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BULETIN SEADPRI

Pusat Kajian Bencana Asia Tenggara
Southeast Asia Disaster Prevention Research Initiative

NEW HEAD OF SEADPRI-LESTARI, UKM

After 15 years of its establishment, SEADPRI-UKM proudly welcomes Gs. Dr. Nurfashareena Muhamad, who is also the first graduate of the institution, as its new Head. Her expertise is in Disaster Risk Reduction and Geographical Information System with research interest covering optimization of the use of geospatial technology in decision-support systems to facilitate knowledge-based decision making for land-use planning and development to reduce the risk of disasters at the local level.

With her fortitude, dedication and prudence, it is hoped that this alumna will steer and sustain the efforts aimed at realizing the mission and vision of SEADPRI-UKM. We look forward to more successful years ahead under the leadership of Gs. Dr. Nurfashareena Muhamad!

CONGRATULATIONS!

JUNE 2023

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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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Climatic Hazards Programme

Climate Resilient Development as a way forward

Navakanesh M Batmanathan
SEADPRI-Universiti Kebangsaan Malaysia

(a) Opening speech by Prof. Tan Sri Dr. Jemilah Mahmood; (b) Panel session moderated by Mr. Muru Loganathan (centre) with Prof. Joy Jacqueline Pereira (left) and Mr. Yin Shao Loong (right) as session speakers; (c) Stakeholders from both the public and private sectors attended the workshop.

Accelerating climate adaptation requires more data and evidence, and, the scientific community can play a vital role in securing such information. Climate resilient development is a conceptual idea on which the UK and Malaysian scientists can work together to establish a framework for better adaptation strategies. This is imperative, as a rapidly narrowing window of opportunity exists, to enable climate-resilient development.

To this end, the British High Commission of Kuala Lumpur organized a climate science workshop to acknowledge the practical contributions of scientists at the local and regional levels. The workshop began with a series of sessions emphasizing the need for adaptation-driven policies, including their challenges and the way forward.

The key outcome reveals that the lack of adaptation-related applications significantly hindered the progress of climate adaptation measures, evidently from the Green Climate Fund (GCF), where only one project is approved with three others as supporting projects. A major proportion of international funds are geared toward mitigation plans and this needs to be revisited. Pursuing adaptation-driven measures may provide a great entry point for climate-resilient development, which is the process of integrating mitigation and adaptation measures.

A long-term resilience pilot project using nature-based solution has been ongoing in Penang Island with support from local authorities and the Think City group. The initiatives here include urban greening to mitigate heat island effects and microclimate. It is the first urban climate adaptation program in Malaysia.

The emphasis on impact-based scenarios by decision-makers clearly highlights the importance of adaptation plans, and scientific communities must be able to differentiate between climate and impact-based scenarios. Such modeling can be improved with a collaborative and integrative approach involving government, private sectors, civil societies, and communities.

For city scale projection, MetMalaysia works closely with Indonesia and the Philippines on high-resolution modeling for tropical cities. The joint research is to understand fundamental science before substantiating the models. An example from the UK reveals impact-based forecasting on a shorter timeframe is focused on climate risk reports, and socio-economic variability is considered. Overall, impact-based assessment at the city scale requires a comprehensive approach that considers weather data, city infrastructure, and population vulnerabilities, with continuously monitoring of conditions and evaluation of the uncertainties from meteorological parameters to improve its effectiveness.

In recent times, cascading geological hazards have posed a significant challenge for landslide susceptibility modeling. Debris flow has grown twofold over the years in Malaysia, mainly due to intense rainfall coupled with high slope angles and geological factors. With the advancement in geospatial technologies, satellite scanning using InSAR records millimeter (mm) scale subsidence at a regional level is available. The Mineral and Geoscience Department monitors critical areas and implements ground tools to observe instability. In the UK, an alarm system is used to monitor acoustic sounds on the ground, and the development of a landslide tracking tool is also ongoing.

Other approaches include the use of wildlife and the ways of indigenous communities as an early warning system. This can be elusive; however, it can be improved with a proper framework to monitor such aberrant datasets. These initiatives reflect the potential for regional collaboration to share knowledge and best practices on reducing climate risks. International partnerships can also provide access to funding and technical assistance for climate adaptation measures.

As a way forward, practical contribution and science communication are vital steps for enhancing long-term strategies for building resilience to climate-change impacts and ensuring sustainable economic growth; most importantly, integrating climate-resilient development into national policies and plans. This will provide an overview of both short- and long-term climate risks and is crucial for a range of sectors, including water management, agriculture, energy, transportation, urban planning, and infrastructure development.

However, fragmented governance is a major issue and a contributing factor to the impacts of climate change in these sectors. Inclusive governance with an emphasis on climate resilient development are necessary, and a holistic approach may help to tackle emerging risks in Malaysia.

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Dialog Pasca COP 27: *Science, Technology and Innovation to Boost Climate Ambition*

Siti Khadijah Satari & Joy Jacqueline Pereira
SEADPRI-Universiti Kebangsaan Malaysia

Datuk Seri Ir. Dr. Zaini Ujang, Ketua Setiausaha Kementerian Alam Sekitar dan Air (KASA) dan Ms. Meena Raman, Ketua Program Third World Network menjadi penceramah utama dalam Post COP 27 Dialogue-Science, Technology and Innovation to boost climate ambition.

Persidangan Ke-27 Konvensyen Rangka Kerja Pertubuhan Bangsa-Bangsa Bersatu mengenai Perubahan Iklim (COP 27) yang berlangsung pada 8-16 November 2022 telah membuka jalan kepada harapan masa depan untuk menangani cabaran global perubahan iklim secara berkesan. Persidangan tersebut melibatkan 90 ketua negara seluruh dunia dengan penyertaan 35,000 perwakilan daripada 190 buah negara. Matlamat persidangan adalah untuk menggalakkan dan membimbing negara-negara seluruh dunia untuk sama-sama mengambil tindakan yang berkesan terhadap perubahan iklim. Persidangan yang diadakan telah memfokuskan kepada kerjasama perubahan iklim yang lebih inklusif selaras dengan sains dan teknologi terkini melalui mempercepatkan tindakan iklim global dengan cara pengurangan pelepasan gas rumah hijau, peningkatan usaha adaptasi dan peningkatan aliran kewangan yang disesuaikan bagi tindakan pemulihan.

