HAB-ASEAN: Harmful Algal Bloom (HAB) Remote-Monitoring and Detection over Wireless Networks for Food Security in ASEAN

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The Kelantan Fisheries Department (JPNK) has imposed an immediate ban on molluscs from Sungai Geting, Tumpat due to a suspected 'red tide'

A 'red tide' is a common term used for uncontrolled algae bloom that is harmful to humans.

According to Bernama, JPNK director Nazri Ishak said that **the sale and harvest of shellfish, such as oysters, cockles, and clams, are prohibited as of October until further notice.**

"An analysis by the Fisheries Biosecurity Lab shows that molluscs from the area are contaminated with saxitoxin from harmful algae, *Alexandrium minutum*," he said.

"If consumed, the contaminated molluscs can cause poisoning and pose a threat to human health," he said in a statement on Monday, 11 October.

Fisheries Dept: Do Not Eat Shellfish From Kelantan For Now Due To Toxins

Customers are advised to ask for the origin of the shellfish they are buying.

By May Vin Ang — 14 Oct 2021, 05:45 PM — Updated 28 days ago

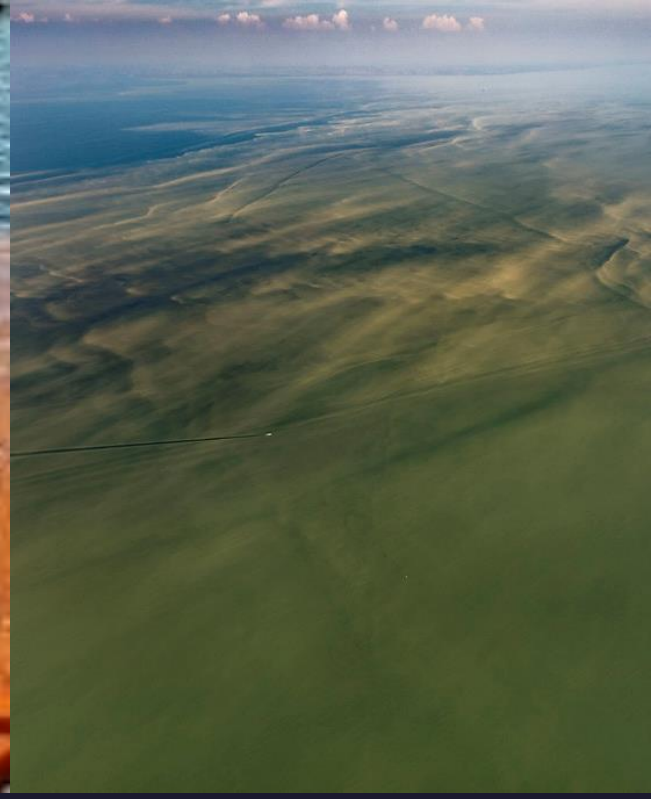
#news #kelantan #shellfish #foodpoisoning #health #informative #environment

Cover image via Murai MY & New Straits Times

The ban was initially on the shellfish from one area, but now the ban is on the shellfish from the entire state!!

Fisheries Dept: Do Not Eat Shellfish From Kelantan For Now Due To Toxins, https://says.com/my/news/fisheries-dept-bans-shellfish-from-sungai-geting-due-to-red-tide



Harmful algal bloom (HAB)

- Colonies of algae — simple plants that live in the sea and freshwater — grow out of control and produce toxin
- Commonly known as “red tide”- but HABs do not just paint the water red; some turn the water cloudy, brown or foamy.
- The discoloration in the water is most visible early in the morning. As the day warms up, the mass of microalgae will sink down to avoid extreme heat (Approx. 2 meters below sea level).
- High possibility of recurrence once area is afflicted.
- Tend to occur in sheltered places with restricted water movements, such as lagoons, ports and embayment.

