

BULETIN SEADPRI

pusat kajian bencana asia tenggara
southeast asia disaster prevention research initiative

BUILDING A BETTER TOMORROW: SEADPRI'S INITIATIVES BETWEEN 2017 AND 2022

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SEADPRI-Universiti Kebangsaan Malaysia

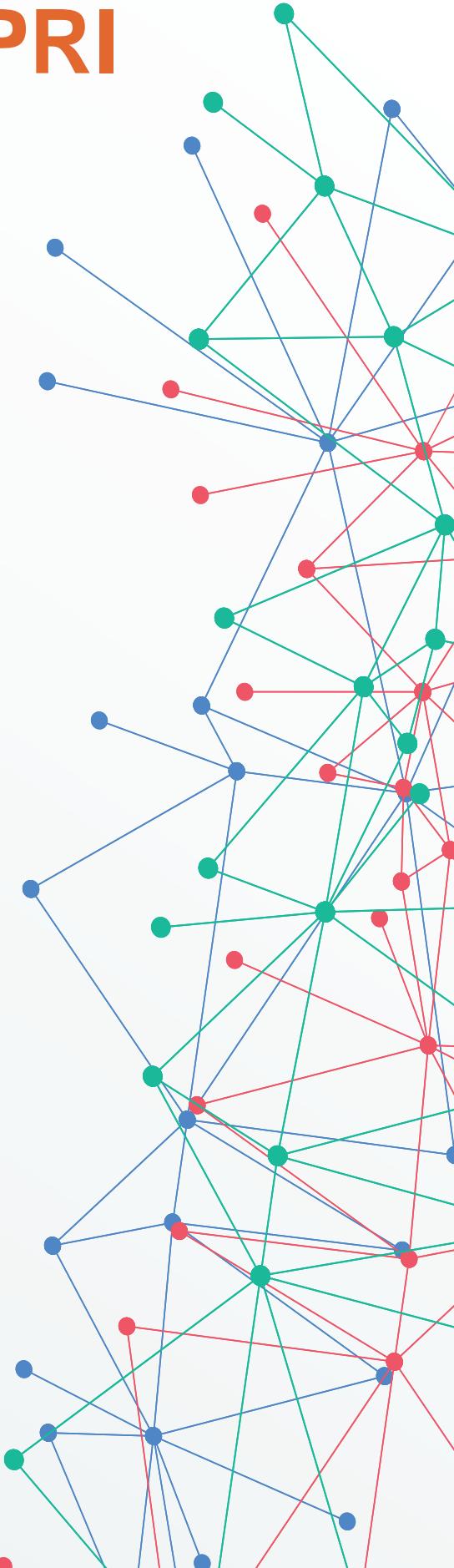
Since the establishment of Southeast Asia Disaster Prevention Research Initiative, Universiti Kebangsaan Malaysia (SEADPRI-UKM) on 1 June 2008, SEADPRI-UKM has played a significant role as a center conducting research related to disaster prevention. It also supports the government in making policy decisions on climate, geological and technological disasters, as well as increasing human capital and workforce capabilities at the local, state, national and international levels, particularly in Southeast Asia. SEADPRI-UKM also partnered with other agencies and institutions to share knowledge, create skills, and exchange information and technology (Table 1).

As an International Centre of Excellence (ICoE) for Disaster Risk and Climate Extremes, SEADPRI-UKM has organised more than 60 workshops and training sessions with its partners over the years. Between the period of 2017 and 2022, there was an average of 10 events conducted annually by SEADPRI-UKM; in 2017, the highest number of events being 13 (Fig. 1). Despite the COVID-19 pandemic in 2020, SEADPRI-UKM continued to foster long-term community resilience in addressing disaster risks and climate change issues through the virtual sessions of workshops, training, forums and consultations. A slight increase in the number of events between 2020 and 2021 was evident (Fig. 1).

It has been observed that women made up around one third of the participants in the events conducted in 2017 (Fig. 2). The increasing trend of women participation continued even after 2017; it went up to about 40% of participation in 2018, with more than 40% of female attendees noted in the following years (Fig. 2). Data like this is hope for the future for increasing women's participation in climate change initiatives, as women account for the majority of the world's poor when there are climate-related disasters; and 80% of those who are displaced by climate change are women.

In line with the mission and vision of SEADPRI-UKM, events were held for information sharing and exchange between SEADPRI-UKM and the collaborators or project partners; this was to further expand the networking between the experts, academician and researchers (Fig. 3). The institutions and agencies involved as conveners for the events conducted between 2017 and 2022 are shown in Table 1. Its role is also to ensure continued capacity-building of the agencies and experts in hazards and disasters, and to enhance the adaptation assessment and implementation capabilities of the country dealing with climate change. Among the events for capacity building are as follows:

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Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM)

Buletin SEADPRI

Buletin SEADPRI is published biannually by Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) through Penerbit LESTARI. It contains short communications, case studies and original research on science, technology, innovation, impact, vulnerability and governance related to disaster risk reduction.

About SEADPRI-UKM

Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) has been in operation since June 2008. Based at the Institute for Environment and Development (LESTARI), the Centre addresses crucial challenges on disaster risk reduction in Malaysia and the region. The research focus is on climatic hazards, geological hazards and technological hazards, with emphasis on capacity building, mainly through post-graduate programmes and specialized training. Transdisciplinary research conducted by the Centre is action-oriented, bridges the science-governance interface and provides pathways for disaster prevention.

In 2016, SEADPRI-UKM was acknowledged by the Integrated Research on Disaster Risk Programme (IRDR), jointly sponsored by International Science Council (ISC) and the United Nations Office for Disaster Risk Reduction (UNDRR), as an IRDR International Centre of Excellence (ICoE) for Disaster Risk and Climate Extremes (ICoE-SEADPRI-UKM). Globally, SEADPRI-UKM now sits with a group of 16 institutions with similar recognition, representing various regions. The focus of ICoE-SEADPRI-UKM is to strengthen local input for addressing regional disaster risks in conjunction with national and international partners. A major flagship is the Asian Network on Climate Science and Technology (ANCST), coordinated by SEADPRI-UKM and funded by the Cambridge Malaysian Education and Development Trust, to link disaster risk reduction and climate change for building resilience in the region.

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- Launch of the Malaysia Window to Cambridge at UKM (MW2C@UKM)
- Natural Hazards and Risk in Asia Pacific
- LiDAR for Landslide Hazard Mapping and Monitoring
- The National Conference on Science, Technology and Innovation in Disaster Risk Reduction
- Geohazards and Disaster Risk Reduction
- SEADPRI Forum 2017: Flood Modelling for Insurers- From Data to Decisions
- Training on the Predictability of Extreme Weather Events
- Landslide and Karst Susceptibility Assessment
- Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment
- Modelling Atmospheric-Oceanic Processes for Weather and Climate Extremes (MAPEX 2019)
- 4th Atmospheric Composition and Asian Monsoon workshop (ACAM 2019)
- Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience
- Malaysian Youth Delegation Virtual Training Series No. 1-4
- Training of Trainers for Social Entrepreneurship (SE) for DRR in Malaysia and Cambodia
- Youth and Young Professionals in Science, Engineering, Technology and Innovation for Disaster Risk Reduction Webinar "Road to GPDRR"
- Series of technical forums as a post-mortem of the flood incidents in December 2021
- OpenStreetMap Training of Trainers (ToT)
- Training of Trainers on Geological Disaster Knowledge

To address the climate crisis, one needs to understand the cause of it and how to defend against its impacts. Education and public awareness have been identified as the driving force to help the public, especially the young generation, to become more positive and accepting in responding to climate emergency. Events aimed at educating and creating public awareness included the following workshops:

- Natural Hazards and Risk in Asia Pacific
- LiDAR for Landslide Hazard Mapping and Monitoring
- SEADPRI Forum 2018: Typhoon Risk Assessment for Coastal Cities
- Landslides in Penang Island, Malaysia: Insights on emerging issues and the role of geoscience
- Modelling Atmospheric-Oceanic Processes for Weather and Climate Extremes (MAPEX 2019)
- The IPCC Role, Activities and Findings: IPCC with Malaysian Youth and Young Professionals
- Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience
- Malaysian Youth Delegation Virtual Training Series No. 1-4
- Youth Social Entrepreneurship for Building Community Resilience to Disasters and Climate Change in the Tropics
- e-Asia Pacific Science and Technology Conference for Disaster Risk Reduction (e-APSTCDRR)
- Coffee Table Talk Series No. 1 – Youth Perspectives on Earthquakes and Landslides in Malaysia
- Climate Reset Dialogue
- Earth Day celebration 2021: Restore Our Earth
- SEADPRI Forum 2021: Risk Science for Resilient Cities–From Concept to Action
- IRDR 2021 International Conference on Advancing Risk Science for Development

