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Synthesis

EXPLORING RESEARCH • INSPIRING INNOVATION

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SOARING UPWARDS
MALAYSIAN HIGHER EDUCATION

UPM
UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

Governance of FLOOD DISASTER MANAGEMENT

MALAYSIAN CASE STUDY

- WIPNET
- Water Module
- Safe Kids Malaysia

Older People

more vulnerable to disaster?

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Synthesis Magazine

We are back! Synthesis magazine is rebranded into new concept and style. With the fundamental concept, Synthesis is an official research magazine published by Research Management Centre, Office of Deputy Vice Chancellor (Research & Innovation) UPM. It covers research events, award-winning innovations, and high impact publications that emerge from various faculties and institutes across the university. Apart from that, it features some info-graphics about UPM research dynamics.

Readership

Synthesis is the official research news of UPM published by Research Management Centre, Office of Deputy Vice Chancellor (Research & Innovation) UPM. It is available online only and free of charge to the academic community as well as the techno-entrepreneurs, and public. If you would like to get further information, please e-mail the editors at synthesis@upm.edu.my.

Letters to Editors

If you have any comments and suggestions about the content of the publication, please e-mail to synthesis@upm.edu.my. The editors reserve the right to edit articles before publication.

Malaysia Disaster Management: Are we good enough?

As the world we are living in, we are used to be part of innovation, development and modernization and, always strive to be at the top. People are busy with the world's development and often overlook at the importance of the environment in which we have been living in. As studies done at the Yale University in the United States of America, the earth is estimated to have about 3.04 trillion trees using remote sensing satellite data. As for that, the forests often be marked as the earth's lungs. The world's lungs absorb a massive amounts of the carbon dioxide that flows around the atmosphere. They are, vital and guarding those lungs is the most crucial if we are to defend the variability of life on earth and battle the global warming.

The local researchers, especially in UPM, have been involving in many projects and organizations, together in giving ideas and transforming the disaster management in Malaysia. Apart from that, the National Security Council (NSC) also coordinates disaster management in accordance with Directive No. 20, the "Policy and Mechanism on National Disaster Relief and Management." The Council facilitates activities that are implemented by the Disaster Management and Relief Committee, which comprises various agencies at federal, state and local levels. This committee is given the task of coordinating flood relief operations at national, state and district level with the combined aims of reducing flood damage and reducing loss of human life.

Some of the current projects that have been established are Flood Modelling and Early Warning System by The Drainage and Irrigation Department (JPS), Weather Forecast and Tsunami Early Warning System by Meteorological Department, and Air Pollutant Index (API) by Department of Environment. The UPM researchers also are moving forward in contributing the disaster management such as Emergency Communication Setup and the project on the Application of Flood Warning System and Disaster Management in Malaysia by Wireless and Photonic Network Research Centre.

"Apart from that, the National Security Council (NSC) also coordinates disaster management in accordance with Directive No. 20, the "Policy and Mechanism on National Disaster Relief and Management."

All in all, back to our main concern on Malaysia disaster management: Are we good enough?. Yes, local researchers and experts are working together to make sure that we are well prepared for the unpredictable disaster happenings. In this issue, Synthesis will highlight some of the interesting topics on Flood Management, Innovations on Disaster Management, and so on. We are hoping that Malaysia will always be the safest place for the global community.

Prof. Dr. Mohammad Hamiruce Marhaban
Director
Research Management Centre(RMC), UPM
Tel: +603 – 8947 1610
E-mail: mhm@upm.edu.my

Governance of Flood Disaster Management: Malaysian Case Study

(Muhamad Hanafiah Juni, Saifulsyahira Jaaman, Ahmad Farhan Ahmad Fuad, Edre Mohammad Aidid)

Flood is a yearly event and the most devastating natural disaster experienced in Malaysia. Throughout Malaysia, including Sabah and Sarawak, there is a total of 189 river basins with the main channels flowing directly to the South China Sea and 85 of them are prone to recurrent flooding. The estimated area vulnerable to flood disaster is approximately 29,800 km2 or 9% of the total Malaysia land area, and is affecting almost 4.82 million people which is around 22% of the total population of the country (Department of Irrigation and Drainage Malaysia, 2009).

Government has established the Natural Disaster Management and Relief Committee (NDMRC) in 1972, hence given the task of coordinating flood relief operations at every stage of national, state and district levels with the combined aims of reducing flood damage and preventing the loss of human life. Flood disaster management in Malaysia is based on the National Security Council (NSC) Directive No.20 and Fixed Operating Regulations (PTO). These are outlining the aims of Policy and Mechanism on Disaster and Relief Management. This directive also describes the purpose of responsibilities and determining how the various agencies should be involved in disaster management. In the directive the policy was mentioned in general for all kind of disaster to have an integrated system of disaster management with emphasis on the concerted and coordinated actions.

