

## **Future Earth in Asia as knowledge and engagement hub: The example of the SIMSEA programme<sup>1</sup>**

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The marginal seas of Asia are at the interface of the Indo-Pacific Oceans and the Asian land mass. As marine basins bounded by islands, peninsulas and submarine ridges, from the Bering Sea in the north to the Indonesian Seas in the south and to the Arabian Sea in the west. These seas are vulnerable to rapid population growth, overharvesting of marine resources and pollution. The region's marine ecosystems have more than 30% of the world's coral reefs and produce around 40 million tons of fish and more than 80% of the world's aquaculture products annually.

SIMSEA was conceived collaboratively by three scientists (from Japan, Malaysia and Philippines) in 2013 with the initial intention of establishing a place-based socio-ecological research programme. The scope was enlarged to include South Asia in late 2014, because of the importance of the South Asian region in global sustainability. The vision of SIMSEA is of an international alliance of physical, ecological and social scientists working together in collaboration with other stakeholders to generate policy and community-relevant knowledge towards sustainability of the marginal seas of South and East Asia. It comprises a community of practice that will co-design an integrative transdisciplinary programme that will facilitate its transition to sustainability and play a catalytic role in projects and programmes among countries in the region, and close gaps in relations between science and society.

The overall goal of the programme is to generate knowledge that can bring about transformative change towards sustainability in South and East Asia, and contribute towards sustainability at the global level.

### **Development of the SIMSEA Programme**

The seminal idea for a sustainability initiative in the marginal seas of East Asia (originally) emerged out of the 16th meeting of the ICSU Regional Committee for Asia and the Pacific (ICSU RCAP) in Seoul, Korea in November 2013. ICSU-ROAP then obtained earmarked funds raised by the Immediate Past President of ICSU, Prof. Yuan T.

Lee of Taiwan, to support a two-year programme of development beginning in mid-2014.

SIMSEA is evolving into a regional initiative in line with the spirit of ICSU's Future Earth program for global sustainability. It espouses scientific excellence through transdisciplinary research while promoting inclusiveness via co-design and co-production with relevant stakeholders.

### **Pre-scoping Workshop February 2014**

ICSU-ROAP and its partners, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and the Science Council of Japan (SCJ) hosted a pre-scoping workshop at JAMSTEC, in Yokohama, Japan on 27-28 February 2014. The objectives of the workshop were to facilitate the exchange of information and knowledge on the existing discipline-oriented research on the seas of East Asia and the Western Pacific, and to discuss the co-design of a transdisciplinary research program on the marginal seas of East Asia, which will contribute to global sustainability under the framework of Future Earth. Workshop participants who were carefully chosen lead researchers and implementers made presentations of the state of extant international programs in East Asian Seas (see Table 1)

Participants representing national government agencies of Philippines, Thailand, Malaysia, Korea and Vietnam provided up-dates on the status of nationally driven programmes on coastal and marine ecosystems (Table 2).

### *On-line survey of perceived research priority areas*

As part of the development of SIMSEA, an on-line survey was conducted to determine the research subjects considered priority by the scientific community in the region of the marginal seas of South and East Asia. This was an activity that was considered preparatory prior to the SIMSEA scoping workshop scheduled for November 2014. The survey adopted the method described earlier.

**Table 1. Presentations on international programs in East Asian Seas at SIMSEA Pre-scoping Workshop Feb. 2014**

Activities of IOC/WESTPAC	Wenxi Zhu, Head of the Intergovernmental Oceanographic Commission Regional Office for Western Pacific
Activities of PICES	Hiroaki Saito of the North Pacific Marine Science Organization on the (Pacific ICES, The International Council for the Exploration of the Sea)
Activities of APCC	Chin-Seung Chung, Director of the APEC Climate Center
Achievements of LOICZ and the Sato-Umi Concept	Tetsuo Yanagi of the Land Ocean Interactions in the Coastal Zone Project and Kyushu University
The East Asian Seas- A Bumpy road to sustainable ocean development	Chua Thia-Eng former Council Chair of the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)
New strategy for coastal marine science for establishment of 'Future Oceans'	Nobuyuki Miyazaki of the University of Tokyo
Views from living marine resource management and the Coral Triangle Project	Annadel Cabanban, Consultant, CTI Southeast Asia Project on Coastal and Marine Resources Management (GEF ID 3589: Coral Reefs, Fisheries, and Food Security (CTI-CFF))

