IPHAB-XVI
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WESTPAC HAB Programme

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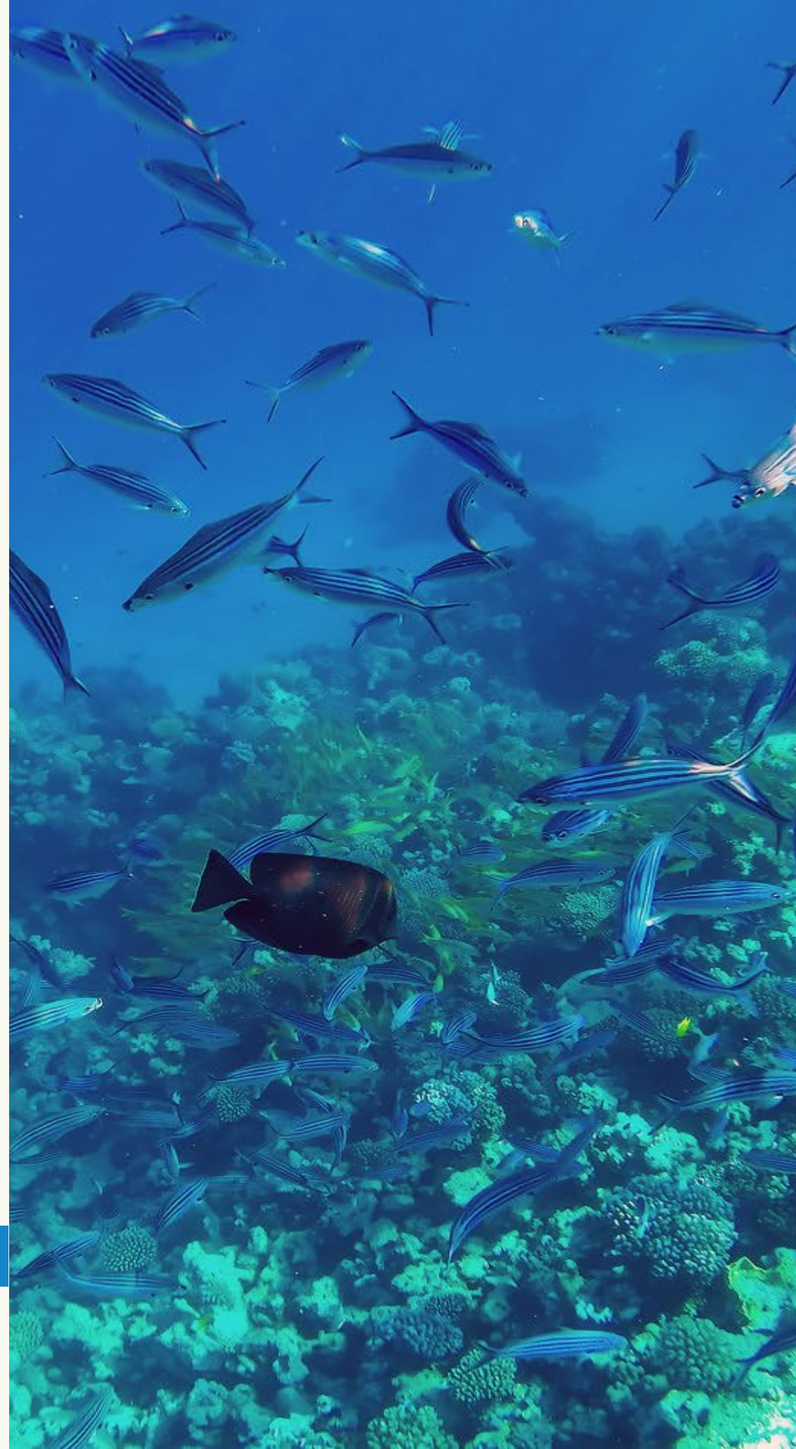

1. Justification

(Why this programme/project/working group is needed for the Sub-Commission)

Under the changing ocean environment with climate change, more frequent Harmful Algal Bloom (HAB) has been observed and its geographical coverage has been also expanded. The HABs cause health problems and fish kills, which are risks for human well-being and sustainable seafood provision to the society. Mitigation and management of the impact by HABs to the society is a common urgent issue of countries in the WESTPAC region to achieve sustainable development, especially to meet the target 14.2 of the SDGs Goal 14 on sustainably managing and protecting marine and coastal ecosystems to avoid significant adverse impacts by strengthening their resilience.

