ASEAN IVO PROJECT PROGRESS REPORT

ICT Virtual Organization of ASEAN institutes and NICT

NAPC: Networked ASEAN Peat Swamp Forest Communities

National Institute of Information and Communications Technology

UPM UNIVERSITI PUTRA MALAYSIA

MIMOS BERHAD

28 Nov 2018, Wednesday

Sari Pacific Hotel, Jakarta

Presentation Outline

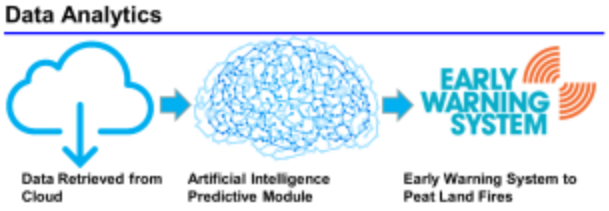
- What is NAPC?
- Project Objectives
- Major Issues – Peat Swamp Forest
- Technological Innovation: IoT-Based Peat Swamp Monitoring
- Social Innovation: Community Engagement
- Project Impact

What is NAPC?

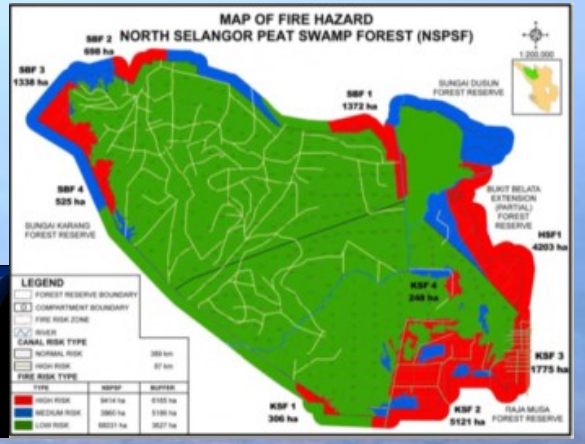
- Project Title:
  - NAPC: Networked ASEAN Peat Swamp Forest Communities
- Project Fund:
  - ICT Virtual Organization of ASEAN Institutes and NICT (ASEAN IVO)
- Project Members:
  - Wireless and Photonic Network Research Centre (WiPNET), UPM Malaysia
  - Institute of Tropical Forestry and Forest Products (INTROP), UPM Malaysia
  - MIMOS Berhad, Malaysia
  - School of Computing and Informatics, Universiti Teknologi Brunei (UTB), Brunei
  - Faculty of Forestry, Bogor Agricultural University, Indonesia
  - NICT Asia Center, Chulalongkorn University, Thailand
  - Badan Pengkajian dan Penerapan Teknologi (BPPT), Indonesia
  - Posts and Telecommunications Institute of Technology (PTIT), Hanoi, Vietnam
- Duration: July 2018 – June 2020 (2 years)

Project Objectives

- Deploy **IoT-based solution for peat swamp forest monitoring** with the communities
- **Technological innovation**: to deploy, analyse and disseminate information using an IoT-based peat swamp forest monitoring system
- **Social innovation**: to conduct social programs for peat swamp forest communities such as educational and entrepreneurship events related to the peat swamp forest



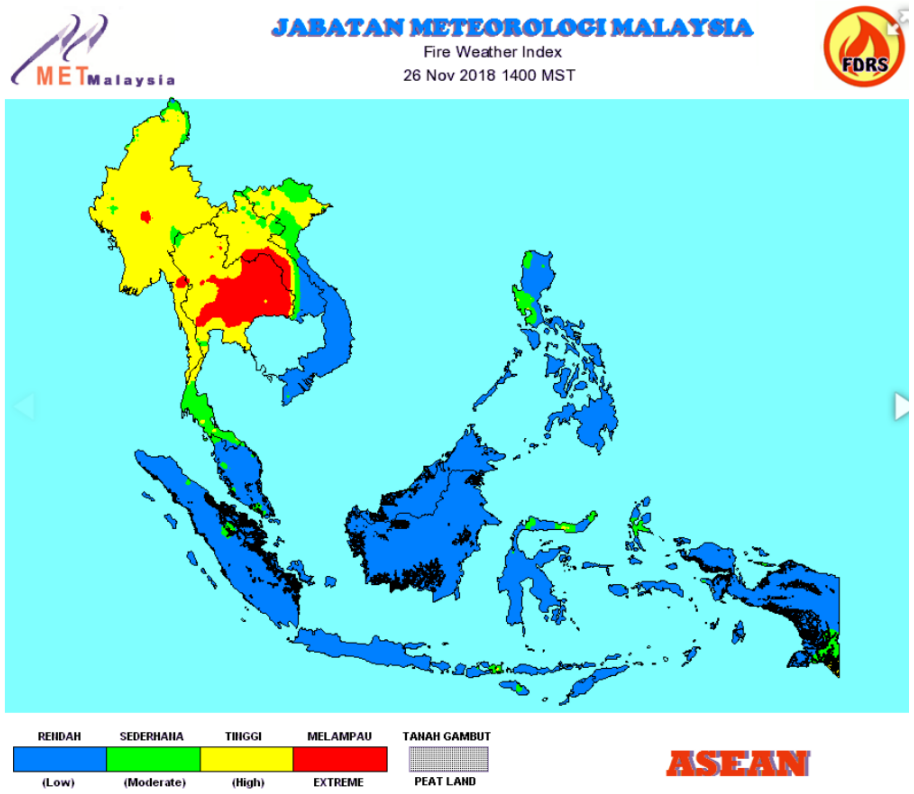
Major Issues: Peat Swamp Forest



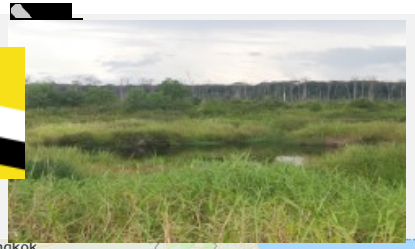
An area covering 6500 hectares bordering the southern part of the Raja Musa FFR is directly affected and has been severely degraded by fire in 2012