- Citizen Assemblies for Langkawi, Sabah and Sarawak
- Disaster Risk in the Era of Climate Change
- Chocolate Talk on DRR for the Youth and Young Professionals: Climate Change Adaptation and Disaster Risk Reduction
- OpenStreetMap Training of Trainers (ToT)
- U-INSPIRE Malaysia@UKM Celebrates Earth Day 2022
- Climate Change 2022 Risks, Adaptation and Mitigation: Implications and Way Forward
- Training of Trainers on Geological Disaster Knowledge
- Disaster Risk Reduction Knowledge and Awareness Capacity Building
- Climate Change and the Ocean: Challenges and Opportunities

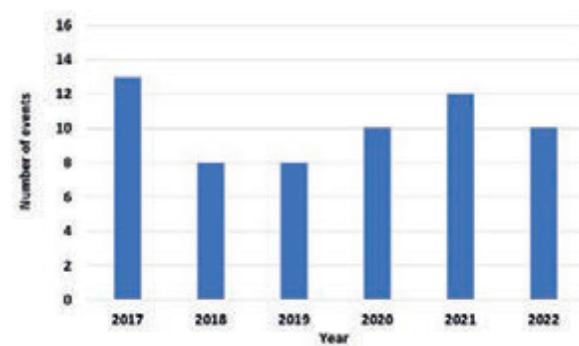


Figure 1: Number of SEADPRI-UKM events between 2017 and 2022

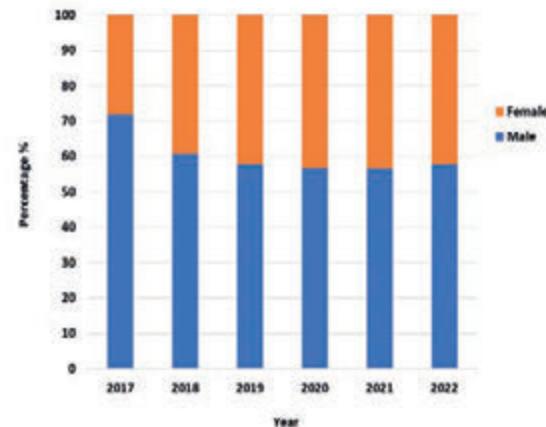


Figure 2: Percentage of male and female participants in SEADPRI-UKM events between 2017 and 2022

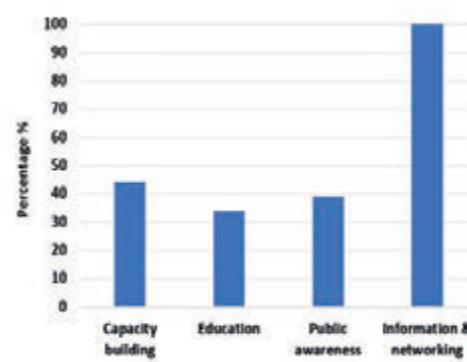


Figure 3: Initiatives of SEADPRI-UKM as an International Centre of Excellence (ICoE) for Disaster Risk and Climate Extremes over the past 6 years (between 2017 and 2022)



As a leader in innovative research and knowledge sharing on holistic disaster prevention, SEADPRI-UKM will continue to enhance the collaboration and exchange of information between researchers engaged in scientific and technological aspects of climate science, climate change and natural disasters. Their studies

Table 1. Collaborators of SEADPRI-UKM events between 2017 and 2022

No.	Title of Course/Workshop/Seminar/Campaign	Year of Implementation	Collaborators
1.	Launch of Malaysia Window to Cambridge at UKM (MW2C@UKM), Bangi, Malaysia	19 January 2017	SEADPRI-UKM, ANCST, MCSC and CMEDT
2.	The Second National Workshop on Sendai Framework for Disaster Risk Reduction	6 March 2017	NADMA and SEADPRI-UKM
3.	Workshop on Disaster Resilient Cities: Risk Assessment and Forecasting of Geophysical and Atmospheric Hazards	9-10 March 2017	NUOF, MIGHT, Innovate-UK, SEADPRI-UKM, DBKL, NADMA, JPBD, GSN and ANCST
4.	Workshop on Natural Hazards and Risk in Asia Pacific	28 March 2017	SEADPRI-UKM, IC-SU-ROAP and ANCST
5.	Urban Meteorology and Climate Conference, Hong Kong, China	25-26 May 2017	City University of Hong Kong, ANCST and SEADPRI-UKM
6.	Workshop on LiDAR for Landslide Hazard Mapping and Monitoring, Putrajaya, Malaysia	11-13 July 2017	JMC, SEADPRI-UKM, project partners of the Newton-Ungku Omar Fund (NUOF) under the administration of MIGHT and Innovate-UK
7.	Bengkel Konsultatif 3 Pelan Sains, Teknologi & Inovasi bagi DRR (STM DRR)	24 July 2017	NADMA and SEADPRI-UKM
8.	The National Conference on Science, Technology and Innovation in Disaster Risk Reduction	5-6 October 2017	ASM, NADMA and SEADPRI-UKM
9.	Training Workshop on Geohazards and DRR, Cameron Highlands, Malaysia	9-13 October 2017	GSM, SEADPRI-UKM, JMG and JKJ
10.	Workshop on Disasters and Heritage Areas, Cebu, Philippines	15 October 2017	COOP, SEADPRI-UKM and ANCST
11.	SEADPRI Forum 2017: Flood Modelling for Insurers- From Data to Decisions	7 November 2017	SEADPRI-UKM, Malaysian Association of Risk and Insurance Management (MARIM), JBA Risk Management, ANCST and APN
12.	Training on the Predictability of Extreme Weather Events	14-15 November 2017	METMalaysia, SEADPRI-UKM, ANCST and University of Cambridge
13.	Regional Science Policy Dialogue: Science, Technology and Innovation for Bridging Disaster Risk Reduction and Climate Change Adaptation	16 November 2017	ANCST, UNISDR Asian Science Technology Advisory Committee (ASTAAC) and Asia-Pacific Network for Global Change Research (APN), NADMA, METMalaysia and SEADPRI-UKM
14.	Workshop on Landslide and Karst Susceptibility Assessment	1 March 2018	GSM, SEADPRI-UKM and NUOF project partners
15.	International Conference on Atmospheric Composition and Climate Change in Asia 2018 (ICACCA 2018)	27-28 March 2018	SEADPRI-UKM, LESTARI-UKM, ANCST, FST-UKM, IPI-UKM, IOES University Malaysia, METMalaysia, ODE and Monsoon Asia and Oceania Networking Group (IGAC-MANGO)
16.	SEADPRI Forum 2018: Typhoon Risk Assessment for Coastal Cities	14 May 2018	SEADPRI-UKM, METMalaysia and ANCST
17.	Workshop on Disaster Resilient Cities: Advances in Meteorological Forecasting and Hazards Assessment	29 - 29 June 2018	SEADPRI-UKM, MIGHT, DBKL, NADMA, ANCST, NUOF partners from Malaysia and UK and other agencies
18.	Workshop on Geohazards and Disaster Risk Reduction	18-20 September 2018	SEADPRI-UKM, ANCST, MW2C@UKM, MIGHT, NUOF, JMG, GSM and METMalaysia
19.	Landslides in Penang Island, Malaysia: Insights on emerging issues and the role of geoscience	20 September 2018	USM, JMG, SEADPRI-UKM and City Council of Pulau Pinang (MPP)
20.	Conference on Flood Catastrophes in a Changing Environment 2018 (CFCCE 18), Nanjing, Jiangsu, China	15-16 November 2018	Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, co-organized by Centre for Environmental Sustainability and Water Security (IPASA), UTM, ANCST, SEADPRI-UKM, Key Laboratory of Watershed Geographic Sciences, Chinese Academy of Sciences (WGS) and Poyang Lake Aquatic and Wetland Ecosystem Observation and Research Station, CAS
21.	Workshop on Status of Climate Science and Technology in Asia	15-16 November 2018	ANCST, SEADPRI-UKM, APN, ISC-ROAP and International Centre for Integrated Mountain Development (ICIMOD). National partners: IPCC Focal Point, Ministry of Energy, Science, Technology, Environment and Climate Change Malaysia, ASM, UKM and GSM
22.	Workshop on Modelling Atmospheric-Oceanic Processes for Weather and Climate Extremes (MAPEX 2019), New Delhi, India	28-29 March 2019	ANCST, SEADPRI-UKM and Indian Institute of Technology Delhi (IIT Delhi)
23.	SEADPRI Forum 2019 @ ASM: The Special IPCC Report on 1.5°C- Implications for Southeast Asia Workshop (ACAM 2019)	25 April 2019	ASM, SEADPRI-UKM and ANCST
24.	2nd National Conference on Science, Technology and Innovation for Disaster Risk Reduction	14-15 October 2019	Faculty of Science and Technology, UKM
25.	Workshop on Building Disaster and Climate Resilience in Cities	15-16 October 2019	NADMA, ASM, SEADPRI-UKM, ANCST
26.	Workshop on the IPCC Role, Activities and Findings: IPCC with Malaysian Youth and Young Professionals	26 October 2019	SEADPRI-UKM, Malaysian and US partners in NUOF project
27.	Workshop and Dialogue – Key Findings of the IPCC & Bridging the S&T Divide in the Pacific Islands, Suva, Fiji	14-15 November 2019	ASM, IPCC, MESTECC, SEADPRI-UKM, ANCST, U-INSPIRE Malaysia and MYD USP and Secretariat of the Pacific Regional Environment Programme (SPREP), ANCST, SEADPRI-UKM, APN, ISC-ROAP