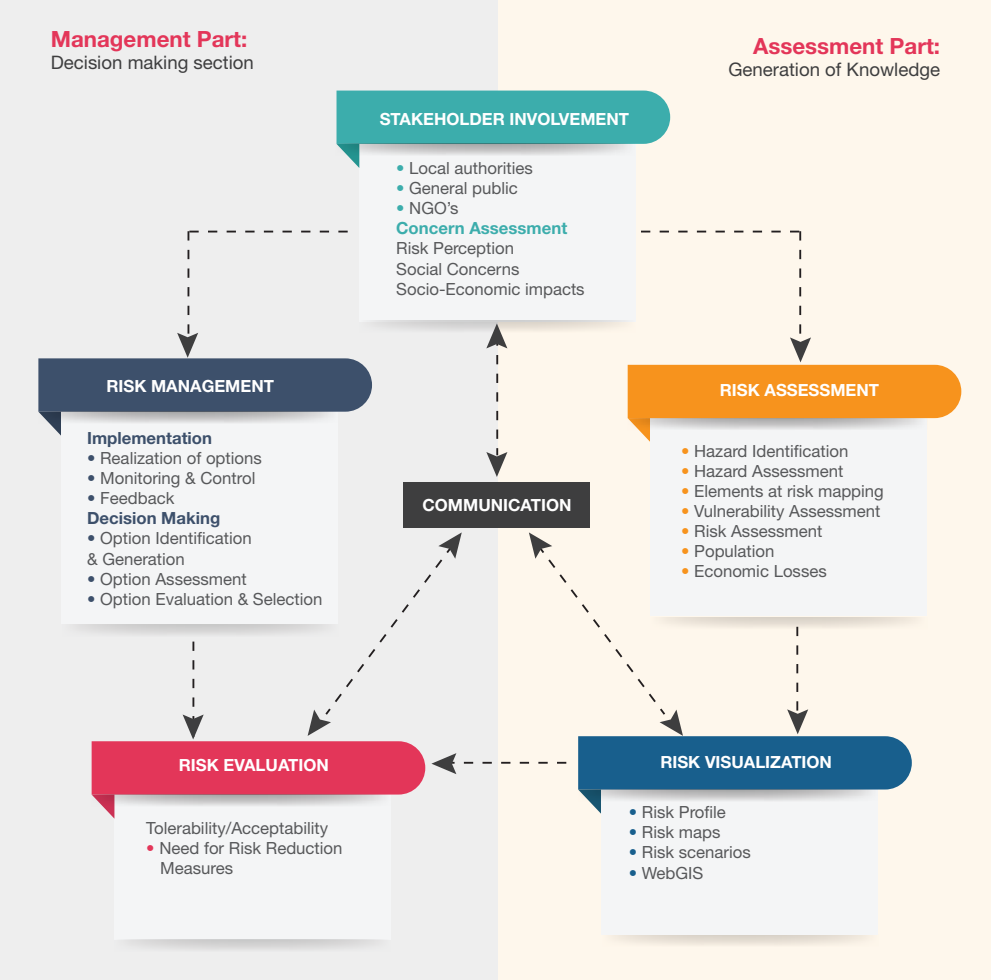


Figure 1 Disaster Governance Framework

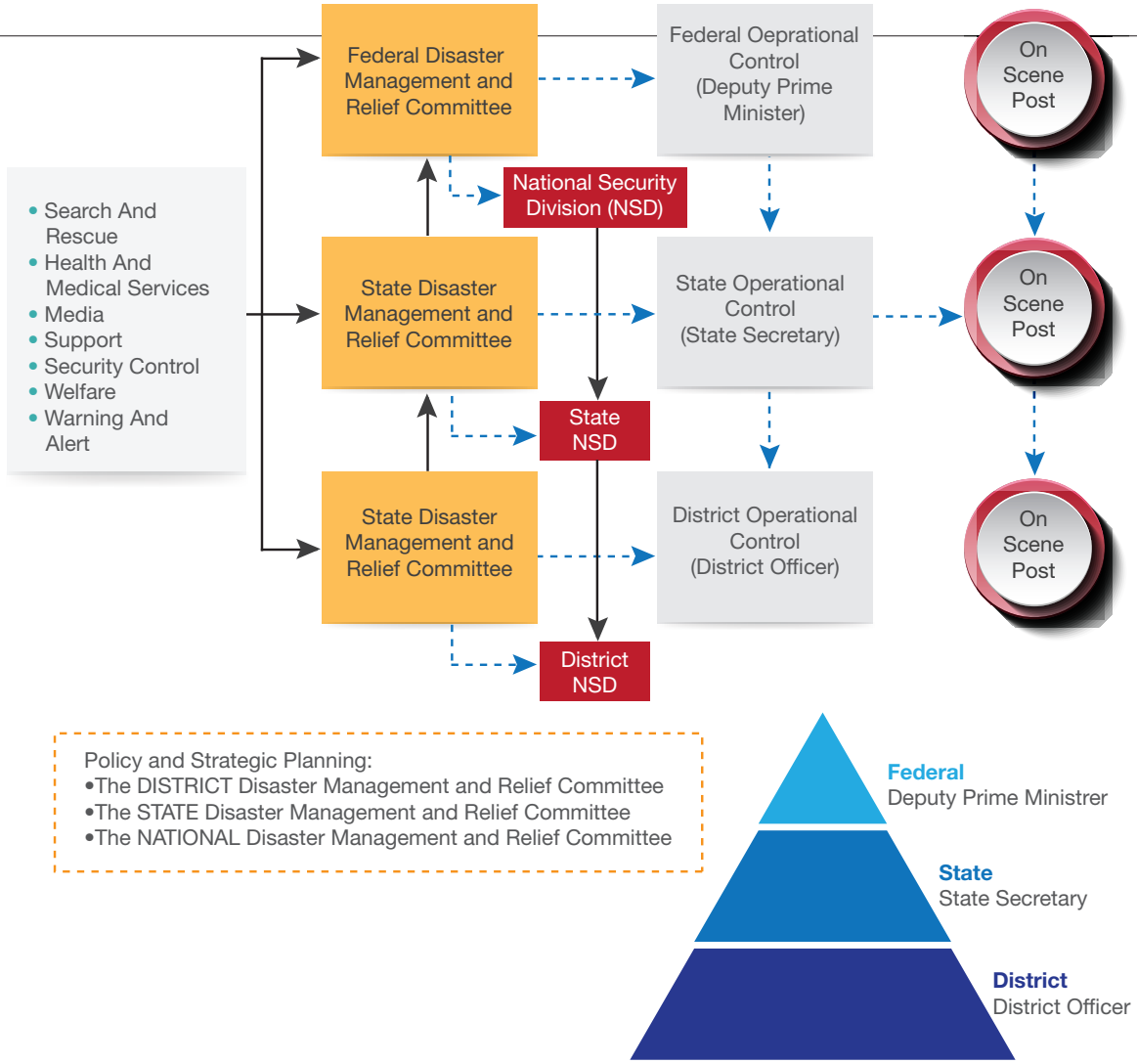


Figure 2 Malaysia Disaster Management Structure

> "Flood disaster management in Malaysia is based on the National Security Council (NSC) Directive No.20 and Fixed Operating Regulations (PTO). These are outlining the aims of Policy and Mechanism on Disaster and Relief Management."

Federal Legislation and States Enactments direct or indirectly enforce in flood management such as the Environmental Quality Act (EQA) 1974, National Land Code 1965, Water Act 1920 (Revised 1989), Drainage Works Act 1954, Local Government Act 1976, Street, Drainage and Building Act 1974, Town, Country and Planning Act 1976, Environmental Quality Act 1974 and Land Conservation Act, 1960. These Legislation or Enactments exist to serve the Federal and State Government for control of the resources and developments within their states. The custodian of these laws is not that of one Government department only, but designated to many different departments, each with its own responsibilities and functions. Therefore Malaysia flood governance entails the need of a coordinated system in dealing with this natural disaster. It is a crucial chain which connects the authority and the community. Lacking of proper governance has possibly led to flood victims facing same problems every year. However, Kemaman District in Terengganu has come up with a standard operating procedure in flood management, which is integrated and coordinated flood governance in mind. This template has been proposed to be a decentralized and coordinated national level flood governance.

Assoc. Prof. Dr. Muhamad Hanafiah Juni

Health Services Management Unit
Faculty of Medicine and Health Sciences, UPM
Tel: +603 - 8947 2419
E-mail: hanafiah_juni@upm.edu.my

Wireless and Photonic Networks

Wireless and Photonics Network Research Centre (WiPNET), Universiti Putra Malaysia is one of Malaysia leading centres for communication networks and was established in 2008. Appointed as the National Centre of Excellence for Sensor Technology (NEST) by the Malaysian Government, WiPNET embarks upon research, consultancy and education on the most advanced communications technologies, encompassing both wireless and photonics.

WiPNET focuses on the end-to-end communication network solutions, starting from the fundamentals of material, sensor nodes, right up to system development. These solutions are deployed in critical fields such as telecommunication, agriculture, food analysis, biomedical and environmental monitoring. The group makes significant scientific findings in functional nanomaterials, optical fiber and wireless devices, broadband communication networks and satellite systems. It produced more than 70 postgraduates and published over 480 articles in prestigious journals and conferences from 2011 to 2016. WiPNET also secured approximately RM5.5 millions funds and generated seven patents during the period.