The HABs are natural phenomenon and cannot be stopped their occurrences. Therefore, holistic understanding and measures based on multidisciplinary and even transdisciplinary approaches are important to address problems caused by HABs. Based on this understanding, the program aims at promoting transdisciplinary HAB science under the UN Ocean Decade.

Based on the strong natural science on HABs accumulated through long-time WESTPAC-HAB programme, transformative science would be promoted through effort of engaging various stakeholders to better address various problems caused by HABs. From the natural science side, understanding biology and ecology of phytoplankton and identification of causative species including morphology among others are the very basis to adequately address occurrences of HABs to choose necessary measures for mitigation. To early detect and issue warning to the society, novel techniques such as meta-barcoding and DNA analysis are expected to be utilized. From the social science side, to develop and maintain monitoring system to be effective, analysis of social system including administrative structure and relationships among stakeholders, i.e., national and local governments as management and monitoring bodies, fisheries including aquaculture industries as producers of shellfish and fish, and citizens as consumers are necessary.

2. Objectives

Long-term objectives of WESTPAC-HAB program since its establishment in 1989:

- Understanding of the biological and chemical nature, population dynamics and environmental effects of harmful algae and their bioactive products.
- Prevention of ill consequences caused by HABs, through providing scientific knowledge useful for establishment of reliable cost- and load-effective management systems including monitoring and research.

Specific objectives for this timeframe:

- To coordinate the exchange of HABs information **especially on emerging issues** among the member states and all HABs-related organizations.
- To develop training modules and conduct capacity-building activities to improve our understanding of the ecology, physiology, and toxicity of HABs species.

3. Major activities, outputs & outcomes

3-1. Scientific sessions organized and conducted

Activity (1): Mitigation and Management of Harmful Algal Blooms at the 2nd UN Ocean Decade Regional Conference & 11th WESTPAC Scientific Symposium

Outputs & Outcomes:

A total of 15 oral and 3 poster presentations were shared and attended by more than 50 participants for this session. There were contributions from 7 countries (Singapore, Malaysia, Japan, Philippines, Indonesia, Russia and China).

Detailed observations of HABs in relation to environmental conditions were shared, and the significant impacts of HABs on ecosystems were highlighted. A variety of methods and tools to observe and understand HAB dynamics were presented ranging from traditional to newer methods such as genomics, and optics all the way to capacity and institution building. Importantly, methods to mitigate HAB impacts such as economic models and modified clay.

Timeframe

Project this term start year: 2021

Outputs of Scientific Session and recommendations

1. Understanding bloom triggers is important and needs to be approached using combined observations of HAB species, environmental and other biotic factors
2. There is a need to harness and compare different approaches (e.g., taxonomy, genomics, optics, remote sensing) to detect HAB species particularly since each has their own pros and cons and also depending on questions/objectives/scale
3. Considering the interdisciplinary and transboundary nature of HABs, a regional perspective of HABs is needed with greater sharing of information and approaches, and standardizing where possible
4. Partnerships and collaborations with communities and industries are needed to sustain and expand HAB monitoring programs and importantly to ensure the science can help mitigate HAB impacts

Presenters and participants of the event

3. Major activities, outputs & outcomes

3-1. Scientific sessions organized and conducted

Activity (2): Incubator 6, focused on "Establishing Decision-support tools for Eutrophication and Harmful Algal Blooms (EuHABs) Management" at the 2nd UN Ocean Decade Regional Conference & 11th WESTPAC Scientific Symposium

Timeframe

Project this term start year: 2021

Outputs & Outcomes: The session, co-convened by Eko Siswanto (Japan Agency for Marine-Earth Science and Technology, Japan), Aletta T. Yñiguez (University of the Philippines, Philippines/ GlobalHAB, IOC WESTPAC-HAB and IPHAB), Anukul Buranapratheprat (Burapha University, Thailand), Jing Zhang (University of Toyama, Japan), Jutarak Luang-on (Japan Agency for Marine-Earth Science and Technology, Japan), and Liu Qian (Ocean University of China, China), featured 14 talks and attracted over 50 participants. Discussions centered on the use of remote-sensing and modeling tools for HABs and eutrophication, addressing satellite data limitations, the potential of drone platforms for monitoring, and tuning locally developed marine ecosystem models for managing nutrient loads.