are important for supporting SEADPRI-UKM as a focal point on issues related to science and governance for disaster risk reduction in Southeast Asia. These efforts will also support knowledge-based decision making on hazards and disasters for the policymakers in our country. As we prepare to respond to the climate emergency at both the national and international levels, we need to grow our human capital and nurture the youth to enable them to secure a better future for everyone.

28.	2019 International Workshop for Youth and Young Professionals (YYPs) in DRR Research	6-8 December 2019	IDMR of Sichuan University, SEADPRI-UKM, U-INSPIRE Alliance and IDDR IPo of China
30.	Workshop on Promotion of Social Entrepreneurship in Disaster Risk Reduction	21 January 2020	IDRC Canada, SEADPRI-UKM, Royal University of Phnom Penh (RUPP), GSM, the Malaysian DRR Service Organization (MDRSO) and the Selangor State Disaster Management Unit
31.	Inaugural MYD Virtual Training Series No. 1 - UNFCCC101: The Paris Agreement and its Relevance to Malaysia	6 June 2020	U-INSPIRE Malaysia, MYD, SEADPRI-UKM and ANCST
32.	MYD Virtual Training Series No. 2 - Climate Change Mitigation and Adaptation	4 July 2020	U-INSPIRE Malaysia, MYD, SEADPRI-UKM and ANCST
33.	MYD Virtual Training Series No. 3 - Climate Change Policies	8 August 2020	U-INSPIRE Malaysia, MYD, SEADPRI-UKM and ANCST
34.	Workshop on Youth Social Entrepreneurship for Building Community Resilience to Disasters and Climate Change in the Tropics	13 August 2020	IDRC Canada, SEADPRI-UKM, U-INSPIRE Malaysia and ANCST
35.	MYD Virtual Training Series No. 4 - Climate Finance	12 September 2020	U-INSPIRE Malaysia, MYD, SEADPRI-UKM and ANCST
36.	e-Asia Pacific Science and Technology Conference for Disaster Risk Reduction (e-APSTCDR)	15 October 2020	SEADPRI-UKM, ASM, Asia Pacific Science Technology and Academia Advisory Group (AP-STAG) and ANCST
37.	Inaugural U-INSPIRE Malaysia Coffee Table Talk Series No. 1 - Youth Perspectives on Earthquakes and Landslides in Malaysia	24 October 2020	U-INSPIRE Malaysia, Young Earth Scientist (YES) Malaysia, ISC ROAP, JMG, SEADPRI-UKM and ANCST
38.	SEADPRI Forum 2020: The International Financial Landscape for Climate Change Adaptation	19 November 2020	SEADPRI-UKM, ASM, IDEA UKM and ANCST
39.	Strategic Consultation on Climate Change and Groundwater	14 December 2020	ASM, SEADPRI-UKM, GSM, IGM and JMG
40.	Strategic Consultation on Climate Change Adaptation and Disaster Risk Management	25 February 2021	ASM, NADMA, Academy of Risk Management Malaysia and SEADPRI-UKM
41.	Climate Reset Dialogue	27 February 2021	SEADPRI-UKM, U-INSPIRE Malaysia, The Global Shapers Kuala Lumpur, ANCST
42.	Citizen Assembly for Langkawi	10-11 April 2021	ASM, SEADPRI-UKM, LESTARI and PPL
43.	Webinar for Earth Day celebration 2021: Restore Our Earth	22 April 2021	SEADPRI-UKM, U-INSPIRE Malaysia@UKM, ANCST
44.	SEADPRI Forum 2021: Risk Science for Resilient Cities-From Concept to Action	7 May 2021	SEADPRI-UKM, UNDRR Asia Pacific Science Technology Academia Advisory Group (AP-STAG), ANCST, UNESCO Youth and Young Professionals Group on Disasters, ISC-ROAP and ASM
45.	IRD 2021 International Conference on Advancing Risk Science for Development	8-10 June 2021	SEADPRI-UKM, IDRC Canada, Geological Society of Malaysia and Institut Geologi Malaysia
46.	Training of Trainers for Social Entrepreneurship (SE) for Disaster Risk Reduction (DRR)	26 June 2021	SEADPRI-UKM, IDRC Canada, Geological Society of Malaysia and Institut Geologi Malaysia
47.	Training of Trainers for Social Entrepreneurship (SE) for DRR in Cambodia	10 August 2021	SEADPRI-UKM, IDRC Canada, Royal University of Phnom Penh (RUPP) and ANCST
48.	Citizen Assembly for Sabah	18 August 2021	ASM, SEADPRI-UKM and LESTARI and UMS
49.	Citizen Assembly for Sarawak	6 September 2021	ASM and SEADPRI-UKM, LESTARI, UNIMAS and UPM, campus Bintulu
50.	Webinar Risiko Bencana di Era Perubahan Iklim	21 October 2021	NADMA, SEADPRI-UKM and Panel Peker Sains dan Teknologi untuk Pengurangan Risiko Bencana (STEP)
51.	Chocolate Talk on DRR for the Youth and Young Professionals: Climate Change Adaptation and Disaster Risk Reduction	30 October 2021	U-INSPIRE Alliance and SEADPRI-UKM
52.	Bengkel Dasar Pengurangan Risiko Bencana Negara dan Perincangan Rang Undang-Undang Pengurusan Bencana	8-10 February 2022	NADMA and SEADPRI-UKM
53.	Youth and Young Professionals in Science, Engineering, Technology and Innovation for Disaster Risk Reduction Webinar "Road to GPDRR"	10 and 12 March 2022	UNESCO, U-INSPIRE Alliance, SEADPRI-UKM, UNICEF, ANCST and U-INSPIRE Malaysia
54.	Bengkel Memulakanbadikan Penggaluan Dasar Pengurangan Risiko Bencana (DRR) Negara dan Perincangan Dasar Penggaluan Rang Undang-undang	21-23 March 2022	NADMA and SEADPRI-UKM
55.	Series of technical forums as a post-mortem of the recent flood incidents	22 March 2022; 12 April 2022	SEADPRI-UKM, Institution of Geospatial and Remote Sensing Malaysia (IGRSM), IEEE Geoscience and Remote Sensing Society Malaysia (GRSS Malaysia), UPM and Science and Technology Research Institute for Defence (STRIDE), Ministry of Defence Malaysia
56.	An OpenStreetMap Training of Trainers (ToT)	29-30 March 2022	SEADPRI-UKM and U-INSPIRE Malaysia, ANCST, UNICEF Malaysia and U-INSPIRE Indonesia
57.	U-INSPIRE Malaysia@UKM Celebrates Earth Day 2022	22 April 2022	U-INSPIRE Malaysia@UKM, ANCST, SEADPRI-UKM, ANCST, UNICEF Malaysia and UTM
58.	Dialogue on Climate Change 2022: Risks, Adaptation and Mitigation - Implications and Way Forward	19 May 2022	ASM, CGM, ANCST and SEADPRI-UKM
59.	Training of Trainers on Geological Disaster Knowledge and Awareness	7 July 2022	SEADPRI-UKM, ANCST, UNICEF and NatGeo
60.	Discourse on Climate Change and the Ocean: Challenges and Opportunities	1 August 2022	ASM, LESTARI and SEADPRI-UKM
61.	Bengkel Bina Upaya Pengelaluan Dan Keadaan Pengurangan Risiko Bencana	22 August 2022	U-INSPIRE Malaysia@UKM & UTM, SEADPRI-UKM, UNICEF and ANCST

