



**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION  
(of UNESCO)**

**Eleventh Intergovernmental Session of the IOC Sub-  
Commission for the Western Pacific (WESTPAC-XI)**  
Qingdao, China, 21-23 April 2017

Item **5.1.2.3** of the Provisional Agenda

**PROGRESS REPORT ON MONITORING THE ECOLOGICAL IMPACTS OF  
OCEAN ACIDIFICATION ON CORAL REEF ECOSYSTEMS  
(May 2015–April 2017)**

In accordance with Terms of Reference of IOC Sub-Commission for the Western Pacific, the report is provided to facilitate the consideration by the Sub-Commission on the progress made on the WESTPAC-SEAGOOS pilot project – Monitoring the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems.

The report presents a summary of the activities and results of this project over the last intersessional period. The Sub-Commission is invited to consider its workplan for the next intersessional period.

## **I. Project**

1. Monitoring the ecological impacts of ocean acidification on coral reef ecosystems

## **II. Project objectives and expected outputs/outcomes**

1. To understand the situation of ocean acidification (OA) in the region and its status when compare to the global level, which could help to understand trend of ocean acidification and its impact to marine ecosystem in future.
  2. To increase capability on OA monitoring/research by establishing the Standard Operation Procedure (SOP) for ocean acidification monitoring, which are appropriate to the country in the region.
  3. To establish the pilot sites for OA monitoring, both carbonate chemistry and biological parameters, in the region which will provide the data and information to support the target of SDG 14.
  4. To encourage the researcher in the region to aware an impact of OA to marine ecosystem in the region and establish the network in the region and join with the global OA network.
2. The expected outcomes include:
1. To achieve the target of SDG 14 on minimizing impact of OA on marine ecosystem and serve as technology transfer to the marine scientific community in the region.
  2. To achieve establishment OA observation network in the regional and join afford to work with the OA global network to build up the better understand situation and impacts to the ecosystem at the Global level.
  3. To achieve assessment status of OA and its impacts to the marine ecosystem in the region.

## **III. Principal Investigator (Chairperson) and Project Steering Group**

3. Principal Investigator: Dr Somkiat Khokiattiwong, Department of Marine and Coastal Resources of Thailand

4. The Steering Group include:

1. Dr. Somkiat Khokiattiwong (Thailand) – Project Investigator
2. Dr. Suchana Chavanich (Thailand)
3. Dr. Weidong Yu (China)
4. Dr. Intan Suci Nurhati (Indonesia)
5. Prof. Aileen Tan Shau Hwa (Malaysia)
6. Dr. Maria Lourdes San Diego-McGlone (Philippine)
7. Dr. Rusty Branard (USA)
8. Dr. Libby Jewett (USA)
9. Dr. Vo Si Tuan (Vietnam)

## **IV. Terms of Reference of the Project Steering Group**

5. COMPOSITION:

6. The Project Steering Group (PSG) shall consist of member states of WESTPAC which interested to participate and willing to contribute their in-kind and activities of the Nation to join the Project. The member of PSG will be nominated by IOC National Focal Point or researcher or research institute. The communicate of the PSG will be base on correspondence. The project will seek support from member countries through the IOC-WESTPAC and other sources to secure an implementation of the project and its activities. The PSG may need to meet face to face, if necessary,

when the resources of the project is available. Other participants may be invited as observer, if deemed necessary, under their own support.

#### 7. FUNCTIONS:

8. The Project Steering Committee (PSC) is established to meet the scientific, managerial implementation, and resource need of the Project. It has overall responsibility for the formulation of strategy, and for the planning and coordination of WESTPAC-OAIME Project.

9. The function of PSC has to take response on:

- 1) To be very active in participation of project activities;
- 2) To review an existing status of project and serve regional need;
- 3) To identify the project requirement and provide the technical assistance;
- 4) To identify and search for resources to support project activities at the nation, if possible;
- 5) To provide the recommend and suggestion to adopt new project member and withdraw the membership upon the request of the member;
- 6) To be efficiency interact and correspondent with IOC-WESTPAC office, IOC-WESTPAC project or programme, IOC-GOOS programme, GOOS Regional Alliance (GRA) including related research project or programme under other organizations;
- 7) To provide national project's report and prepare the project report to the IOC-WESTPAC