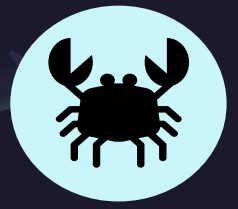
HAB Effects

Primary effects

Contamination of water

Deterioration of aquatic ecosystem

Degradation of air quality

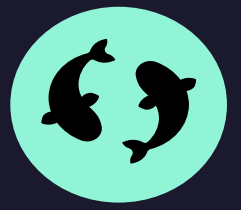


Contamination of shellfish

Secondary effects

Threat on human health

Killing of marine mammals



Massive fish mortality

Regional economy decline

Other HAB afflicted areas in Malaysia

Harmful algal blooms

	HARMFUL MICROALGAE	LOCATION	IMPACT
2001	*Alexandrium minutum*	Tumpat, Kelantan	Shellfish contamination six hospitalised, one death
2002	*Prorocentrum minimum*	Johor Baru, Johor	Water discolouration
2003-2004	*Cochlodinium polykrikoides*	Kota Kinabalu, Sabah	Fish kills
2005	*Cochlodinium polykrikoides*	Kota Kinabalu, Sabah	Water discolouration
2006	*Cochlodinium polykrikoides*	Kuching, Sarawak, Kota Kinabalu, Sabah	Fish kills
2007	*Neoceratium furca*	Pangkor, Lumut, Penang	Water discolouration
2009	*Pyrodinium bahamense*	Kota Kinabalu and surrounding areas	Shellfish contamination
2013	*Pyrodinium bahamense*	West coast, Sabah	Shellfish contamination, 3 deaths, over 40 hospitalised

Current HAB monitoring methods in Malaysia:

- Performed by the ***Fisheries Biosecurity Division***
- Sampling is performed once every 3 months and testing is conducted in labs.
- Frequent sampling is only performed after bloom is detected

CELL COUNT (MICROSCOPE)

IDENTIFICATION OF SPECIFIC MICROORGANISM (MICROSCOPE)

DETECTION OF TOXIN

MICE-BIOASSAY

Toxic tides: risks from harmful microalgae, https://www.thestar.com.my/News/Environment/2014/04/07/Toxic-tides-Risks-from-harmful-microalgae/