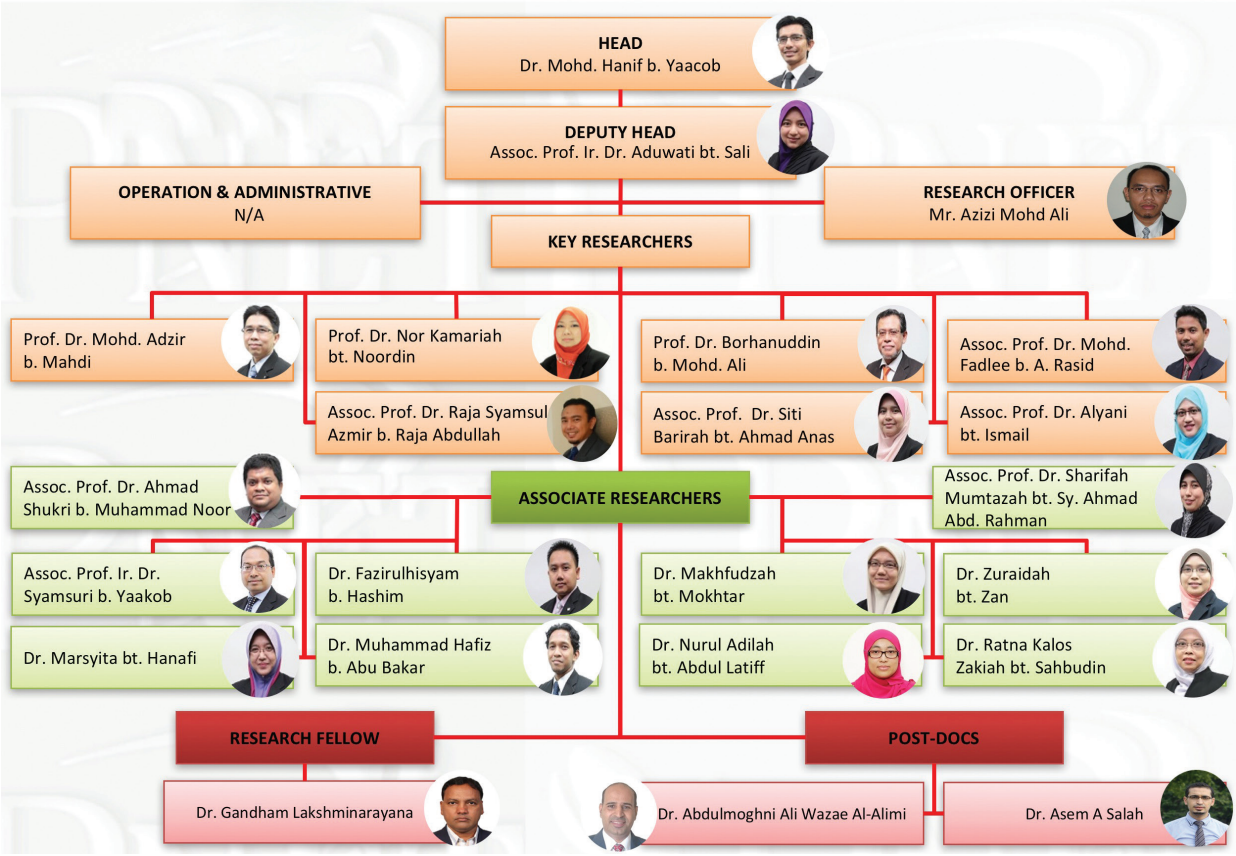
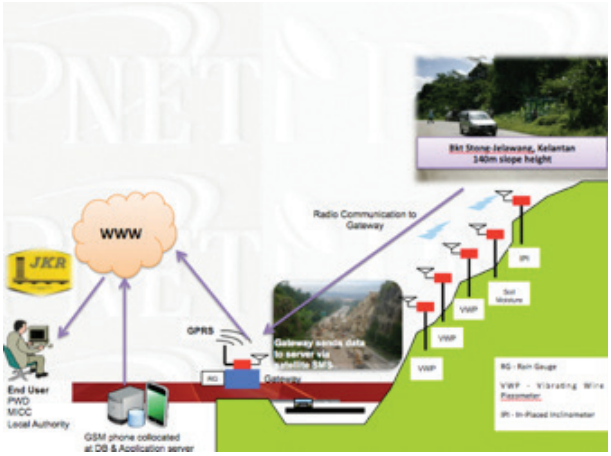


Figure 3 WiPNET Structure

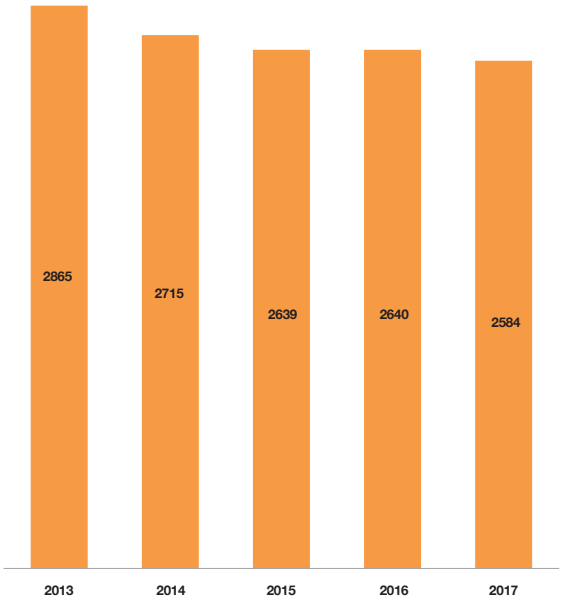
WiPNET Wireless Sensor Network Based Slope Monitoring System

WiPNET has successfully implemented environmental-related projects to design, develop, deploy and evaluate of WSN system for slope health monitoring and slope disaster detection. The system consists of geotechnical sensors including vibrating wire piezometer, rain gauge, soil moisture and in-place inclinometer connected to sensor nodes within WSN cloud to provide real time and ubiquitous monitoring. The system assists the authorities in efficiently managing slope related risks. The system was deployed in several sensitive hillslopes close to dense population and main roads in Klang Valley and Cameron Highland.



