



When IoT Meets Forestry: From NAPC to NET-PEAT to FFDS



Experience Sharing and Following-Up of Finished
Project



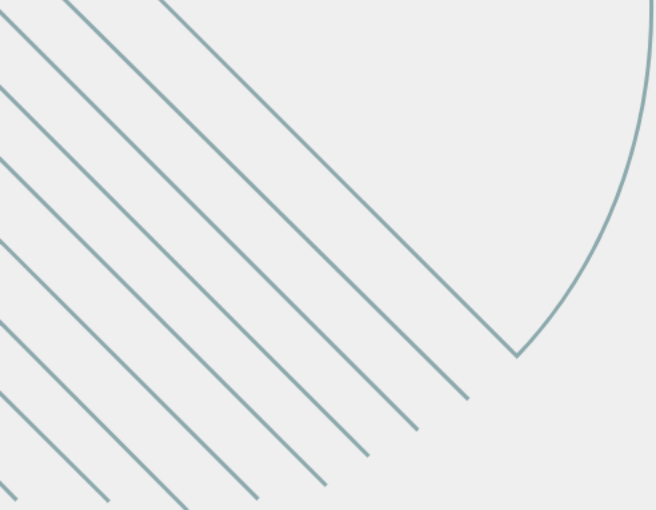
Prof. Ir. Dr. Aduwati Sali
Universiti Putra Malaysia (UPM)
aduwati@upm.edu.my



CONTENTS

1. Introduction
 2. Intellectual Property (IP)
 3. Awards and Recognition
 4. Newspaper Cutting/Publication
 5. Research Activities
- 

INTRODUCTION



CLEAN AIR IN ASEAN THROUGH IOT-BASED PEATLAND MONITORING

Red skies in Jambi caused by haze filtering out sunlight

ASEAN+

Monday, 23 Sep 2019

9:29 AM MYT



JAMBI: The skies turned red here on Sunday (Sept 22) due to the haze, caused by widespread forest fires, that has risen to the upper levels of the atmosphere, reports *Sinar Harian*.

The Malay daily reported that Indonesia National Board for Disaster Management information chief Agus Wibowo Soet had explained that the phenomenon, which was also known as "Rayleigh Scattering", was caused by the movement of haze away from hotspots.

Indonesian astronomer Marufin Sudibyo also explained that the skies did not turn red because of a sudden increase in temperatures.

"Rayleigh Scattering happens when sunlight is dispersed by smoke, dust or airborne particles that filter shorter wavelengths and release longer wavelengths that are in the orange or red spectrum, making the area appear to be dim and red," he said.

Marufin also told *Sinar Harian* that in the Jambi situation, the density of the micro- and nano-particles in the air was large enough to make it much more dense than the normal atmosphere.

However, he stressed that the phenomenon did not have any adverse effects on human vision.

Haze: Still no respite for Malaysians

NATION

Monday, 23 Sep 2019



PETALING JAYA: There is no respite for Malaysians from the haze, as many areas are recording polluted air levels or are at the brink of breaching the "unhealthy" mark.

This is despite forecast that the haze may lift soon.

The geographical scope of the haze has widened, with more parts of the country experiencing polluted air.

As of 5pm yesterday, the number of areas with high API readings across the country rose to 45.

This was a stark contrast to only 18 areas which were classified as having unhealthy or very unhealthy API levels at 5pm on Saturday.

Very unhealthy air quality levels were recorded at Johan Setia in Klang (208) at 5pm yesterday, while Sri Aman peaked at 205.

NEWS NATIONAL

To blunt impact of forest fires, Brunei to introduce new law to tackle open burning

Incidents of open burning recorded daily in past year

Wardi Wasil

© AUGUST 5, 2019



Firefighters extinguish fire on peat land forest in Central Kalimantan during Indonesia's worst bout of haze in 2015. The fires were lit by companies clearing vast tracts of land for plantations. Photo: Romeo Gacard/AFP



BANDAR SERI BEGAWAN – Brunei is set to introduce a law that will tackle "rampant" open burning in an effort to mitigate bush and forest fires.

HEALTH IMPACT DAN SDG

Environmental Impact

Peatland forests are the largest **carbon storage**

Forest fire was predicted to burn peat to a depth of 100cm and produced **CO2 emissions** of 6,355,809 tons/ha [1]

Health Impact

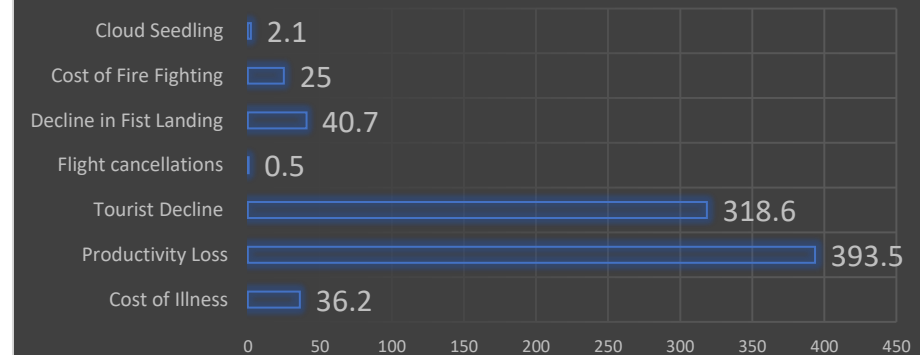
Air pollution can lead to [3]:

- Memory loss
- High blood pressure
- Respiratory illness (asthma, pneumonia)
- Risk of lung cancer in non-smokers

Economic Impact

In 2015, fire and haze cost in Indonesia: **USD16.1 billion** - twice the cost of reconstruction following the 2004 tsunami [2]

Estimated Aggregate Incremental Cost of the Haze Damage in Malaysia in 1998 RM (million)



[1] Ambar Tri Ratnaningsih and Sri Rayahu Prasetyaningsih 2017 IOP Conf. Ser.: Earth Environ. Sci. 97 012029, 'The Characteristics of Peats and Co2 Emission Due to Fire in Industrial Plant Forests', <https://iopscience.iop.org/article/10.1088/1755-1315/97/1/012029/pdf>

[2] The Cost of Fire An Economic Analysis of Indonesia's 2015 Fire Crisis <https://documents1.worldbank.org/curated/en/776101467990969768/pdf/103668-BRI-Cost-of-Fires-Knowledge-Note-PUBLIC-ADD-NEW-SERIES-Indonesia-Sustainable-Landscapes-Knowledge-Note.pdf>

[3] World Economic Forum https://www.linkedin.com/posts/world-economic-forum_air-pollution-affects-every-cell-in-the-human-activity-7105474950311878656-1Si?utm_source=share&utm_medium=member_desktop