1) Stationing of LoRA receivers at the identified coastal site

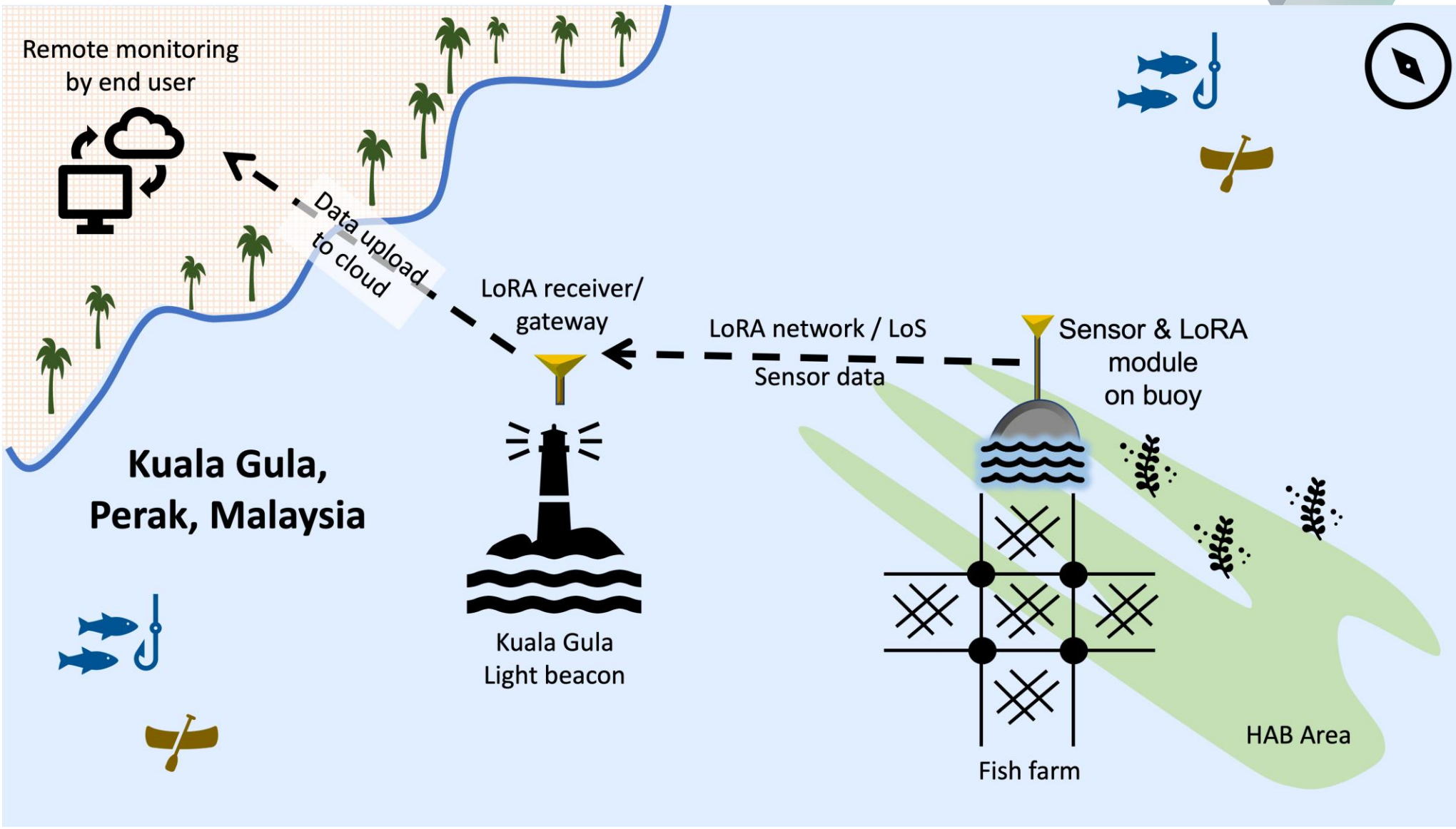
2) Integration of marine-grade sensors on buoy

3) Establishing communication protocol between LoRA and sensor-buoy

4) Deploying remote-monitoring of HAB system and visualization of real-time data on dashboard.