**Table 2: Presentations on the status of national coastal systems**

Views from Coastal Ecosystems of the Philippines	Porfirio Miel Alino of the Marine Science Institute, University of the Philippines Diliman
Views from Integrated Coastal Zone Management of Thailand	Somkiat Khokiattiwong, Southeast Asian Global Ocean Observing System (SEAGOOS)
Views from Oceanography of Malaysia	Nor Aieni Haji Mokhtar of the Ministry of Science, Technology and Innovation
Rapid Arctic Warming in Recent Decades	Seong-Joong Kim of the Korea Polar Research Institute
Near Future Ocean Climate: Indonesia	Fadli Syamsudin of the Maritime Continent Center of Excellence, Agency for the Assessment and Application of Technology
Reviews of Oceanography in Vietnam	Vo Si Tuan of the Institute of Oceanography, Vietnam Academy of Science and Technology

The survey suggested that the concern in the SIMSEA region were similar to that found as priorities for research on the coastal and marine ecosystems at the global and included *inter alia* coastal and marine processes and terrestrial interactions, connectivity of ecosystems, ocean acidification and adaptation; and well-being of coastal communities

The results of the survey were tabled to the SIMSEA research prioritization workshop that was organized to specifically identify key research areas for the SIMSEA programme.

*SIMSEA Research Prioritization Workshop, Nov. 2014*

The research prioritization workshop was organized by ICSU-ROAP and the fledgling SIMSEA Program Office at the University of the Philippines, Diliman, Quezon City, Metro Manila. It aimed to bring together scientists and administrators with expertise and experience in physical, ecological, and social sciences in the marine and coastal ecosystems of the marginal seas of Asia (MSEA), so that the process of co-design of research and other activities for the SIMSEA programme can be established.

As suggested by the pre-scoping workshop held at the beginning of 2014, the unifying conceptual determinant of the workshop was the sustainability of the socio-ecological health of MSEA.

Researchers, administrators and representatives from community based organization from France, Japan, Korea, Malaysia, New Zealand and the Philippines engaged in the discussions to collaboratively build a regional programme known as SIMSEA. Presentation during the workshop included those designed to lay the ground for a firm understanding of Future Earth and SIMSEA. Forward looking ideas and plans related to work in coastal and marine environments and the full results of the electronic survey mentioned earlier were presented and discussed (see Table 3). These presentations provided the basis for a comprehensive scenario-building exercise for SIMSEA that incorporated principles of co-design and co-production of knowledge as expounded by Future Earth.

**Table 3.** Foresight presentation made during the SIMSEA Prioritization Workshop held in Nov.2014

Prof. Mitsuo Uematsu University of Tokyo	Coastal and marine science in Southeast Asia (COMSEA) for Future Oceans
Prof. Simon Thrush University of Auckland	Multidisciplinary approach in coastal management in New Zealand: a case-study
Prof. Richard LeHeron University of Auckland	Marine futures: Scenarios, directions and potential interventions
Dr. Samuel Mamauag of UP-MSI.	Vision and healthy ocean indices and status of marginal seas in South and East Asia
Annadel Cabanban SIMSEA Programme Office	Results of the on-line survey of perceived priority areas of work in the MSEA region

It introduced a relatively new approach to program development that was more inclusive of the stakeholders which aimed to envision the future of the MSEA given its current status and planned interventions to achieve a desired future condition. The outcome of the workshop included a vision of SIMSEA as *An international alliance of physical, ecological and social scientists working towards the sustainable development of the marginal seas of South and East Asia*. It was also decided that the term “marginal seas” would include coastal (estuarine, land and sea) and marine areas. The crux of sustainability in the marginal seas in Asia is resiliency and the workshop proposed that resilient marginal seas should be one that supports sustainable fisheries, conserves marine biodiversity, is able to adapt to climate change, supports the blue economy, build nations with ocean literacy, are able to enhance human well-being; and are effectively governed for socio-ecological and economic sustainability.