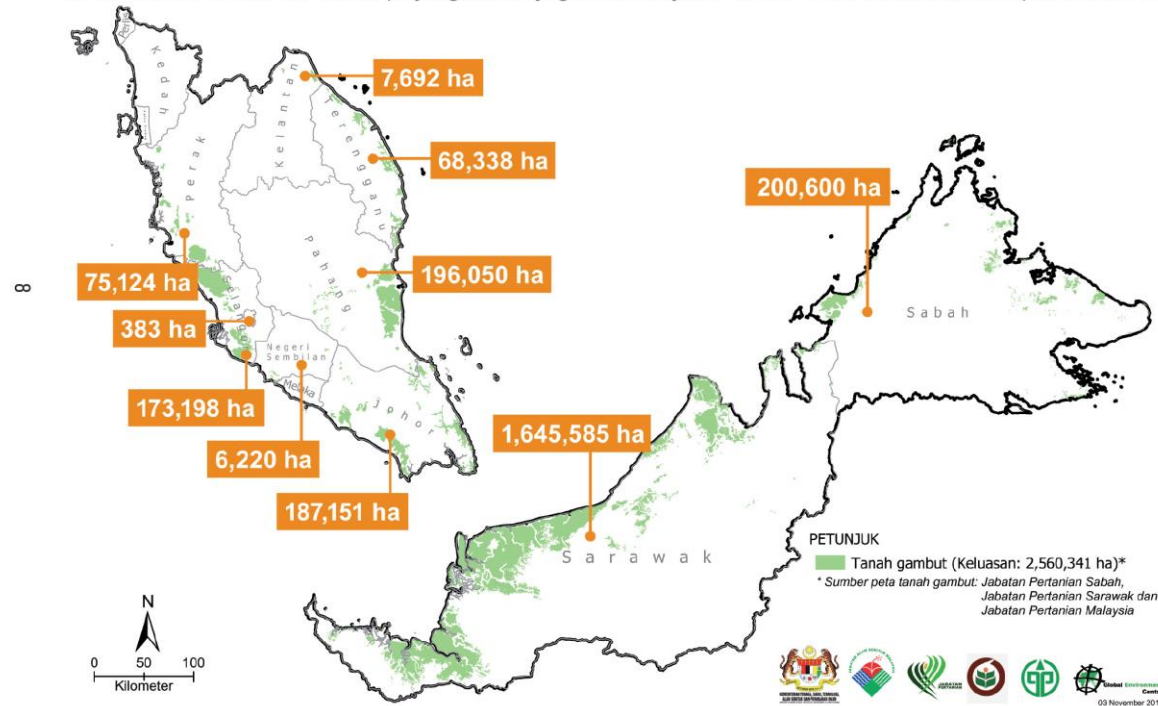


POLICY



TABURAN TANAH GAMBUT DI MALAYSIA

Malaysia memiliki kawasan tanah gambut seluas 2.56 juta hektar meliputi kira-kira 7.74% muka bumi negara ini manakala keluasan hutan paya gambut juga adalah jenis hutan kedua terbesar selepas hutan darat.



CASE STUDY: INNOVATION ON TECHNOLOGY-BASED PEATLAND MANAGEMENT

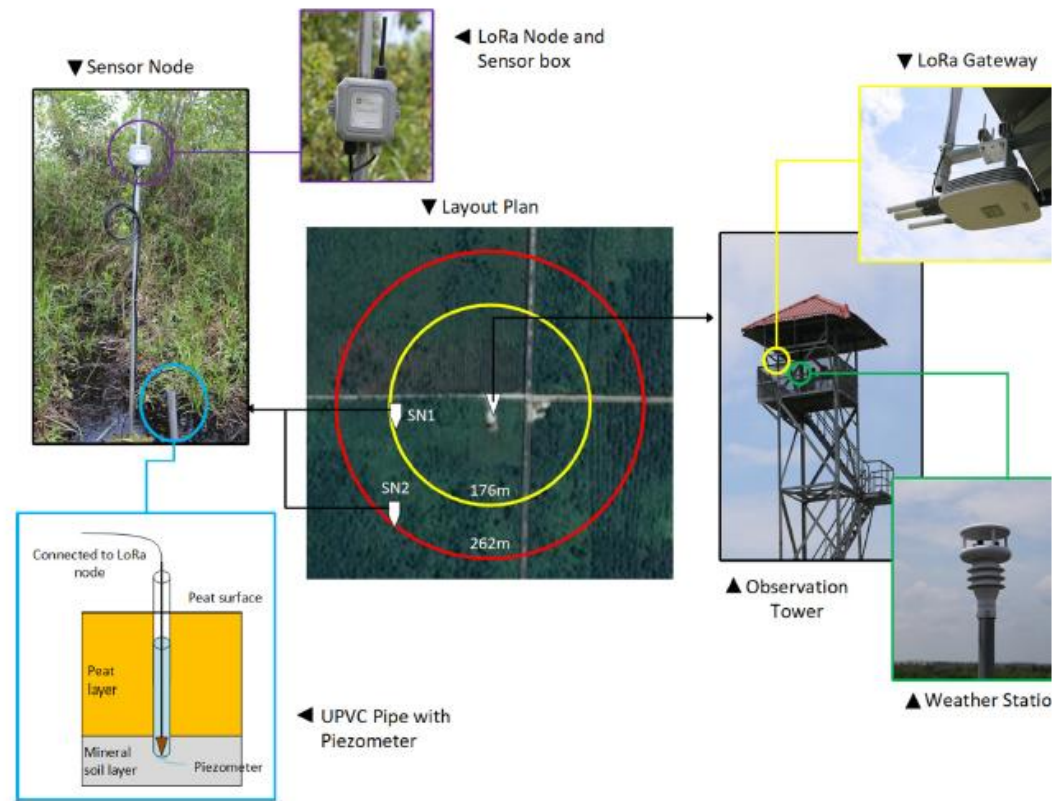


Fig. 1. Overall layout plan of the deployed IoT system, with each component highlighted.



HOW WE PROGRESSED

2018

NAPC: Networked ASEAN Peatland Forest Communities



2021

ASEAN-US Science Prize for Women 'Clean Air, Clean Water'

2022

NET-PEAT: Networked ASEAN Peatland Forest Communities for Transboundary Haze Alert



JABATAN HUTAN SARAWAK



2025

Forest Fire Detection System (FFDS).

2024

ITEX
MALAYSIA

Gold Medal, ITEX 2024



Jambi Indonesia

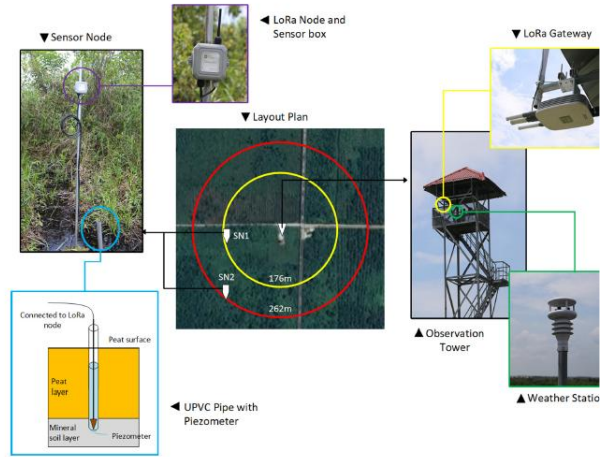
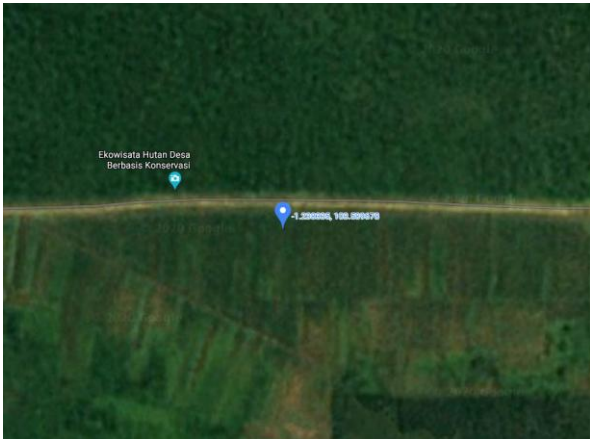
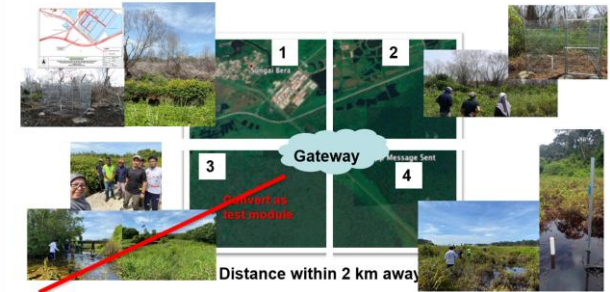