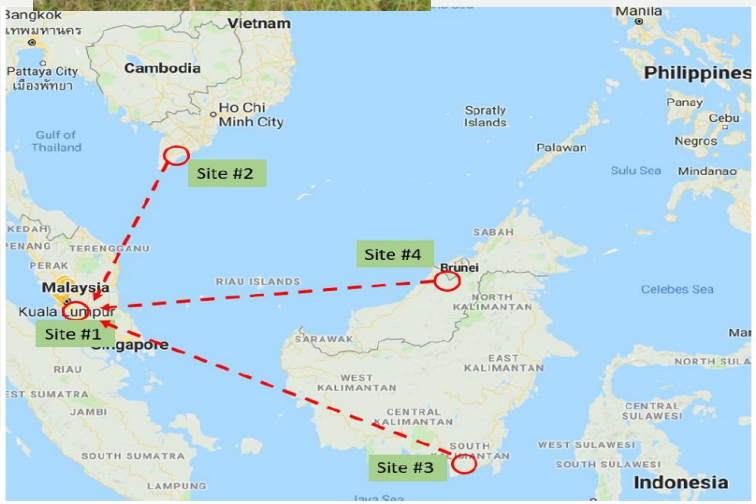
Major Issues: Current Challenges

- Forest fires in peatlands
- Manual sampling of water table reading – once every 2 weeks by very limited number of staff (Department of Forestry)
- Inaccurate reading – sensors deployed at convenient places, since fire-prone areas are remotely located
- Fire Danger Rating System (FDRS) is currently based on current manual system – accuracy and timely updates can be improved



Proposed 4 Project Locations in ASEAN





	NAME		LOCATION
A	MALAYSIA	Raja Musa Forest Reserve	Selangor
B	BRUNEI	Badas Peatland	Brunei
C	VIETNAM	Ca Mau Peat Swamp	U Minh Ha
D	INDONESIA	Sebangau Park	Central Kalimantan

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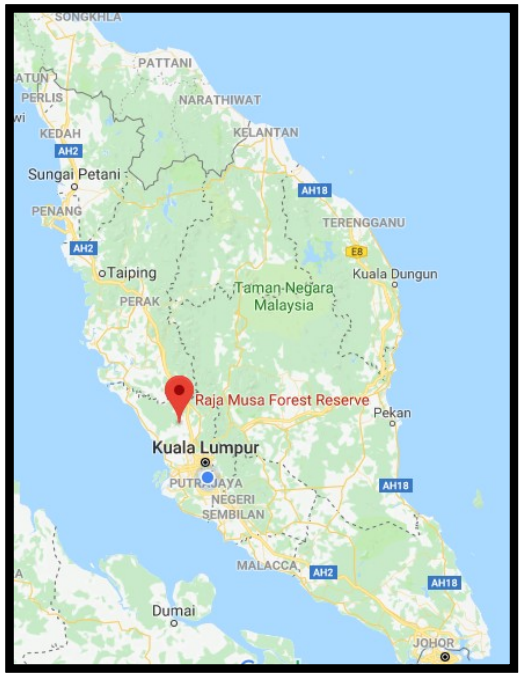
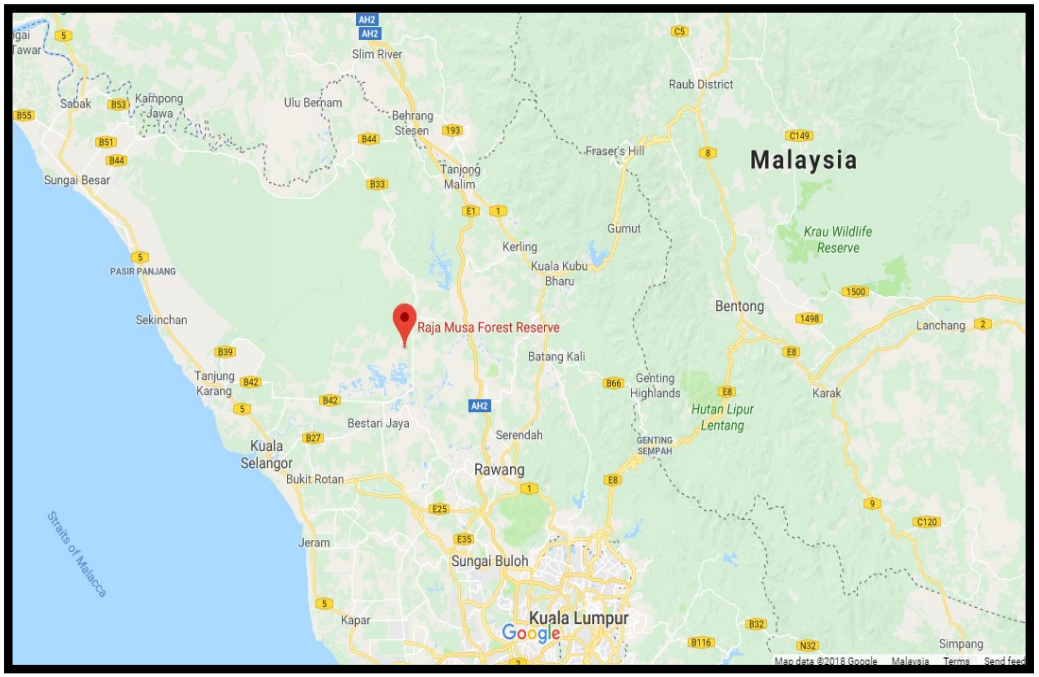
MALAYSIA:
RAJA MUSA FOREST RESERVE

Raja Musa Forest Reserve

- Raja Musa Forest Reserve (RMFR) is located at 3° 24' 48.0744" N,101° 23' 2.0256" E, in the north western part of Selangor State.
- The rainfall recorded for RMFR is between 58.6mm to 240mm per month.