Do You Know?

Statistics of UPM Publications in Scopus (Doc. Types: Article, Review, Article in press) (*Source: Scopus*)



Statistics of Publications in Scopus (Doc. Types: Article, Review, Article in press.

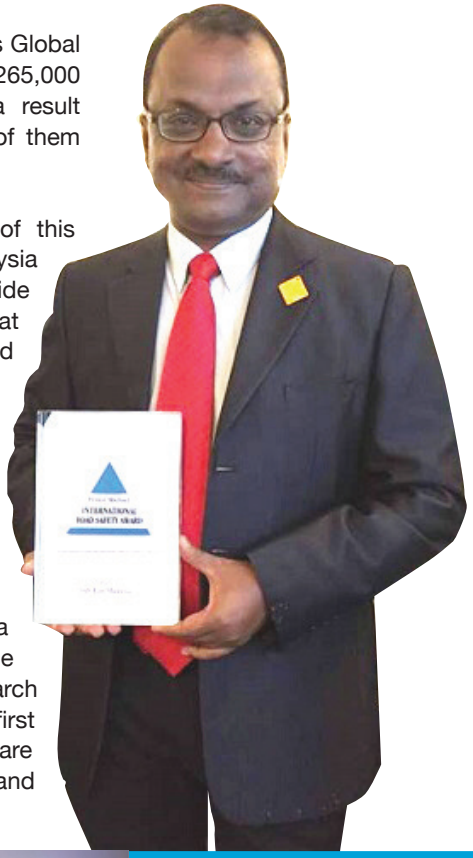
WiPNET Outreach Program

WiPNET educates the public via some outreach programs such as 'Ericson -Reforestation of Mangrove with schools in Perak and 'Emergency Communication Setup' with school prone to flood in Kelantan.

Dr. Mohd. Hanif Yaacob
Head
Wirelesss and Photonic Networks (WIPNET) Research Centre, UPM
Tel: +603 - 8946 4345
E-mail: hanif@upm.edu.my

Safe Kids Malaysia

According to the World Health Organization's Global Burden of Disease, it is estimated that 265,000 childhood deaths worldwide occur as a result of fire-related burns each year, with a majority of them occurring in low- and middle-income countries.



Recognizing the need to increase awareness of this global public health issue, today Safe Kids Malaysia Universiti Putra Malaysia (UPM), Safe Kids Worldwide and Honeywell (NYSE:HON) launched Safe Kids at Home, an educational safety program designed to help prevent fires, burns and scalds among children ages 7 to 12 years old. The program is supported by Honeywell Hometown Solutions, the company's corporate citizenship initiative that focuses in five critical areas; family safety and security, science and math, housing and shelter, habitat and conservation and humanitarian relief. The program was developed based on the findings of a 2016 survey conducted by Safe Kids Malaysia and Universiti Putra Malaysia (UPM), one of the country's leading research universities. A new research report, How Safe is Your Home?. "Malaysia is the first country in ASEAN to launch the program and we are proud to partner with Safe Kids Malaysia UPM and Safe Kids Worldwide," said Greer of Honeywell ASEAN. Recently, Safe Kids Malaysia Universiti Putra Malaysia (UPM) won the Excellence in Communication Award, beating more than 400 coalitions from more than 30 countries and Prince Michael International Road Safety Award 2017 in London. Congratulations !

> "Malaysia is the first country in ASEAN to launch the program and we are proud to partner with Safe Kids Malaysia UPM and Safe Kids Worldwide"

Assoc. Prof. Dr. Kulanthayan K.C. Mani
Department of Community Health
Faculty of Medicine and Health Sciences, UPM
Tel: +603 - 8947 2398
E-mail: kulan@upm.edu.my

Water Safety Module

The knowledge of water safety must be widely spread especially due to a significant rise of drowning cases in Malaysia recently. The public must understand that water safety is not merely about having the ability to swim and that it can be learned anywhere, even for someone who does not know how to swim. For these reasons, Assoc. Prof. Dr. Tengku Fadilah Tengku Kamalden, from the Department of Sport Studies, Faculty of Educational Studies, Universiti Putra Malaysia (UPM) created the Certified Online Course (COC) Water Safety by them.

This bilingual online water safety course is convenient as participants can learn all about water safety without stepping a foot into a swimming pool, making the course accessible from any locations and at any time preferred by the participants.