Fig. 1. Overall layout plan of the deployed IoT system, with each component hig

RMFR Malaysia



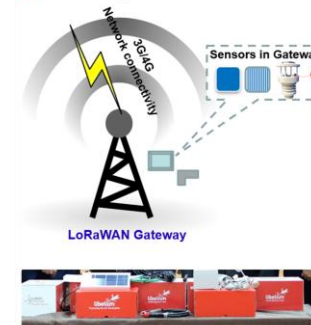
Deploy to 4 sectors with 4 sensor node station



Due to the harsh location we decided to convert node3 as our test module in the lab. If problem exist with any of our 3 other sensors we can replace and fix it without any further downtime.

Badas Brunei

Gateway location



NAPC AND NET-PEAT: IOT SYSTEM DEPLOYMENT

SUPPORTS SELANGOR FORESTRY DEPARTMENT FIRE MANAGEMENT SYSTEMS

Strengthen
Monitoring
systems

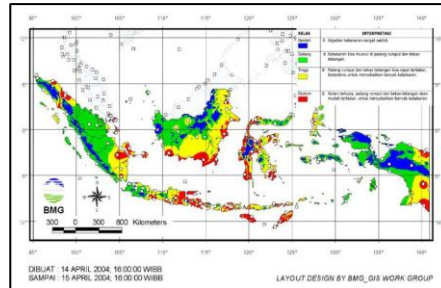
Early
Preparedness of
Suppression
team

Peatland Data
Analytics

Validation of
hotspots
information from
satellite

Strengthen JPNS
Suppression Team

Intensifying
restoration
activity



NETWORKED ASEAN PEATLAND FOREST COMMUNITIES

Peatland
forest fire
detection

LoRa
transmission for
Multiple Land
Use

Peatland Data
Analytics

Real time IoT-based
peatland monitoring

Alert system and
preparedness for
peatland forest fire

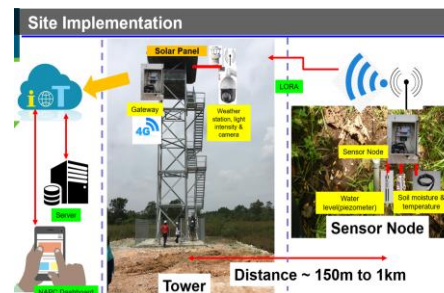
System deployed:
Jan 2020 (no fire
occurrence observed
at monitored plot)

Cost effective by
using LoRa
transmission
technology

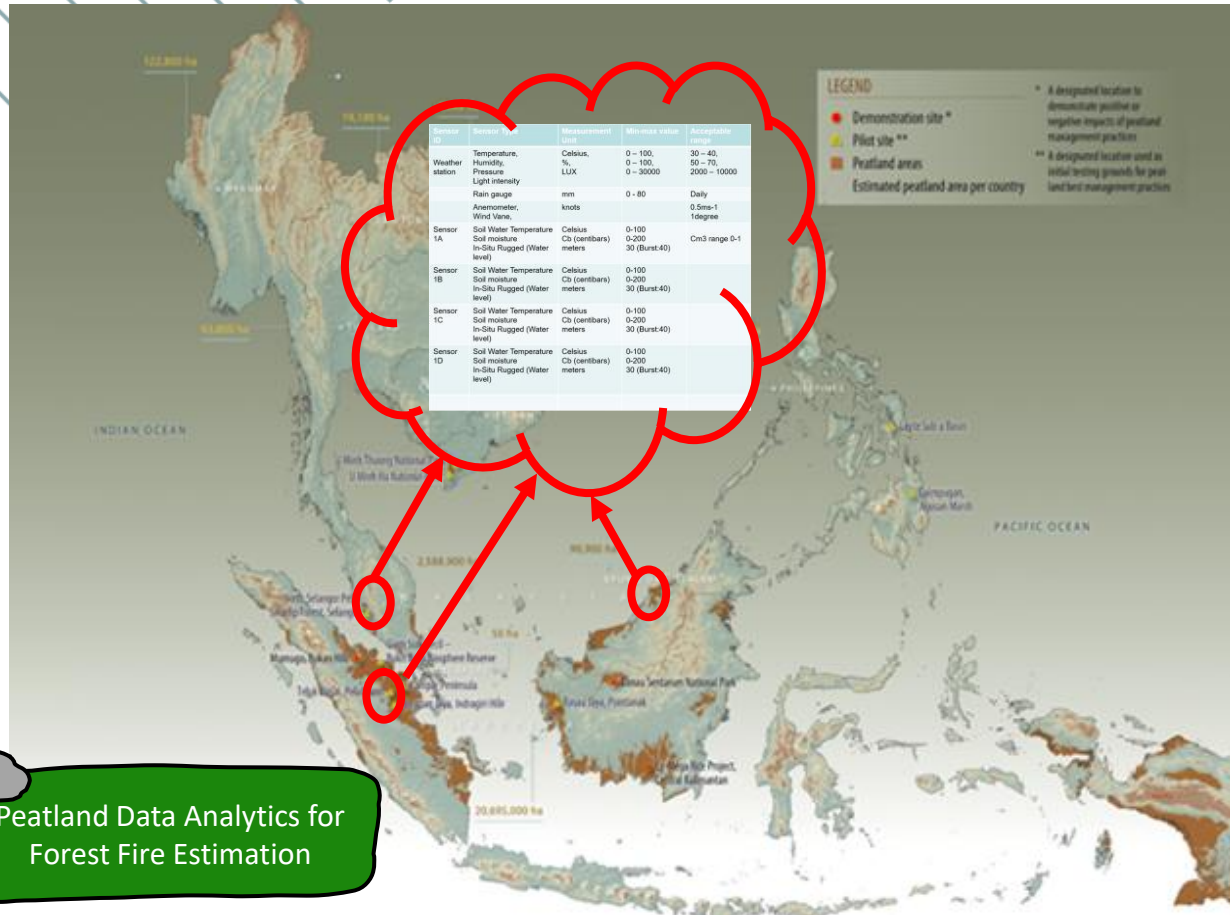
Cost of fire
suppression in
Selangor: Up to
RM1.5million/year