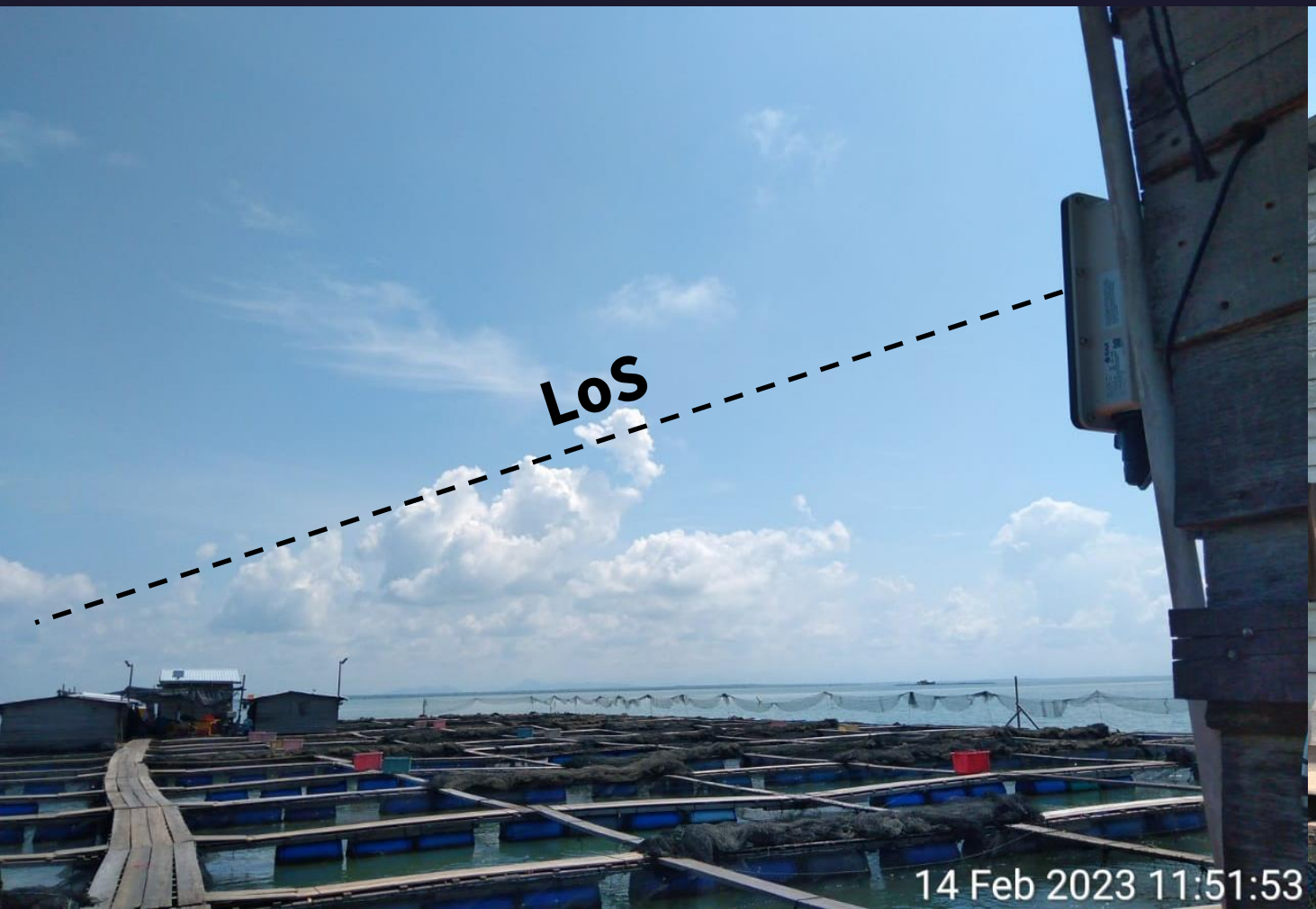
5) Data analytics and machine learning to recognize unusual water quality patterns to alert authorities and fish farmers