Climatic Hazards Programme

Climate change and the ocean: Challenges and Opportunities

Go Wen Ze,¹ Lubna Alam² & Joy Jacqueline Pereira¹

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²LESTARI-Universiti Kebangsaan Malaysia



1 August 2022 (Monday) | 2.30-3.30 pm

The IPCC Working Group Reports and other information are available at: <https://www.ipcc.ch/>

Aim: Mobilise scientific leadership and partnerships for climate resilient development

Schedule:

- 1430: Welcome Remarks
Associate Professor Dr. Goh Choo Ta
Director of LESTARI-UKM
- 1440: Keynote: Climate Change and the Ocean
Prof. Rashid Sumaila, International
Distinguished Professor of LESTARI-UKM
- 1510: Commentator's Viewpoints
Prof. Dato' Dr. Aileen Tan Shau Hwai
ASM Fellow & Director of CEMACS-USM
- 1515: General Discussion
- 1525: Closing Remarks
Prof. Joy Jacqueline Pereira
Chair of ASM Committee on Climate
Change and Disaster Risk Reduction
- 1530: Adjourn

According to the Intergovernmental Panel on Climate Change (IPCC), climate change is causing a profound impact on the oceans and marine life. This is apart from anthropogenic activities that are affecting the marine life and marine habitats. The consequences of climate change include the thermal expansion of water (the key cause of sea level rise), ocean acidification, deoxygenation (oxygen loss), and forcing marine life to redistribute to other places. This is already happening with the world now struggling to limit the increase in average temperature to 1.5°C in the future. It is evident that climate change has direct impacts on the ocean, fish and fisheries which in turn compromise food security and economies if it is not well-managed. About 70% of the Earth's surface is water-covered and it is critical to help balance the conditions for the oceans are the primary life support system that we rely on. Yet, it has been neglected in most climate talks. Finally, for the first time, some progress is being shown with the latest international climate negotiations to include oceans permanently into the multilateral climate change regime.

A discourse on Climate Change and the Ocean: Challenges and Opportunities was jointly convened by the Academy of Sciences Malaysia (ASM), Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia and Asian Network on Climate Science and Technology (ANCST). This event was held on 1 August 2022 via Zoom from 2.30-3.30pm. The aim of this meeting was to mobilize scientific leadership and partnerships for climate resilient development in the ocean sector. The discourse received great support from more than 100 participants, including the scientists and experts from other regions. Professor Dr. Rashid Sumaila was the keynote speaker on climate change and the ocean. He was bestowed the

University Killam Professorship at University of British Columbia, in recognition of his international research leadership on the future of oceans. Currently, he is the Distinguished International Professor at LESTARI, UKM. The session was jointly moderated by Professor Joy Jacqueline Pereira, the Chair of the ASM Committee on Climate Change and Disaster Risk Reduction; and Vice Chair of the IPCC Working Group II on Impacts, Adaptation and Vulnerability; and Dr. Sharina Abdul Halim, the Deputy Director of LESTARI Universiti Kebangsaan Malaysia and the IPCC Working Group II Lead Author for Chapter 10 on Asia.

Professor Dr. Rashid Sumaila introduced the Ocean Canada partnership which comprised six working groups namely, Law and Policy; National Data and Integrated Scenarios; Knowledge Mobilization at the national level; Pacific Region, Arctic Region and Atlantic Region Working Groups at the regional level. Professor Rashid has linked Ocean Canada with the new initiative of Ocean Malaysia Partnership, which has been launched at LESTARI, UKM. He emphasized the importance of a collaborative approach to the management of Malaysia's ocean, and how real climate change is happening, regardless of where we are located. Everyday human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere, besides pollution being generated. He commended the IPCC for bringing together all the scientists to help the world understand, and to come up with the policy measures to tackle the issues related to climate change and the ocean.

Professor Dr. Rashid explained the need for management and marine protection for human-ocean interaction in order to secure both the marine environment and fish economy. He

Climatic Hazards Programme

summarized how climate change has direct impacts on the ocean, fish and fisheries. It has been observed that the factors such as temperature rise, salinity, hypoxia and acidification have caused the changes in the body size, reproduction, primary productivity and habitats of the living organisms in the ocean. Furthermore, changes in population growth, abundance, species distribution; community structure, trophic interactions, biodiversity; fisheries catch, fisheries economics and fisheries management are also among the consequences of climate change. If there is no proper care being taken of the ocean, the food security as a whole will be threatened.

Audiences were also given an overview on the three models being developed for the South China Sea (SCS) fisheries, namely reef fisheries, continental shelf fisheries and deep-water fisheries. Over the past few decades, extensive overexploitation, overcapacity and overfishing are among the major issues in most of the SCS coastal fisheries. Majority of the assessed SCS fisheries have shown temporal decline in Catch per unit effort (CPUE). Besides that, increasing proportions of low value fish in the catch and fisheries shifting to smaller and faster recruiting species have been observed. Other than that, there is an increase attention on developing offshore fisheries. The key concerns that need to be tackled to ensure ocean sustainability are the governance; conflict; fishing industry subsidies; illegal, unregulated and unreported (IUU) fishing; environmental degradation and climate change; feed grade fishing; and biodiversity loss.

The scenario modelling, which comprises two climate change scenarios and four fisheries management scenarios are being developed as a reference for the fishing industry to project the future impacts of climate change due to the greenhouse gas (GHG) emissions. Under the best-case scenario with mild climate change (low GHG emissions: RCP2.6) and a 50% decrease in fishing efforts, it is projected that the SCS will have a 22% biomass loss and USD 6.7bn annual revenue loss. Whilst, under a worst-case scenario with severe climate change (high GHG emissions: RCP8.5) and a 50% increase in fishing effort, the SCS is projected to have a 93% biomass loss and USD 11.4bn annual revenue loss.

Despite all the challenges, the fishing industry can generate revenue if proper practices are implemented on the feed-grade fishing (FGF), such as through the rebuild process to avoid catching juveniles and allowing them to mature and reproduce in the wild instead. The modelling across five Chinese provinces from 2015-2099 showed that the revenues from the rebuild scenario projected to be 10 to 25 times higher than under current FGF practices. In order to address the issue of FGF practices, we should halt the catch of juveniles through the enforcement of laws that are already in place. Besides that, the minimum mesh size should be revised and appropriate protein feed sources independent of FGF should be developed.

More regional dialogues, engagement of further scientific research and integration of climate change and fisheries management policies are the key recommendations to ensure sustainability of the ocean. In addition, the issues of overfishing and climate change must be addressed, as continued inaction will jeopardize both wildlife and humans. The keynote speaker ended his speech by highlighting the important of 'walk-the-talk'.

Professor Dato' Dr. Aileen Tan Shau Hwai, the Director of the Centre for Marine and Coastal Studies (CEMACS) at Universiti

Sains Malaysia, was invited as the commentator for this discourse. She delivered a comprehensive viewpoint that enabled the audiences to understand the current status, issues and challenges of the ocean and marine sector in Malaysia. To date, there is no policy on ocean and marine management in the country. Hence, this call is indeed timely to start and initiate the cross-sectoral as well as cross-ministerial collaboration. In Malaysia, we are blessed with rich biodiversity. And yet, people tend to focus less on the vast ocean heritage which can be turned into wealth, as the ocean biodiversity representing a wealth of systematic ecological data that helps us understand our natural world and the origin.

She pointed out that land discharge, marine litter and plastic pollutions are often the factors threatening the ocean besides the changing of climate, especially to the living organisms. The future of our ocean will be challenged and will be a bare habitat without life, if we do not take the responsibility to protect and conserve it now.