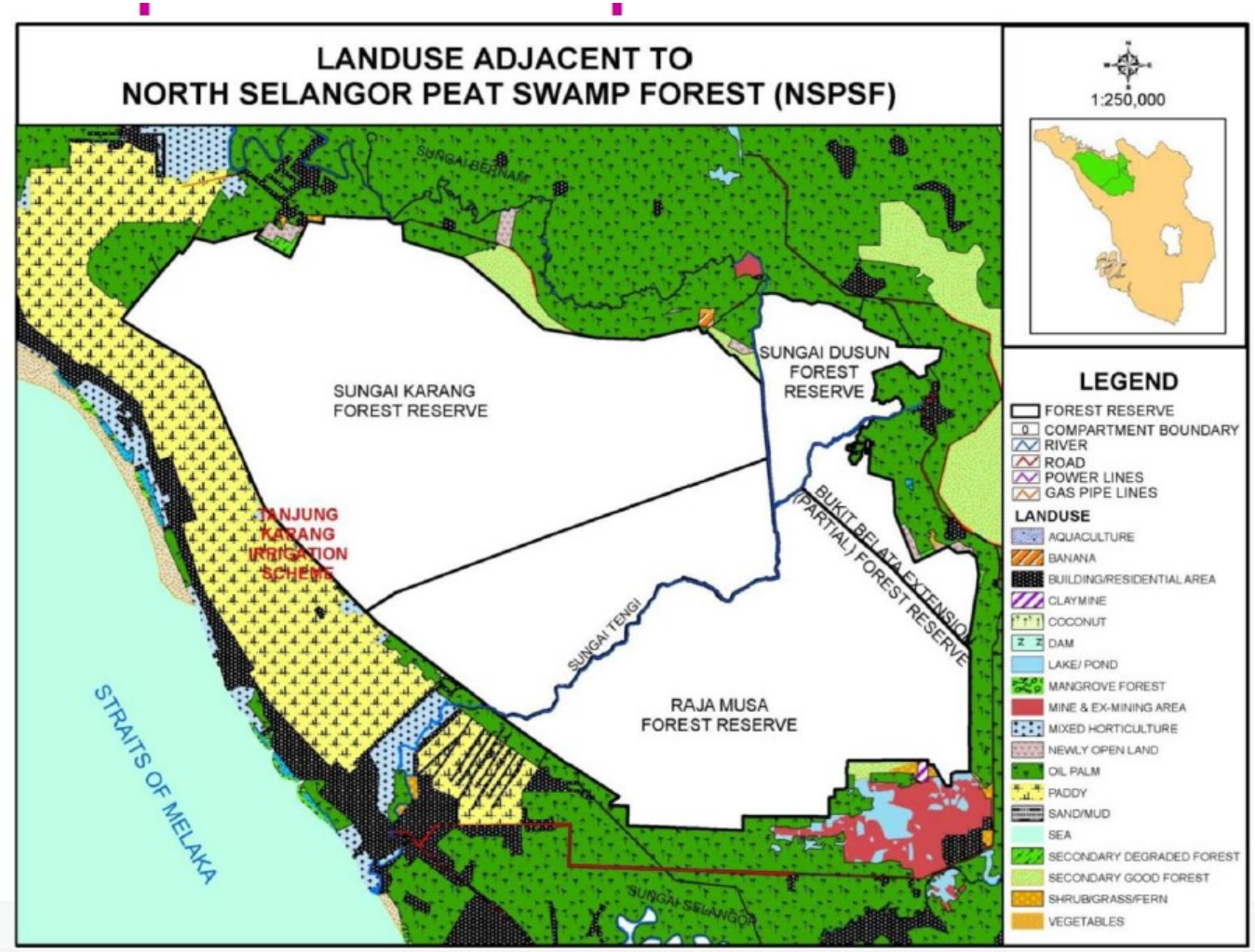
Map of Raja Musa Forest Reserve

Land use map of North Selangor peat swamp forest

Lookout tower in RMFR

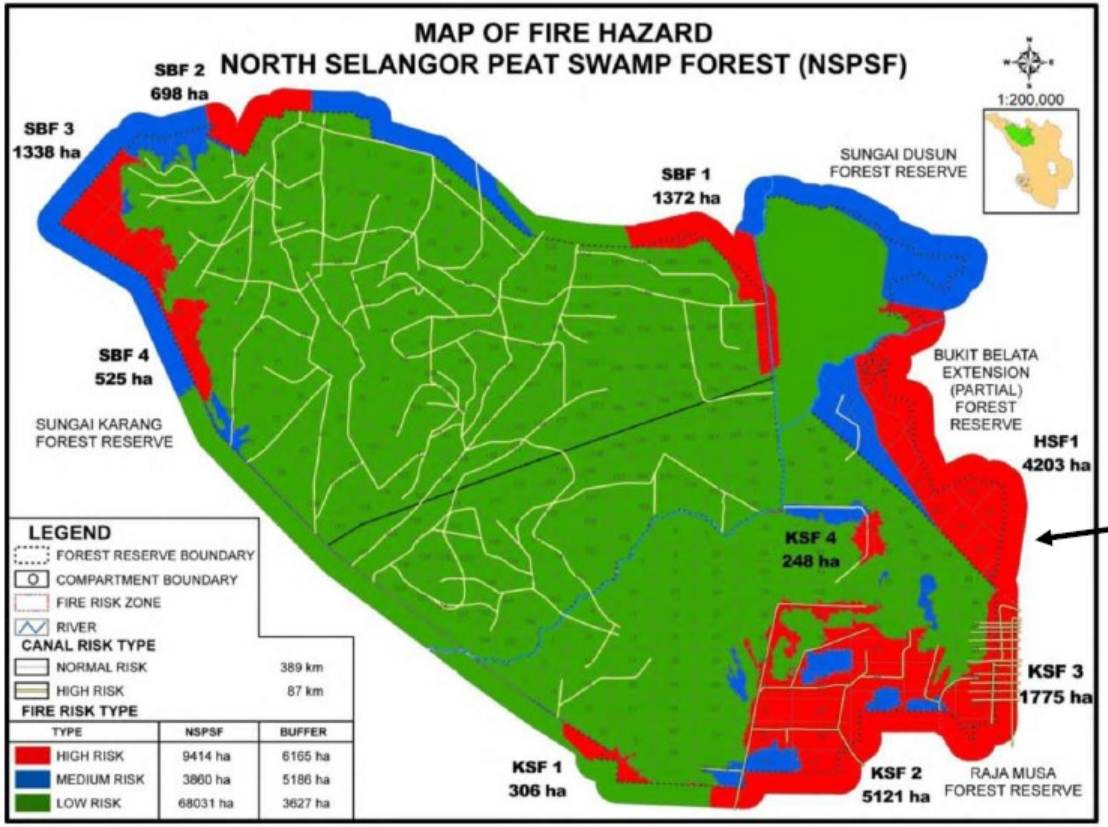
Peat swamp area in RMFR

Peat Swamp Forest Area – Raja Musa Forest Reserve (RMFR)