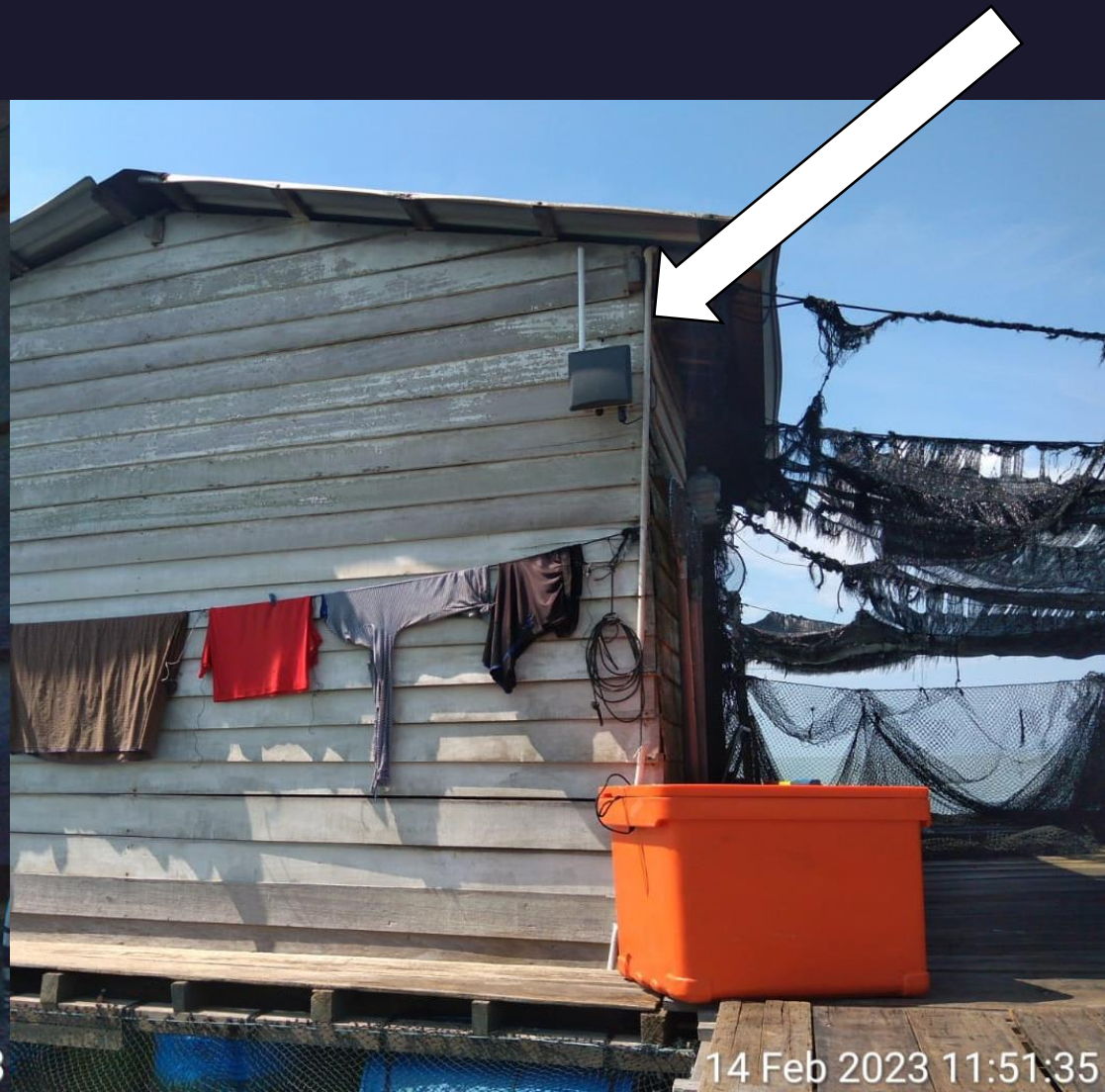
The solution:
Remote Monitoring for Early Detection of HAB