Sebagai peneraju pemikiran dalam sains, teknologi, inovasi dan ekonomi untuk masyarakat yang progresif, harmoni, makmur dan mampan, Akademi Sains Malaysia (ASM) bersama pihak pihak Pusat Kajian Bencana Asia Tenggara (SEADPRI-UKM) dan Asean Network on Climate Science and Technology (ANCST) telah menganjurkan *"Post COP 27 Dialogue-Science, Technology and Innovation to boost climate ambition"* pada 1 Disember 2022 secara dalam talian melalui platform zoom. Ia bertujuan untuk mendapatkan sudut pandangan yang meluas daripada sains pelbagai bidang dalam merangka arah tuju ke hadapan bagi merangsang matlamat iklim untuk mengurangkan pelepasan gas rumah hijau (GHG) dan penyesuaian terhadap impak iklim di Malaysia. Dialog telah mendapat sokongan daripada lebih 80 orang peserta daripada institusi kerajaan, universiti, sektor swasta dan pertubuhan bukan kerajaan (NGO). Dua orang pembentang utama dan empat orang pengulas terdiri daripada pakar perubahan iklim telah membentang dan mengupas isu dengan sangat baik.

Dialog yang dijalankan telah mengenal pasti bahawa isu perubahan iklim bukan sahaja mengenai alam sekitar, ia juga adalah isu ekonomi yang merentas semua sektor. Pembiayaan krisis iklim kini memberi tumpuan kepada mengurangkan pelepasan karbon dioksida dalam usaha membendung perubahan iklim, manakala kira-kira satu pertiga daripadanya telah diperuntukkan untuk projek membantu masyarakat menyesuaikan diri dengan kesan cuaca ekstrem pada masa hadapan. Pelepasan gas rumah hijau harus dikurangkan 45 peratus menjelang 2030 bagi mengehadkan pemanasan global pada paras 1.5 darjah Celsius. Bumi mengalami pelbagai risiko dan beberapa tempat tidak boleh didiami sekiranya pemanasan global melebihi nilai tersebut.

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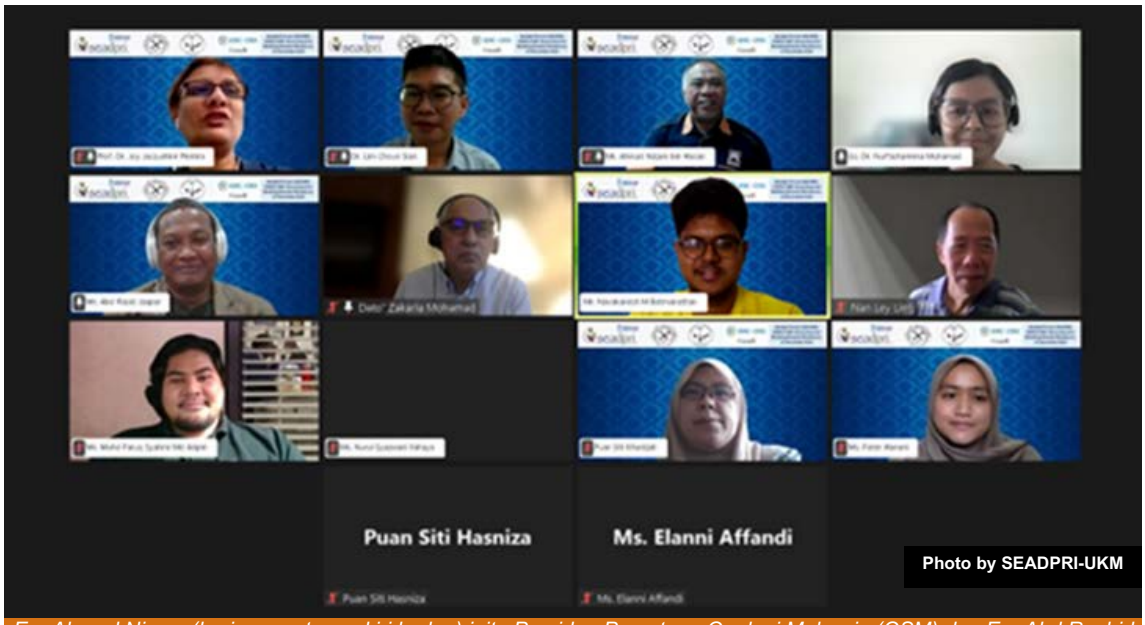
Climatic Hazards Programme

Forum SEADPRI bersama GSM & IGM: *Geoscience for Building Disaster Resilience*

Siti Khadijah Satari & Joy Jacqueline Pereira
SEADPRI-Universiti Kebangsaan Malaysia



En. Ahmad Nizam (barisan pertama, kiri kedua) iaitu Presiden Persatuan Geologi Malaysia (GSM) dan En. Abd Rashid Jaafar (baris kedua, kanan pertama) iaitu Presiden Institut Geologi Malaysia (IGM) telah menberi ucapan aluan dan seterusnya merasmikan "SEADPRI FORUM with GSM & IGM: Geoscience for Building Disaster Resilience"

Forum tahunan SEADPRI bertajuk "SEADPRI forum with GSM & IGM: Geoscience for Building Disaster Resilience" telah diadakan secara atas talian melalui platform zoom pada 23 Disember 2022 bermula 8.30 pagi hingga 5.30 petang. Forum ini dianjurkan oleh Pusat Kajian Bencana Asia Tenggara (SEADPRI-UKM) anjuran bersama Persatuan Geologi Malaysia (GSM), Institut Geologi Malaysia (IGM), International Development Research Centre (IDRC) dan Institut Geologi Malaysia. Ucapan aluan-aluan telah disampaikan oleh En. Ahmad Nizam bin Hasan selaku Presiden GSM dan En. Abd Rashid Jaafar selaku Presiden IGM. Penganjuran Forum ini telah mendapat penyertaan yang menggalakkan daripada lebih 130 ahli geologi dari pelbagai sektor awam dan swasta serta penyelidik UKM. Dalam forum tersebut seramai enam orang pembentang utama telah mengupas permasalahan mengenai pengurusan risiko bencana dan bahaya iklim di Malaysia. Manakala empat pembentang muda telah membentang mengenai pemodelan kerentanan untuk bahaya iklim.

