Biodiversity Conservation, Ecosystem and Human Health and Blue Economy

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Fourteenth Intergovernmental Session of the IOC Sub-Commission for the Western Pacific
4-7 April 2023, Jakarta, Indonesia
Presentation outline

- Biodiversity conservation, ecosystem and human health, and Blue Economy
- Why is biodiversity conservation important?
- Our effort in addressing marine biodiversity conservation, ecosystem, human health and blue economy
- A summary of key achievements
- Key activities since the last Session (April 2021)
- Problems encountered and recommendation for future development
- Planned activities for May 2023- April 2025
Richness of Species Diversity for Fishes

Species density

[Stuart-Smith et al. 2013]
Protein Source, Food security

Cultural Value & Heritage

- Our forebears are great seafarers with life neatly intertwined with the sea
- Lost of biodiversity constitute lost of cultural heritage & our historical diversity

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THE BLUE ECONOMY

- is inclusive and improves the lives of all
- harnesses renewable energy
- uses smart shipping to lessen the impacts on the environment
- is based on sustainable fisheries
- creates jobs, reduces poverty and ends hunger
- takes action against illegal fishing
- protects coastal communities from the impacts of climate change
- conserves marine life and oceans
- tackles marine litter and oceans pollution

Lee et al., 2020
( Environment International)
Marine Biodiversity in Relation to Human Impacts
Future threats: Warmer, Breathless, and Acidic

Burning fossil fuels, deforestation and industrial agriculture release carbon dioxide (CO₂) and other heat-trapping gases into our atmosphere, causing our planet to warm. The ocean has buffered us from the worst impacts of climate change by absorbing more than 90 percent of this excess heat and about 25 percent of the CO₂, but at the cost of causing significant harm to marine ecosystems.

- **SEA LEVEL**: Sea level rise is accelerating, flooding coastal communities and drowning wetland habitats.
- **BLEACHING**: Warm-water coral reefs (marine biodiversity hotspots) could be lost if the planet warms by 2°C (3.6°F).
- **TOXIC ALGAE**: Larger and more frequent blooms are making fish, birds, marine mammals and people sick.
- **HABITATS**: Lower oxygen levels are suffocating some marine animals and shrinking their habitats.
- **ACIDIFICATION**: More acidic water harms animals that build shells, such as corals, clams, and oysters.
- **FISHERIES**: Disruptions in fisheries affect the marine food web, local livelihoods, and global food security.

Future threats: Emptying of our Ocean
### Projects supported by IOC-WESTPAC

#### Coral Reef Resilience to Climate Change and Human Impacts

**Thamasak Yeemin**  
Marine Biodiversity Research Group, Ramkhamhaeng University, Bangkok, Thailand

#### Coral Reef Restoration

**Suchana Chavanich**  
Department of Marine and Coastal Resources (Thailand) and Chulalongkorn University

#### Harmful Algal Blooms

**Kazumi Wakita & Po Teen Lim**  
Centre For Marine & Coastal Studies, Universiti Sains Malaysia, Malaysia

#### Harmful Jellyfish Research in the Western Pacific and Adjacent Seas

**Aileen Tan Shau Hwai**  
Centre For Marine & Coastal Studies, Universiti Sains Malaysia, Malaysia

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<table>
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<tr>
<th>Project</th>
<th>Leader</th>
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<tr>
<td>Enhance the Capacity for Species Identification and Genetic Analysis</td>
<td>Youn-Ho LEE</td>
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<td>on Marine Organisms in the Coral Reef Ecosystems in the Western Pacific</td>
<td>Korea Institute of Ocean Science and</td>
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<td>- 3rd Phase (DRMREEF-III)</td>
<td>Technology (KIOST)</td>
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<td>WESTPAC Ocean Remote Sensing Project for Coastal Habitat Mapping</td>
<td>Teruhisa KOMTSU</td>
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<td>Japan Fisheries Resource Conservation</td>
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<td>Distribution, Source, Fate and Impacts of Marine Microplastics in the</td>
<td>Daoji LI</td>
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<td>WESTPAC (Asia Pacific Region)</td>
<td>East China Normal University</td>
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<td>Marine Toxins and Seafood Safety (IOC-WESTPAC-TMSS)</td>
<td>Dao Viet Ha</td>
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<td>Institute of Oceanography, Vietnam</td>
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Coral Reef Resilience to Climate Change and Human Impacts