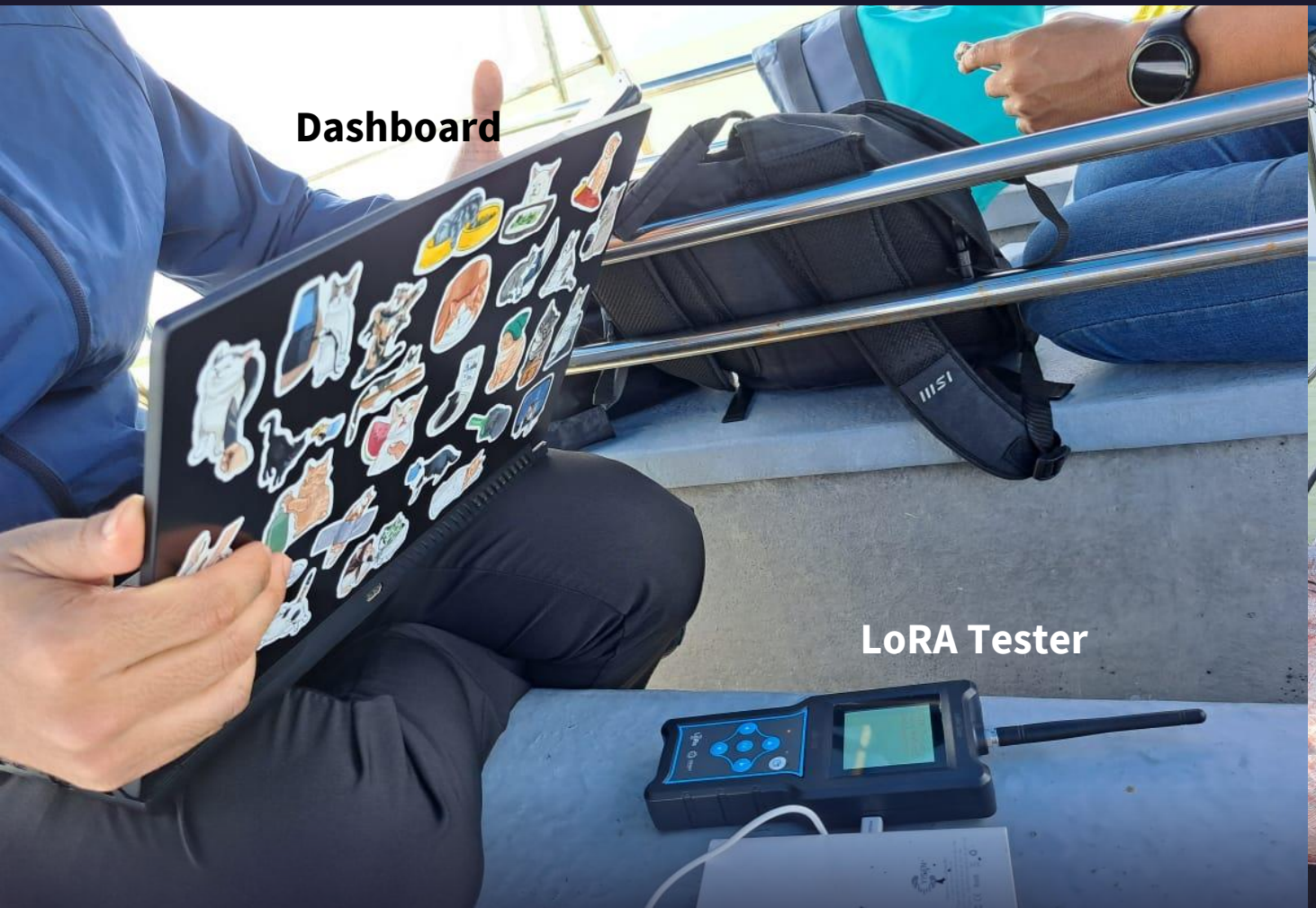
Selected Fish Farm: Kuala Gula, Perak mariculture site