Forum SEADPRI yang diadakan bertujuan untuk memperkenalkan konsep dan terminologi berkaitan pengurusan risiko bencana dalam konteks Malaysia kepada peserta yang terdiri daripada ahli GSM dan IGM serta beberapa penyelidik UKM. Peserta telah diberi penjelasan mengenai aplikasi geosains dalam pengurusan bencana dan pendedahan terhadap inisiatif tempatan berkaitan bahaya iklim. Hasil kajian projek penyelidikan yang dibiayai oleh pihak IDRC dan Newton Ungku Omar telah dibentangkan dalam Forum yag dijalankan. Keputusan tinjauan ahli projek IDRC di Shah Alam dan Kuala Selangor terhadap penduduk yang terjejas di kawasan geobencana menunjukkan 50% penduduk penduduk mempunyai kesedaran tentang perubahan iklim. Kuala Lumpur Multi Hazard Paltform (KL-MHP) terhasil daripada kajian projek NUOF telah dibangunkan untuk memberi amaran awal potensi kejadian cuaca ekstrem di Kuala Lumpur. Sistem ini berfungsi untuk membantu operasi harian pihak Dewan Bandaraya Kuala Lumpur (DBKL) dengan memberi maklumat mengenai ramalan hujan dalam menangani bahaya seperti banjir kilat.

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Climatic Hazards Programme

Climate Change 2023: The IPCC AR6 Synthesis Report on Implications for Disaster Risks

Puteri Amirah Nabilah Azman, Nurfashareena Muhamad & Joy Jacqueline Pereira
SEADPRI-Universiti Kebangsaan Malaysia

The Intergovernmental Panel on Climate Change IPCC was a joint recipient of the Nobel Peace Prize in 2007. The role of IPCC has been to assess on a comprehensive, objective, open and transparent basis the scientific, technical, and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.

IPCC reports are neutral with respect to policy, although they may need to deal objectively with scientific, technical, and socio-economic factors relevant to the application of particular policies. The current synthesis report (AR6) will provide input for the Global Stock Take under the upcoming Paris Agreement. The assessments have been conducted to achieve sustainable development and its goals.

IPCC is an intergovernmental panel with 195 member states with appointed National Focal Points. Hundreds of scientists and experts from around the world are involved in the preparation of IPCC reports. Malaysian researchers could get involved with IPCC by contributing to existing literature because our IPCC assessment area is as good as the literature available. Professor Dr. Joy Jacqueline Pereira, a Principal Research Fellow at Universiti Kebangsaan Malaysia's Southeast Asia Disaster Prevention Research Initiative (SEADPRI-UKM) and Vice-Chair of the (IPCC), informs that there will be a special report in the next cycle that is dedicated to cities focusing on the science, social and hazard perspectives. Malaysians are encouraged to contribute to the topic so that tropical issues are adequately highlighted in this coming global report.

The AR6 synthesis report is a report that draws on the nine reports that were released in the sixth assessment cycle. The report highlighted adverse impacts from human-caused climate change that will continue to intensify if no actions are taken. The impacts are widespread and cover water availability, food production, health and wellbeing, city settlements and infrastructure due to floods and storms as well as biodiversity and ecosystem. With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced. According to the data obtained in the report, annual hottest day temperature, annual soil moisture and annual wettest-day precipitation changes are regionally differentiated. It appears that impacts are more focused along the equatorial belt where Southeast Asia is located. The increased rainfall projected for the region would increase risks related to floods and landslides.

Limiting warming to 1.5°C and 2°C involves rapid, deep, and in most cases, immediate greenhouse gas emission reductions. The reduction must happen in the next decade and cover all sectors including transport, industry, building, energy supply, land-use change, and forestry. There are multiple opportunities for scaling up climate action. In the AR6, climate responses and adaptation options and mitigation options are shown together with respect to the different sectors such as energy supply, land, water, food, settlements, infrastructure, health, society, livelihood, and economy. This sets the scene for climate resilient development and provides policymakers with some concrete examples. Near-term adaptation and mitigation actions have more synergies than trade-offs with Sustainable Development Goals (SDGs). Higher mitigation investment flows are required for all sectors and regions to limit global warming. Southeast Asia requires increased investment flows in mitigation by about 6-9 times. There is a rapidly narrowing window of opportunity to enable climate resilient development. For more details, please download the report from the IPCC website [https://www.ipcc.ch/].

Prevention of disasters is always more cost-effective than responding and recovering from a disaster event. In Malaysia, the National Disaster Management Agency (NADMA) is most experienced in coordinating complex disasters. Most hazards in Malaysia are climate related. It is important to note that disaster prevention is distinct from disaster mitigation. Prevention covers non-structural measures such as legislation, landuse regulations, standards, guidelines and insurance. Aspects of prevention include delineation of disaster-prone areas and vulnerable populations, early warning tools, risk communication and engaging stakeholders. Disaster prevention can be linked well to the National Adaptation Plan by the Ministry of Natural Resources, Environment and Climate Change (NRECC) that is looking at the long-term hazards due to climate change.

Disaster mitigation (which is different from climate change mitigation) encompasses structural measures for reducing disaster risks. It covers both engineering and nature-based structures, drawing on technological and innovative solutions. Ministries and technical agencies need to bridge the silos for integrated implementation risk reduction measures in the country. A solution pathway advocated by the Academy of Sciences Malaysia is to draw on the wealth of knowledge and experience of all operational, research and academic institutions, to harness science to accelerate transformation through a context specific, area-based approach, and promote processes for implementing climate change mitigation, adaptation and disaster risk reduction together. Funded by the Newton-Ungku Omar Fund, SEADPRI-UKM led a Malaysia-UK consortium to develop a Multi-hazard Forecasting System for Kuala Lumpur, as the first step to handle aspects of extreme events at the city-level. This will be expanded to cover mitigation actions to enhance adaptation co-benefits and reduce risk to future climate change in the city.

