



**Asian Network on
Climate Science and Technology
(ANCST)**

**Asian Network on Climate Science and Technology
Annual Report 2021**

19 March 2022

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Annual Report 2021 (Year 8) to Cambridge Malaysian Education and Development Trust (CMEDT) and Malaysian Commonwealth Studies Centre (MCSC)

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ACKNOWLEDGEMENT

Universiti Kebangsaan Malaysia’s Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) would like to acknowledge the support of the Cambridge Malaysian Education and Development Trust (CMEDT) and Malaysian Commonwealth Studies Centre (MCSC) for funding the establishment and operations of the Asian Network on Climate Science and Technology (ANCST). The support of the Guy Carpenter Asia-Pacific Climate Impact Centre, City University of Hong Kong and Indian Institute of Technology, Delhi is also much appreciated. The International Development Research Centre (IDRC), Asia-Pacific Science, Technology and Academia Advisory Group (AP-STAG), U-INSPIRE Malaysia as well as other national and international partners that co-financed and collaborated in workshops and other activities are also gratefully acknowledged.



THE GREAT RESET
CLIMATE RESET DIALOGUE
EMPOWERING YOUTHS FOR CLIMATE ACTION

27 FEBRUARY
10:00 - 10:45am
Zoom Webinar

SPEAKERS

- Dr. Nurhishareena Muhamad, Senior Fellow, SEADPRI-UKM
- Jasmin Isling bin Haniff, Climate and Education Specialist, UNICEF
- Summa Chai Inoh, Senior Programme Specialist, UNICEF

Logos for Inspire, UNICEF, and other partners are visible at the bottom of the poster.

U-INSPIRE Malaysia@UKM is a youth network working on disaster risk reduction and climate change [www.ukm.my/uinspiremalaysia]. The network is nurtured by the ANCST STG on Young Professionals in DRR and Climate Change, and led by Dr. Nurhishareena Muhamad of SEADPRI-UKM. The network is now growing organically into a self-sustaining entity. In 2021, U-INSPIRE Malaysia conducted many initiatives to mobilize the youths in Malaysia, with support from the International Science Council Regional Office for Asia and the Pacific (ISC-ROAP) and the United Nations International Children's Emergency Fund (UNICEF). The youths are connected to the region via ANCST to other entities such as UNESCO and the UNDRR.

Asian Network on Climate Science and Technology (ANCST) Annual Report 2021

Executive Summary

A major achievement of the Cambridge Malaysian Education and Development Trust and Malaysian Commonwealth Studies Centre (CMEDT/MCSC) and Universiti Kebangsaan Malaysia in support of human sustainability is the establishment of the Asian Network on Climate Science and Technology (ANCST) through a Collaborative Agreement signed on 19 November 2013. Led by Professor Lord Julian Hunt of University of Cambridge and Professor Joy Pereira of UKM's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM), this international network is flourishing with considerable impact. ANCST facilitates collaboration and exchange of information between researchers engaged in scientific and technological aspects of climate change and climate-driven disasters specific to Asian conditions and phenomena. From its base at SEADPRI-UKM, with support from world-class Commonwealth institutions, ANCST coordinates Special Topic Groups (STGs) on key climate science and technology topics including monsoon dynamics, land-sea interactions, climate change effects on the urban environment, and climate-driven disaster risk reduction and resilience building.

Accomplishments in 2021: ANCST convened **four online events** with multiple partners involving researchers, policymakers, private sector practitioners and early career researchers. The reach of ANCST expanded through the forum on *Risk Science for Resilience Cities-From Concept to Action*, convened with key partners, to provide input to the Global Agenda on Disaster Research, helmed by the United Nations Office for Disaster Risk Reduction (UNDRR) and the International Science Council (ISC). High level science-policy interfacing focused on facilitating promotion of the Kuala Lumpur Multihazard Platform (KL-MHP), jointly developed by University of Cambridge and SEADPRI-UKM with several partners in Malaysia and the UK with support from the Newton-Ungku Omar Fund. The importance of such a forecasting system for cities in tropical Asia was emphasized at the Fifth United Nations Special Thematic Session on Water and Disasters on 25 June 2021, with the Emperor of Japan in attendance; the UNFCCC Asia-Pacific Regional Climate Week on 9 July 2021, to build momentum to work in line with the aspirations of COP26 at Glasgow and the Paris Agreement; and the British High Commission's campaign on 8 November 2021, to highlight key UK-Malaysia science partnerships in support of UNFCCC COP 26. Papers from existing collaborations of ANCST have been published in key journals, some involving Professor Lord Julian Hunt, a testament of its scientific rigor.