Outputs of Scientific Session and recommendations

Key outputs of the session included an enhanced understanding of available tools for addressing EuHAB issues, improved communication among scientists and policymakers, and the establishment of new ideas for collaboration and data sharing. Participants emphasized the need for integrating various monitoring approaches to address regional EuHAB problems effectively and suggested future research collaborations to develop a more robust regional monitoring system."

3. Major activities, outputs & outcomes

3-1. Scientific sessions organized and conducted

Activity (3): WESTPAC HAB Session conducted at ICHA 2023 in Hiroshima, Japan,

5-10 November 2023

Outputs & Outcomes: Emerging issues shared, i.e., new species and its first social damage to fisheries in Hokkaido, Japan reported; Collaborative effort to respond to the incident among national, local government officers and academics and regional cooperation among WESTPAC HAB members shared among WESTAC and international scientists and practitioners

3. Major activities, outputs & outcomes

3-2. Regional/National trainings for capacity development organized/conducted

Activity 1: UM and IOCAS Joint seminar on Mitigation of HABs
16-19 August 2023

Joint Symposium and Seminars on Mitigation of Harmful Algal Blooms (HABs)

We are pleased to announce that experts from the Institute of Oceanology, Chinese Academy of Science (IOCAS), Prof. Zhiming Yu and his research team will be in Malaysia as part of the effort to strengthen research collaboration among HAB researchers in the region.

A joint symposium and two seminars will be organized during the visit.

The joint symposium between IOCAS and IOES will be held in Bachok Marine Research Station (BMRS), the Institute of Ocean and Earth Sciences, University of Malaya, Bachok, Kelantan.

Tentative program for **Joint Symposium**:
Venue: BMRS Seminar Room, BMRS, IOES, UM, Bachok, Kelantan
Date: 16th August 2023
Time: 1000 - 1700

The in-person seminar will be held in the Institute of Ocean and Earth Sciences (IOES), University of Malaya, Kuala Lumpur, and followed by an online webinar jointly organized with WESTPAC HAB program. The seat is limited for the in-person meeting at IOES, UM.

Tentative program for **in-person seminar**:
Venue: Anggerik Meeting Room, Institute of Advanced Studies Building (IAS Building), UM, Kuala Lumpur
Date: 18th August 2023
Time: 1430 - 1730

Tentative program for **webinar**:
Venue: MS TEAMs
Date: 19th August 2023
Time: 1430 - 1630

Prof Yu and his team will share their success story using modified clays to mitigate the occurrence of algal blooms in China. A dialogue session will be arranged with stakeholders from aquacultures industries and relevant authorities at the end of the

Activity 2: National seminar on Seafood safety organized by Ministry of Health Malaysia- Food safety and quality program.

Outputs & Outcomes: more than 200 staffs from the related agencies participated in the event to learn about seafood safety related to algal origin seafood poisoning. This is a follow-up event after the shellfish poisoning event in a shellfish farming area without known record of algal blooms in Malaysia.

PROGRAM KESELAMATAN DAN KUALITI MAKANAN
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Ruj. Kami: KKM.600-1/3/154 Jld.3 (/)
Tarikh : 30 April 2024