Professor Dato' Dr. Aileen emphasized that there is a need to engage the public in environmental issues, like the biodiversity crisis. The important message about the linkages and connection between humans and the nature (ocean) has to be made clear to the general public, scientists and the policymakers with the intent that everyone is aware of and able to foresee the consequences, if we risk depleting it.

She also pointed out that our ocean blue resources have the great potential to feed the world in addressing the food security issue with a lower environmental footprint than many other food resources. When compared to terrestrial, the ocean blue resources do not just refer to the fish but also cover the invertebrates, such as molluscs and the plants (seaweeds). Due to the issue of overfishing and climate change, aquaculture is actually taking over and will continue to grow; it has contributed to more than 50% of the seafood consumed.

In Malaysia, the aquaculture sector has been focusing on the high value seafood such as tiger prawns, groupers and sea bass. In this case, the small fish was used to feed the big fish.



Photo by SEADPRI-UKM

The event was jointly moderated by Professor Dr. Joy Jacqueline Pereira (top row, right) and Dr. Sharina Abdul Halim (top row, left). The keynote speaker, Professor Dr. Rashid Sumaila (second row, left) and commentator Professor Dato' Dr. Aileen Tan Shau Hwai (second row, centre).

Climatic Hazards Programme

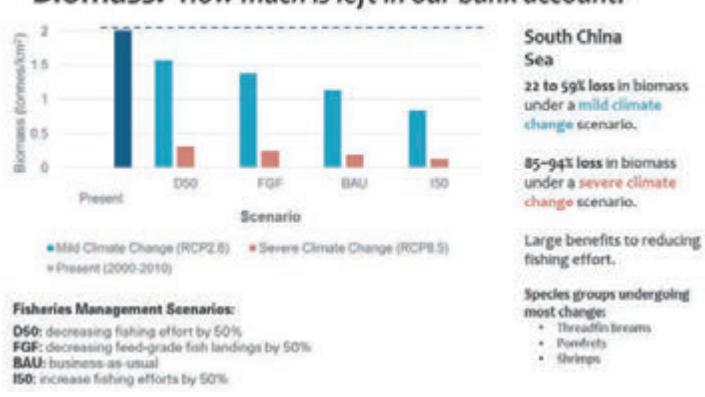
As such, there is a need to look into other options such as fish on the lower trophic level that produces less carbon footprint; this is now branded as aquatic food or the blue food. Even so, the blue food in this region and in Malaysia is still greatly underutilized and under-resourced.

The sustainable aquaculture of blue food is believed to be able to meet the agenda 2030 for Sustainable Development Goals (SDGs) which directly contributes to a number of SDGs: poverty, hunger, good health, gender employment, sustainable production, climate, marine and land base resource. This has also indirectly contributed to other SDGs, such as education, clean water, innovation, equity, urban development and partnership.

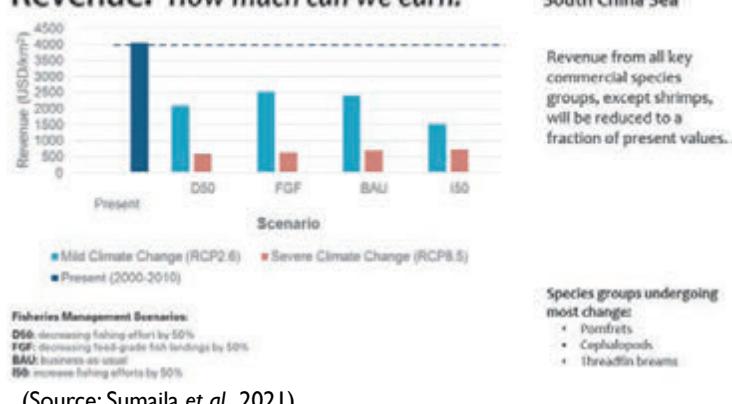
Each region, including the Western Pacific and also the areas around South China Sea, has their own opportunities, advantages and challenges in implementing and protecting the ocean resources. Hence, this will open up more opportunities for collaboration that is moving towards transboundary solutions for a better future.

However, when it comes to climate change, global data collection is the information that is always being relied on. Professor Dato' Dr. Aileen mentioned that the best way is to translate the global scenario or global climate prediction to the local scale; this is much more meaningful for the scientists and policymakers to make more appropriate decisions and actions pertaining to climate change in the local scenario. This way, we will be able to find local solutions to global issues and further translate the scientific findings to impactful actions and solutions. Most importantly, solutions are needed to make a better change to our ocean future.

Biomass: How much is left in our bank account?



Revenue: How much can we earn?



Scenario Modeling

- 2 climate change scenarios;
- 4 fisheries management scenarios.

Climate change scenarios (n=2)	Fisheries management scenarios (n=4)				
Mild (RCP2.6) Low greenhouse gas emissions	→	Decrease fishing effort by 50% (D50) 50% decrease in fishing in the initial ten years, then held constant to 2099	Decrease FGF landings by 50% (FGF) 50% reduction in the landings of fleets responsible for FGF	Business-as-usual (BAU) Current level of fishing is extended to 2099 with no change	Increase fishing effort by 50% (I50) 50% increase in fishing in the initial ten years, then held constant to 2099
Severe (RCP8.5) High greenhouse gas emissions	→				

*FGF denote feed-grade fishing; BAU stands for business as usual.

(Source: Sumaila et al., 2021)

Climatic Hazards Programme

Disaster Risk Management in Southeast Asia: Trends, Capacity, and Challenges

Navakanesh M Batmanathan

SEADPRI-Universiti Kebangsaan Malaysia

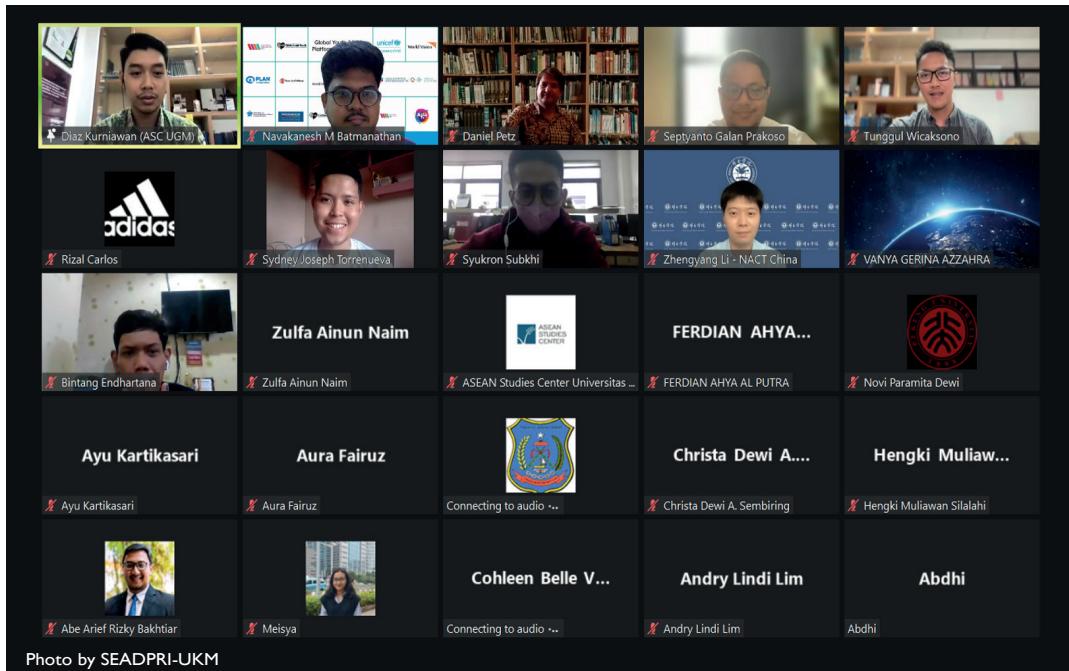


Photo by SEADPRI-UKM

SEADPRI-UKM was represented by Navakanesh Batmanathan at the webinar on "Measuring the Readiness of Member Countries in Dealing with Disasters Across Southeast Asia", hosted by Asian Studies Center on 15th July 2022

In the spirit of understanding disaster risk management at the regional level, a webinar was held on "Measuring the Readiness of Member Countries in Dealing with Disasters Across Southeast Asia". The keynote speaker, Dr. Daniel Petz, highlighted the role of disaster risk management in Southeast Asia, with emphasis on the trends, capacity, and challenges among these nations. He described the role of international frameworks such as Hyogo, Sendai, World Humanitarian Summit and Paris Agreement, in shaping national and regional capacity building for climate change adaptation and resilience building. The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) was also highlighted.