Placement of LoRA gateway





Testing LoRA connectivity & signal strength from gateway



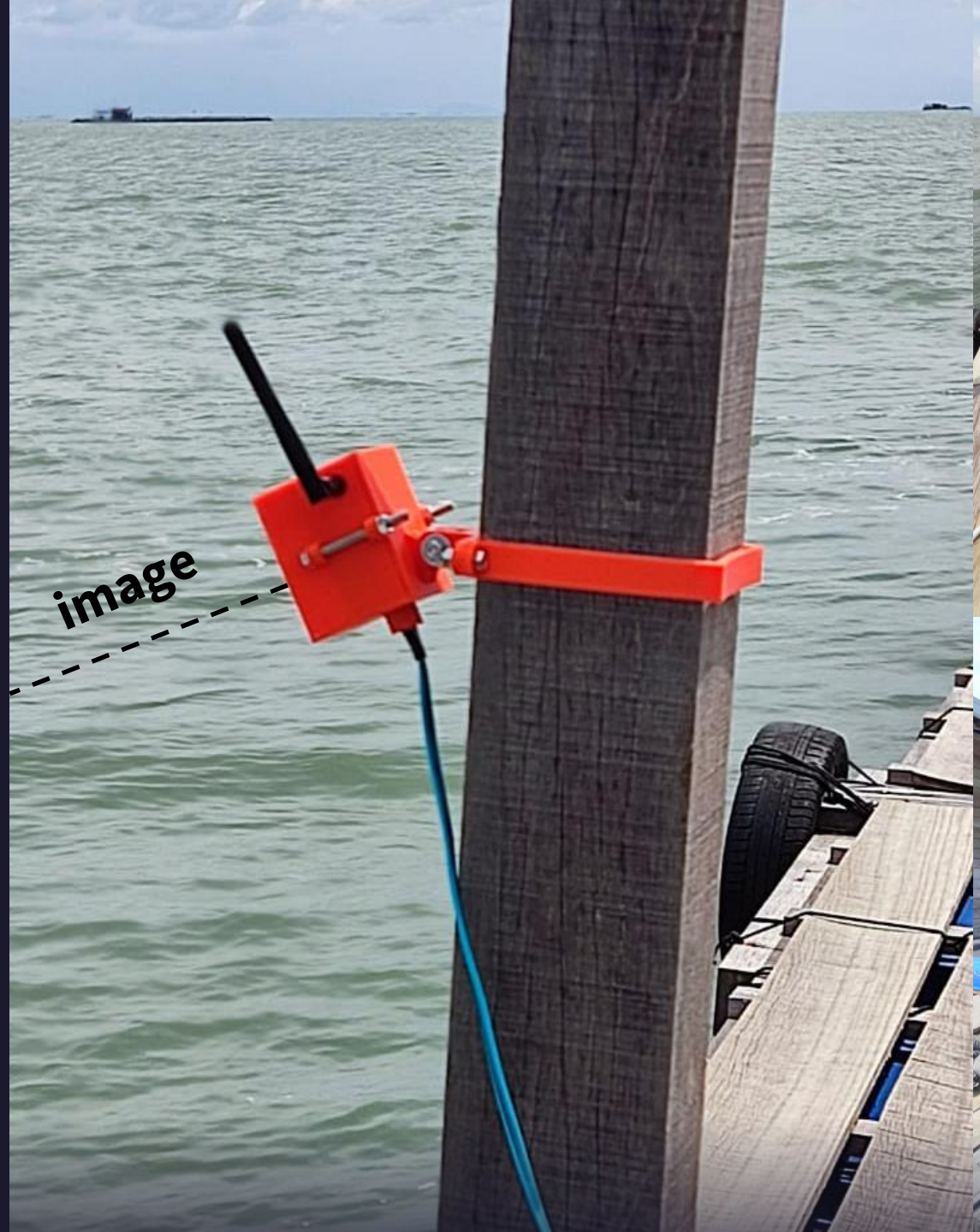
HAB monitoring based on chemical and physical parameters

Monitoring parameters:

- Chlorophyll – productivity of algae
- Temperature – climate change

HAB monitoring based on chemical and physical parameters

Monitoring parameters:
• Water discoloration – algae on water surface



We are looking for..

More PARAMETERS and COLLABORATORS

1. Drop in dissolved oxygen (DO) – massive decay of algae / diatom
2. Spike in Nitrogen (N) – increase in nutrient
3. Spike in Phosphorus (P) – increase in nutrient)
4. Toxin (common toxin is saxitoxin)
5. IoT deployment to monitor other fish farms in **ASEAN countries**
6. **Experts from ASEAN and Japan**

- IoT experts
- aquaculture experts

Funding and awards for project

National Instruments Malaysia
(American multinational company)
awarded the proposal
RM 100,000

GOLD CERTIFICATE

Dr. Nadiah Husseini Zainol Abidin

from

Universiti Putra Malaysia, Malaysia

has received the gold award for the presentation titled:

Remote Monitoring of Harmful Algal Bloom via Marine Toxin Biosensor Integrated LoRa for Food Security

at the online ASEAN IVO Forum on November 18, 2021

Chairman of the ASEAN IVO Steering Committee

Gold certificate from ASEAN IVO
(a global alliance of ICT R&D
institutes and universities in the
ASEAN region and Japan.


Remote Monitoring of Harmful Algal Bloom
'Malaysia is blessed with natural resources, and it is up to us to manage it wisely'
REMOTE-MONITORING OF HARMFUL ALGAL BLOOM VIA MARINE TOXIN BIOSENSOR INTEGRATED LORA FOR FOOD SECURITY
Source: Dof Malaysia Youtube Channel
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Thank you
Terima kasih

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