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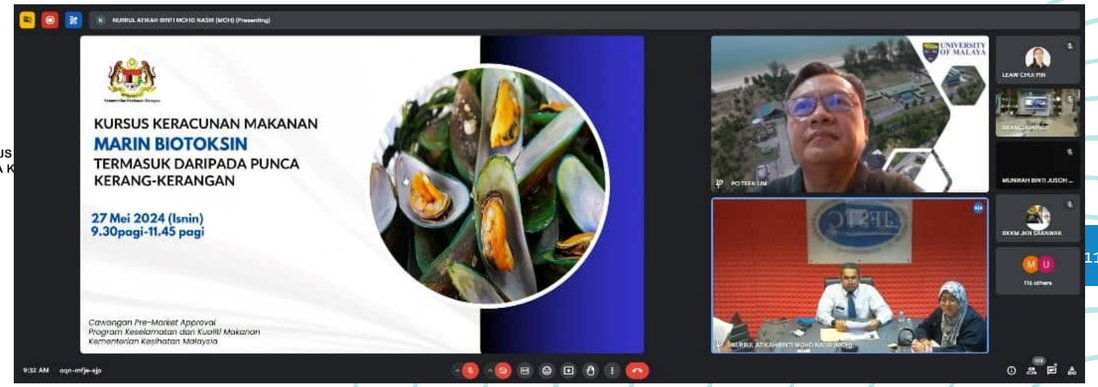
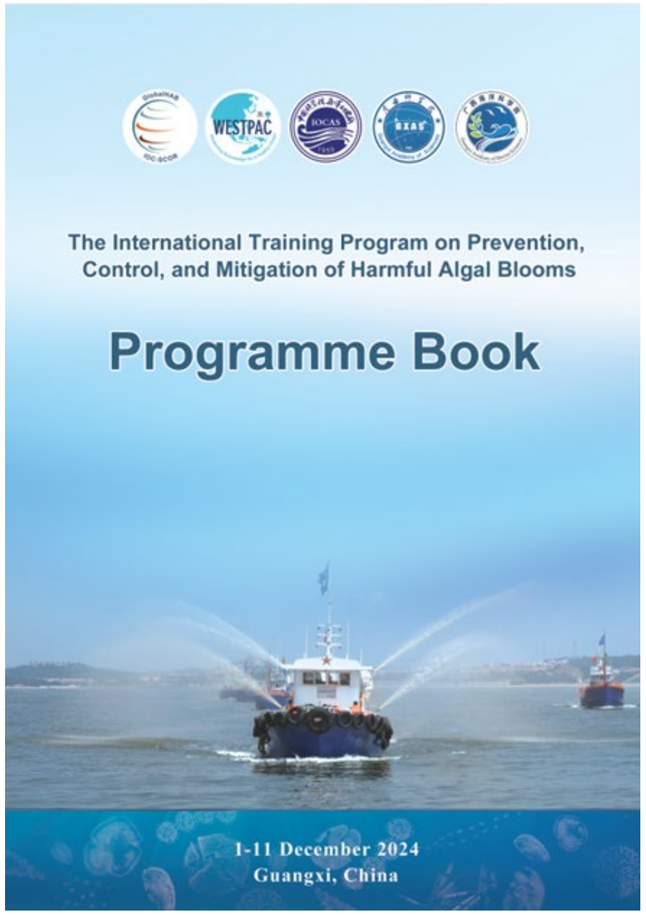
JEMPUTAN SEBAGAI PENCERAMAH BAGI KURSUS
MARIN BIOTOKSIN TERMASUK DARIPADA PUNCA K



Activity3: The international training program on prevention, control, and mitigation of Harmful Algal Blooms December 1-11, 2024; Guangxi, China



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International Union for Conservation of Nature

Activity 4.

An international workshop to conduct comparative study on global change and variation trends of harmful algal blooms in the East and West coasts of the Pacific was hosted Dr. Ai Feng Li, Ocean University of China from 22-26 October 2024 in Qingdao China.

7th XMAS 2025 Xiamen Symposium on Marine Environmental Sciences
January 14-17, 2025

HAB session at Xiamen Symposium on Marine Environmental Sciences (XMAS) 2025

The Xiamen Symposium on Marine Environmental Sciences (XMAS) was first initiated by State Key Laboratory of Marine Environmental Science, Xiamen University (MEL) in 2014 to promote interdisciplinary studies in marine environmental science. Since then, it has grown to become one of the largest conferences in marine science in Asia.

The upcoming XMAS 2025 will take place in Xiamen, China, from January 14-17, 2025. During this event, a session on Harmful Algal Blooms will be hosted: ***Alleviating the Impact of Emerging Harmful Algal Blooms (HABs) to Coastal Ecosystems and Seafood Safety for a Sustainable and Healthy Ocean***

Conveners: Po Teen Lim, Haifeng Gu, Xiaolong Yu, Chui Pin Leaw

This session welcomes studies on emerging HAB events, including research on microalgae and macrophytes harmful events in the Asian Pacific region and beyond. Topics of interest include:

1. Dynamics of HABs, from molecular to ecological aspects, including transboundary events.
2. Knowledge gaps on the physiological and molecular responses of HAB species from tropical to temperate regions.
3. Early warning systems of HABs using novel technologies.
4. Development of monitoring (automated and in-situ) and mitigation (modified clays and other) technologies to minimize the impacts of HABs to mariculture.
5. Trends and emerging HAB events (species, occurrence, and frequency) of regional importance under changing climate conditions.