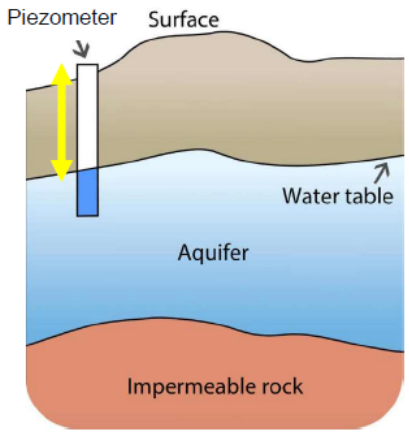
Total Area: 75,392 hectares

Map – Fire Hazard

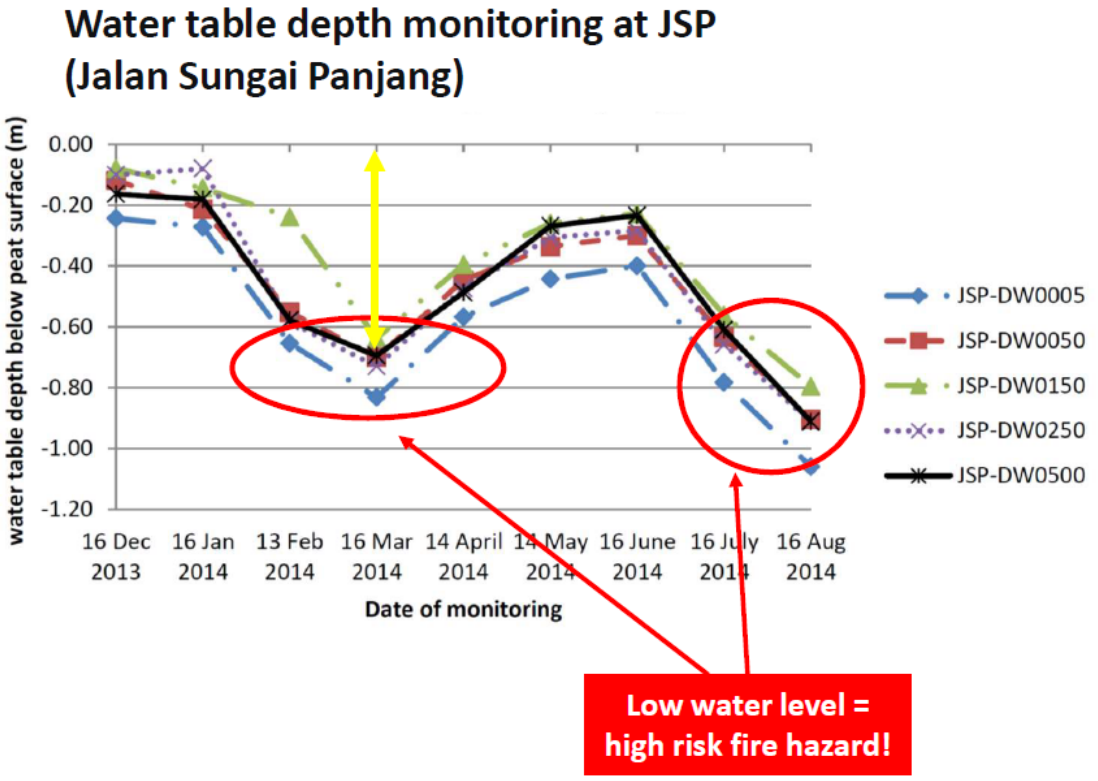


Red = High Risk

Manual Data Collection



Monitoring water table
(level below which the ground is saturated with water)

