

# ASEAN IVO 2017: NETWORKED ASEAN COASTAL COMMUNITIES

Presented by:

# OUTLINE

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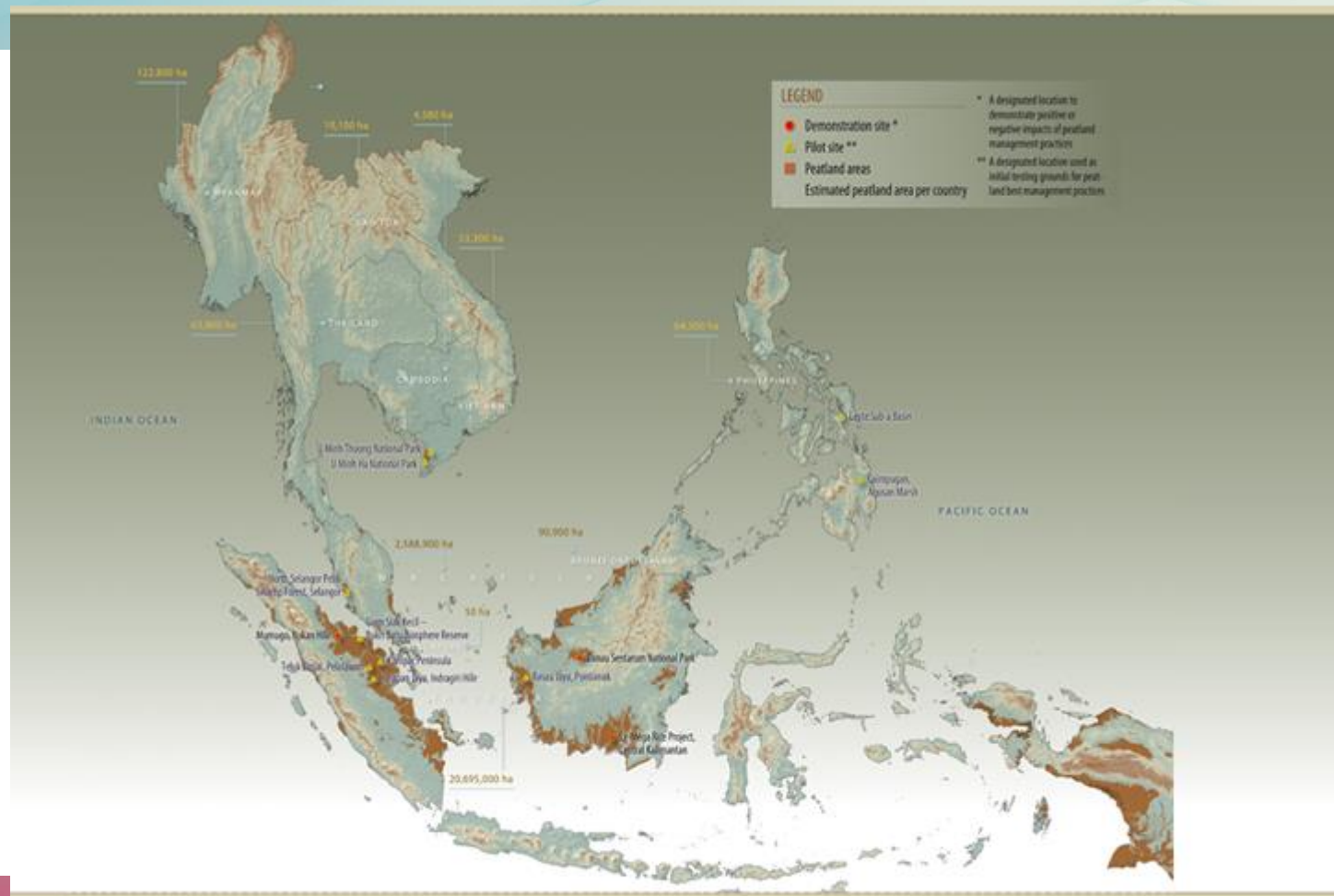
# GROUP MEMBERS

- UPM
- MIMOS
- PTIT, VIETNAM
- SURANAREE INSTITUTE OF TECHNOLOGY (SUT), THAILAND
- SHINSHU UNIVERSITY, JAPAN

# PROBLEM STATEMENT

- Approximately 25 million hectares of peatlands located in the coastal area.
- Over 3,000 plant species and also unique animal species especially fishes and dragonflies.
- Due to insufficient monitoring and lack of sustainable peatland management, a number of peatland degradation occur.
- Specific for ASEAN region, it is found that drainage, drying and burning of peatlands in ASEAN are estimated to lead to emissions of 2 billion tonnes of CO<sub>2</sub> per year.