Estimation of
Ground Water
Level (GWL) in
peatland

Mitigation of
climate change
effects

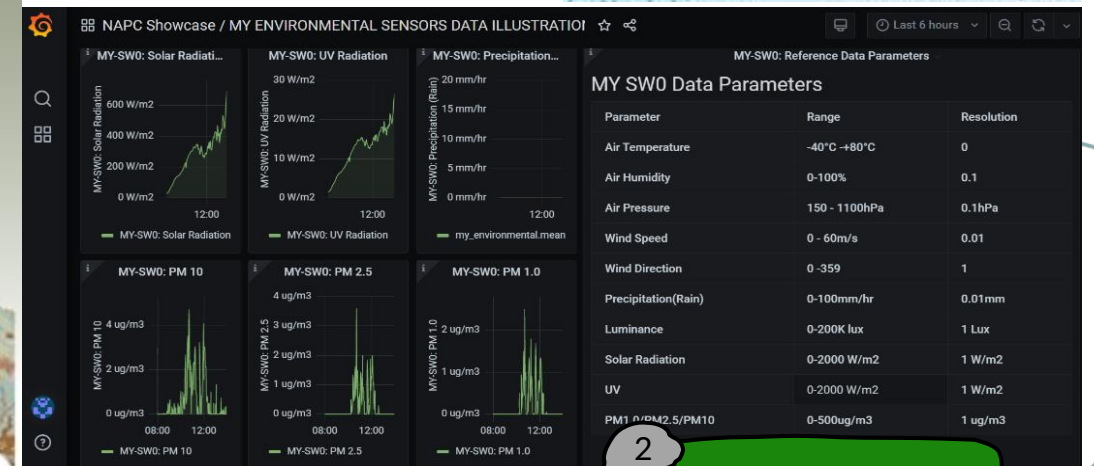
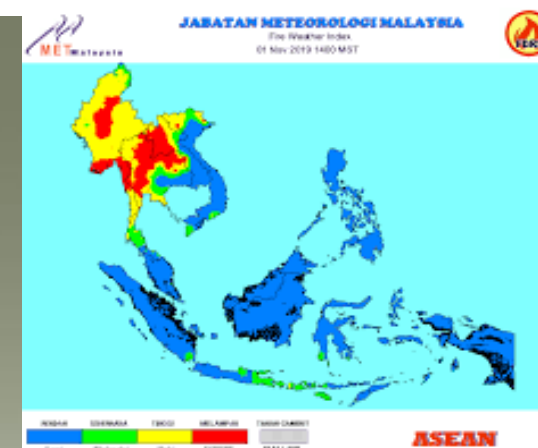


NAPC AND NET-PEAT



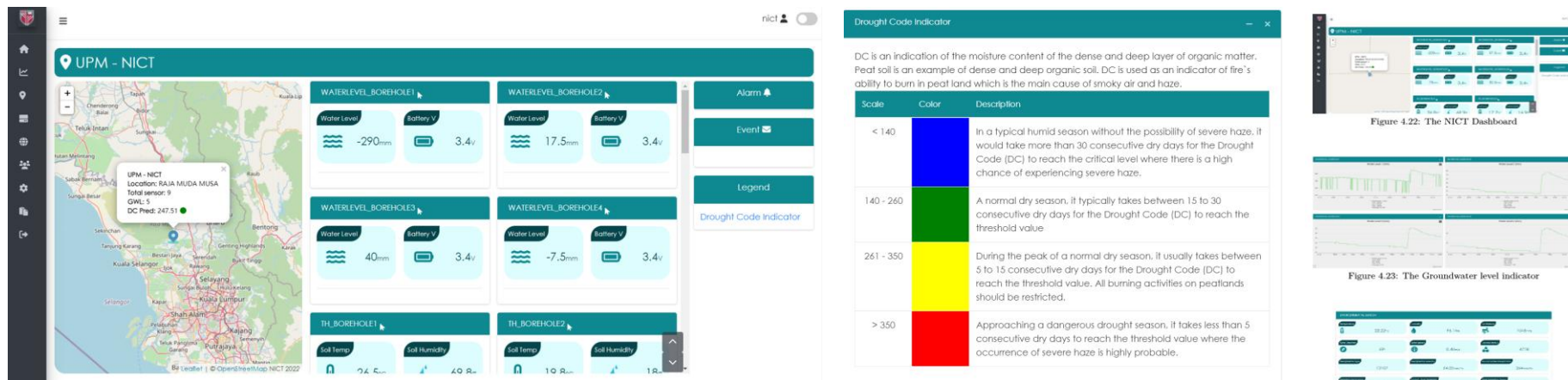
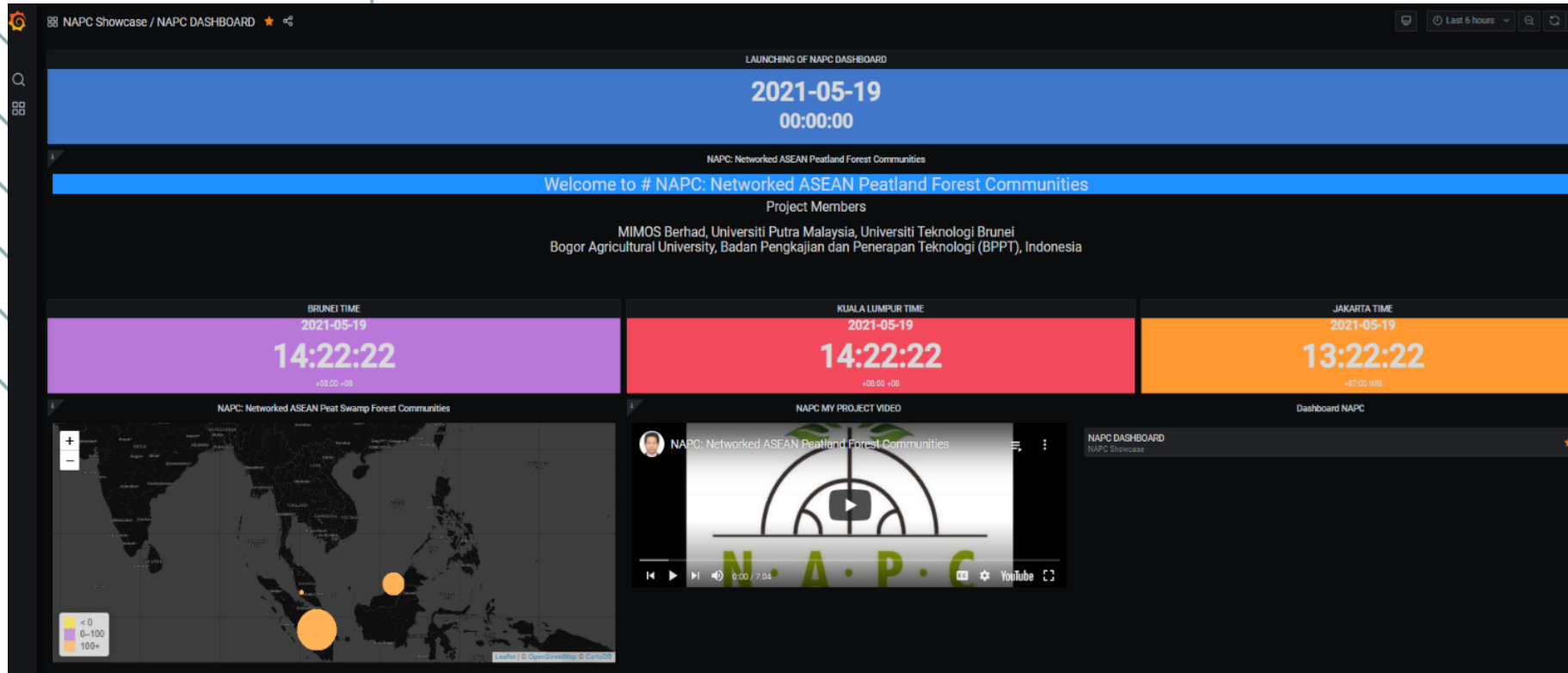
1