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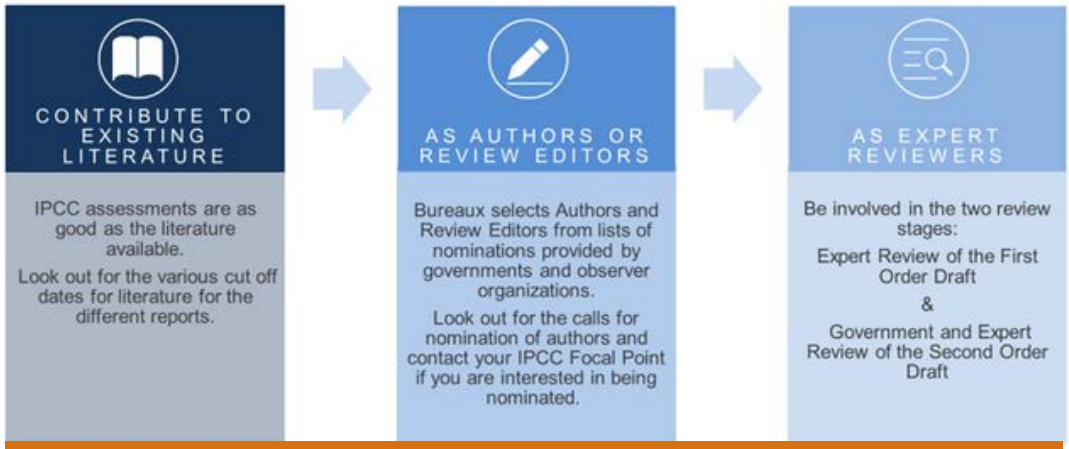
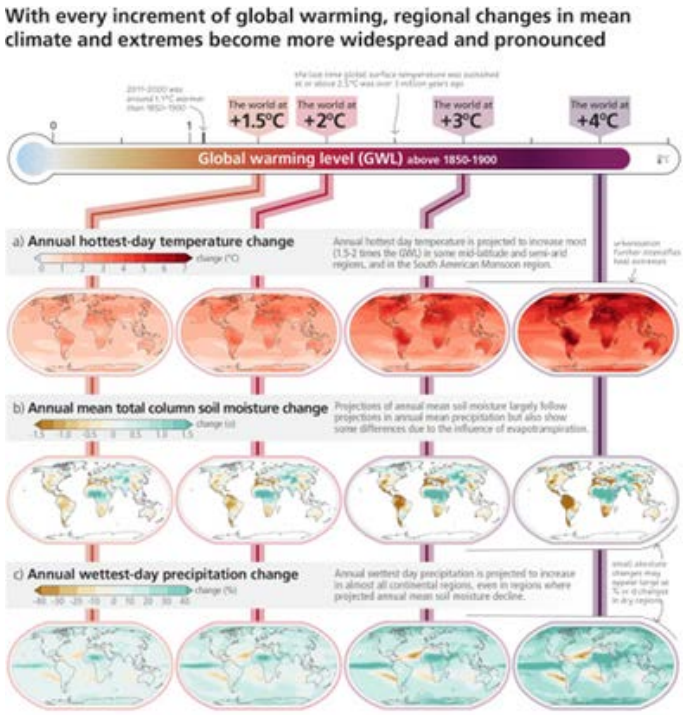
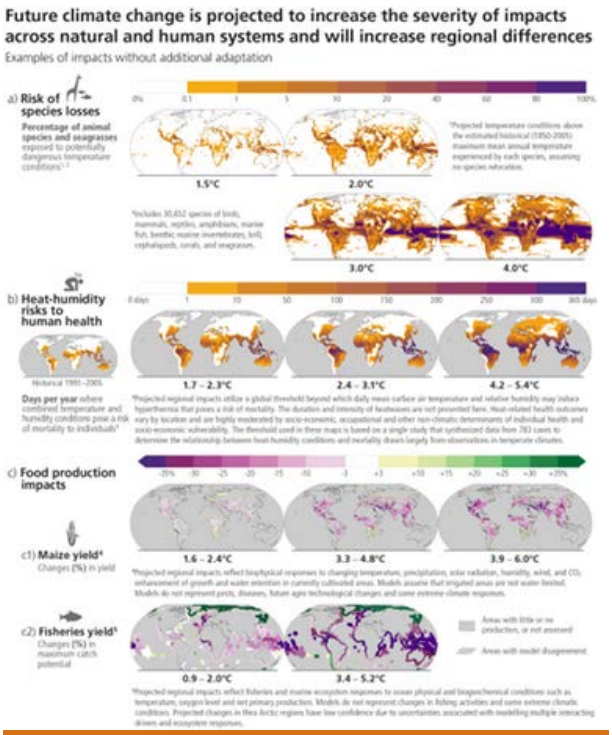


Steps showing how to get involved in the IPCC assessment for the upcoming global report.

Solution pathway by the Academy of Sciences Malaysia



Source: IPCC AR6 Figure SPM.2



Source: IPCC AR6 Figure SPM.3

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Geological Hazards Programme

Youth Innovation in Open-Data: Experiences from OpenStreetMap

[1]Nurfashareena Muhamad, [1]Faten Hanani Hakimi & [2]Sufyan Aslam
[1]SEADPRI-Universiti Kebangsaan Malaysia
[2]UNICEF Malaysia

Photo by SEADPRI-UKM

Participants at the successful OpenStreetMap workshop

OpenStreetMap is an open platform tool that has great potential for emergency response. With complete data, OSM can be used as an alternative to authoritative data where the mappers can provide fresh or updated data to avoid data staleness. Besides its use during disasters, OSM can be used for many other purposes such as tourism, transportation, health services and more.