Future Plan: The ANCST work plan for 2022 is to continue the modus operandi of forging strategic alliances and leveraging on ongoing initiatives to continue activities involving researchers, practitioners and decision makers on key climate change issues. Concerted efforts will be made to scale up activities and reinforce the global image of University of Cambridge and UKM as research collaborators in building resilience to climate change and natural disasters through ANCST under the patronage of CMEDT/MCSC.

Achievements of ANCST: An Overview

- ❖ Since its establishment, ANCST has mobilized prominent Asian experts and assembled over 2800 scientists, policymakers and private sector practitioners in the region through 54 workshops and associated events, and enhanced their engagement in global processes such as the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).
- ❖ The Malaysia Window to Cambridge at UKM, an off-shoot programme of ANCST, has left a legacy of over 80 high-calibre young scientists.
- ❖ The ANCST website portal (<http://www.ancst.org/>) is an active forum with over 800,000 visitors, containing a record on all initiatives, events and publications.
- ❖ The ANCST Bulletin Board sends out periodic short email alerts on time-sensitive news, to keep scientists continuously engaged, particularly regarding the IPCC Sixth Assessment Cycle.
- ❖ The ANCST Database currently contains the contact information of over 2500 experts and policymakers working in the region.

Asian Network on Climate Science and Technology (ANCST) – Annual Report 2021

1.0 Introduction

Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development. This is recognized in the three major global agreements of 2015; the Paris Agreement of the United Nations Framework Convention on Climate Change, Sendai Framework on Disaster Risk Reduction and 2030 Agenda for Sustainable Development. Increases in global temperature, sea level rise, ocean acidification and other climate change impacts are serious threats that have to be addressed. The survival of many societies and of the biological support systems of the planet is at risk. Whilst global-level cooperation facilitates means of collaboration, context specific and continuous capacity enhancement, data and knowledge improvement is required to identify practical solutions to mitigate the issue. Such solutions are best marshalled by a network of regional experts who are already engaged in scientific and technological work in their respective areas.

The Collaborative Agreement between Universiti Kebangsaan Malaysia (UKM) and the Cambridge Malaysian Education and Development Trust and Malaysian Commonwealth Studies Centre (CMEDT/MCSC) signed on 19 November 2013 to establish ANCST, provided support for (i) administrative functions; (ii) promotion of disaster prevention and climate resilience in Asia through collaborative capacity building and outreach programmes; (iii) academic and research activities through staff exchanges and collaborations of common interests; and (iv) facilitation of student exchanges to enhance awareness and strengthen ties between the institutions. The robust structure of ANCST that has underpinned its remarkable progress was conceived by principal partners and key players in the region from two international workshops, organized under the aegis of UKM and CMEDT/MCSC, the first in Bangalore, India (July 2011) and the second in Bangi, Malaysia (November 2012).

ANCST facilitates collaboration and exchange of information between researchers engaged in scientific and technological aspects of climate science, climate change, natural disasters, as well as associated impacts, adaptation and solution pathways specific to Asian conditions and phenomena. This is done from its base at UKM's Southeast Disaster Prevention Research Initiative (SEADPRI-UKM), with support from world-class Commonwealth institutions in Cambridge, Hong Kong and India. Prominent Asian experts lead Special Topic Groups (STGs) that constitute the core of ANCST at the regional level, marshalling members from multiple disciplines and age cohorts in Asia on clearly defined topics related to climate science and technology.