Transdisciplinary research topics that would receive priority in development during the period 2015-2020 were also identified. These were clustered according to the three sub-themes of Future Earth (Table 4). The organization of the two-step process of scoping of the research agenda of SIMSEA demonstrated the feasibility of bringing together thought leaders in multiple disciplines, not only from the region but also from developed countries, to engage and define the transdisciplinary research agenda for, SIMSEA.

#### **The organizational structure of SIMSEA**

##### *The SIMSEA Scientific Steering Committee (SIMSEA SSC)*

The core group consisting of the initiators of SIMSEA (Prof. Hasan, Prof. Yamagata and Prof. Cruz) and Dr. Annadel Cabanban, who was appointed as the SIMSEA Program Executive met on 30 June 30 to 1 July 2014 at UP-MSI to discuss

the initial directions and strategies for development of SIMSEA as a Future Earth activity in the Asia Pacific region. At the meeting it was agreed to its transition to a Science Steering Committee. In addition to the four core founding members, two other scientists were included, Prof. Marie Antonette Juinio-Meñez, marine biologist/ecologist and former Director of UP-MSI and Prof. Fadzilah Majid-Cooke a sociologist from the Universiti Malaysia Sabah (UMS).

The SSC will meet twice a year. The first held in February 2015 discussed the outcome of the SIMSEA research prioritization workshop and reiterated the need to emphasize co-design of solutions-oriented research and to involve more social scientists particularly in the design and conduct of research on transformations to sustainability in the region. The SSC was and still is optimistic that inclusive transdisciplinary research will provide a deeper knowledge of phenomena and processes important to the sustainability of marginal seas of Asia.

The third meeting of the SSC focused on means to promote SIMSEA, identification of potential sources of funding, and on plans to hold a SIMSEA regional symposium in September 2016 as a precursor to the SIMSEA International Conference proposed for September 2017. The SSC also agreed to seek ways to expand partnerships to strengthen the capability of SIMSEA.

#### **SIMSEA Programme Office**

During the first SIMSEA SSC meeting on 30 June to 1 July 2014 in UP-MSI, the SSC explored partnership with the University of the Philippines System (UPS) as a host for the initial stages of the programme. The Director of the Office for international Linkages, Prof. Rhodora V. Azanza affirmed the interest of UP and agreed to develop a framework with ICSU ROAP in setting up the

**Table 4.** The scope of SIMSEA transdisciplinary research topics for 2015-2020 clustered by Future Earth research sub-themes, identified by the Prioritization Workshop.

<p><b><u>A. Dynamic Planet</u></b></p> <ol style="list-style-type: none"> <li><u>1. Spatial and temporal scales for assessing sustainability of coastal and marine ecosystems services</u></li> <li><u>2. Extent of cumulative effects of climate change and extreme weather events impacts on marine environments, biodiversity, humans and livelihoods</u></li> <li><u>3. Tipping points and resilience of marginal seas in relation to global change</u></li> <li><u>4. Impacts of priority pollutants on marine organisms and humans</u></li> <li><u>5. Relationships between rapid urbanization and extent of marine pollution effects associated with changing urban and rural landscapes</u></li> </ol>
<p><b><u>B. Global Sustainable Development</u></b></p> <ol style="list-style-type: none"> <li><u>1. Consequences of economic growth strategies on socio-economic and environmental wellbeing</u></li> <li><u>2. Mechanisms to define balance, trade offs and cultured bottom lines in resources use</u></li> <li><u>3. Ocean health and its indicators in different regions</u></li> <li><u>4. Establishing ecologically coherent networks of locally managed marine areas including MPAs</u></li> </ol>
<p><b><u>C. Transformations towards Sustainability</u></b></p> <ol style="list-style-type: none"> <li><u>1. Building local community capabilities towards sustainability</u></li> <li><u>2. Co-developing and co-learning plausible alternative pathways toward sustainability</u></li> <li><u>3. Fostering ocean views among resource planners, users and managers</u></li> <li><u>4. Cultural and other determinants of unity and wise use of resources in the marginal seas</u></li> </ol>