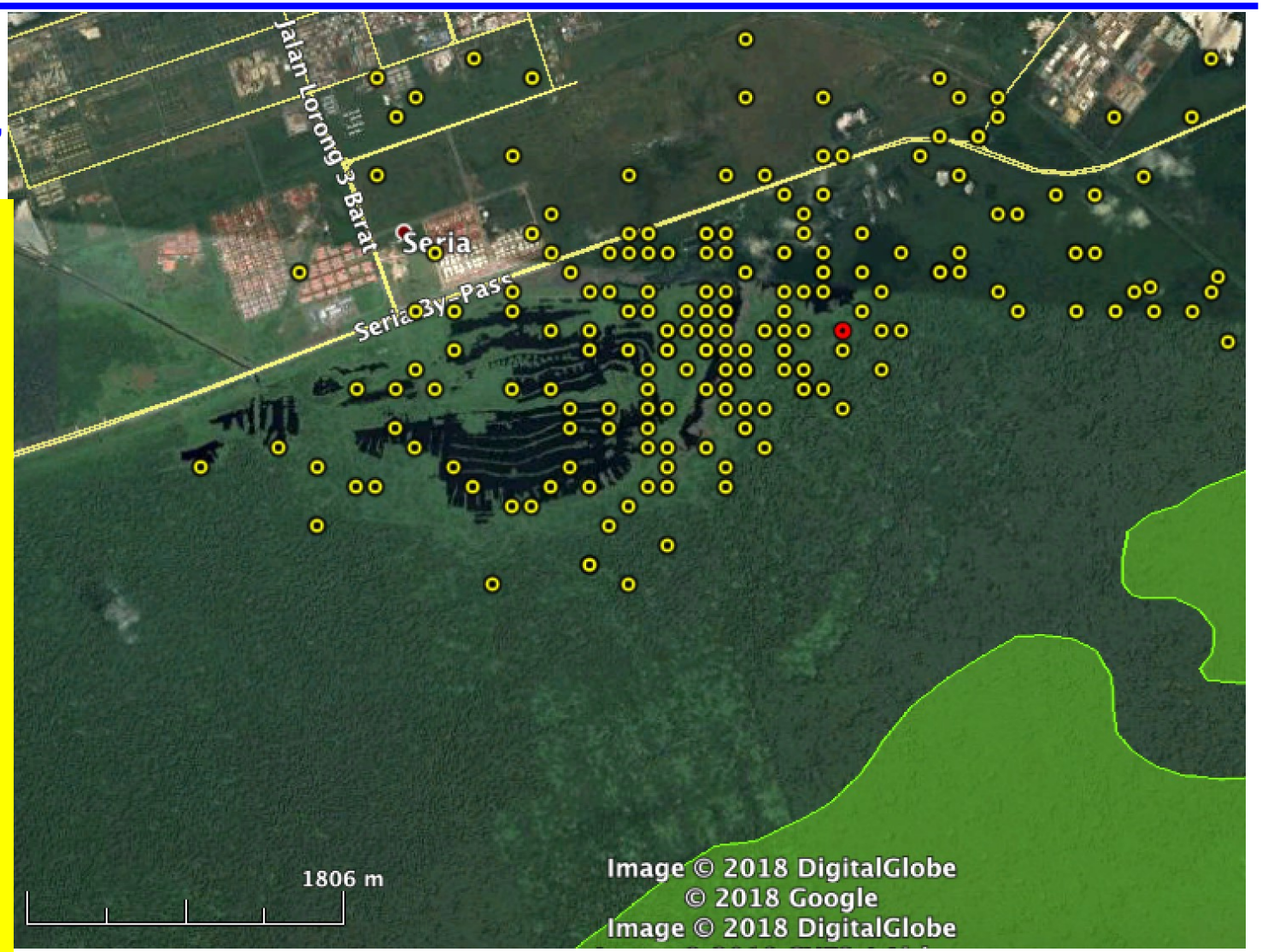


BRUNEI:
BADAS PEATLAND

Specific Location in Brunei: Badas Peatland

- Study area
- N 4.59° E114.35°, radius 3 km

Yellow spots mark fire events in Feb-April 2016 (MODIS data). Black polygons are water bodies created by sand mining. Light green area (SE) is the central area of the peat dome, dominated by quite pristine "padang alan" (S. albida) forest. Just north of the road are housing estates. In NE corner is an oil & gas sector industrial estate. Informal, illegal farmers grow crops in burnt areas and gather food products from the peatland.



Degraded peatland. Alan Bunga forest 1 km away in background. Regeneration of invasive Acacia and grass in burnt area. Lakes and ponds are common features in peatland.

Government warning against use of land

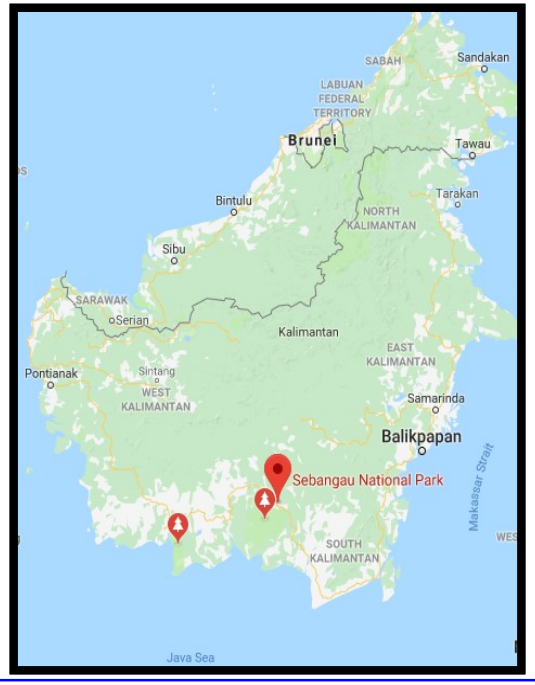
Illegal growing of food

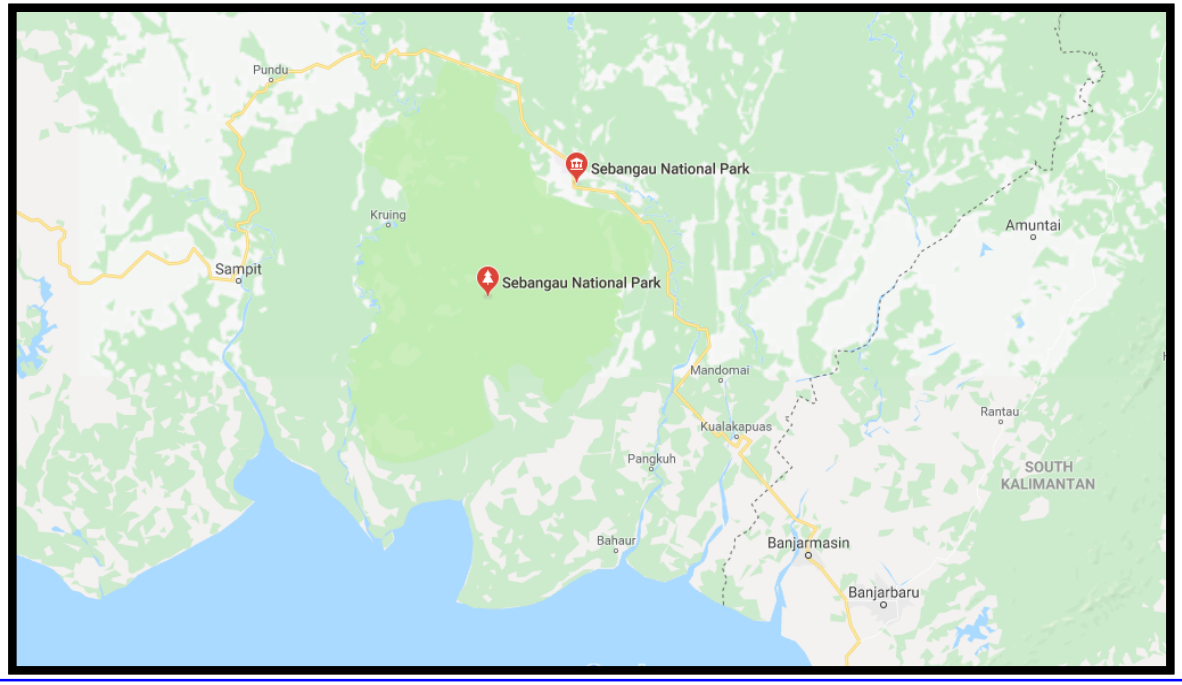
Housing estate

INDONESIA: SEBANGAU NATIONAL PARK, CENTRAL KALIMANTAN

Sebangau National Park, Central Kalimantan

- Sebangau National Park is located at 2° 35' 50.5572 " S, 113° 40' 25.752" E, in south Central Kalimantan, Indonesia.
- Annual rainfall recorded in Sebangau National Park varies between 2000 and 4000 mm