Peatland Data Analytics for Forest Fire Estimation



2

Integration with FDRS for Alert System



NAPC / NET-PEAT DASHBOARD

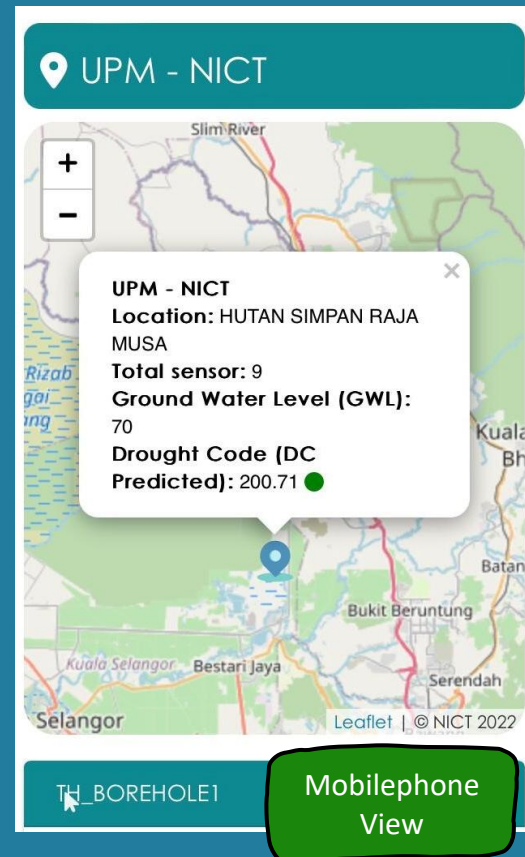


Figure 4.22: The NICT Dashboard



Figure 4.23: The Groundwater level indicator



Figure 4.24: The environmental information

FFDS: Forest Fire Detection System

Why Kuala Baram?

| Bushfire breaks out at Kuala Baram village, burns over 2 acres

BY KATRINNA MOON ON AUGUST 1, 2025, FRIDAY AT 11:57 AM

SARAWAK

For the freshest news, join [The Borneo Post's Telegram Channel](#) and [The Borneo Post on Newsday](#).



Photo shows the extent of last night's fire at Kampung Nelayan 5. – Bomba photo

MIRI (Aug 1): Firefighters successfully extinguished a bushfire that broke out in Kampung Nelayan 5, Kuala Baram here last night.

The Lutong fire station said an emergency call was received at 7.50pm.

MALAYSIA

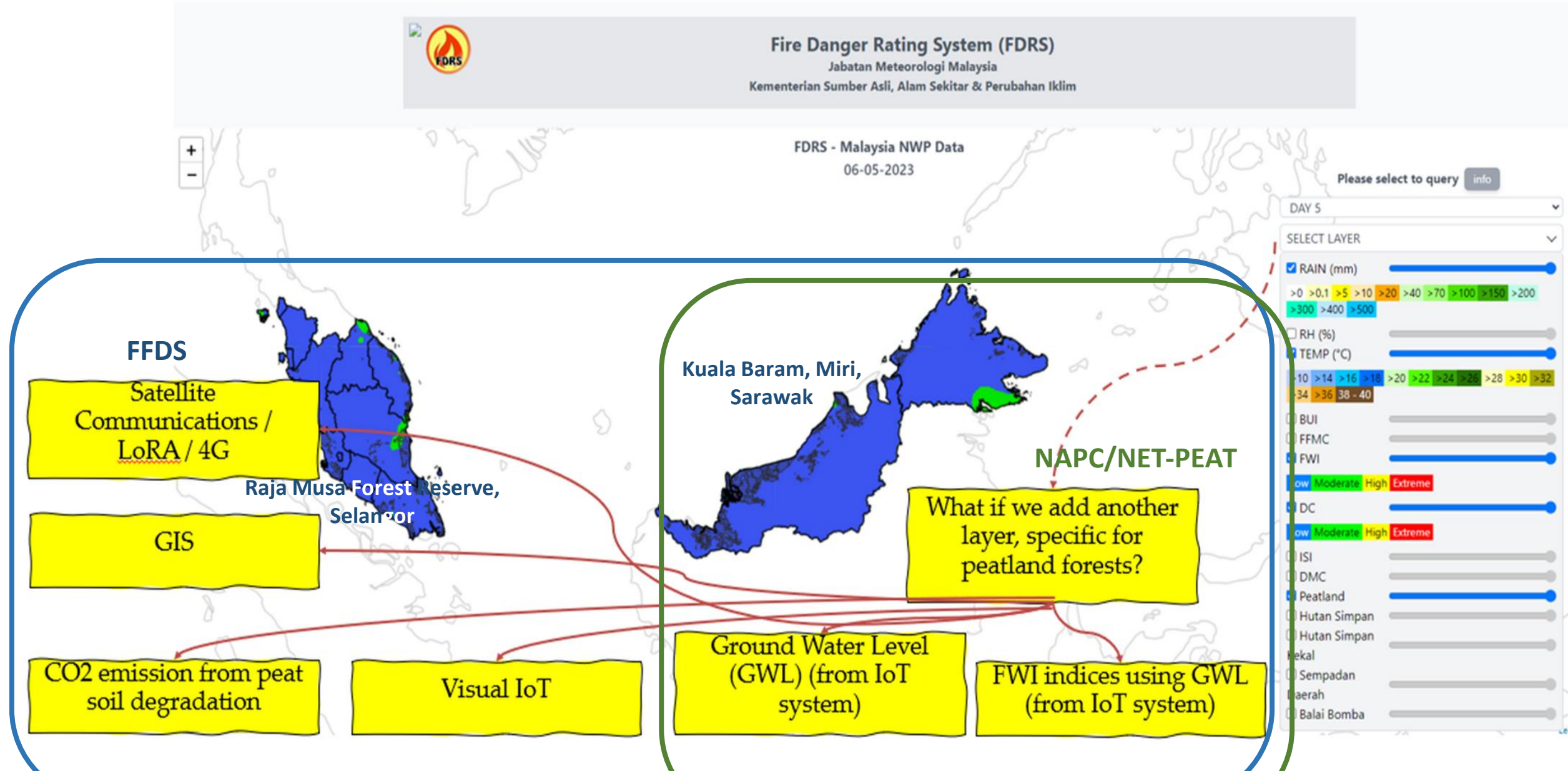
Continuous hot, dry weather sees 75ha of land in Kuala Baram burnt



Firefighters work to contain the fire in Kuala Baram. — Picture courtesy of Fire and Rescue Department of Malaysia



FFDS



FFDS: Forest Fire Detection System

Why Kuala Baram?