Special Topic Groups (STGs) led by prominent Asian experts bring ANCST members together by convening workshops and training courses, conducting joint research, exchanging research findings and laying the foundation for the creation of common databases. These currently include:

- ❖ STG on **Disaster Prevention and Climate Resilience**, led by Professor Rajib Shaw, Keio University, Japan;
- ❖ STG on **Atmospheric Composition and Climate Change**, led by Professor Mohd Talib Latif, Universiti Kebangsaan Malaysia;
- ❖ STG on **Climate Change, Floods and Anthropogenic Activities**, led by Professor Zulkifli Yusup, Universiti Teknologi Malaysia;
- ❖ STG on **Urban Meteorology and Climate**, led by Professor Johnny Chan & Prof. Jimmy Fung, Hong Kong;
- ❖ STG on **Asian Atmosphere-Ocean Processes**, led by Professor Manju Mohan, Indian Institute of Technology Delhi; and
- ❖ STG on **Young Professionals in DRR and Climate Change**, led by Dr. Nurfashareena Muhamad, SEADPRI-UKM.

2.0 Capacity Building and Outreach

Since its establishment in November 2013, ANCST has brought together **over 2800 scientists in Asia**, comprising researchers, policymakers, private sector practitioners and early career researchers. This was accomplished in partnership with key national and regional partners, **through a total of 54 workshops** and associated events since then. Key climate science and technology topics advanced by ANCST include monsoon dynamics, land-sea interactions, climate change effects on the urban environment, and climate-driven disaster risk reduction and resilience. There are six operational STGs that spearhead the activities of ANCST.

In 2021, the high-profile of ANCST in the region was maintained through **four** online events, convened with multiple partners to benefit researchers, policymakers, private sector practitioners and early career researchers. Highlights of the events are as follows:

- (i) **The Great Reset Dialogue: Climate Reset**, 27 February 2021: convened by SEADPRI-UKM, ANCST, U-Inspire Malaysia and Global Shapers Community Kuala Lumpur [<http://ancst.org/the-great-reset-dialogue-climate-reset/>]. Led by the STG on Young Professionals in DRR and Climate Change, the discussion focused on mobilizing youth participation to mainstream the climate debate in the country.
- (ii) **Earth Day Celebrations 2021** (Sambutan Hari Bumi), 22 April 2021: convened by U-Inspire Malaysia, ANCST, and SEADPRI-UKM [<http://ancst.org/national-event-ancst-supporting-the-celebration-of-2021-earth-day/>]. Led by the STG on Young Professionals in DRR and Climate Change, this landmark event in Bahasa Melayu reached out to youths from the rural areas of Malaysia;
- (iii) **SEADPRI Forum 2021: Risk Science for Resilience Cities-From Concept to Action**, 7 May 2021: convened by SEADPRI-UKM, ANCST, UNDRR Asia Pacific Science Technology Academia Advisory Group (AP-STAG) and partners [<http://ancst.org/seadpri-forum-2021/>]. The event provided input to the Global Agenda on Disaster Research, helmed by the UNDRR and the International Science Council (ISC). Prof. Johnny Chan and Prof. Manju Mohan, two key collaborators of ANCST, made very important interventions on the urgent research needs for improving the urban atmosphere, a major challenge in the region and beyond; and
- (iv) **Training of Trainers: Social Entrepreneurship for Disaster Risk Reduction in Cambodia**, 10 August 2021: convened by SEADPRI-UKM, ANCST and partners for the *Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience* funded by the International Development Research Centre (IDRC) Canada [<http://ancst.org/training-of-trainers-social-entrepreneurship-for-disaster-risk-reduction-in-cambodia-10-august-2021/>]. The hands-on training of trainers was intended to familiarize early career researchers with the understanding and philosophy of social entrepreneurship and provide a step-by-step process on how to develop as well as sustain their own social enterprises. The event commenced with presentations on the status of social enterprises followed by fundamentals of social entrepreneurship, including development of a business model with respect to disaster risk reduction.



Objectives: Promote understanding of risk science and the regional risk landscape in a changing climate; identify major challenges and research priorities for risk science of cities in the region; and explore means for implementing actions, including drawing on the energy of youth and young professionals.

