and Fiji • Prof. Andreas Neef, University of Auckland, New Zealand

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

Establishment of rainwater harvesting technology in selected upland farming communities in the Philippines • Ms Leila Landicho, University of the Philippines Los Baños, Philippines

Enhancing climate risk resilience through human security development and capacity development in the province of Aurora, Philippines • Prof. Juan Pulhin, University of the Philippines Los Baños, Philippines

Developing life-supporting marine ecosystems along the Asia-Pacific coasts—A synthesis of physical and biological data for the science-based management and socio-ecological policy making • Dr Tatiana N. Dautova, Russian Academy of Sciences, Russian Federation

Building climate resilience in farming systems in sloping lands of South Asia • Prof. Buddhi Marambe, University of Peradeniya, Sri Lanka

Integrated analysis of climate, land use and water for resilient urban megacities: A case study of Thailand and Viet Nam • Dr Sathaporn Monprapussorn, Srinakharinwirot University, Thailand

Investigations on microplastics pollution in aquatic environment in selected developing countries from Southeast Asia • Prof. Sandhya Babel, Thammasat University, Thailand

Enhancing capacity for public communities in renewable energy producing from livestock wastes adapting climate change • Dr Thu Nga Do, Electric Power University, Viet Nam

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.

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

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Tenzin Khorlo National Environment Commission

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FINANCIAL RESOURCES IN FY 2020 (USD)

Donor contributions FY 2020	Ministry of the Environment, Japan		1,840,053
	Hyogo Prefectural Government, Japan		199,921
	Ministry of Environment, Republic of Korea		40,000
	Ministry for the Environment, New Zealand		19,056
Balance brought forward from FY 2019			
(including committed funds for multi-year projects)			1,091,191
Returned funds from completed projects and adjustments			722,875
		Total	3,913,096
USE OF RESOURCES IN FY 2020 (USD)		Executed and committed*	
Core programmes			2,275,649
Frameworks			-40,216
Other scientific and policy activities			332,605
Institutional activities			145,933
Personnel, administration and operational costs			599,818
		Total	3,313,790

* The lists below contains current members of APN at the time of publication.

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APN Annual Report Fiscal Year 2020

© Asia-Pacific Network for Global Change Research. Published in December 2021.

ISSN: 2185-7628 DOI: 10.30852/ar.2020

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