One way to increase the contribution to OSM data is through Mapathon, which is a coordinated event where mappers need to be digitally involved in mapping a selected area through competition. The Shah Alam Mapathon (SAM) was held on 5 December 2022 and its purpose was to build the capacity of young mappers to utilize the open-access platform through buildings digitization in the Shah Alam area.

On 4 March 2023, SEADPRI-UKM and U-INSPIRE Malaysia@UKM, with support from UNICEF Malaysia and other partners successfully conducted a workshop to share the experience and knowledge about the development of open-data through OpenStreetMap (OSM) in Malaysia.

The workshop was held at Hotel De Palma, Shah Alam, from 10.00 am until 12.00 pm. It aimed to present the potential of OSM as a new alternative source of data in supporting decision making, and to gather views from the stakeholders on the potential and reliability of OSM. The workshop involved all the active participants of SAM, panels from Grab Malaysia, OSM Malaysia Community and National Geospatial Centre along with participants from U-INSPIRE Malaysia@UKM members. Other than becoming a sharing platform for the development of open-data, the workshop also acted as the closing event of SAM with an appreciation session for all active participants. The workshop received great support from all the participants. The participants gained exposure on open data which can potentially allow them to implement their expertise or knowledge for future development of the OSM.

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Geological Hazards Programs

Adakah Malaysia terletak di dalam Lingkaran Api Pasifik?

Lim Choun-Sian
SEADPRI-Universiti Kebangsaan Malaysia

The atlas showing the tectonic plate boundaries and distribution of the major active volcanoes that ultimately govern the delineation of the Ring of Fire along the rim of the Pacific Ocean or Pacific Tectonic Plate (Source: CNN[1]).

Ringkasan

Jawapan: TIDAK… Perbincangan ilmiah setakat hari ini mengenai gempa bumi sejagat hanya berkisar mengenai pergerakan plat tektonik tetapi tidak sekali-kali mengenai pergerakan garisan Lingkaran Api Pasifik. Yang mana garis maya atau "makhluk" ini seolah-olah telah mula bergerak.

Susulan itu daripada beberapa gegaran gempa bumi jauh dari Indonesia yang dirasai di Malaysia dan juga gempa bumi lemah yang didakwa berlaku di kawasan Malaysia semenjak beberapa bulan yang lepas. Berikut merupakan petikan komunikasi risiko daripada soalan-soalan sering ditanya oleh media massa dan pihak berkepentingan kepada SEADPRI. Penerangan dan rujukan daripada sumber geo-sains telah ditambah sebagai penjelasan.

Apakah itu Lingkaran Api Pasifik?

1. Tafsiran mudah untuk Lingkaran Api Pasifik ialah satu kawasan sepanjang pesisir Lautan Pasifik di mana proses tektonik plat menyebabkan banyak gempa bumi dan letusan gunung berapi [2].
2. Ia adalah satu garis tebal dan maya, secara geologi "Lingkaran Api Pasifik Bukan Garisan yang Nyata" sebagai satu garis yang bersambungan di Bumi. Kegiatan gempa bumi dan volkano yang berjauhan di sepanjang garis ini tidak semestinya berkait satu sama lain dan menyebabkan kegiatan seismik bersiri [3].
3. Garisan ini yang dilukis atas peta kuno untuk menunjukkan kedudukan pembentukan volkano [4]. Usaha ini mungkin dimulakan oleh sains volkanologi untuk menerangkan aktiviti volkano di pinggir Lautan Pasifik pada awal 1900-an, iaitu separuh abad sebelum perkembangan teori Plat Tektonik lagi [5].
4. Pada masa keghairahan untuk memasukkan Malaysia sebagai negara dalam zon Lingkaran Api, masih ada penerbitan saintis di luar negara berpolemik dan tidak setuju untuk memasukkan Indonesia Barat ke dalam lingkaran ini [5].
5. Secara asas, penentuan Lingkaran Api Pasifik didasari oleh:
   - Lingkaran Api Pasifik terbentuk daripada plat tektonik dan berada di sempadan plat tektonik [6, 9].
   - Dicirikan oleh kedudukan aktiviti volkano yang aktif semenjak 10,000 tahun yang lepas di zon subduksi, di zon pertemuan dua plat berlanggar, menyebabkan pembentukan volkano yang terdiri daripada 75% puncak volkano dunia yang masih aktif [6, 7, 8, 9].
   - Kekerapan gempa bumi yang tinggi di mana lokasi plat tektonik bergeser, 90% gempa bumi dunia berlaku di Lingkaran Api Pasifik [6, 7].
   - Terletak di sekitar zon subduksi di mana terbentuknya palung lautan di Bumi apabila plat tektonik menyusup ke bawah satu plat yang lain. Palung-palung ini menjadi lokasi kepada beberapa lautan paling dalam di dunia [6, 9].

Kenyataan Penutup

Malaysia masih jauh untuk dilayakkan sebagai negara di bawah bahaya Lingkaran Api Pasifik. Walau bagaimanapun, Malaysia bukanlah negara gempa bumi sifar dan tidak kebal terhadap gegeran gempa bumi. Pengurangan risiko bencana dan kesiapsiagaan yang bersesuaian dengan keadaan geologi negara untuk membina daya tahan komuniti dan infrastruktur amatlah penting untuk menjamin negara ini terus selamat daripada sebarang ancaman gempa bumi atau tsunami yang dicetuskan oleh gempa bumi di perairan laut-dalam.

Rujukan

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Technological Hazards Programme

Silica nanospheres to detect cholera bacteria DNA

Dedi Futra, Lee Yook Heng, Su Yin Lee & Ling Ling Tan
SEADPRI-Universiti Kebangsaan Malaysia

Water is an essential element for human activities such as industrial production, agriculture, recreation, navigation, hydroelectric power generation, and irrigation. It is also a very important medium for the survival of living organisms like fish, bacteria, plankton, etc. Rapid population growth and urbanization, however, has contributed to the polluting of surface and ground waters, and caused hundreds of million people to lack access to safe drinking water. Contaminated water may act as a source for disease transmission and lead to the outbreak of water-related diseases, such as the cholera parasitic disease and Hepatitis E viral infection.