Keynotes: Concept and Practice of Risk Science (Dr. Jenty Kirsch-Wood, Chief of the Global Risk Analysis and Reporting Section, UNDRR) & Development of the Global Research Agenda for DRR (Prof Qunli Han, Executive Director, IRDR)

Outcome: Key findings from the Forum were conveyed to the 2021 Integrated Research on Disaster Risk (IRDR) to develop the *Global Research Agenda* for disaster risk reduction and risk-informed development toward 2030 and beyond.



3.0 Academic and Research Activities

Targeted high level science-policy interfacing is critical for strengthening linkages with key strategic partners to influence regional research priorities and facilitate development of regional initiatives. High level science-policy interfacing has enabled ANCST to contribute to the mainstreaming of policy-relevant solutions for building climate resilience in the region. Research collaborations worth over £2.2 million have also been generated from external sources through targeted science-policy interfacing with regional and global institutions, where the role of ANCST is to provide the pathway for enhanced regional synergies.

In 2021, science-policy interfacing was challenged by the absence of physical face-to-face meetings due to the Covid-19 pandemic. Notwithstanding, Professor Pereira made online presentations with Professor Hunt as joint presenter at three high-profile events, to highlight a major product where ANCST played an instrumental role in shaping the partnership. The Kuala Lumpur Multihazard Platform (KL-MHP) was developed by University of Cambridge and SEADPRI-UKM with several partners in Malaysia and the UK with support from the Newton-Ungku Omar Fund. The STG leaders such as Professor Chan of Hong Kong and Professor Rajib Shaw of Japan served as expert reviewers and facilitated information dissemination. Professor Pereira made presentations at the following events to emphasize the importance of such a forecasting system for cities in tropical Asia:

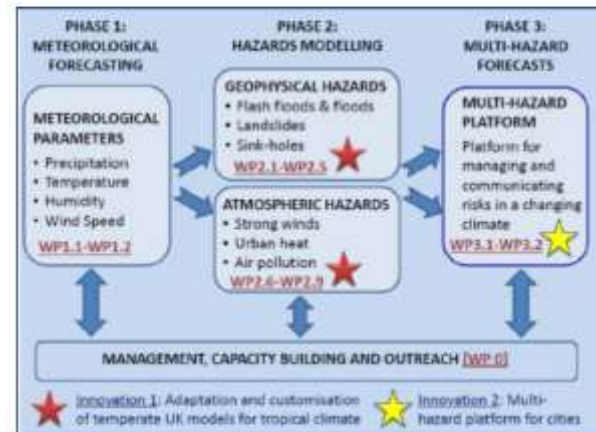
- ❖ Fifth United Nations Special Thematic Session on Water and Disasters on 25 June 2021, with the Emperor of Japan in attendance;
- ❖ UNFCCC Asia-Pacific Regional Climate Week on 9 July 2021, to build momentum to work in line with the aspirations of COP26 at Glasgow and the Paris Agreement; and
- ❖ British High Commission's campaign on 8 November 2021, to highlight key UK-Malaysia science partnerships in support of UNFCCC COP 26.

ANCST is also collaborating with Professor Pereira on a major initiative on *Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience* funded by IDRC Canada. The focus in 2021 was to build the capacity of social entrepreneurs in developing an open source geophysical hazard database. The survey that ANCST facilitated has been analysed to provide insights on the awareness and readiness of youth in taking climate actions and mobilizing to reduce the risk of hazards. The findings were shared with key government agencies in the country and a manuscript is now being prepared.

STG Leader Professor Manju Mohan of IIT Delhi collaborated with Professor Julian Hunt and others to publish a report in *Current Science* on the status of modelling atmospheric-oceanic processes for weather and climate extremes in Asia. This paper was the outcome of the workshop convened in New Delhi on 28–29 March 2019 by IIT Delhi and ANCST, in collaboration with key partners from the Government of India. The report was based on presentations from India and other countries including Indonesia, Malaysia, Singapore, Bangladesh, Thailand, China, Saudi Arabia and Japan. The paper highlighted aspects related to challenges in operational forecasts of extreme weather events, mechanisms, drivers and feedbacks in atmospheric-oceanic processes leading to extremes, and the role of environmental factors on extreme weather events.