# PROBLEM STATEMENT



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- Fires in peat soils have been identified as a major contributor to transboundary haze pollution in the region.
- Drainage and unsustainable management practices have made peatlands vulnerable to fire.
- All of these problems combined to make the degradation of the peat swamp forests of Southeast Asia into one of the most extensive and important land degradation problems in the world.
- Loss of peatlands will also have a significant social, health and economic impact for the people in the region.
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# OBJECTIVES

- 1) Technological innovation:
  - To deploy, analyse and disseminate information using an IoT-based coastal monitoring, especially on peatland sustainability.
- 2) Social innovation:
  - To conduct social innovation programs for coastal communities such as educational and ICT-related entrepreneurship events.



# Methodology

- Implementation of the work will be carried out as follows:
  1. Initial work and formation meeting with the coastal communities in respective countries shall take place immediately.
  2. From there, project partners shall design the best coastal monitoring system connecting all community areas. Endorsement and authority clearance for implementation plan will start in July 2018 until September 2018.
  3. The implementation will be carried out in October to December 2018. The duration is essential as it is also a rainy season in ASEAN countries and good measurement and observation can be identified over this duration.



# Site #1

## Sabak Bernam (Malaysia)

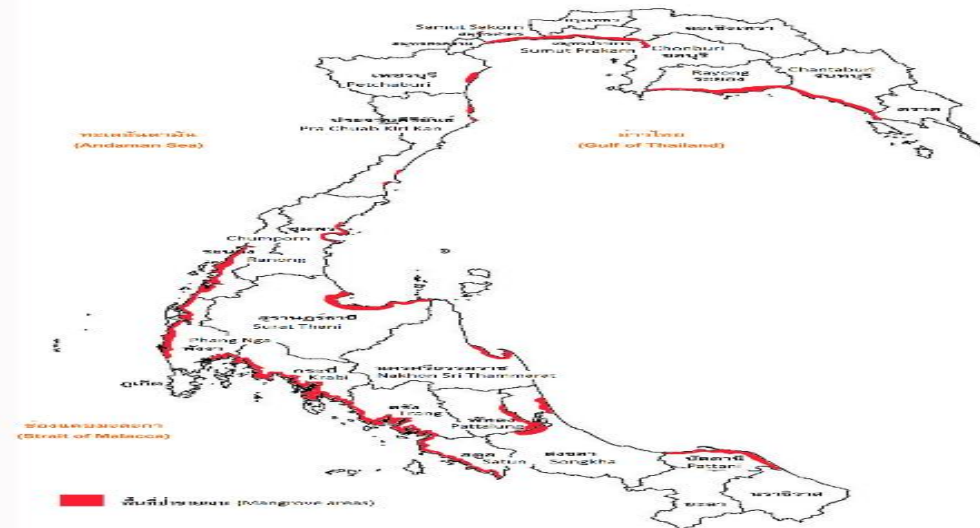
- A district in Sabak Bernam called Bagan Nakhoda, located near Bernam River and Straits of Malacca
- It is a mangrove forest area where the locals derive economic activities.
- The villagers are mostly elderly people who were once fishermen.
- The village is situated exactly by the mouth of River Bernam and Straits of Malacca, where there are a rich habitat of mangrove plants. The area is already equipped with basic sensors and a Gateway for monitoring,
- The plan is to extend the project to get the data relayed back to a control centre at UPM where monitoring, coordination and decision making can be implemented.