Map of Sebangau National Park, Central Kalimantan

Sebangau River

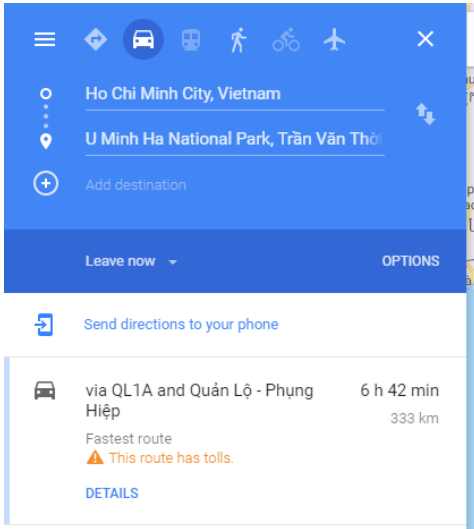
Peat swamp in Sebangau National Park

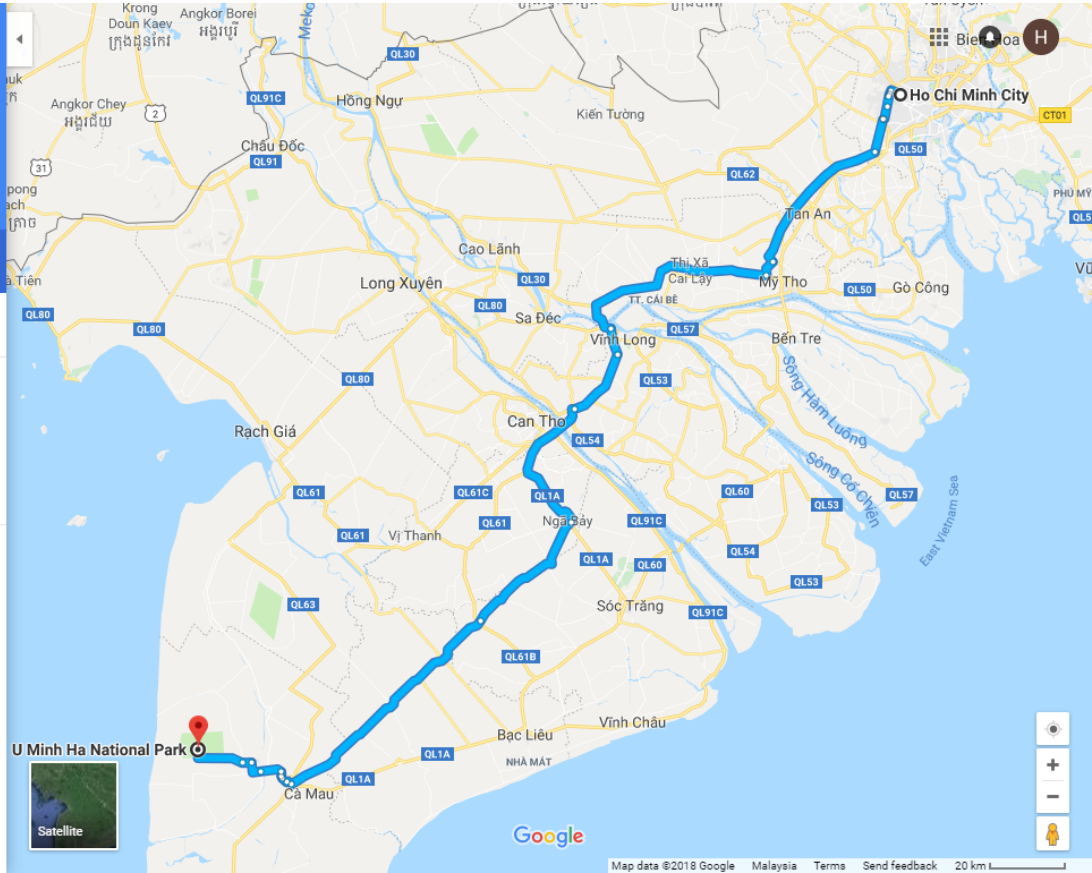
Aerial view of Sebangau National Park

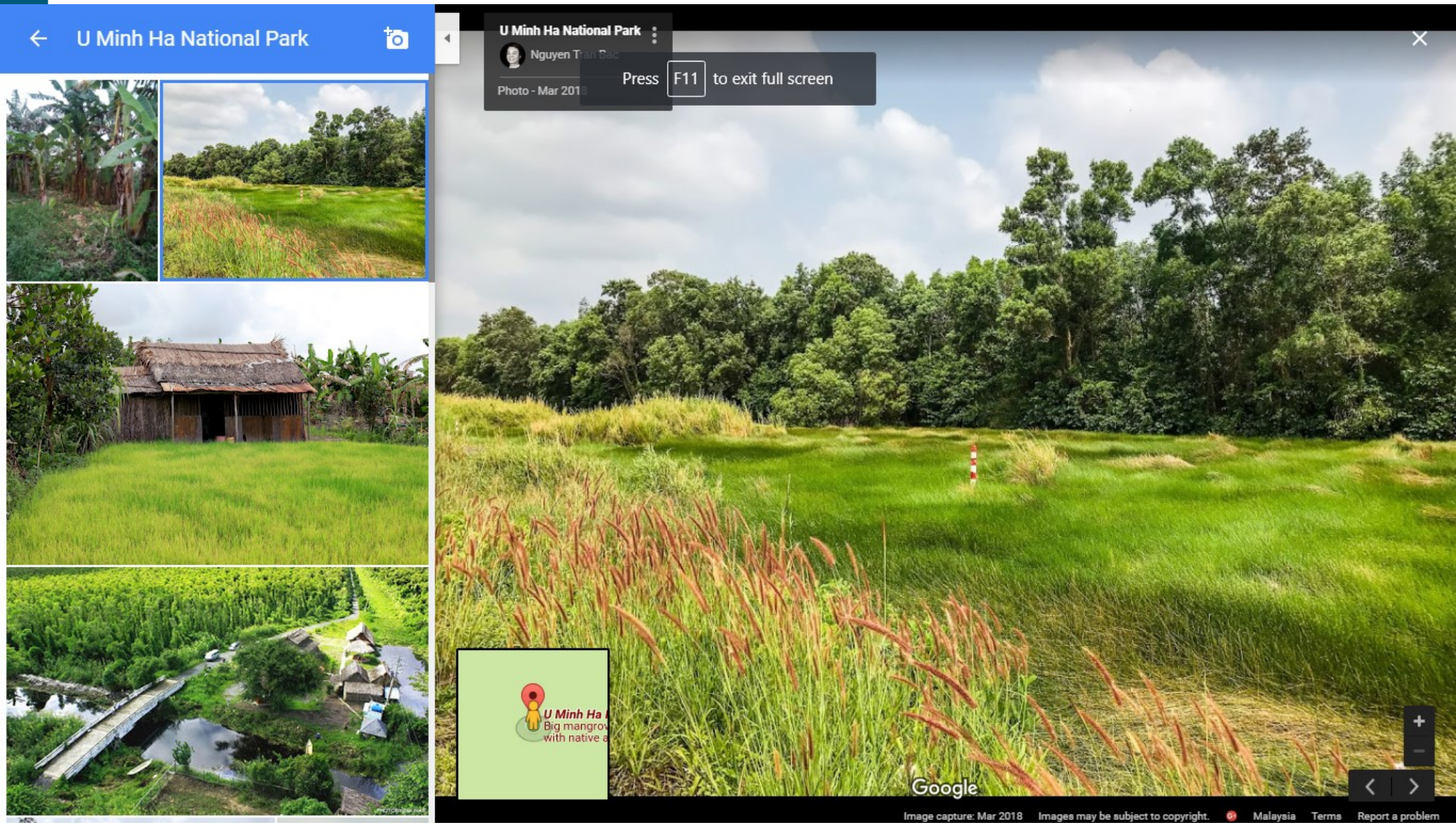
VIETNAM:
CA MAU PEAT SWAMP FOREST

Vietnam: Ca Mau Peat Swamp Forest

- U Minh Ha National Park
- Google maps: https://goo.gl/k6G79M
- Photos: https://goo.gl/Kajdyn