MHP – A Multi-hazard Forecasting System for Cities

Innovate UK **MIght** Newton-Ungku Omar Fund



PROJECT LEADERS: Prof. Joy Jacqueline Pereira (SEADPRI-UKM) & Prof. Lord Julian C.R. Hunt (University Of Cambridge)

STG Leader Professor Zulkifli Yusup of Universiti Teknologi Malaysia collaborated with Professor Qi Zhang from the Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences (NIGLAS), to publish a special issue of *Hydrology Research* (doi: 10.2166/nh.2021.000). This special issue was an outcome of the conference on *Flood Catastrophes in a Changing Environment 2018* (CFCCE'18), held on 15-18 November 2018 in Nanjing, China, where ANCST played an instrumental role in bringing the partners together. Additional papers were also sourced through an open call to capture the current state of knowledge on floods. The special issue covered topics of climate impacts, modelling and model uncertainty, flooding pollution and flood risk management.

Publications by key members of ANCST include research articles and workshop reports. In 2021, papers from existing collaborations of ANCST have been published in key journals, some involving Professor Lord Julian Hunt, a testament of its scientific rigor. The report of events are also uploaded to the ANCST website (<http://www.ancst.org/>) to enhance outreach.

The **ANCST Website Portal** (<http://www.ancst.org/>) serves as a central resource for current, accurate and accessible information on climate science and technology. The Portal has received about 800,000 visitors as of 31 December 2021.

The **ANCST Bulletin Board** sent out several calls for expert review by the IPCC, participation in workshops and training for early career researchers. The STG Leaders generally availed themselves to this service to enhance communication with scientists in the region.

The **ANCST Database** currently contains the contact information of about 2500 experts and policymakers working on climate science and disaster resilience in Asia. Events convened by ANCST provide an opportunity to grow its membership and expand the database.

PUBLICATIONS

- ❖ **Pereira, J.J., Ng, T.F., Hunt, J.C.R.** (2021). Climate action. In: Joel C. Gill, Martin Smith (eds). *Geosciences and the Sustainable Development Goals*, 313-337. Switzerland: Springer.
- ❖ **Mohan, M., Sukumaran, S., Pant, V., Kunchala, R.K., Hunt, J.C.R.** (2021). Modelling atmospheric-oceanic processes for weather and climate extremes, *Current Science*, 120:2, 257-259.
- ❖ Zhang, Q., **Yusup, Z.** (2021). Flood catastrophes in a changing environment (Editorial), *Hydrology Research*, 52:1 2021 [doi: 10.2166/nh.2021.000]
- ❖ **Nurfashareena, M., Arshad, S.H.M., Pereira, J.J.** 2021. Exposure elements in disaster databases and availability for local scale application: case study of Kuala Lumpur, Malaysia. *Frontiers in Earth Science* 9: 1- 14
- ❖ Azhari, A., Halim, N.D.A., Othman, M., **Latif, M.T., Juneng, L., Sofwan, N.D., Stocker, J., & Johnson, K.** 2021. Highly spatially resolved emission inventory of selected air pollutants in Kuala Lumpur's urban environment. *Atmospheric Pollution Research* 12: 12-22
- ❖ Daniel, M.T., Ng, T.F., Kadir, M.F.A., & **Pereira, J.J.** 2021. Landslide susceptibility modelling using a hybrid bivariate statistical and expert consultation approach in Canada Hill, Sarawak, Malaysia. *Frontiers in Earth Science* 9(616225): 1- 15
- ❖ Bhuiyan, T.R., Er, A.C., **Nurfashareena, M. & Pereira, J.J.** 2021. The Socioeconomic impact of climate-related hazards: flash flood impact assessment in Kuala Lumpur. *Natural Hazards*, 109: 1509-1538
- ❖ Paramananthan, S., **Nurfashareena, M. & Pereira, J.J.** 2021. Soil related factors controlling erosion and landslides in Malaysia, 72: 165-175
- ❖ **Pereira, J.J., Bhuiyan, T.R., Nurfashareena, M., Khairul, M.Z.I.** (2021). SEADPRI Forum 2021: Risk Science for Resilient Cities- From Concept to Action, *SEADPRI Bulletin*, 22, 11. [<http://ancst.org/wp-content/uploads/2021/12/SEADPRI-Forum-2021.pdf>]
- ❖ **Nurfashareena M., Ahmad S.A., Muhammad D.A.M.** (2021). Empowering Youths for Climate Action, *SEADPRI Bulletin*, 22, 12. [<http://ancst.org/wp-content/uploads/2021/12/Empowering-Youths-for-Climate-Action.pdf>]