WHAT WE PITCHED

Peatland forest fire detection

Peatland forests are the largest **carbon storage**

Forest fire was predicted to burn peat to a depth of 100cm and produced **CO2 emissions** of 6,355,809 tons/ha [1]

In 2015, fire and haze cost in Indonesia: **USD16.1 billion** - twice the cost of reconstruction following the 2004 tsunami [2]

Technology can help with integrated peatland management

Cost-efficient **IoT system** using LoRA/4G/5G/satellite technology

Informed decisions with **big data analytics**

Mitigation of **climate change** effects

Comprehensive Geospatial and IoT Visualization

Remote sensing (**geospatial**) + visual + ground (**IoT**) data

Localised Fire Danger Rating System (**FDRS**) Indices



The background features several decorative geometric elements. In the top-left corner, there are thin, parallel diagonal lines. In the top-right corner, there is a cluster of overlapping semi-circles in red, teal, and blue. In the bottom-left corner, there is a larger cluster of overlapping semi-circles in red, teal, blue, and yellow. In the bottom-right corner, there is a large, faint circular outline and some thin diagonal lines.

PATENT/COPYRIGHT CERTIFIED

SCIENTIFIC CONTRIBUTION: INTELLECTUAL PROPERTY (IP) *[1 PATENT, 6 COPYRIGHTS]*

GIS Characterisation or Fire Weather Index (FWI) in Peatland Forest (Flowchart) - LY2024W08392

GIS Characterisation or Fire Weather Index (FWI) in Peatland Forest (Source code)- LY2024W08592

Patent "System and Method for Predicting Peatland Forest Fires - PI 2024003825

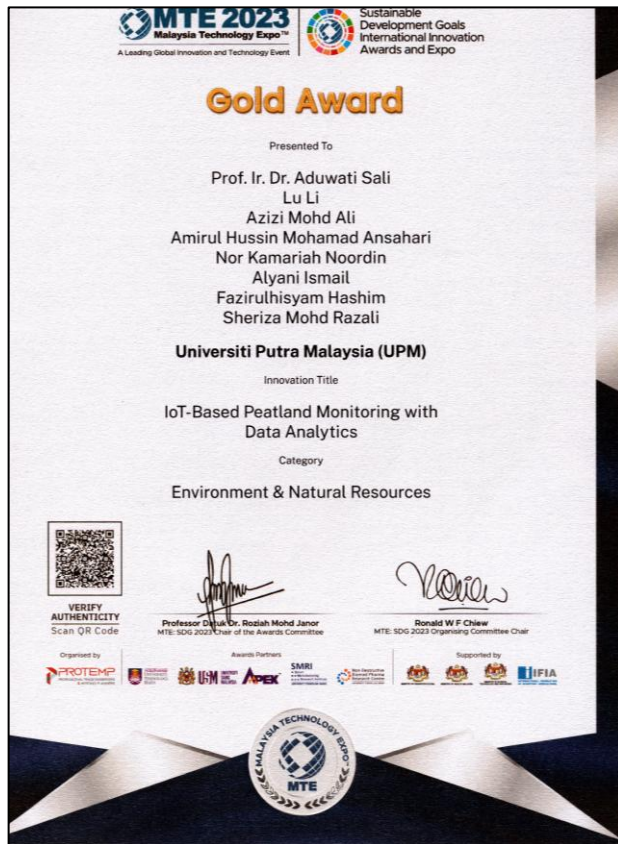
Copyright 'Sourcecode interface for Machine Learning (ML) Formulation to Predict Drought Code (DC)' – Source Code – LY2023W06590

Copyright 'Estimation of Ground Water Level (GWL) for Tropical Peatland Forest Using Machine Learning – Manual and Source Code' – LY2023W01545

Copyright 'LoRA Optimisation for Peatland Monitoring – Manual and Source Code' - LY2021W06024

Copyright 'Data Analysis for Peatland Monitoring – Manual and Source Code' - LY2021E06013

AWARDS AND RECOGNITION





U.S. Mission to Asean (USASEAN) ✓

5 Julai jam 11:21 PG · 🌐

Inspired by her sons' health issues with asthma, exacerbated by the annual haze in the region due to peatland forest fires, #Malaysia representative in the 2021 Science Prize for Women supported by USAID - US Agency for International Development and UL, Professor Aduwati Sali of Universiti Putra Malaysia, focuses her research on peatland monitoring and management to prevent the frequent haze pollution in the region.

Learn more about her work here: <https://bit.ly/3cu74Rt> ✓






ANUGERAH INOVASI NEGERI SELANGOR (AINS) TAHUN 2022

JOHAN

Pusat Penyelidikan Wireless and Photonics Networks Research Centre (WIPNET) dan Institut INTROP UPM

NAPC/NET-PEAT: Networked ASEAN Peatland Forest Communities for Transboundary Haze Alert



DISRUPT TODAY

JOHAN

facebook.com/engineeringupm @engineering.upm @facultyofengineering_upm Fakulti Kejuruteraan Universiti Putra Malaysia

PERTANIAN • INOVASI • KEHIDUPAN
BERILMU BERBAKTI
WITH KNOWLEDGE WE SERVE



PERTANDINGAN INOVASI TERBUKA MAJLIS PERBANDARAN SEPANG TAHUN 2022

JOHAN

KATEGORI PROTOTAIP

Tarikh: 22 08 22
RM 1,000.00

Bayar: PERTANDINGAN INOVASI TERBUKA MAJLIS PERBANDARAN SEPANG TAHUN 2022
Ringgit Malaysia: SATU RIBU RINGGIT SAHAJA

18 081985 12 0582 631315211 11




ANUGERAH INOVASI NEGERI SELANGOR TAHUN 2022

JOHAN

KATEGORI INSTITUT PENGAJIAN TINGGI

RM5,000.00

BAYAR PAY
RINGGIT MALAYSIA

TARIKH: 081022

PERTANIAN • INOVASI • KEHIDUPAN
BERILMU BERBAKTI
WITH KNOWLEDGE WE SERVE




Prof. Ir. Dr. Aduwati bt. Sali
Ketua Projek




ANUGERAH INOVASI NEGERI SELANGOR TAHUN 2022

JOHAN

KATEGORI INSTITUT PENGAJIAN TINGGI

RM5,000.00

BAYAR PAY
RINGGIT MALAYSIA

TARIKH: 081022

PERTANIAN • INOVASI • KEHIDUPAN
BERILMU BERBAKTI
WITH KNOWLEDGE WE SERVE

The background features several decorative geometric elements. In the top-left corner, there are thin, parallel diagonal lines. In the top-right corner, there is a cluster of overlapping semi-circles in red, teal, and blue. In the bottom-left corner, there is a similar cluster of overlapping semi-circles in red, teal, blue, and yellow. In the bottom-right corner, there is a large, faint, light-blue circular arc and some thin diagonal lines.