The disaster management cycle is a good approach to handle any disaster type across the ASEAN region. It includes processes such as preparedness, mitigation, individual disaster response, relief, rehabilitation, and reconstruction. These processes also

depend on capacity, with capacity building at different levels. The combination of attributes, strengths, and resources within a community or society is crucial in achieving systematic approaches to handling disasters. This may include infrastructure, physical means, institution, and societal coping abilities. However, challenges faced include funding and capacities at various levels.

Disaster risk management faces many challenges such as limited preparedness, weak coordination, inadequate international standards, poor integration of DRR and climate change adaptation, as well as Covid-19. There is opportunity for regional-level collaboration to overcome these challenges. An example is to engage the private sector and philanthropic organizations to support DRR and disaster risk management activities. SEADPRI-UKM could also play a major role in advancing science and innovation to support disaster prevention in Southeast Asia.

Climatic Hazards Programme

Disaster Risk Reduction: Expanding at the Tertiary Level

Nurfashareena Muhamad & Mohd Fairus Awang

SEADPRI-Universiti Kebangsaan Malaysia



Photo by SEADPRI-UKM



With support from UNICEF Malaysia, SEADPRI-UKM and collaborators conducted a workshop in Kuala Lipis, Pahang, to build the capacity of prospective indigenous trainee teachers on disaster risk reduction.

Enhancing capacity offers vulnerable communities the opportunity to manage adverse conditions, risks, or disasters. This can be developed by improving existing knowledge, strengths, attributes, and resources among individuals, organizations or communities. A university where a majority of the youths are located is a good place to start. It plays an essential role in disaster risk reduction (DRR) through disaster education, relief, and support to the affected community; it is an ideal place to grasp the situation from a research perspective. The participation of Youth and Young Professionals (YYPs) in DRR activities often comes from public and private universities where youths come from diverse backgrounds. However, the involvement of YYPs from other tertiary education institutions is very limited. This has been the motivation to conduct a pilot case of DRR Experiential Learning at selected teacher training institutions; prospective teachers are an under-represented YYPs group.

The Bengkel Bina Upaya Pengetahuan dan Kesedaran Pengurangan Risiko Bencana was held on 22nd August 2022 at the Institut Pendidikan Guru (IPG) Tengku Ampuan Afzan, Kuala Lipis, Pahang. This workshop was organized under the UNICEF Malaysia fund on YYPs Empowerment: Implementing SETI for Disaster Resilience led by the SEADPRI-UKM and U-INSPIRE Malaysia@UKM in collaboration with UNICEF Malaysia with support from the Asian Network on Climate Science and Technology (ANCST) and Universiti Teknologi Mara (UiTM). About 46 indigenous trainee teachers were present in this one-day workshop. The workshop began with an introduction to DRR, followed by an afternoon programme filled with various interactive and hands-on disaster activities such as hazard model constructions and games related to mudslides, earthquakes, and volcanic eruptions. This workshop has successfully established a cohort of indigenous trainee teachers who can train their group while also being a medium of information delivery to help students understand DRR in line with their teaching background.



Brainstorming session on pre and post action for the disaster event



Simple modeling to enhance understanding of flood occurrences



Disaster SNAKES AND LADDERS for the participants to understand the basic concept of disaster

Climatic Hazards Programme

Engaging Children and Youth in Disaster Risk Reduction

Nurfashareena Muhamad,¹ Mohd Fairus Awang¹ & Sufyan Aslam²

¹SEADPRI-Universiti Kebangsaan Malaysia

²UNICEF Malaysia



Activities such as school risk mapping, mudslides constructions, preparedness bag and a coloring contest were conducted to enhance disaster preparedness of children at Sekolah Kebangsaan Janda Baik, Bentong, Pahang.

Today's capacity building approach to disaster knowledge and experience are more focused on Youth and Young Professionals (YYPs) groups than children. Children are also among the groups that face the risk of disaster. Children are agents of change who have a special capacity to reduce disaster risk in their households, peers at school and communities. The main mechanism for harnessing that capacity is through disaster risk reduction (DRR) and resilience education that starts in schools. Schools are seen as an effective place for children to learn new skills and encourage behavioral changes. The implementation of the DRR education module in schools are one of the initiatives for students to gain exposure and initial knowledge about disasters that occur in their surroundings. The agenda of empowering the capacity of children in schools through their participation in various disaster-related activities can help this group to be more prepared in terms of knowledge and skills on DRR and resilience by actively participating in all related activities.

The Bengkel Pemerkasaan Pengetahuan dan Kesedaran Bencana di Sekolah was held on 29 August 2022 in Sekolah Kebangsaan (SK) Janda Baik, Bentong, Pahang. The workshop was organised under

the UNICEF Malaysia fund on YYPs Empowerment: Implementing SETI for Disaster Resilience led by the Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) and U-INSPIRE Malaysia@UKM in collaboration with UNICEF Malaysia with support from the Asian Network on Climate Science and Technology (ANCST), MERCY Malaysia and SK Janda Baik. The workshop began with an introduction to disaster through animation and "Tindakan Pantas" to explain disasters, safety measures and how to respond in the event of a disaster. Each student was given a pamphlet with brief information on disasters and preparedness measures to share with their households. Hands-on activities were conducted in the afternoon session covering various interactive disaster tasks such as school risk mapping, mudslides constructions, preparedness bag and a coloring contest. This workshop is one of the approaches that is seen to be able to educate children about disaster. The activities conducted captured the interest of all students and teachers showing that school children have the potential as agents of conveying information to their respective households, which is then more broadly disseminated to the surrounding local community.

Geological Hazards Programme

Sharing Best Practices in Geoscience Communication for DRR

Lim Choun Sian, Nurfashareena Muhamad & Joy Jacqueline Pereira
SEADPRI-Universiti Kebangsaan Malaysia



CALLING FOR PARTICIPANTS!

GEOSCIENCE COMMUNICATION FOR DRR: SHARING OF BEST PRACTICES

18 OCTOBER 2022 (TUESDAY),
BAYVIEW HOTEL LANGKAWI ISLAND, KEDAH

Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM), with support from the Asian Network on Climate Science (ANCST), International Development Research Centre (IDRC) Canada and other partners will organize a side session to empower young geoscientist on Geoscience Communication for Disaster Risk Reduction (DRR): Sharing of Best Practices.

The event will be held in conjunction to the 17th GEOSEA Regional Congress 2022 parallel with the 34th National Geoscience Conference (NGC) in Langkawi Island, Malaysia on 18 October 2022 in the Technical Session 1 on Environmental Geology and Climate Change of the Congress. For further information visit:

<https://geolsocmalaysia.org/geosea2022/>

Selected Speakers:



Dr. Nuraini Rahma Hanifa
National Research and Innovation Agency (BRIN),
Indonesia / U-INSPIRE Alliance



Mr. Navakanesh M. Batmanathan
SEADPRI-UKM / IDRC Project
The National Geographic Young Explorer



Sr.Gt.Ts.Dr. Rabieahfuzul Abu Bakar
Universiti Teknologi Mara (UiTM)



Miss Faten Hanani Hakimi
U-INSPIRE Malaysia@UKM

Celebration of Earth Day 2022 led by U-INSPIRE Malaysia@UKM with presence from other youth and young professionals groups in Malaysia.

Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) with support from the Asian Network on Climate Science (ANCST), International Development Research Centre (IDRC) Canada hosted a special session on Geoscience Communication for Disaster Risk Reduction (DRR): Sharing of Best Practices at the 17th Regional Geoscience Congress of Southeast Asia (GEOSEA XVII) in conjunction with the 34th National Geoscience Conference. The GEOSEA XVII was jointly organized by the Geological Society of Malaysia (GSM), Department of Mineral and Geoscience Malaysia (JMG) and Institute of Geology Malaysia (IGM) from 17-21 October 2022.

GEOSEA Congress is a flagship event held biannually and hosted by geological societies or organizations of the Southeast Asian countries from Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam under the alliances of Regional Congress on Geology, Minerals and Energy Resources of Southeast Asia, better known as GEOSEA. This year, the congress was attended by 300 participants from the region,

including India, Indonesia, Malaysia, Myanmar, Philippines and Thailand. SEADPRI's principal fellow Professor Joy Pereira presented a keynote paper, Climate Change and Disaster Risk Reduction in Southeast Asia: Obligations of Geoscience, at the main session of the congress followed by the special session on Geoscience Communication for DRR: Sharing of Best Practices. This session targeted geoscientists in the region to understand their role, not just in recognizing and investigating the hazards, but also in liaising and collaborating with a variety of stakeholders, so that accurate and reliable information in a form that they will understand is communicated to those who need to use it.