The innovation created by the Certified Online Course (COC) Water Safety is also the world's first interactive online water safety course module utilizing the 'social learning' approach that allows direct interactions between students and the experts or facilitators.

The project which began in July 2016 and completed in August 2017, has two copyrights and trademarks and four modules comprise the following four titles: water safety, security near water, water safety rights and let's be skilful.

Assoc. Prof. Dr. Tengku Fadilah Tengku Kamalden

Department of Sport Studies
Faculty of Educational Studies, UPM
Tel: +603 - 89468155
E-mail: tengku@upm.edu.my

Are older people more vulnerable to long term impacts of disaster?

Natural disasters, as the greatest challenges for human societies, affect millions of people every year around the world. In this case, older adults are among the most vulnerable groups to the immediate impact of natural disasters. Several studies have found that physical well-being of older adults is more affected by natural disasters compared with their younger counterparts. Some previous studies reported that the older adults are more likely vulnerable to psychological problems. However, other studies found that the older adults are less vulnerable to psychological impacts of disasters compared to younger survivors.

There are two perspectives to explain older adults' reactive to stressful events, including disasters. First perspective includes the maturation inoculation theories. The maturation theory proposes that older adults are less

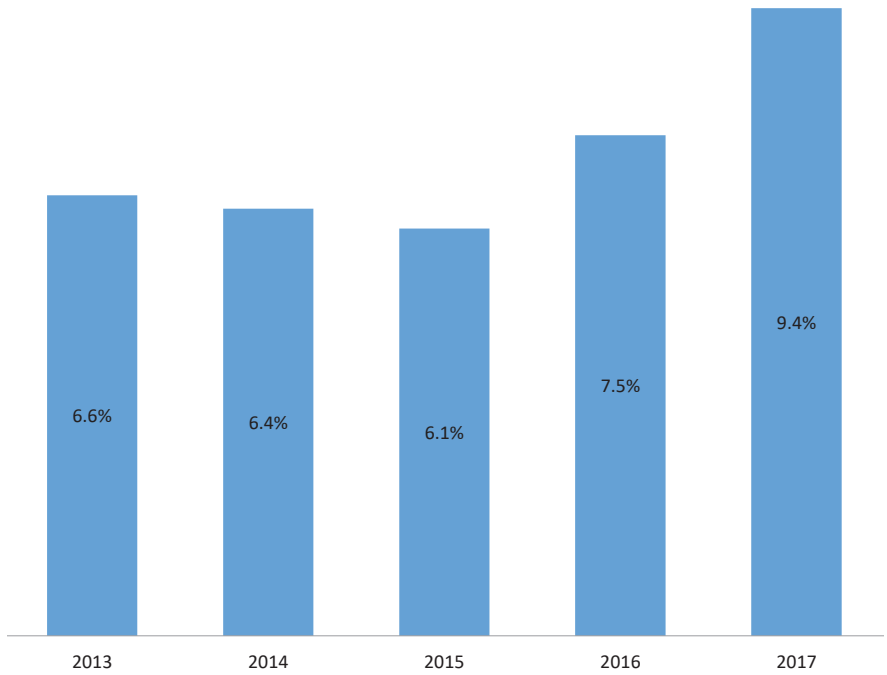
> "The findings from the current study supported some studies that found the older adults survivors were less vulnerable to psychological problems. For example, the results from a study conducted 18 months after the 1988 earthquake in Armenia showed that no difference was observed on psychological disorders between the older adults and younger adults."

Assoc. Prof. Dr. Sharifah Azizah Haron
Head
MyAgeing Laboratory of Social Gerontology
Malaysian Research Institute on Ageing (MyAgeing)
Tel: +603 - 8947 2754
E-mail: sh.azizah@upm.edu.my

> According to the resource theory, older adults are not easily able to recover because of lower socioeconomic status and weak functional capacity.

emotionally reactive to post-disaster distress. According to the maturation theory, older adults have more mature coping styles, which protect them against stressors. Therefore, older adults are less reactive to stressful life events. Additionally, the inoculation theory suggests that previous experience with disaster provides an inoculation against strong emotional reaction to similar disasters. The second perspective that claims older adults are more vulnerable to natural disasters than younger people includes the resource and exposure theories. According to the resource theory, older adults are not easily able to recover because of lower socioeconomic status and weak functional capacity. Similarly, the exposure theory argues that older adults are not easily aware of the disaster signal; therefore, they are more likely to experience a greater sense of deprivation resulting from their losses

The findings from the current study supported some studies that found the older adults survivors were less vulnerable to psychological problems. For example, the results from a study conducted 18 months after the 1988 earthquake in Armenia showed that no difference was observed on psychological disorders between the older adults and younger adults. Similarly, the results of an epidemiological study conducted after Hurricane Honduran revealed that the older adults survivors were at equal risk of developing psychological problems as the younger survivors Contrary to some commonly held beliefs that aging is associated with increased dependency, loss of self-control, ailment, incapacity, disengagement from life, and social isolation that may prone them more vulnerable to life crises, the results of our study showed that older adults earthquake survivors have a higher positive mental health compared with their younger counterparts in the wake of natural disasters. According to the present study, it can be concluded that advancing age per se does not contribute to increasing vulnerability.