Cholera, a waterborne disease, is an acute intestinal infection marked by exhaustive diarrhea due to ingestion of foods or waters contaminated with the pathogenic Vibrio cholerae (V. cholerae) bacteria. Cholera infection can be endemic, epidemic, or pandemic especially after a natural disaster, such as a flood, or in areas with poor sanitation; it results in the production of enterotoxin responsible for watery diarrhea. It is non-virulent and only serogroups O1 and O139 strains contribute to the widespread epidemic of cholera.

The first outbreak of cholera was reported in 1854, when the Thames river water was polluted with raw sewage containing V. cholerae bacteria, which resulted in a cholera epidemic in London. The largest number of cholera cases were reported in Africa in 1996 with 6216 deaths recorded. As a result of this, regular determination and identification of V. cholerae in environmental waters have become crucial to prevent cholera infection in humans.

Polymerase chain reaction (PCR) and microarray techniques are common standard methods used for the specific detection of V. cholerae DNA. However, the main weaknesses in these methods are that it is time-consuming, and involve using multiple and toxic chemicals that can possibly inhibit or interfere with the PCR amplification process. Therefore, a fast and simple assay system for the specific detection of this pathogenic cholera infectious agents is urgently needed. In terms of simplicity, an electrochemical DNA biosensor would be a good candidate as a substitutive tool to these sophisticated conventional methods by virtue of its high sensitivity, fast kinetics, its ease-to-handle, and the low cost.

Various nanomaterials have been used in conjunction with DNA biosensors to enhance their sensitivity towards the specific genes ascribed to the biocompatibility and large binding surface area of the nanomaterials. Silica nanospheres, in particular, have received great interest in the construction of biosensors based on the electrochemical strategy for ultrasensitive monitoring of DNA due to their high stability, rich surface chemistry, and facile preparation. Tris(bipyridine)ruthenium(II) [Ru(bpy)32+]-doped silica nanospheres have been utilized for the detection of DNA hybridization based on thiolated DNA probe-modified gold electrode, and demonstrated a wide linear response range from 10 fM to 10 pM. The Ru(bpy)32+-doped silica nanoparticles have also been made use of to label the DNA probe immobilized on the polypyrole (Ppy) modified platinum electrode. The DNA hybridization event was investigated via electrogenerated chemiluminescence strategy with a low detection limit at pM level achieved. Microcantilever DNA biosensor, which was developed based on rhodamine B isothiocyanate-modified silica nanoparticles attained a lower detection limit of <3 fM with good selectivity. Monolayer of silica nanoparticles on the cysteine-modified gold electrode was successfully constructed for sequence-specific detection of DNA using tris(1,10-phenanthroline)cobalt(III) [Co(phen)33+] DNA hybridization indicator. A low detection limit was acquired at the pM level. The improvements in the DNA biosensor performance with respect to limit of detection (LOD), dynamic linear range, and selectivity as shown by the application of silica nanoparticles as immobilization carriers affirmed the unique structural features of silica nanoparticles for efficient binding of capture probe at high loading capacity.

Beware of food- and water-borne diseases during and after a flood. Symptoms of the disease include diarrhea, vomiting, fever, abdominal pain, and headache. (Google image)

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Technological Hazards Programme

Persampelan Air Laut Ledakan Alga Berbahaya

Tan Ling Ling & Nurul Yuziana Mohd Yusof
SEADPRI-Universiti Kebangsaan Malaysia

Persampelan air laut bersama pihak Jabatan Perikanan Negeri Kelantan pada 20 Jun 2022 di perairan laut negeri Kelantan yang sedang mengalami ledakan algal berbahaya. Prof. Madya Dr. Tan Ling Ling (kiri) sebagai ketua projek GUP-2021-066 (kiri) dan Dr. Nurul Yuziana Mohd Yusof (kanan) sebagai penyelidik bersama.

Program Bencana Teknologi, Pusat Kajian Bencana Asia Tenggara (SEADPRI-UKM) telah mengadakan satu sesi kerja lapangan persampelan air laut ledakan alga berbahaya (HAB) pada 20 Jun 2022. Persampelan air laut telah dijalankan bersama pihak Jabatan Perikanan Negeri Kelantan dan pelajar sarjana LESTARI serta Felo Pasca Doktoral UKM untuk membuat persampelan air yang mengandungi spesies dinoflagelat daripada kawasan HAB di perairan laut Kelantan menggunakan kapal Jabatan Perikanan Negeri Kelantan atas kerjasama penyelidikan antara kumpulan penyelidik di UKM dan Jabatan Perikanan Negeri Kelantan dalam kajian pembangunan biosensor untuk pengesanan HAB. Pembangunan biosensor HAB memerlukan sampel kultur tulen spesies dinoflagelat yang berkaitan HAB terutamanya pada peringkat penentusahan melalui kaedah biologi molekular seperti RT-PCR, serta untuk peringkat pengujian biosensor kelak. Sampel tersebut perlu ditambahkan dengan medium pertumbuhan dan perlu dihantar segera ke makmal penyelidikan kami di UKM Bangi, Selangor.