The session, convened by Dr. Nurfashareena Muhamad, involved four IDRC-funded speakers from Malaysia and Indonesia empowering young geoscientists through their best-case studies in the region. This session has boosted the visibility of SEADPRI's efforts in mobilizing young geoscientists in the region besides strengthening existing collaborations and explored the potential with new regional collaboration partners.

Geological Hazards Programme

Advancing Geosciences in East and Southeast Asia through the 58th CCOP Annual Session

Lim Choun Sian

SEADPRI-Universiti Kebangsaan Malaysia



After the last meeting held in Chiang Mai, Thailand in 2019, the 58th Coordinating Committee for Geoscience Programmes in East and South East Asia (CCOP) Annual Session met again this year at Bandung, Indonesia from 9-12 October 2022. This was the first face-to-face Annual Session after all the online sessions during the COVID-19 pandemic and over 160 participants from 21 countries attended in person and virtually.

The CCOP is a unique organization founded in 1966 within UN-ECAFE (now UN-ESCAP) and it became an intergovernmental organization in 1987. The CCOP currently comprises 16 member countries, 14 cooperating countries and 17 cooperating organizations throughout the world. For more than 55 years, CCOP has provided a strong foundation of bilateral and multilateral cooperation for its member countries, the cooperating countries and organizations.

CCOP provides venues for various geoscientific programmes and activities organized by international partnerships of over 50 years in the region. With its inception, CCOP has conducted work in geological surveys, exploration and technological cooperation in the extraction of off-shore petroleum and mineral resources in the region. In response to the needs of member countries, CCOP projects have become increasingly diverse over time, especially in the areas of groundwater resources, geohazards, global climate change and urban geology. Facing the imminent fourth industrial revolution, CCOP compiles, manages and utilizes large amounts of data collected and accumulated by its member countries, and

increasingly focusses on data sharing, education and capacity building.

The theme for this Annual Session was "Geoscience for Energy Transition in East and South East Asia". The session was officiated by the representative of the Governor of West Java, Eko Budi Lelono, Vice-chairperson CCOP Steering Committee, and as co-organizer from the Geological Agency of Indonesia (GAI) gave the welcome address. H.E. Kwon Hee-Seog, Ambassador of the Republic of Korea to ASEAN and H.E. Arifin Tasrif, Minister of Energy and Mineral Resources, Indonesia attended the opening ceremony.

The Advisory Group for CCOP met on 9 October this year. The committee comprised cooperating countries, organizations and honorary advisors. Dato' Yunus Abdul Razak, a SEADPRI Associate Fellow and CCOP Honorary Advisor, and Dr Lim Choun Sian, Coordinator of Geological Hazards Programmes of SEADPRI, attended the Advisory Group meeting. In the Annual Session, country and organization reports were presented by CCOP member countries, cooperating countries and organizations, introducing the progress and plans in collaboration with CCOP and bilateral/multilateral cooperation among CCOP regions.

SEADPRI from Universiti Kebangsaan Malaysia has been a cooperating organization in CCOP since 2007, collaborating in various projects on sustainability, disaster risks, exchange of S&T information and research; it makes available places and facilitates training and postgraduate research. Dr Lim Choun Sian presented an annual report on the activities being carried out and completed with CCOP and its members. Among the projects were the Newton Ungku Omar Fund Project on "Disaster Resilient Cities: Forecasting Local Level Climate Extremes and Physical Hazards" with the British Geological Survey (BGS) and Department of Mineral and Geoscience Malaysia, "Promotion of Social Entrepreneurship in Disaster Risk Reduction to Build Community Resilience" with Cambodia and various other joint activities via Asian Network on Climate Science and Technology (ANCST), U-INSPIRE Malaysia and Asia Pacific Geoparks Network on geoscience for youths, disaster risk and geoparks with member countries, namely Indonesia and Thailand.



CCOP Advisory Group Meeting. From Left: Dato'Yunus Abdul Razak (Vice Chair), Mr. Ioannis Abatzis (Chair) and representatives from BGS. Also present were representatives from Geological Survey of Canada and SEADPRI.

Geological Hazards Programme

Key outcomes at the Global Platform for DRR

Navakanesh M Batmanathan

SEADPRI-Universiti Kebangsaan Malaysia



Photo by SEADPRI-UKM

Mr. Navakanesh Batmanathan (far right) represented SEADPRI-UKM and interacted with U-Inspire Alliance partners from Nepal, Japan and Indonesia at the Global Platform 2022.

The Global Platform (GP2022) for Disaster Risk Reduction began with preparatory events on 23 May 2022, prior to the high-level meeting from 25-27 May 2022. The theme was “From Risk to Resilience: Towards Sustainable Development for All in a COVID-19 Transformed World”; it was divided into three sub-themes: Disaster risk governance; COVID-19 recovery; DRR financing.

On 23rd May 2022, the Asia-Pacific Partnerships on Disaster Risk Reduction Forum was held with the motivation to address the key themes of the upcoming Asia-Pacific Ministerial Conferences on Disaster Risk Reduction (APMCDRR) that would be covered in Brisbane, Australia from 19th to 22nd September 2022. It included reflections from the APP-DRR members on the focus areas of the three main pillars:

- a) Investing in resilience and preparedness
- b) Shock-proofed infrastructure and systems
- c) Resilient communities

Some of the key points highlighted at the forum were the need to invest in upstream financial to reduce disaster risks, focus on resilience infrastructure, the role of risk informed infrastructure and critical infrastructure. The role of local players to strengthen DRR strategies is certainly an important aspect as well as a mid-term review of Sendai Framework to improve disaster resilience. Suggestions to improve our disaster risk reduction strategies in Malaysia included mainstreaming indigenous knowledge into infrastructure, improving the multi-hazard platform using satellite or space-based technologies and the need for different population groups to improve DRR at local levels. Gender equality and social inclusions need to be addressed for better involvement on DRR-related matters as well as the use of a multisectoral management system to improve early warning efforts and national level disaster risk reduction assessment with all stakeholders.

A session on “Disaster Governance – Engagement of Stakeholders in National Disaster Risk Reduction” was held on 24th May 2022 with the objective of understanding the experiences, good practices and lessons learned about inclusive governance in the implementation of the Sendai Framework. The elements of successful governance and inclusion that we wish to see replicated were identified. Key outcomes included boosting the number of best practices, improvement on gender equality and establishment of cross-sectoral engagement. Recommendations to improve our disaster governance in Malaysia included an updated national disaster risk reduction and management plan as well as the establishment of a National Disaster Management Information System (NDMIS); improvement of adaptation policy measures in the transport sector; the use of corrective risk management, prospective risk management approach and systemic risk governance.

Another thematic session was “Improved Understanding and Governance of systemic risk: Unpacking the 2022 Global Assessment Report”. The key discussions included dissemination of the 2022 Global Assessment Report (GAR) recommendations and implementing its findings in areas where necessary, together with breaking down silo-thinking, using a whole-of-society approach and whole-of-economy approach. Others highlighted the importance of climate financing to support African countries, as well as a collaborative approach to establish DRR strategies. The emphasis on understanding the intrinsic link between risk and development processes is certainly a necessity, especially its impact on local communities. As a developing nation embracing the impact of natural hazards, some key recommendations here may help to assist countries such as Malaysia to improve its DRR strategies. One of it is breaking silo-thinking within the operational part of the federal administration, improving multisectoral and multidisciplinary ways of working, and the use of a systemic approach to understand risk in a more holistic manner.