Do You Know?

Percentage of UPM Publications in Top 5% Journal Percentile (*Source: Scival*)

■ Percentage of UPM Publications in Top 5% Journal Percentile

REMDII

AS there is no cure for eczema, treatment of the condition may prove to be challenging for many. However, eczema can be properly managed and controlled with a good moisturisation regime and proper medical advice.

This innovation produced tocopherols and carotenoids, which are a pro-vitamin A, from a natural source, and that natural source is red palm oil.

REMDII Sensitive is a smart emollient that has been formulated to help alleviate the symptomsof eczema. It is a preservative-free deep moisturising cream that contains anti-inflammatory bioactives. It has the full spectrum of tocopherols and tocotrienols complementing with other ingredients in a balance blend to repair despaired skin conditions without involving the use of steroid. Tocotrienols are one of the two forms of vitamin E, with the other being tocopherols.

Tocotrienols had very good anti-inflammatory properties, but it has always been used for cardiovascular diseases, cancer, etc. This innovation produced tocopherols and carotenoids, which consist of, pro-vitamin A, from a natural source, and that natural source from is red palm oil.

The bioactive ingredients in the REMDII's formulation are specially engineered to be dynamically acting on the troubled skin. The bioactives which is full spectrum vitamin E,carotenes and vitamin C are selected from the most sustainable and reliable sources to ensure that the highest level of product's functionality can be achieved. Then, the bioactives is carefully processed with standardized nano-processing conditions to turn the ingredients to the nano-size range so that they can penetrate the skin layers easily and reside at just the right position under the epidermis layer. The bioactive that successfully penetrate into the dermis layer will start acting synergistically to protect and repair the skin. The protected skin will be less prone to the challenges exposed to the environmental stresses including of moisture loss, photo-destruction, microbial invasion and etc.

Prof. Dr. Lai Oi Ming
Department of Bioprocess Technology
Faculty of Biotechnology and
Bimolecular Sciences. UPM
Tel: +6 03-8946 7520
E-mail: omlai@upm.edu.my

Licensing Company
Lipidware Sdn. Bhd.
Mobile
011-1620 0826
(Dr. Lai Wee Ting)
012-3095000
(En. Hisham)
E-mail
lipidware@gmail.com

For more information on innovation and commercialization, contact us at:
Putra Science Park
Office of the Deputy Vice Chancellor
(Research and Innovation)
Universiti Putra Malaysia
43400 Serdang, Selangor, Malaysia
Tel: 0389471254
http://www.sciencepark.upm.edu.my | promosi@upm.edu.my

Lecturers Won National Academic Awards (AAN)

PUTRAJAYA, November 3, 2017 – Two Universiti Putra Malaysia (UPM) researchers were awarded the *Anugerah Ahli Akademik Harapan* at the 10th National Academic Award (AAN) held in Putrajaya Grand Ballroom, Hotel Marriot Putrajaya, IOI Resort City.

Dr Mohd Yusof from the Faculty of Economics and Management, UPM received the Award for Publication of Article in a Journal (Social Science & Arts) while Assoc. Prof. Dr Lim from the Faculty of Science, UPM received the Award for Most Promising Academician.

According to Dr Lim Hong Ngee, the research has come to fruition as it resulted in a spin-off company, GO Advanced Solutions Sdn. Bhd., selling graphene oxide and other graphene derivatives, and providing consultations and solutions pertaining to the use of grapheneous materials for a myriad of utilizations.

Anugerah Ahli Akademik Harapan is aimed at recognizing academicians with the ability to perform and develop their skills under the age of 40. The recipient of the award is an academician who exhibits the potential of teaching and learning as well as research, outstanding performance, leadership and teamwork at the national or international level. Candidates can only accept this award once

It was in 2006, the National Academic Award (AAN) was introduced by the Ministry of Higher Education (MOHE) which fully recognizes the success of Malaysian scholars.

Prof. Ali received Malaysian Society for Microbiology (MSM) award

BANGI, December 6, 2017 – Prof. Dr. Mohd Ali Hassan was awarded the Malaysian Society for Microbiology Award 2017 at the International Congress of the Malaysian Society for Microbiology (ICMSM) 2017 Dinner and Malaysian Society for Microbiology Award Ceremony.

Prof. Dr. Ali, who is the Head of Industry and Community Relations in Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia (UPM), was honoured for actively conducting research with microorganisms in agriculture at both national and international levels.

Besides being an active member of the association, he used to hold the position of the president between the years 1999-2002.

Dr. Zetty granted with 2017 Merdeka Award Grant

KUALA LUMPUR, Dec 13 2017– Dr. Zetty Norhana Balia Yusof, 35 who is a lecturer at the Biochemistry Department of Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia (UPM) had been selected among the three recipients of 2017 Merdeka Award Grant for International Attachment due to an outstanding research proposal.