# Site #2

## Songkhla (Thailand)

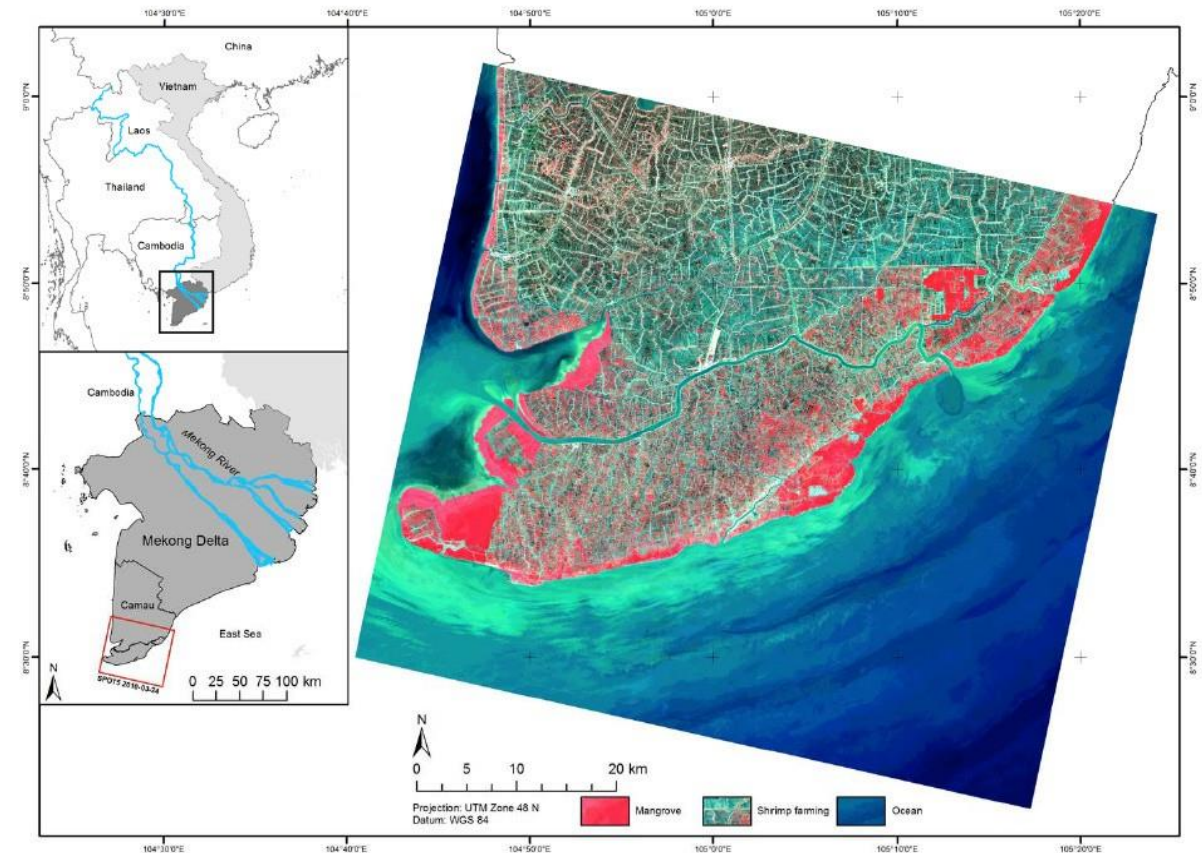
- Song Khla is located on the eastern coast of southern part Thailand, where mangrove forests are found along both the east and west coast of Thailand.
- Mangroves forests are most dense in the western coast or the Andaman coast of Phan Nga, Satul, Krabi and Trang
- It was found that Songkha experienced the most drastic decrease in mangrove area in the country with a 63.5% decline from 2000 to 2009
- The plan is to implement the IoT-based system at a site located in a district in Songkhla, called Singha Nakorn located at the Satingpra peninsula connecting Songkhla lake and the Gulf of Thailand.
- The area was once the Songkhla city center for over 300 years. The district was populated by fisherman villages with its rich mangrove forests. However, in the past few decades, the mangrove forests quickly declined due to the expansion of urban areas
- The area has thus been under the royal project of HM the King Rama IX to restore the mangroves and its ecosystem since 1994



# Site #3

## Ca Mau, Vietnam

- During the Vietnam war, approximately 100,000 ha of mangrove forests were destroyed due to the spraying of aerial defoliants.
- In the early 1970s, the mangrove forest area in Ca Mau province covered approximately 200,000 ha.
- In the 1980s and early 1990s, the mangroves were further reduced due to the overexploitation of timber for construction and charcoal and the conversion of forest land into shrimp-farming land.
- With the proposed IoT-based mangrove monitoring, it is expected that better mangrove management can be implemented.



# Leveraged Resources and Participants

- UPM has been involved with a number of research projects in WSN and IoT with Ministry of Multimedia and Communications. UPM was also heading National Centre for Sensor Technology (NEST) from 2010 – 2014.
- MIMOS is the leader for IoT Roadmap in Malaysia and has strong collaboration with NICT in which they developed prototype hardware for IoT-based applications. MIMOS has BITX Labs which stands for Big Data, IoT Technology Accelerator which assists developers to develop application in IoT.
- SUT and PTIT have experience in conducting WSN and wireless communications-related research project. PTIT has been involved with ASEAN IVO project before, and this will help the team to coordinate the project according to what is expected by the funding body.