SIMSEA Programme Office in the UP Diliman campus. The Office will also serve as a Secretariat of the SSC. A Memorandum of Agreement (MOA) was signed by the President of the Academy of Science Malaysia on behalf of ICSU-ROAP and the President of the University of the Philippines (UP) on 22 October 2014.

*SIMSEA Institutional Partners*

The agencies represented by the three scientists who conceptualized SIMSEA i.e. ICSU-ROAP, UP-MSI and JAMSTEC became the cooperating agencies in moving SIMSEA forward. There are now six other institutional partners of SIMSEA:

- Atmosphere and Ocean Research Institute (AORI), University of Tokyo
- Application Lab, Japan Agency for Marine-Earth Science and Technology (APL /JAMSTEC)
- Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT)
- Marine Science Institute, University of the Philippines (UP-MSI)
- Institute of Marine Sciences (IMS), University of Auckland, New Zealand
- Universiti Malaysia Sabah (UMS)

The Universiti Malaysia Sabah (UMS) became an active partner of SIMSEA in March 2016 when it established a SIMSEA Research Group that forms a SIMSEA research node located in Malaysia. Members of the group consist of academics from the Faculty of Humanities, Art and Heritage, Faculty of Medicine and the Borneo Marine Research Institute. It will serve as an additional knowledge and engagement hub that will develop SIMSEA as a Future Earth driven research activity. The research group is led by Professor Fadzilah Majid Cooke from the Faculty of Humanities, Art and Heritage and together with the other organizations within UMS has about 20 researchers in total.

SIMSEA will strive to establish the regional framework for transdisciplinary solutions oriented research. In SIMSEA, middle-income countries such as the Philippines and Malaysia acted in unison with industrialised countries such as Japan and New Zealand in designing the proposed programme. Additionally, JAMSTEC is currently initiating efforts to secure funding for SIMSEA-related research in a bilateral arrangement with The Philippines under the Science and Technology Research Partnership for Sustainable Development (SATREPS) programme of the Japan Science and Technology Agency (JST).

In essence, the creation of the SIMSEA programme with its institutional partners is enabling a dynamic change towards collaborative research in Asia and the Pacific as envisaged by Future Earth. It will create a sophisticated web of partners that are actively engaged and enable knowledge and resources to circulate in a research system that has been reshaped to meet the demands for regionally driven collaborative research envisaged by the Future Earth programme.

#### **SIMSEA National Programmes**

The establishment of SIMSEA Japan was initiated by Prof. Yamagata of JAMSTEC and Prof. Mitsuo Uematsu of Director of the Center for International Relations, Atmosphere and Ocean Research Institute (AORI), University of Tokyo. The 1 and 2 workshops to develop SIMSEA Japan were held in October 2014 and on 9 March 2015 at AORI. SIMSEA Japan was formally established and endorsed by the Science Council of Japan (SCJ) in June 2015. It is aligned with other national programs under the auspices of the SCJ and reports directly to the National Committee for Japan of the Scientific Committee on Oceanic Research (SCOR), and to the Future Earth National Committee under SCJ.

The formation of SIMSEA Philippines was discussed in a brain-storming session convened by Prof. Cruz, Prof. Meñez and Dr. Cabanban in December 2014. Prof. Rhodora Azanza of UP-MSI and Director of UP Office of International Linkages agreed to be Interim Chair of the National Committee of SIMSEA in the Philippines. Organizational meetings of the Philippines interim committee were held on 21 May and 3 July 2015.