Dr. Zetty research focuses on exploring the potential of Malaysian seaweeds as the alternative control basal stem rot (BSR) disease that significantly reduces palm oil yield produced by a fungus known as Ganoderma boninense.

As the Royal Patron of the Merdeka Award Trust, Sultan of Perak, Sultan Nazrin Muizzuddin Shah presented the award here at the Petronas Twin Towers.

The three recipients of the grants received a short-term attachment to take part in the collaborative programmes or projects of up to three months at internationally recognised host institutions, agencies, organizations and corporations to develop their research and learning knowledge in pursuing excellency in their particular fields.

"The three talented young Malaysians with pioneering spirit will be able to make the best use of the opportunity to engage with the world's best experts, collect valuable insights for their fields research and develop solutions for the people" – said Sultan Nazrin.

It was in 2012 that the Merdeka Award Grant launched and with this year's announcement, there were 11 young Malaysians who successfully established the grant with eight of them have already completed their international attachment.

UPM Lecturers Securing MCMC Internet of Things (IoT) Grants

PUTRAJAYA, January 4, 2017 – Two Universiti Putra Malaysia (UPM) researchers were awarded with the MCMC Internet of Things (IoT) grants amounting to RM250k held at MCMC Auditorium, Cyberjaya.

Out of 59 submissions, Assoc. Prof. Dr. Shaiful Jahari Hashim and Dr. Nurul Adilah Abdul Latif, both from the Faculty of Engineering, UPM were awarded with MCMC IoT grants for their 2 projects out of 5 approved projects which mostly from the industry.

Dr. Siti Aqlima at Antartica

KLIA, 3 Jan 2018 – Dr. Siti Aqlima Ahmad from the Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia (UPM) was fortunate to have the opportunity to fly to Antarctica with the aim to carry out the project research namely the "Bioremediation of Antarctic soils of Bernardo O'Higgins Station".

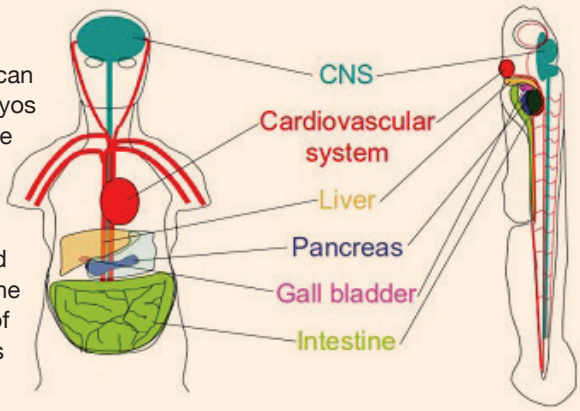
Bernardo O'Higgins Base is one of the main Chilean Antarctic bases located in the so-called Chilean Antarctic Territory, Region of Magallanes and Chilean Antarctica. Dr Aqlima wrote that "Among the activities within five weeks in Antarctica are the sampling, isolation and characterization of hydrocarbon-degrading bacteria especially diesel from Antarctic soil culminating in diesel biodegradation. This research will not only give a wide knowledge on the biodiversity of Antarctic but also on the potential use of psychrotrophic bacteria in treating hydrocarbon-contaminated sites specifically on those with diesel contamination, therefore contributing to the environmental sustainability on climate change.

Zebrafish, a Replacement for Lab Rat

Leader of a research team, Dr. Syahida Ahmad, from the Biochemical Department, Faculty of Biotechnology and Biomolecular Sciences, University Putra Malaysia (UPM) has proudly succeeded in developing easy-to-use, cost effective and fast kit for quick toxicity screening of chemicals or compounds using ornamental zebrafish. Danio Assay kit was developed by the unique properties of zebrafish or scientifically named as Danio rerio.

Compared with other animals such as mice, the zebrafish embryos can be used for testing by the researchers/ users which can save cost and deliver the results in a quicker time. Zebrafish or commercial name's Zebra Danio is a tropical freshwater fish belong to the family of Cyprinidae and native to the Himalayan region.

Female Zebra Danio can produce hundreds of embryos at a time compared with the rat that only produce a dozen per time. This can increase the number of tests, reduce the time and provide accurateness of the data. The gene sequences of the Zebrafish are similar as much as 80% to the human genes. Thus, zebrafish embryos can be used as a guide for studying the effects of chemicals/ drugs or water pollution on humans before birth until after birth.



New Synthesis Editorial Board

Synthesis

EXPLORING RESEARCH
INSPIRING INNOVATION

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Research Management Centre (RMC),
Office of the Deputy Vice Chancellor (Research & Innovation)
Universiti Putra Malaysia
Tel : +603 – 8947 1253
E-mail : dir.rmc@upm.edu.my

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43400 UPM Serdang
Selangor Darul Ehsan

Tel: 03-89468851/89468854
Fax: 03-89416172
E-mail: penerbit@upm.edu.my
Website: www.penerbit.upm.edu.my