# Leveraged Resources and Participants

- Specific roles for each collaborating partners are identified as follow:
  - UPM: To design and implement system connectivity, involving licensing and deployment.
  - MIMOS: To implement IoT middleware and intelligence system for decision making.
  - SUT and PTIT: To be involved in connectivity implementation at the identified sites.

# Budget Explanation

- There are three budget items required to ensure the success of this project, namely research equipment, travelling and workshop

Item	Total (USD)
Research equipment	45,000.00
Meetings and workshops	25,000.00
Research students	28,800.00
<b>TOTAL</b>	<b>98,000.00</b>

# 1- Research equipment

(estimate: USD 15,000.00 x 3 sites = USD 45,000.00)

Research Equipment	Total amount (USD)
<b>Site#1 (Malaysia)</b> Sensors (temperature, humidity, water level, salinity) Gateway Wireless connectivity Deployment and maintenance fees Webpage and IoT middleware development	17,000.00
<b>Site# 2 (Thailand)</b> Sensors (temperature, humidity, water level, salinity) Gateway Wireless connectivity Deployment and maintenance fees	14,000.00
<b>Site# 3 (Vietnam)</b> Sensors (temperature, humidity, water level, salinity) Gateway Wireless connectivity Deployment and maintenance fees	14,000.00
<b>TOTAL</b>	<b>45,000.00</b>

# 2- Travel

## (estimate: USD 25,000.00)

Meeting #	No. of Researcher	Total (USD)
Meeting #1 in KL, Malaysia July 2017 • Flights • Accommodation • Local transportation	2 from Japan 1. from SUT 2. from PTIT	2,500.00
Meeting #2 in Hanoi, Vietnam Dec 2017	3 from Malaysia 1 from Japan 1 from SUT	2,500.00
Meeting #3 in Japan June 2018	3 from Malaysia 1 from SUT 1 from PTIT	2,500.00
Meeting #4 in Thailand Dec 2018	3 from Malaysia 1 from Japan 1 from PTIT	2,500.00
Meeting #5 in Malaysia June 2019	2 from Japan 1. from SUT 2. from PTIT	2,500.00
Research attachment #1 Japan Oct 2018	in 1 from Malaysia	3,250.00
Research attachment #2 Malaysia	in 1 from PTIT	3,250.00
Workshop #1 in Japan		3,000.00
Workshop #2 in Malaysia		3,000.00
<b>TOTAL</b>		<b>25,000.00</b>



# 3. Research Student (estimate: USD 28,800.00)

Research Activities	Duration	Amount
1. Formation meeting design and initial development	1/7/2017 – 31/12/2017	6 students x USD 400/month x 6 months = USD 14,400.00
2. Deployment and installation	1/1/2018 – 30/6/2018	6 students x USD 400/month x 6 months = USD 14,400.00

# EXPECTED OUTPUT

- Three potential deployment and experimental sites have been identified with the following benefits:
  - (i) Peatland monitoring system for disaster prevention method (i.e. peatland fires, flood and tsunami prevention method in Sabak Bernam, Songkhla and Ca Mau
  - (ii) Pilot projects for social innovation for underprivileged people in coastal areas in ASEAN. These applications would benefit the communities as their daily life will be directly affected by problems related to peatland degradation or natural disasters.
- The implemented IoT-based solutions will give them the advantage in preserving the peatlands and to save human lives.

# Facilities, Equipment and other Resources

- Existing Facilities
  - Research laboratories at UPM, MIMOS, SUT and PTIT
  - Meeting venues at UPM, MIMOS, SUT and PTIT
  - Prior engagement with villagers at Bagan Nakhoda Omar, Sabak Bernam, Selangor. Equipment
  - PC/computing hardware and software from UPM, MIMOS, SUT and PTIT
  - Researchers from UPM, MIMOS, SUT and PTIT including support staff relevant to this project
- BITX Lab in MIMOS
  - Big Data IoT Technology Accelerator (BITX) serves as a technology reference centre that facilitates open innovation activities. BITX comprises the following collaborative open innovation labs:
    - Applications Lab for the rapid development and showcase of applications and solutions
    - Smart Devices Lab for the integration of connected devices, sensors and promote information synergy
    - Network & Services Lab for interoperability of devices, networks and systems with big data analytics
- Wireless and Photonic Networks (WiPNet) Research Centre of Excellence
  - WiPNet has been involved with contract research on WSN-related projects since 2010. The projects include agriculture-precision, infrastructure monitoring, WSN standard development and halal product tracking and traceability.

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