Technological Hazards Programme

Harmful Microalgae Detection: Biosensors Versus Some Conventional Methods

Jeremy Jason Chin Chwan Chuong,¹ Lee Yook Heng,² & Tan Ling Ling¹

¹SEADPRI-Universiti Kebangsaan Malaysia

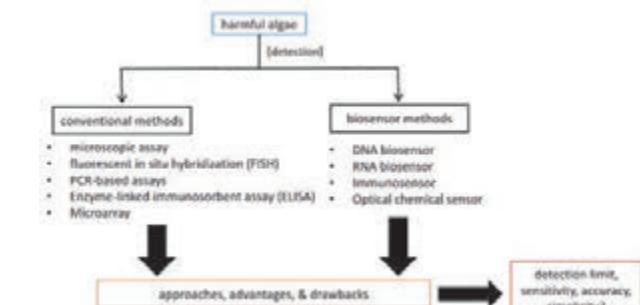
²Faculty of Science and Technology, Universiti Kebangsaan Malaysia

The main conventional methods in harmful algal bloom (HAB) monitoring and detection are based on light microscopy and counting chamber. Light microscopy can be utilized to do species identification among the various types of HAB but is not accurate. Whereas a counting chamber will be used to estimate the quantity of HAB species found in samples collected. Other approaches in HAB identification can be based on mouse bioassay (MBA) or chromatographic technique. Although, these two mentioned approaches focus more on detecting the HAB toxins content and are thereby unsuitable for an early warning system of HAB events but only to monitor the toxicity of the water. Alternatively, many species from HAB, in particular, and phytoplankton in general, can be detected via molecular methods, which are fast and accurate methods capable of simultaneous qualitative detection. Molecular methods can also identify and quantify harmful algae species. The biomedical research and diagnostic industries have been designing simplified ways to sample preparation and distribution while utilizing molecular probe technologies to interpret results. For instance, sample preparation and analysis systems that are portable for in situ detection have been designed but no major implementation had occurred. Although other techniques used for the same purpose include DNA microarrays with different molecular probe techniques, when it comes to identifying phytoplankton, molecular approaches are considered to be quicker and more precise than light microscopy. Several types of molecular methods, including fluorescent in situ hybridization (FISH) of whole-cell, polymerase chain reaction (PCR)-based assays, sandwich hybridization assays, enzyme-linked immunosorbent assay (ELISA), colorimetric whole-cell analysis, monoclonal antibody probes, and DNA microarrays are capable of identifying algae species and detecting toxic algae in routine monitoring programs.

The fundamental principle of the electrochemical biosensor is the chemical interactions between immobilized biocomponents and analyte that produces or consume ions or electrons, changing the measurable electrical properties of the solution, such as potential or electric current. Electrochemical biosensors with increased specificity, stability and sensitivity that are small and easy to fabricate are now accessible. Furthermore, electrochemical biosensors are highly sensitive, portable, relatively inexpensive, and simple to build. Therefore, the electrochemical DNA biosensor can serve as an appropriate HAB monitoring program. A handheld DNA biosensor approach based on sandwich hybridization and molecular DNA probes was capable of detecting the ribosomal RNA (rRNA) of harmful algae *A. ostenfeldii*. This portable biosensor simplifies the detection of harmful algae, however manual RNA separation and manipulation of the hybridization procedures are required.

Furthermore, an electrochemical DNA biosensor based on a double digoxigenin (DIG)-enzymatic label and direct horseradish peroxidase (HRP)-labelled signal probe could detect three species of HABs. The electrochemical signal was examined using cyclic voltammetry or by simply checking the amperometric current magnitude. This amperometric procedure was then investigated in detecting HABs with mixed self-assembled monolayer and bovine serum albumin as a blocking agent in the electrochemical signal. The biosensor's performance was improved in terms of greater sensitivity and enhanced detection limit.

In conclusion, harmful algal bloom events have been increasingly reported all over the world and many conventional methods have been used for the management of these types of environmental issues. Some progress in the conventional methods, such as the microarray approach had led to the detection of thousands of samples in a single test and this could allow reliable simultaneous detection of HAB. However, there is still potential for rapid identification methods that promise fast or easier handling in terms of the detection and monitoring of HAB worldwide. New techniques based on biosensors for the detection of HAB are an improvement over some conventional detection methods, especially with the implementation of nanomaterials in electrochemical biosensors, which can improve the simplicity of detection, sensitivity, and detection time have led to a reliable fast and, simpler identification of harmful microalgae. Although optical-based biosensors are an area that is promising for rapid microalgae analysis, this area is less well explored for such an application. More studies should focus on designing and optimizing biosensor technology that could further improve biosensor reliability and reproducibility for HABs detection. Thus, better prevention, management, and mitigation strategies can be adopted by the stakeholders and relevant authorities to minimize the negative impacts of HABs.



The flow chart represents a general overview of the biosensors versus conventional methods available for the detection of harmful algae species

Technological Hazards Programme

Latihan Penggunaan Ketuhar Makmal Kawalan Digital

Tan Ling Ling and Mohd Faizol Markom
SEADPRI-Universiti Kebangsaan Malaysia



Latihan penggunaan ketuhar makmal kawalan digital dianjurkan pada 26 Mei 2022 di Makmal Bencana Teknologi, SEADPRI-UKM. Encik Eddy Looi (kanan) sebagai jurulatih dalam Latihan instrumen ini dan Prof. Madya Dr. Tan Ling Ling (kiri) sebagai ketua projek ICGB.

Program Bencana Teknologi, Pusat Kajian Bencana Asia Tenggara (SEADPRI-UKM) telah mengadakan satu sesi latihan penggunaan ketuhar makmal kawalan digital berjenama Haida International dan model HD-YQ-E801A pada 26 Mei 2022 bertempat di Makmal Bencana Teknologi, SEADPRI-UKM. Jurulatih dari Chembio Technology Sdn Bhd, Encik Eddy Looi telah dijemput untuk memberi ceramah dan latihan mengenai kaedah menggunakan ketuhar makmal kawalan digital tersebut.

Peralatan ketuhar makmal tersebut adalah diperoleh menggunakan geran penyelidikan antarabangsa International Centre for Genetic Engineering and Biotechnology (ICGEB, XX-2022-002), yang diketuai Prof. Madya Dr. Tan Ling Ling. Suhu operasi ketuhar makmal kawalan digital HD-YQ-E801A adalah di antara 50 °C hingga 250 °C. Saiz dalaman ketuhar ialah 34 × 34 × 32 mm dengan 1 dulang. Ketuhar tersebut dipasang dengan keluli tahan karat di ruang dalam dan kipas untuk peredaran haba. Ia mempunyai dua lapisan tingkap di pintu, elemen pemanas bentuk U (berganda) dan pintu dengan pengedap silikon. Dengan adanya ketuhar tersebut di Makmal Bencana Teknologi, kerja penyelidikan dapat dijalankan dengan lebih lancar di SEADPRI-UKM.



Pembentang Terbaik Kategori Doktor Falsafah Kolokium Siswazah LESTARI (KSL 2022)

Kolokium Siswazah LESTARI (KSL 2022) telah diadakan pada 12 Oktober 2022 secara atas talian melalui perantara Microsoft Teams. Seramai 55 peserta yang terdiri daripada pelajar, kakitangan akademik dan bukan akademik LESTARI turut hadir dalam pembentangan ini. Manakala, seramai 15 orang pelajar telah terpilih untuk membuat pembentangan hasil penyelidikan mereka.

Setinggi-tinggi ucapan tahniah kepada Saudara Navakanesh M. Batmanathan, iaitu merupakan pelajar Pusat Kajian Bencana Asia Tenggara (SEADPRI), di bawah seliaan Prof. Dr. Joy Jacqueline Pereira kerana telah memenangi Anugerah Pembentang Terbaik Kategori Doktor Falsafah dengan tajuk pembentangan ialah "Evidence of Vertical Land Motion Along the Coastal Regions of Selangor and Kota Kinabalu, Sabah". Pembentangan kolokium ini adalah bertujuan untuk menilai kemajuan penyelidikan pelajar agar dapat menghasilkan tesis yang baik serta memberi impak positif kepada Universiti.

IPCC SIXTH ASSESSMENT REPORTS ARE AVAILABLE ONLINE!



The IPCC Sixth Assessment Reports comprise (from upper left) *Climate Change 2021: The Physical Science Basis* from Working Group I; *Climate Change 2022: Impacts, Adaptation and Vulnerability* from Working Group II; and *Climate Change 2022: Mitigation of Climate Change* from Working Group III. The IPCC AR6 Synthesis Report (bottom), which draws on these three reports will be released in 2023.
(Source: Intergovernmental Panel on Climate Change, IPCC)

The IPCC prepares comprehensive Assessment Reports about knowledge on climate change, its causes, potential impacts, and response options. The reports can be retrieved through this link <https://www.ipcc.ch/reports/>.

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ISSN 2180-1142



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