Presentations related to international collaborations and joint research efforts in addressing the expanding HAB issues in the region are also welcomed.

Details of the session can be found on the XMAS 2025 website: *https://xmas.aconf.org/all_session_proposal*

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Activity 5.

A scientific session with the title “alleviating the impact of emerging HABs to coastal ecosystems and seafood safety for a sustainable and healthy ocean” was conducted from 14-17 January 2025. The session was co-convene by Drs. Po Teen Lim, Hai Feng Gu and Chui Pin Leaw. Dr. Mitsunori Iwataki is the invited speaker of the session.

An example of regional collaborative activity to address emerging issues: Ciguatera Fish Poisoning in Indonesia

Application of artificial substrate in toxic dinoflagellates Analysis in Seribu Islands to mitigate Ciguatera Fish Poisoning in Indonesia

- Project for Indonesian fiscal year of 2023 – 2024
- Implementing standardized artificial substrate to sample and collect data on benthic ciguateric species composition → part of attempts to standardize the sampling methods for any future national CFP monitoring program
- Funded by Universitas Indonesia (UI) in collaboration with National Research and Innovation Agency (BRIN) and Universiti Putra Malaysia
- Study site: Seribu Island, Jakarta

Slide courtesy by: Arief Rachman, Riani Widiarti, Hikmah Thoha, Muawanah

4. Problems encountered & recommended actions

Problems encountered

- Lack of funding support for training workshop and networking activities;
- Lack of involvement of other stakeholders (government agencies, NGO) due to limited financial resources
- Lack of data in database hampered the effort to understand long term changes of HABs events in all member states (especially due to climate changes)
- Challenges in data sharing due to existing and outdated policy

Actions

- promote data submission to IOC HAEDAT and OBIS by member states
- Promote data sharing through national focal points based on the International convention of Biological Diversity and its protocols
- Put effort to expand networks among social scientists and different stakeholders in respective countries
- Actively engaging involvement of active young HAB scientist in the program

5. Strategic considerations/thoughts for future development

- Identify emerging HABs issues among countries through communication among steering committee (SC) meeting regularly, depending on funding situation
- Plan and organize at least one capacity building activity at national or regional level
- Promote collaboration with scientists, government and non-governmental organization and industries
- Exchange and sharing of up-to-date information on emerging HABs sciences in the WESTPAC region
- Constant communication with other HAB related international organizations and society (e.g. GlobalHAB, IOC-FAO-IPHAB, PICES S-HAB, ISSHA, EastHAB)
- Provide technical assistances to address emerging HAB issues upon request
- Actively engaging involvement of active young HAB scientist in the program

6. Potential action plans for future implementation

for the period of 2025-2026 and beyond

Program	Plan				Funding Required		Remark
	Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources (i.e. from national or international)	
HAB	1.Steering meeting	Update the status of HAB information in the region and identify emerging HABs issue to address	identified national/regional HAB training courses, identified emerging HAB issues	2025 (online), 2026 (online), 2027	20,000 USD	10,000 USD (Univ. Tokyo, Univ. Malaya, Tokai Univ., etc.)	
	2.Strengthening collaboration with various stakeholders and other HAB related networks (EASTHAB, GlobalHAB, IOCIPHAB, PICES S-HAB, etc.)	Join other HABs related meetings at least one time each by April 2027. Promote collaboration with social scientists, national and local government officers and fishermen/aquaculturists.	Up-to-date information and cutting-edge technique and science on HABs shared among countries in the region; Emerging issues and needs on HABS of the countries in the WESTPAC region disseminated to other HAB related international societies. At least 2 social scientists in WESTPAC countries delivered presentations in the scientific meetings.	2025-2027	No cost		
	3.Capacity building	One capacity building activity every year conducted in line with UN Decade of Ocean Science for Sustainable Development. Possible themes are: i) emerging issues on HABs in countries, ii) novel technique for early warning, iii) monitoring, mitigation and management, etc.	3 early-career ocean scientists in WESTPAC countries delivered presentations in the capacity building activities by April 2027.	2025-2027	No cost	In kind (Univ. Tokyo, Univ. Malaya, Univ. Philippines, etc.)	

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ThankYou

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