Coral Reef Restoration

Distribution, Source, Fate and Impacts of Marine Microplastics in the WESTPAC (Asia Pacific Region)

Marine Toxins and Seafood Safety (IOC-WESTPAC-TMSS)

Harmful Algal Blooms

Harmful Jellyfish Research in the Western Pacific and Adjacent Seas

WestPac Ocean Remote Sensing Project for Coastal Habitat Mapping

Enhance the Capacity for Species Identification and Genetic Analysis on Marine Organisms in the Coral Reef Ecosystems in the Western Pacific - 3rd Phase (DRMREEF-III)

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KEY ACHIEVEMENTS

Establishment & Strengthening of the WESTPAC Network

Capacity Development especially for young scientists

Standardization of research methodology

Trans-boundary research & Collaboration
KEY ACHIEVEMENTS – Joint Publications
KEY ACHIEVEMENTS – Multi-disciplinary involvement

By Medical Scientists, with Marine Biologists

CO-DESIGN AND CO-PRODUCE SOLUTIONS

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Science to Policy makers
Science to the Public

Involvement of policy makers and industry partners

OUTREACH PROGRAMS
KEY ACHIEVEMENTS

Winning the OCEAN HACKATHON® 2022 using data generated from long term monitoring

Winner of Ocean Hackathon® 2022 at Kuala Lumpur, Malaysia (National Level) and Brest, France (International level). It is a 48-hour non-stop event during which teams develop a prototype to tackle a challenge. This event was organized by the Embassy of France. The jellyfish team proposed a challenge to develop the first prediction model for the jellyfish distribution and appearance in Penang Island, Malaysia, a mobile application called Jelly Go.
Main Features of Our JELLY GO!

• **Prediction** for Monthly Jellyfish Abundance
  (Ind./m³ → No. of Jellyfish in 1 Olympic-sized Swimming Pool)

• **Emergency Action Plan** for Medical Teams, Front Liner & Public

• **Citizen Science & Information**

Remarks:
- $2.000 \times 10^{-3}$ Ind./m³ = 20 jellyfish/10 million liters
- or **20 jellyfish in 10ML sea water** (ML = million liter or Megaliter)
- or **20 jellyfish in 4 Olympic-sized swimming pool**
- or **5 jellyfish in 1 Olympic-sized swimming pool**
  (Olympic-sized swimming pool measuring 50m long & 25 m wide contains 2.5ML or 2.5 million liters of water)
Prediction for Monthly Jellyfish Abundance

Data Source: Monthly Sampling for Environmental Parameters (*in-situ*) and Jellyfish Abundance (Ind. x10^{-3}/m^3)
Prediction for Monthly Jellyfish Abundance (2)

Vector Autoregression Model on R

Multivariate Time Series Forecasting

Mean (comparison S.D.) + 1.45

\[
\text{Mean (comparison S.D.)} + 1.45
\]
Emergency Action Plan

Our Response Teams

Our Reference Partner

**EMERGENCY**

**KEEP CALM!**

After holding the button for 3 seconds, we will contact the nearest hospital to your current location.

**SOS**

*Your current address*

Keringgı Heights, Jalan Tanjung Bungah, 11000 Tanjung Bungah, Penang

**Scanner**

**EMERGENCY SOS**

I was stung help!

*Connected to Apple watch...* Keep pointing at Satellite

*Opening messages...*
Citizen Science

Spot One?

Jellyfish

Which of the following jellyfish stung you?