NEWSPAPER CUTTING/ PUBLICATION

SOCIAL INNOVATION AND PEER LEARNING

←

Khairy Jamaluddin ...
63.2K Tweets

⋮

Tweets

Tweets & replies

Media

Likes

↺

Khairy Jamaluddin 🇲🇾 🇸🇲 Retweeted

MIMOS Berhad @mimos... · 7h

UPM, MIMOS partner to develop IoT-based early warning system to curb peat fires. digitalnewsasia.com/digital-econom... [#technology](#) [#university](#) [#Collaboration](#) [#DNA](#) @officialmosti @Khairykj



UPM, Mimos partner to develop IoT-based early warning system to...

digitalnewsasia.com

1

11

17

🔗

SITUATION REPORT

MALAYSIA

GETTING TO THE ROOT OF PEAT FIRES

RESEARCHERS PROPOSE INCREASED COLLABORATION

BY MOHD ZAHIRASRI MOHD TOHIR AND DAYANG NUR SAKINAH MUSA

Peat fires in Malaysia have been an issue for several years, causing widespread destruction and threatening the environment and public health. The situation remains a major concern for policymakers, experts, and the general public.

In recent years, policymakers have implemented several measures to address the peat soil fire issue in Malaysia including the establishment of task forces, the development of early warning systems, and the deployment of firefighting resources. Additionally, efforts have been made to promote sustainable land use practices and reduce the risk of fires. However, challenges still need to be overcome to effectively implement these policies and address the root causes of the problem.

The Malaysian government introduced a national campaign in 2009 called the Peatland Fire Prevention Programme to promote sustainable land use practices and reduce the risk of peat fires. The program focuses on preventing fires by addressing the root causes of the problem, such as unsustainable land use practices, deforestation, and agricultural expansion. The program also aims to strengthen co-ordination and collaboration among various agencies and stakeholders, including the government, NGOs, and local communities, to prevent and respond to wildfires. Raja Musa Forest Reserve is an example of a recovering degraded area due to fire, and it has been reported that the peat condition has improved over the years through a rehabilitation effort.

PEAT FIRE ISSUES IN 2023

Weather events such as droughts and heatwaves can significantly impact the risk of peat soil fires in Malaysia. While it is difficult to predict exact weather patterns for 2023, experts suggest that climate change will continue to impact weather events, potentially leading to more severe droughts and heatwaves and, thus, a higher risk of peat fires. The government has implemented various strategies and measures to mitigate these risks and promote the wellbeing of the people. As of now, the government has been assisted local communities with monitoring and suppression. As an example, an initiative and innovation challenge to suppress peat fire, the X-Fire Challenge Finals competition, was held in 2022 and an invention by The Fire and Rescue Department of Malaysia won the competition (see photo page 29). The invented tool is able to spray water on the surface fire and flood the underground fire simultaneously which it is crucial to suppress underground burning during peat fires. The government has also invested in the health sector,



28

VALERE

Q2 2023

SITUATION REPORT

MALAYSIA

focusing on adapting to climate change. While the drought outlook for Malaysia in 2023 needs to be clarified, the country is taking steps to cope with the potential impacts of climate change on its economy, environment, and society.

RESEARCHERS' EFFORTS IN PEAT FIRE MITIGATION

Malaysia's peat soil fire issue is complex and multifaceted, with several challenges that must be addressed simultaneously. One of the biggest challenges is the need to address the root causes of the problem, including unsustainable land use practices, deforestation, and agricultural expansion. Additionally, there is a need to develop effective early warning systems, co-ordinate firefighting efforts, and invest in resources and personnel. This has prompted several researchers from Malaysia's Universiti Putra Malaysia (UPM), to venture into the research topic of peat fires. One of the current projects at UPM is the APT (Asia Pacific Telecommunity) NET-PEAT which is funded by the government of Japan. The project focuses on deploying Internet-of-things-based solutions at vulnerable peat swamp forests for fire monitoring (see photo 3). Another project is the fundamental study of peat fire suppression; this is an important topic to be studied because peat fires are difficult to extinguish.

The peat soil fire issue in Malaysia remains a significant concern for policymakers, experts, and the public. While there have been positive developments, more needs to be done to address the root causes of the problem and invest in effective measures to prevent and respond to wildfires. A collaboration between the government and researchers to achieve sustainable peatland resources and reduce peat fires should be enhanced. It is essential to prioritise this issue and work toward sustainable solutions that can protect the environment, public health, and livelihoods.

ABOUT THE AUTHORS

Mohd Zahirasri Mohd Tohir is a senior lecturer at the department of chemical and environmental engineering, Universiti Putra Malaysia, and the head of the Safety Engineering Interest Group (SEIG) fire safety division. He is a fire scientist who focused on the research of fire safety engineering and peat fires. Contact Zahir at zahirasri@upm.edu.my.

Dayang Nur Sakinah Musa is a PhD student at the department of chemical and environmental engineering, Universiti Putra Malaysia, she studies smouldering peat fire and suppression strategies in peat swamp forests. Contact Dayang at m.dayangnursakinah@gmail.com.



A recovering area of frequent peat fires in the Raja Musa Forest Reserve in Malaysia. Photo by Dayang Nur Sakinah Musa.

valerimagazine.org

VALERE

29

Borneo Bulletin

THURSDAY, MAY 21, 2020

13

Lifestyle

Kumail Nanjiani is finding his way through 'The Weirdest' Page 16



Fighting peat fires with technology

An interview with Assistant Professor at the Universiti Teknologi Brunei Dr Wida Susanty binti Haji Suhaili, who recently became the national finalist for Brunei in the 2020 ASEAN-US Science Prize for Women.



Wida Susanty
Assistant Professor at the Universiti Teknologi Brunei (UTB) Dr Wida Susanty binti Haji Suhaili recently became the national finalist for Brunei in the 2020 ASEAN-US Science Prize for Women.



Assistant Professor at the Universiti Teknologi Brunei (UTB) Dr Wida Susanty binti Haji Suhaili. PHOTO: KAMARUL ZAKARIA

"I started my research on the IoT as I worked with School of Computing, where my focus is more on Computer Network and Security (CNS)", she said. When she initially vented into the research project on Peatland, the term IoT was not coined yet and was more known as Wireless Sensor Network with the use of sensors to detect without wires to collect data. "When a peatland catches fire, it is different from a normal forest fire because it releases carbon", said Dr Wida Susanty. "When this occurred in 1995, everything closed down, children couldn't go to school because of the smoke. It really affects the economy, health of the people and everyday activities."

In an interview with the Borneo Bulletin, Dr Wida Susanty shared that she started her research on peatland in 2018, a year after she completed her PhD at the University of Edinburgh. Transitioning from her PhD area on Education Technology, she said that at the time the interest of things IoT started to get noticed and IoT had only started to establish. She also engaged an individual at Universiti Brunei, Samarasinghe, SJBBS which then led her to connect with the Forestry Department, Forest of Brunei (FDB), and the Department of Environment, Parks and Recreation (DEPR), where the research then turned into a first-year project (FYP). Since 2018, the project has been evolving.

In 2019, Dr Wida Susanty said there was a call for proposal from the ICT Division of ASEAN-US Science Prize for Women (ASPW) to collaborate on a regional project with experts from Malaysia, Indonesia and Japan.

She shared that Brunei, Malaysia, Indonesia and Japan are looking into a project called the ASEAN Peat Swamp Forest Communities (APSWFC) concerning transboundary issues.