Selamat Datang dan Selamat Bertugas

GS. DR. AIDA SORAYA SHAMSUDDIN

Warga Pusat SEADPRI-LESTARI, UKM mengucapkan selamat datang dan selamat bertugas kepada GS. DR. AIDA SORAYA SHAMSUDDIN sebagai FELO (DS51), yang melapor diri pada 1 Disember 2022. Dr. Aida Soraya Shamsuddin merupakan anak ketiga kepada pasangan Tuan Haji Shamsuddin Derahman dan Puan Hajah Samsiah Deraman. Beliau dilahirkan di Kuala Terengganu, Terengganu pada 29 Mac dan telah mendapat pendidikan awal di Sekolah Kebangsaan Sungai Tong dan Sekolah Kebangsaan Batu 29 dan seterusnya di Kolej Sains Pendidikan Islam Negeri Terengganu (KOSPINT). Setelah mendapat Sijil Pelajaran Malaysia (SPM), beliau kemudian menyambung pelajaran di Kolej Matrikulasi Perak di bawah aliran sains hayat. Bermula pada tahun 2006 sehingga 2009, beliau telah menyambung pelajaran ke peringkat ijazah dan memperolehi Ijazah Sarjana Muda Sains dengan Kepujian (Sains Sekitaran) daripada Universiti Malaysia Sabah (UMS). Beliau kemudian menyambung pelajaran ke peringkat Ijazah Sarjana dan Doktor Falsafah di Universiti Putra Malaysia (UPM) dalam bidang Master Alam Sekitar (2012) dan Ph.D Kesihatan Persekitaran (2018). Beliau juga telah menjalani pasca-kedoktoran di Universiti Islam Antarabangsa Malaysia (UIAM) pada tahun 2020 sehingga 2021. Untuk pengalaman dalam bidang pekerjaan, beliau pernah memegang jawatan sebagai pensyarah di kolej swasta, tutor di Open University Malaysia (OUM) dan guru ganti di sekolah menengah kebangsaan. Kepakaran beliau meliputi bidang hidrologi dan kesihatan persekitaran.

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The Beginning of a New Partnership for Future Progress

Aida Soraya Shamsuddin
SEADPRI-Universiti Kebangsaan Malaysia

The Malaysian Nuclear Agency (NUCLEAR MALAYSIA) and the Institute for Environment and Development (LESTARI), Universiti Kebangsaan Malaysia, organized a technical seminar on February 28, 2023, at the Dewan Tun Dr. Ismail, Malaysian Nuclear Agency, Bangi. This seminar aimed to explore the nature of their relationship, its aims, significant projects, and the possible benefits for both institutions and the country. Professor Dr. Joy Jacqueline Pereira, Gs. Dr. Aida Soraya Shamsuddin, Gs. Dr. Nurfashareena Muhamad and Mr. Mohd Fairus Awang attended this event on behalf of SEADPRI-UKM

Established in 1972, the Malaysian Nuclear Agency is the nation's focal point for nuclear science and technology. Its primary mission is to promote the peaceful application of nuclear technology for socio-economic growth, energy production, and environmental protection. Several vital objectives drive the collaboration between these two institutions:-

1. Enhancing research capabilities: The partnership aims to strengthen nuclear science and technology research capabilities, fostering a culture of innovation and scientific advancement.
2. Human resource development: Collaborative efforts focus on developing highly-skilled professionals and researchers in nuclear-related disciplines, equipping them with the necessary expertise to address current and future challenges.
3. Knowledge exchange: The collaboration facilitates sharing of knowledge, technical expertise, and resources between both institutions, fostering a mutually beneficial learning environment.
4. Applied research: The joint initiatives aim to conduct research to address societal needs, such as energy security, healthcare, agriculture, and environmental sustainability.

At this event, Gs. Dr. Aida Soraya presented a research proposal titled 'Groundwater pollution and sea level rise in the coastal aquifers of Selangor'. In her presentation, she addressed that a rising trend in sea levels has been observed globally and along the Malaysian coastline due to climate change. Coastal floods, inundation, erosion, and seawater intrusion are all adversely affected by the increasing sea level. In spite of the fact that these effects already occur in coastal areas, sea level rise exacerbates their severity. Seawater intrusion is the most prevalent problem in coastal aquifers worldwide, including Malaysia; this can degrade groundwater quality and render it unfit for drinking water, irrigation, or industrial use.

Gs. Dr. Aida Soraya proposed the application of nuclear techniques, such as isotope analysis, in assessing groundwater pollution due to sea level rise in the coastal area of Selangor. Applying stable and radioactive isotopes is considered one of the imperative tools available and favorable to hydrologists and water-resource researchers to help unravel the intricacies inherent in our water-resource system.

After the presentation by researchers from both institutions, the researchers were taken on a tour of laboratories such as Stable Isotope Analysis Laboratory, Nuclear Dating Laboratory 1, and Radioactive Isotope Analysis Laboratory. Researchers from the Malaysian Nuclear Agency explained the application of instruments such as SERCON GEO 20-2 Continuous Flow Isotope Ratio Mass Spectrometer (CF-IRMS) to measure stable isotopes (such as $\delta 2H$ and $\delta 18O$) and Liquid Scintillation Counter (LSC) to measure radioactive isotopes. This was followed by a discussion on the scope of collaboration between the Malaysian Nuclear Agency and LESTARI, UKM.

The collaboration between the Malaysian Nuclear Agency and LESTARI, UKM is a significant step towards strengthening nuclear research and development in Malaysia. Through joint initiatives, knowledge sharing, and resources utilization, both institutions are poised to make substantial contributions to scientific advancement, national development, and international recognition. This partnership serves as a model for effective collaboration between academia and research organizations, contributing to the socio-economic progress of the nation.

Researchers in the Nuclear Dating Laboratory 1

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Photo by SEADPRI-UKM

Staff of Malaysian Nuclear Agency explained the use of SERCON GEO 20-2 Continuous Flow Isotope Ratio Mass Spectrometer (CF-IRMS)

Photo by SEADPRI-UKM

Researchers from Malaysian Nuclear Agency and LESTARI, UKM

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Bengkel Pelan Strategik Perancangan Pengurusan SEADPRI

Mohd Fairus Awang, Mohd Faizol Markom, Noor Shafirah Ramli
SEADPRI-Universiti Kebangsaan Malaysia

Barisan hadapan dari kiri: *Prof. Madya Dr. Tan Ling Ling, Gs. Dr. Nurfasharena Muhamad (Pengerusi Pusat SEADPRI), Gs. Dr. Aida Soraya Shamsuddin, Puan Noor Shafirah Ramli* ***Barisan belakang dari kiri****: Prof. Dr. Joy Jacqueline Pereira, Encik Mohd Faizol Markom, Dr. Lim Choun Sian, Prof. Dr. Sharifah Zarina Syed Zakaria (Mantan Pengerusi Pusat SEADPRI), Encik Mohd Fairus Awang*

Pada 2 Mac 2023, bertempat di Hotel Bangi Resort, Selangor, telah berlangsungnya satu bengkel sangar kerja Pusat SEADPRI-LESTARI, UKM dengan tajuk 'Bengkel Pelan Strategik Perancangan Pengurusan SEADPRI'. Bengkel telah dihadiri oleh sembilan peserta yang terdiri dari pada lima Felo, seorang Ketua Pegawai Penyelidik (RO), seorang Pegawai Sains Kanan (PS), seorang Penolong Pegawai Sains (PPS) dan seorang Pembantu Tadbir (PTO).