The Universiti Malaysia Sabah (UMS) launched a SIMSEA Research Group on 11 March 2016. The group is planning its research projects that will involve many early career scientists who will form the core group of future researchers on global sustainability trained to undertake transdisciplinary research that are policy and community-relevant. The group which will constitute the first SIMSEA node in Malaysia is led by Prof. Fadzilah Majid Cooke of the Faculty of Humanities, Art and Heritage. It has members from the Borneo Marine Research Institute and Faculty of Medicine, UMS.

The development of SIMSEA in Thailand, Indonesia and other countries of Asia including China, Myanmar and Vietnam will strengthen the knowledge hub and engagement of scientists in activities related to Future Earth in Asia.

#### **Promotion of SIMSEA**

A SIMSEA brochure designed jointly by the SIMSEA Program Office and ICSU ROAP has been printed and distributed to members of the SIMSEA SSC, RCAP members and other colleagues. The SIMSEA website (<http://www.simseaasiapacific.org>) developed by ICSU-ROAP and managed by the SIMSEA Program Office at UP-MSI is another source of information on the activities of SIMSEA and other coastal and marine meetings and courses.

The recognition of SIMSEA as a regional activity aligned to the principles of Future Earth has been vigorously promoted at several regional meetings. This included the “Future Earth, Future Philippines” conference held in Manila on 26-27 March 2014 and meetings held at the Future Earth Regional Center for Asia based at the Research Institute for Humanity and Nature (RIHN) in Kyoto. Reports of these activities are published on the websites of ICSU ROAP (<http://www.icsu.org/asia-pacific>) and SIMSEA programme office (<http://simseaasiapacific.org/>). The website of the Future Earth Regional Center in Asia also publishes information on the activities of SIMSEA as and when available (see <http://www.futureearth.org/asiacentre/news-and-events>).

#### *SIMSEA Regional Symposium September 2016*

The SIMSEA Office in Manila will organize a regional symposium on SIMSEA in September 2016. It aims to promote transdisciplinary research in the region and provide opportunities to discuss research collaboration and networking towards sustainable development in the region especially among early career scholars. The main topics of the conference are in line with the recommendations of the SIMSEA Prioritization Workshop held in 2015. There will be sessions on ocean health, productivity of marine ecosystems and sustainable livelihoods, climate change and variability, weather extremes, disaster management and adaptation in the coastal zones, socio-ecological dynamics of sustainable use of oceans, seas and coastal resources, coastal pollution, degradation, and biodiversity loss; and ocean policy and trans-boundary resource flows.

The Symposium aims to provide an excellent opportunity for scientists and stakeholders in the region to better understand the institutional, political and economic conditions driving changes in the marginal sea and their consequences for transformation to sustainability..

### **Financial Support for SIMSEA and Fund Sourcing**

The SIMSEA “Pre-Scoping Workshop” held in Yokohama on 27-28 February 2014 was funded by the Application Laboratory (APL) of JAMSTEC and ICSU-ROAP. The two-year activity to develop SIMSEA that started in July 2014 was provided by ICSU through a grant of USD 200,000 made available from funds raised by the former President of ICSU Nobel Laureate Prof. Y.T. Lee. Other partners in the development of SIMSEA provide in-kind support for events they host.

### **SIMSEA as a regional knowledge and engagement hub**

SIMSEA envisages the formation of an alliance of National SIMSEA hubs to individually support the hosting of meetings to plan and synthesise research results from individual countries and generate a regional outlook, based on the regional framework developed at the beginning of the programme. This is the value of adopting the SIMSEA approach in developing a regional research programme. It is a model for the development of coordinated collaborative research in the region that can contribute towards joint programme implementation and joint policy support when a regional outlook is vital for coherent policy development in the region. SIMSEA will act as a regional knowledge hub where scientists engage to address issues that cannot be addressed by countries individually. The recent severe air pollution episodes in some ASEAN countries is an example of how collaborative research and planning is needed to contribute better knowledge for effective evidence-based policy-making in the region.

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<sup>1</sup>*This paper is abstracted from Cruz et al., 2016*

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