Select:

Date:
- October 2 2020
- November 3 2021
- December 4 2022
- January 5 2023
- February 6 2024

Time:

For Divers:
- Depth (m)
- Temperature (°C)
- Number of Jellyfish

Our Partner
KEY ACHIEVEMENTS

Establishment of the WESTPAC Marine Biodiversity Portal

WESTPAC-XIV, 4-7 April 2023, Jakarta, Indonesia
Microplastics in fishes from the Northern Bay of Bengal

M. Shahadat Hossain 1, A. R. Faisal Sobhan 2, Mohammad Naiz Uddin 3, S.M. Sharifuzzaman 4, Shyedur Rahman Chowdury 5, Sobrat Sarkar 6, M. Shah Nazaz Chowdury 7 8

An updated inventory of sea slugs from Koh Tao, Thailand, with notes on their ecology and a dramatic biodiversity increase for Thai waters

Rahul Mehta 1, Manuel A. Cahuñas Gasínaga 2, Cristian G. Melo 3

A massive bloom of Karenia species (Dinophyta) off the Kamchatka coast, Russia, in the fall of 2020

Tatiana V. Orlova 1, Anatoly I.untsman 2, Elizaveta Y. Lagopova 3, Konstant V. Elmers 4, Maxim K. Sinitsin 5, Vadim A. Karbou 6

Variation of Carbon–Nitrogen–Phosphorus Contents and Allochthonous Inputs: A Product of Heterotrophic–Autotrophic Co-operation in Sponge Xestospongia sp. B of Thailand

Orlova et al. (2022)
KEY ACTIVITIES (since April 2021)

WEBINARS

WESTPAC-XIV, 4-7 April 2023, Jakarta, Indonesia
KEY ACTIVITIES (since April 2021)

WORKSHOPS (International)

WESTPAC-XIV, 4-7 April 2023, Jakarta, Indonesia
KEY ACTIVITIES  (since April 2021)

WORKSHOPS  (National)

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PROBLEMS ENCOUNTERED

• The long-term impacts of the COVID-19 pandemic in terms of socio-economic and logistic problems
  • Face-to-face and on-site workshops and training courses could not take place due to international or domestic travel restrictions imposed by Covid 19 pandemic.

• Lack of recognition of the work and activities by countries outside of the region in the subject related to the research in the Western Pacific region

• Continuous fundings to support continuous research in own country. Recommendations to explore more opportunities from other related international parties/NGOs/organisation for funding opportunity
PROBLEMS ENCOUNTERED

• Lack of data in database, hampering the effort to understand long term changes in the ocean in all member states (especially due to climate change)

• Data sharing are restricted due to data ownership issue by different member states

• Transboundary issue concerning the export of toxin contaminated seafood to neighbouring countries

• Inequal resources, knowledge and capacity on research and long-term monitoring among member states.
RECOMMENDATIONS

• **INCREASE NETWORKING / ENGAGEMENT WITH MEMBER STATES**
  • To conduct physical or hybrid events; and if necessary continue with online meetings
  • To conduct regular seminars/ workshops & Joint Publications with member states

• **DATA SHARING**
  • Promote Data Submission to recognized platforms by member states ie OBIS &
  Promote Data Sharing among member states

• **CONTINUOUS FUNDINGS**
  • Need to explore funding opportunities from other related international parties / organizations

• **CAPACITY DEVELOPMENT**
  • Involvement & Commitment of ECOP
PLANNED ACTIVITIES (May 2023 – April 2025)

- Strengthening Networking
  - Joint field activities
  - Symposium / Series of seminars

- Capacity development training
  - Workshops
  - Summer schools

- Science to Action
  - Communicating science to a broader audience
    ie policy makers, stakeholders & public
Translating Science into Action

**WHAT CAN WE DO?**

- **Continue Engaging** with scientists, policy makers & public

- **Continue Supporting** Marine Science & Technology

- **Continue developing healthy STIE** (*Science Technology Innovation & Economy*) in Marine Biodiversity, Conservation, Ecosystem, Human Health & Blue Economy
Thank You

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