U Minh Ha National Park
U Minh Ha National Park
Nguyen Tran Bac
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Malaysia
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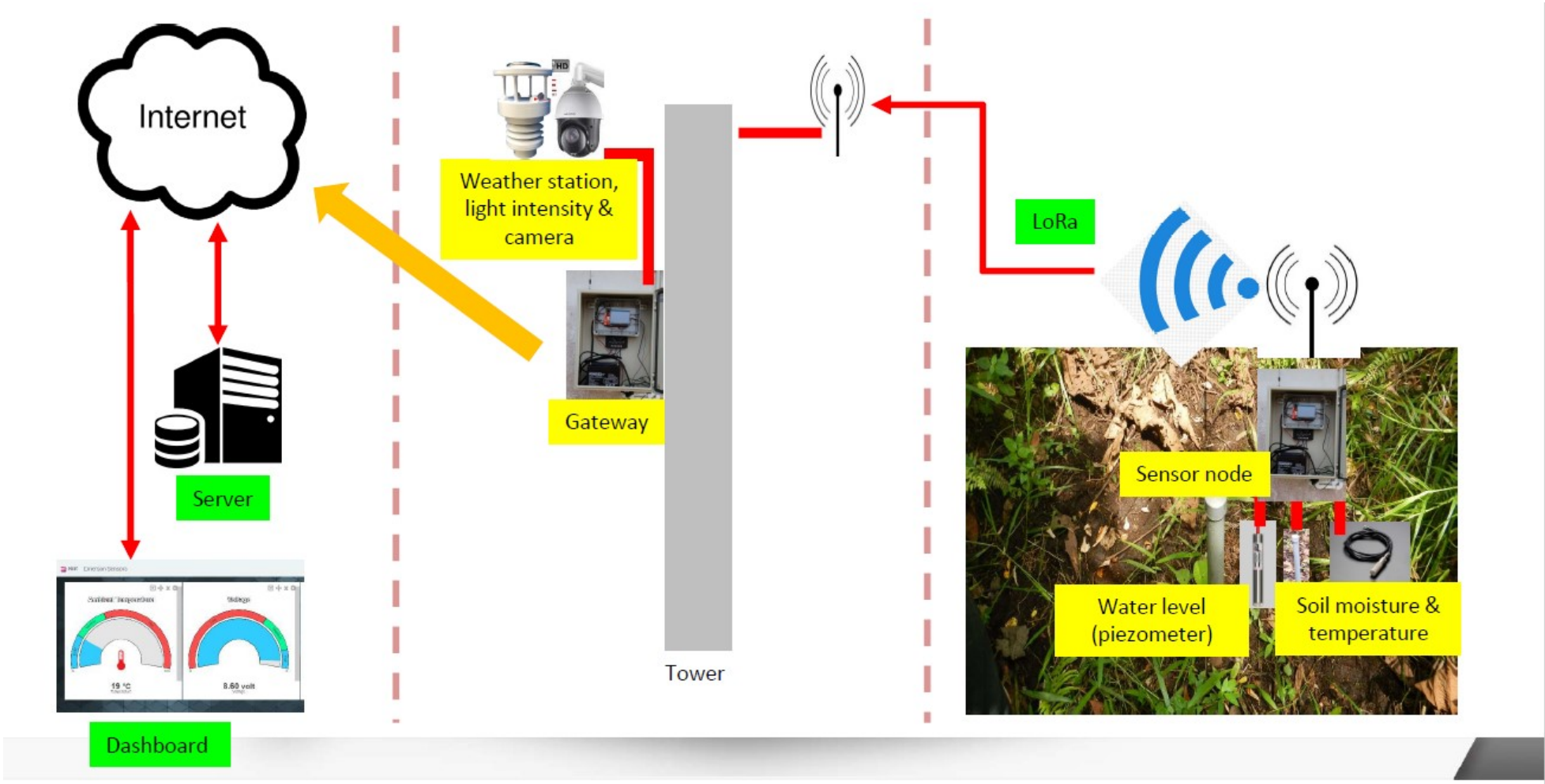
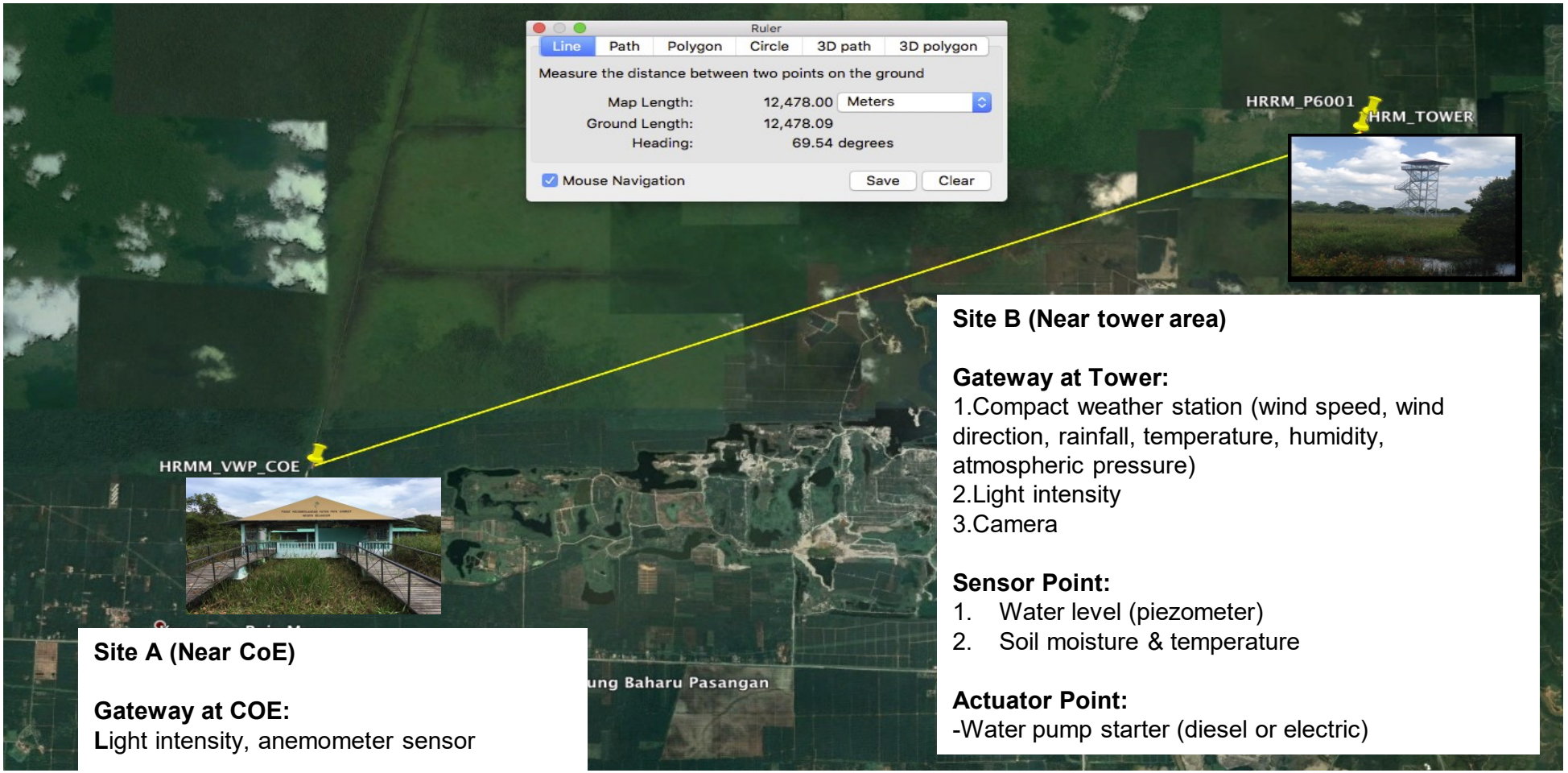
Report a problem

Technological Innovation: IoT-Based Peat Swamp Monitoring



Site Implementation



Site A (Near CoE)

Gateway at COE:
Light intensity, anemometer sensor

Sensor:
Piezometer, temperature, humidity,
– Near dam

Site B (Near tower area)

Gateway at Tower:
1.Compact weather station (wind speed, wind direction, rainfall, temperature, humidity, atmospheric pressure)
2.Light intensity
3.Camera

Sensor Point:
1. Water level (piezometer)
2. Soil moisture & temperature

Actuator Point:
-Water pump starter (diesel or electric)

Social Innovation: Community Engagement

- Stakeholders
  - Jabatan Perhutanan Negeri Selangor (JPNS)
  - Sahabat Hutan Gambut Selangor Utara (SHGSU)
  - Global Environment Centre (GEC)
  - Primary and Secondary Schools

- Community Engagement
  - Alert system – local technology acceptance
  - Social community program for community
    - Education – awareness programs
    - Entrepreneurship
    - Ecotourism

Project Activities

Kick-off Meeting – UPM, 6-7 Aug 2018

LoRa Sharing and Exchange Session - MIMOS, 18 Oct 2018

Global Environment Centre

Jabatan Perhutanan Negeri Selangor

Discussion with local authorities and communities - to engage and get approval

Collaboration Meeting

Monthly Webex Meeting

Cisco webex

Sharing and Dissemination of Information

5th JASTIP Symposium,16-19 October 2018, Sepang, Malaysia

“Disaster Risk Reduction & Environmental Sustainability for Social Resilience“.

MESTECC-APCTT 2018 Conference on the 4th Industrial Revolution , 23-24 October 2018, Putrajaya, Malaysia

“New and Emerging Technologies in Achieving Sustainable Development Goals”

Project Impact

- Enable connectivity for **IoT-based monitoring system in peat swamp forest** areas in four ASEAN countries
- Enable **forest management** community and researchers to further understand peat swamp forest ecosystem by analyzing the collected micro climate data
- Serve as a **peat swamp forest fire monitoring system** for immediate human and automated interventions via FDRS

Thank you!

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