4.0 Work Plan for 2022 and Beyond

The CMEDT/MCSC and its connections to University of Cambridge play a critical role as the patron of ANCST, to mobilize funds from multiple sources. An example is U-INSPIRE Malaysia@UKM, the youth network working on disaster risk reduction and climate change, nurtured by the ANCST STG on Young Professionals in DRR and Climate Change. The network [www.ukm.my/uinspiremalaysia] is growing organically into a self-sustaining entity with support from the International Science Council Regional Office for Asia and the Pacific (ISC-ROAP) and the United Nations International Children's Emergency Fund (UNICEF). There are many initiatives organized to mobilize the youths in Malaysia, and connect them to the region via ANCST and other entities such as UNESCO and the UNDRR.

The ANCST work plan is to continue the modus operandi of forging strategic alliances to leverage exponentially on the seed-funding provided by CMEDT/MCSC and conduct initiatives involving researchers, practitioners and decision-makers on key climate change issues. The work plan for 2022 is as listed below:

- ❖ Showcasing ANCST at the Asia Pacific Ministerial Conference on DRR hosted by the Government of Australia through the involvement of ANCST Young Scientists, postponed from the previous year [Led by Dr. Nurfashareena Muhamad, Leader of STG on Young Professionals in DRR and Climate Change, and Prof. Rajib Shaw, Leader of STG on Disaster Prevention and Climate Resilience];
- ❖ Continuous improvement of the ANCST website to highlight products from the projects funded by the NUOF and IDRC, and serve as a forum between scientists and policymakers in the region;
- ❖ Growing of ANCST membership via its workshops and periodic ANCST Bulletin, which carries information on opportunities for training, research and publication as well as IPCC's call to review the reports;
- ❖ Publication of manuscripts from initiatives supported by ANCST and targeted science-policy interfacing focusing explicitly on securing support for long-term activities;

The coverage of climate related issues will be broadened to improve integration of climate and disaster risks in cities as well as facilitation of mitigation actions that yield effective adaptation co-benefits. There will be special focus on advancing social entrepreneurship in climate risk reduction, in addition to activities that further enhance the profile of ANCST and grow its membership. Special Topic Groups will be established on climate extremes and coastal cities; green technology for water, forestry and urban settlements; ocean-atmosphere dynamics; data-centres coordination; transboundary hazards; climate extremes and heritage sites; biodiversity and mountain ecosystems; and governance and its complexities.

The long-term plan is the establishment of a Cambridge Chair at UKM to enhance the global image of University of Cambridge and Universiti Kebangsaan Malaysia as research collaborators in building resilience to climate change and natural disasters, through ANCST and the Malaysia Window to Cambridge at UKM, under the patronage of the CMEDT/MCSC. The Cambridge Chair is intended to support two-way exchanges of distinguished academics and researchers, with the CMEDT/MCSC serving as the gateway to entities in Cambridge and the UK, and SEADPRI-UKM being the gateway to Malaysia, ASEAN and the Commonwealth in Asia. A business model is being explored involving the Multihazard Platform as a flagship.

5.0 Administration and Finance

The structure of ANCST and the composition of the ANCST International Steering Committee and the ANCST International Advisory Committee is under review. The new structure and composition will be finalized with the MCSC/CMEDT, which funded the establishment of ANCST in 2013. SEADPRI-UKM will remain as the main coordination centre of ANCST with finance controlled by the UKM Bursar. The collaborative agreement signed on 19 November 2013 between CMEDT/MCSC and UKM, which was first extended to 2020, has been extended again to 2025.