#### **V. Activities carried out and/or to be carried out during the last intersessional period (May 2015 – May 2017)**

10. Three Training/Workshop were carried out during WESTPAC's intersessional period in Thailand by strongly support of the Thai's government. The purpose of series training/workshop was to increase capability on monitor/observation and to established the OA network in the WESTPAC region. The First training/WS was in January 2015. Its purpose was to introduce the ongoing global ocean acidification monitoring and its impact on the reef ecosystem research and networking. The results from the training/WS agreed on selected monitoring and analytical method for carbonate chemistry (pH by spectrophotometry method, total alkalinity by titration method, and biodiversity change in the reef ecosystem by using ARMS (Artificial Reef Method) method followed the NOAA). The following second training/WS was carried out in September 2015. The purpose of this training /WS was to introduce the theory and principal analytical method of carbonate chemistry of seawater and monitoring of biodiversity change on the reef ecosystem. The results from training/WS agreed to establish the Standard Operation Procedure (SOP) draft team to draft the chemical and biological monitoring including. There was also propose the pilot monitoring sites by participants of each countries which totally cover the Southeast Asia waters. The SOPs draft team compose of the experts from in and outside region (mainly support by NOAA and Woods Hole Oceanographic Institute). The third training/WS was carried out in August 2016 with the main propose to be hand on practice of carbonate chemistry analysis and ARM processes. The carbonate chemistry practice was carried out by (1) using spectrophotometry method for pH measurement including seawater sampling, sample preparation and preservation, (2) using auto-titration method for total alkalinity analysis including unit conversion for further calculation with CO2SYS software/excel-macro, and (3) practice on however to use CO2SYS software/excel-macro to calculate all related carbonate chemistry parameters. The materials that were used in construction ARM and used in carbonate chemistry analysis were provided for demonstration. There was expectation that the participants would get an experience and would be benefit for further development of OA experiment and operation in their countries. Implementing draft of SOPs, during the training/WS, were requested to be reviewed and feedback from participants for further improvement. The pilot monitoring sites, which proposed by the second training/WS, were reviewed and confirmed. Each training/WS received about 25-40 participants from the region and 5-6 experts as resources person. The project

just organize the session and workshop during the 10th WESTPAC International Conference, Qingdao, China, 17-20 April 2017.

**VI. Problems encountered and actions to be considered by the 11th Intergovernmental Session, tentatively scheduled for April 21-23, 2017, Qingdao, China**

11. No problem during the past intersessional period of the project.

## VII. Workplan and Budget for May 2017 – May 2019

Project					Funding Required		Remark
	Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources (i.e. from national or international)	
Monitoring the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems	1. Training/Workshop for capacity building and follow up the progresses of implemented project in member countries	<ol style="list-style-type: none"> <li>To keep continue to provide capacity building need of member countries and seeking for the further cooperation on ocean acidification monitoring/research</li> <li>To follow up the progresses of implementation of the pilot sites on carbonate chemistry of seawater and biodiversity change</li> <li>To provide the plate form for data and information exchange among participation countries including data analysis</li> <li>To find out a good practice of ocean acidification research and study to support the SDG14 activities of IOC</li> </ol>	<ol style="list-style-type: none"> <li>Product of data and information generate from the previous intersessional phase</li> <li>Support the technology transfer on ocean acidification to the member states in the region</li> <li>Strong ocean acidification network in the region</li> </ol>	August 2017	IOC- USD 5,000 (support resources persons and some travel grant)	Travel, per diem and accommodation including local organizer-training/ws venue Local logistics USD 20,000	
	2. Consultative meeting of the project steering group through the skype and join the activities with GOA-ON (Global Ocean Acidification Observation	<ol style="list-style-type: none"> <li>To consult and follow up the work plan and activities during the intersession period</li> <li>To join activates and work with IOC on SDG14 and the partner such as GOA-ON and IAEA etc.</li> </ol>	<ol style="list-style-type: none"> <li>To achieve the activities of network in the region and strong cooperation with the global programme to support the need of SDG14</li> </ol>	During intersessional period (2017-2018)	IOC- USD 5,000 (Travel grant)	In-cash and In-kind support from the member state and other sources 5,000	

Project					Funding Required		Remark
	Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources (i.e. from national or international)	
	Network (upon the occasion)						
	3.Training/Workshop for capacity building and follow up the progresses of implemented project in member countries	<ol style="list-style-type: none"> <li>1. To keep continue to provide capacity building base on need of member countries and direction need to support the SDG14 and to provide direction for the future implement of the OA research in region</li> <li>2. To follow up the progresses of implementation of the OA monitoring and its impacts from the pilot sites on carbonate chemistry of seawater and biodiversity change</li> <li>3. To provide the plate form for data and information exchange among participation countries including data analysis for further comparison with the global data and information to understand the trend is going to be in the region</li> <li>4. To find out a good practice of ocean acidification research and study to support the SDG14 activities of IOC</li> </ol>	<ol style="list-style-type: none"> <li>1. Product of data and information generate from the Implementation of the project</li> <li>2. Support the technology transfer on ocean acidification to the member states in the region</li> <li>3. Strong ocean acidification network in the region and trend of OA and its impacts in the region</li> </ol>	August 2018	IOC- USD 5,000 (support resources persons and some travel grant)	Travel, per diem and accommodation including local organizer-training/ws venue Local logistics USD 20,000	