Brunei, although a small country, also contributes to the NAFIC network a big portion of the land area is covered in peatland. The contribution started off through the management of making small sensors that were connected to the internet, but never tested in the real environment, which then evolved to ensuring more devices with the funding from NAFIC.

"In Brunei, in terms of disaster management, the first agency we actually contacted was the National Disaster Management Centre (NDMC) as we thought they were the ones who dealt with these things. They then directed us to other agencies to further understand the situation," added Dr Wida Susanty.

Continue to Page 14

SOCIAL INNOVATION AND PEER LEARNING



Sistem IoT bantu cegah kebakaran tanah gambut

RENCAH UTAMA
Oleh: FARID AHMAD

IoT berkaitan dengan tanah gambut bukanlah sesuatu yang baru. Namun, hal ini akan dibuktikan dengan IoT yang digunakan untuk mencegah kebakaran tanah gambut. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.



INOVASI yang dikenal sebagai NET-PEAT: Networked ASEAN Peatland Forest Communities for Transboundary Hazard Alert ini telah mendapat beberapa pengiktirafan.

INFO

Tanah Gambut

- Kebakaran tanah gambut di dalam ekosistem tropika merupakan masalah alam sekitar yang utama di Malaysia dan juga Tenggara.
- Kajian berkaitan tanah gambut dipaparkan dalam laporan tahunan pada tahun 2019.
- Sistem ini akan menjadi faktor utama dalam mencegah kebakaran tanah gambut berlaku di kawasan-kawasan yang rawan kebakaran.

Dalam usaha mencegah kebakaran tanah gambut, Kementerian Alam Sekitar dan Keanekaragaman Hayati Malaysia (KEMAS) telah bekerjasama dengan Universiti Putra Malaysia (UPM) untuk melaksanakan projek ini.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.



SISTEM IoT dibangunkan bersama-sama dengan FDI bagi membantu mencegah kebakaran tanah gambut.

Sistem IoT akan dipasang pada kedalaman 1.5 meter di hutan peyagambut sebagai sensor yang akan memantau air dalam tanah (GWL). Data berkenaan akan di hantar ke pelayan yang khusus sebagai Loka untuk mengukur kelembapan keadaan tanah.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.

Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran. Menurut Menteri Koordinator Bidang Perekonomian Airlangga Hartono, IoT akan membantu mencegah kebakaran tanah gambut di kawasan-kawasan yang rawan kebakaran.



Salah satu lokasi yang rawan kebakaran tanah gambut adalah kawasan-kawasan yang rawan kebakaran di kawasan-kawasan yang rawan kebakaran.

Peneliti Dari Berbagai Negara Studi Banding Penanganan Karhutla di Jambi



Kunjungan lapangan peneliti di Manggala Agni Daops Sumatera IX Kota Jambi

Oleh: Tatik Wijaya Editor: Firdaus BS 26 Jul 2022 19:24

KBRN, Jambi : Penanganan kebakaran hutan dan lahan (Karhutla) di Provinsi Jambi menarik perhatian para peneliti dari berbagai negara dan menjadikan Provinsi ini sebagai lokasi studi banding penanganan Karhutla. Sebanyak 22 Peneliti dari dalam dan luar negeri hari ini melakukan kunjungan lapangan ke markas Manggala Agni Daops Sumatera IX Kota Jambi.



SCIENTIFIC CONTRIBUTION: PUBLICATIONS

1. Nur Luqman Saleh, Aduwati Sali, Liew Jiun Terng, Sharifah Mumtazah Syed Ahmad Abdul Rahman, Azizi Mohd Ali, Borhanuddin Mohd Ali, Sheriza Mohd Razali, Ahmad Ainuddin Nuruddin, Nordin Ramli, 'Peatland forest monitoring and management solution in Peninsular Malaysia: Optimal parameters for LoRa data,' Ain Shams Engineering Journal, Volume 16, Issue 6, 2025, 103374, ISSN 2090-4479, <https://doi.org/10.1016/j.asej.2025.103374>. (<https://www.sciencedirect.com/science/article/pii/S2090447925001157>)
2. L. Li, A. Sali, J. T. Liew, N. L. Saleh and A. M. Ali, "Machine Learning for Peatland Ground Water Level (GWL) Prediction via IoT System," in IEEE Access, doi: 10.1109/ACCESS.2024.3419237.
3. Li, L.; Sali, A.; Noordin, N.K.; Ismail, A.; Hashim, F. Prediction of Peatlands Forest Fires in Malaysia Using Machine Learning. Forests 2023, 14, 1472. <https://doi.org/10.3390/f14071472>Li, L.; Sali, A.; Noordin, N.K.; Ismail, A.; Hashim, F.; Rasid, M.F.A.; Hanafi, M.; Razali, S.M.; Aziz, N.A.; Sukaesih Sitanggang, I.; et al. Modeling of Evaporation Rate for Peatland Fire Prevention Using Internet of Things (IoT) System. Fire 2023, 6, 272. <https://doi.org/10.3390/fire6070272>
4. L. Li et al., "Estimation of Ground Water Level (GWL) for Tropical Peatland Forest Using Machine Learning," in IEEE Access, vol. 10, pp. 126180-126187, 2022, doi: 10.1109/ACCESS.2022.3225906, <https://ieeexplore.ieee.org/document/9967973>
5. Li, L.; Sali, A.; Noordin, N.K.; Ismail, A.; Hashim, F. Prediction of Peatlands Forest Fires in Malaysia Using Machine Learning. Forests 2023, 14, 1472. <https://doi.org/10.3390/f14071472>
6. Li, L.; Sali, A.; Noordin, N.K.; Ismail, A.; Hashim, F.; Rasid, M.F.A.; Hanafi, M.; Razali, S.M.; Aziz, N.A.; Sukaesih Sitanggang, I.; et al. Modeling of Evaporation Rate for Peatland Fire Prevention Using Internet of Things (IoT) System. Fire 2023, 6, 272. <https://doi.org/10.3390/fire6070272>
7. Aduwati Sali, Azizi Mohd Ali, Borhanuddin Mohd Ali, Sharifah Mumtazah Syed Ahmad Abdul Rahman, Jiun Terng Liew, Nur Luqman Saleh, Ahmad Ainuddin Nuruddin, Sheriza Mohd Razali, Ibtisam G. Nsaif, Nordin Ramli, Hafizal Mohamad, Naomi Terada, 'Peatlands Monitoring in Malaysia with IoT Systems: Preliminary Experimental Results'. In: Suhaili W.S.H., Siau N.Z., Omar S., Phon-Amuaisuk S. (eds) Computational Intelligence in Information Systems. CIIS 2021. Advances in Intelligent Systems and Computing, vol 1321. Springer, Cham. https://doi.org/10.1007/978-3-030-68133-3_23
8. Jiun Terng Liew, Aduwati Sali, Nor Kamariah Noordin, Borhanuddin Mohd. Ali, Fazirulhisyam Hashim, et al.. Sustainable Peatland Management with IoT and Data Analytics. 22nd IFIP WG 5.5 Working Conference on VIRTUAL ENTERPRISES, PRO-VE 2021, Nov 2021, Saint-Etienne, France. 10p. (emse-03346490)



THANK YOU

(AND TRIBUTE TO THE LATE ASAI-SAN)