Di antara objektif perlaksanan bengkel ini adalah seperti berikut:

- Menjadi platform pembentangan dan perkongsian perancangan dari kalangan ahli.
- Percambahan idea-idea terkini dan dinamik bagi pemantapan pengurusan dan penyelidikan pusat.
- Membolehkan kakitangan berinteraksi, membina hubungan baik dan bekerja secara efektif dengan rakan sekerja untuk mencapai objektif yang sama.
- Mewujudkan interaksi positif dalam kalangan kakitangan bagi membentuk semangat kerja secara kolaborasi.
- Mewujudkan perasaan bertanggungjawab kakitangan terhadap keputusan kumpulan.

Pembentangan dan perbincangan dimulakan dengan pembentangan halatuju program untuk 5 tahun berdasarkan imbasan kepada beberapa siri halatuju Pusat SEADPRI masa lepas. Halatuju tersebut dipinda dan ditambahbaik mengikut keperluan semasa dan program. Program-program yang terdapat di Pusat SEADPRI adalah Program Bencana Iklim, Program Bencana Geologi dan Program Bencana Teknologi.

Pembentangan diteruskan dengan Perancangan ERK Felo Akademik, kemudian disusuli dengan inovasi dan draf KPI kakitangan pengurusan, dan akhir sekali adalah perbincangan dan cetusan idea di kalangan ahli.

Perbincangan meja bulat di antara ahli Pusat SEADPRI

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Aktiviti 5S Makmal Bencana Teknologi dan Pejabat Am SEADPRI

Mohd Fairus Awang, Mohd Faizol Markom, Noor Shafirah Ramli
SEADPRI-Universiti Kebangsaan Malaysia

Perlaksanaan aktiviti 5S di Pusat SEADPRI pada 20 - 24 Feb 2023

Pada 20 hingga 24 Febuari 2023 iaitu selama empat hari, satu aktiviti 5S telah dijalankan di Makmal Bencana Teknologi dan Pejabat Am Pusat SEADPRI. Aktiviti ini telah disertai oleh empat orang kakitangan Pusat SEADPRI iaitu Prof. Madya Dr. Tan Ling Ling, Encik Mohd Fairus Awang, Encik Mohd Faizol Markom dan Puan Noor Shafirah Ramli.

Secara lazimnya hasil dan faedah yang boleh dicapai adalah:

- Peralatan dan instrumen makmal atau pejabat akan lebih tersusun dan teratur, serta mudah untuk dipantau.
- Mencegah kehilangan peralatan atau instrumen di makmal dan pejabat.
- Memudahkan pencarian bahan pakai habis dalam almari penyimpanan.

Laporan aktiviti 5S ini juga telah dibentangkan dalam Mesyuarat Institut dan telah diperakui untuk didaftarkan sebagai inovasi bagi kakitangan yang terlibat dalam aktiviti tersebut.

Satu pertandingan UKM GEOSTARS sedang berlangsung dari 12 Jun sehingga 11 Ogos 2023. Pertandingan ini adalah anjuran Pusat SEADPRI bersama U-Inspire Malaysia, Asian Network on Climate Science and Technology (ANCST) dan GRAB Malaysia.

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U-INSPIRE MALAYSIA@UKM ANNUAL REPORT IS AVAILABLE ONLINE!

LAPORAN TAHUNAN
ANNUAL REPORT
2022
UINSPIRE MALAYSIA@UKM

3rd Anniversary

Cabaran-cabaran tahun lalu tidak menjadi penghalang semangat U-INSPIRE Malaysia@UKM untuk terus menyumbang kepakaran dalam bidang berkaitan pengurangan risiko bencana (DRR) dan perubahan iklim. Sejak ditubuhkan, U-INSPIRE Malaysia@UKM masih lagi giat menjalankan program berteraskan kesedaran dan pengetahuan tentang bencana yang ditumpukan kepada kalangan belia dan profesional muda. Pandemik COVID-19 telah menormalisasikan kerja secara talian, namun dunia sedang perlahan-lahan pulih dari kesan pandemik yang mana kerja secara lapangan sudah kembali dipraktikkan semula.

Aktiviti pada tahun 2022 mula memperlihatkan penglibatan kumpulan belia dan kanak-kanak dalam sektor pendidikan, dengan tujuan untuk membina kapasiti dan melihat potensi mereka dalam DRR. U-INSPIRE Malaysia@UKM memegang cita-cita untuk terus memastikan bidang DRR dan perubahan iklim dapat terus diperkukuhkan di negara ini melalui peranan kumpulan belia dan profesional muda.

ULANGTAHUN KETIGA
THE THIRD ANNIVERSARY

Past challenges never stopped U-INSPIRE Malaysia@UKM from continuing to serve the community by contributing expertise for disaster risk reduction (DRR) and climate change. Since its establishment, U-INSPIRE Malaysia@UKM has been actively involved in conducting programs for the youth and young professionals groups on disaster awareness and knowledge. The COVID-19 pandemic has normalized online work, but since the world started recovering from its impact, most programs continued to be conducted on the field.

Programs in 2022 focused on the involvement of youth and children in the education sector, aiming to build capacity in these groups and nurture their potential in DRR. One of the goals of U-INSPIRE Malaysia@UKM is to ensure that efforts to manage DRR and climate change can be strengthened in this country through the role of youth groups and young professionals.

The 2022 Annual Report consists of a summary of the many activities that had been carried out by its members in the year 2022. It is hoped that the Report will inspire youth groups and stakeholders in Malaysia, and further elevate the voices of youth and young professionals in Malaysia in the field of DRR and climate change. The report can be retrieved through this link: https://www.ukm.my/uinspiremalaysia/?p=358

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