Research Cooperation on the Sustainability of the Marginal Seas of South and East Asia

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1 Context

The South and East Asian marginal seas are vulnerable to rapid coastal population growth, overharvesting of marine biological resources, and pollution. The region's marine ecosystems have more than 30% of the world's coral reefs and produce about 40 million tons of fish and more than 80% of the world's aquaculture products. The high extraction volume of marine bioresources, rapid population growth, and far-reaching economic development increasingly test the limits of these seas to sustain the ecosystem services that drive economic growth and development in the region. The conservation and management of marine resources and ecosystems, while coping with the pressures of climate change/variability and other global changes either brought about or augmented by human activities, are immense challenges that require cohesive transnational endeavours in the region and the rest of the world.

The Sustainability Initiative in the Marginal Seas of South and East Asia (SIMSEA) is an international alliance of physical, ecological, and social scientists working together to meet the regional challenges of biodiversity conservation, sustainability of marine ecosystem services, and protection of human well-being in light of population pressure, environmental degradation, extreme weather events, and climate change/variability. The objectives are to : co-design an integrative program that would establish the sustainability of the marginal seas of South and East Asia ; and play a catalytic role in projects and programs to facilitate scientific cooperation for the benefit of societies.

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

SIMSEA has adopted the Future Earth design principles of inclusiveness and transdisciplinary research and seeks to align research to meet the needs of the UN Sustainability Development Goals (SDG). Although there is still no framework for promoting scientific collaboration in the region, research institutions from several countries have in the past joined forces to better understand the sustainability challenges facing marginal seas with programs such as the UNEP Regional Seas Programme and the Coral Triangle Initiative, a multilateral partnership of six countries working together to sustain marine and costal resources in Southeast Asia. While currently funded by ICSU and participating agencies, SIMSEA provides another model of collaboration that could be deepened and extended to other areas where science can inform public policy. If South and East Asian nations are to address collective challenges, they need to develop platforms that would enhance multinational research collaboration in the region.

The Coral Triangle Initiative (CTI) — The Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CRFF) (Foale *et al.* 2013) is an example of a North–South conservation program involving six countries (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, and Timor Leste). The North includes a consortium of NGOs and bilateral donors that fund projects that will contribute to the five CTI goals : designate and effectively manage priority seascapes ; apply an ecosystem approach to management of fisheries and other marine resources ; establish and manage marine protected areas ; achieve climate-change adaptation measures ; and improve the status of threatened species. Scientists involved in CTI believe that the relationship between the North–South partners of NGOs and national governments is equitable. The South approves and endorses the activities and projects, while the North provides the financial resources and expertise for the projects and activities and provides financial contributions for operations of the Regional Secretariat based in Indonesia.

2 Empirical Approach and Main Findings

Development of SIMSEA — The idea for a sustainability initiative in the marginal seas of East Asia emerged in 2013 and evolved as a regional initiative that espouses scientific excellence through transdisciplinary research, while promoting inclusiveness *via* co-design and co-production with relevant stakeholders. Several meetings and consultations were held to formulate and refine strategies and plans for the initiative. At a pre-scoping workshop held in February 2014, the participants underscored the importance of having a standardized set of indicators to assess ocean health, the value of transdisciplinary collaboration among natural scientist and social scientists, and the need to encourage and train young scientists to ensure continuity of the program.

An electronic survey was sent to key researchers to come up with a preliminary list of priority areas in preparation for the prioritization workshop. Researchers and scientists with expertise in physical, ecological, and social sciences convened to initiate

the collaborative planning and implementation of research to improve the health of marine and coastal ecosystems and their resilience and to ensure the sustainability of ecosystem services, development, safety and security in the region. The participants agreed on the vision for SIMSEA as an international alliance of physical, ecological, and social scientists working toward the sustainable development of coastal and marine areas. For marginal seas, the vision was resiliency characterized by : sustainable fisheries ; conservation of marine biodiversity ; adaptation to climate change ; blue economy ; nations with ocean literacy ; healthy seas for human well-being ; and appropriate governance. Group discussions resulted in the following outputs : schematic diagrams of the links among physical, ecological, and socioeconomic research topics and clusters of research questions ; a list of prioritized research topics and schedule of implementation ; and a list of transdisciplinary questions/topics for planning the SIMSEA research agenda in 2015-2020 (and beyond) according to the three main research themes of Future Earth (dynamic planet, global sustainable development, and transformations toward sustainability).

The first SIMSEA Regional Symposium will be held on 26-28 September 2016 in Quezon City, Philippines to provide an opportunity to better understand the institutional, political, and economic conditions driving changes in the marginal sea. Over 100 scientist and stakeholders in the region will focus on designing a holistic socio-ecological research program on the marginal seas for sustainability in Asia.

Organizational structure — SIMSEA is a key program under the priority area on Ecosystems of the International Council for Science, Regional Office for Asia and Pacific (ICSU-ROAP). A SIMSEA Science Steering Committee (SIMSEA SSC) was established in July 2014, and has 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 marginal seas of South and East Asia. The SSC is optimistic that inclusive transdisciplinary research will provide a deeper knowledge of phenomena and processes important to the sustainability of marginal seas.

The SIMSEA program office hosted by the University of the Philippines operates using seed funds provided by ICSU. SIMSEA now has six institutional partners (, accessed June 27, 2017) : the Atmosphere and Ocean Research Institute (AORI), University of Tokyo ; the Application Laboratory, Japan Agency of Marine-Earth Science and Technology (APL JAMSTEC) ; the Marine Science Institute, University of the Philippines (UPMSI) ; the Research Unit for Ethnography and Development, Universiti Malaysia Sabah ; the Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu (UMT) ; and the Institute of Marine Sciences (IMS), University of Auckland, New Zealand. National SIMSEA alliances are now in different stages of development in Japan, Malaysia, Philippines, Thailand, and Indonesia. Links are being explored with other regional and international institutions such as the Southeast Asia Fisheries Development Center (SEAFDEC).

The initial institutional partners have had long-standing interests in promoting international scientific collaboration ; however, only one or two institutions had been involved in sustained collaborative activities within a regional framework. SIMSEA

will strive to provide this missing regional framework, design a research program, and help coordinate program funding. Through these arrangements, partners will seek to jointly tackle shared challenges such as marine and regional air pollution, resource scarcity, climate change/variability and biodiversity among coastal communities. The creation of SIMSEA is enabling change in collaborative research in Asia and the Pacific to include : the possible emergence of new organizations to steer public research or promote innovation and new programmatic directions within such organizations ; identification of new sources of funding dedicated to research in the marginal seas and in academic settings ; and new domestic and international partnerships seeking to expand participation in and application of research. These are the ideals shared by Future Earth that would create a complex Web of partners within which resources circulate knowledge in ways that are reshaping research systems in Asia and the Pacific.

Promotion of SIMSEA and Future Earth — Future Earth recently recognized SIMSEA as one of its programs in Asia. SIMSEA will propose a collaborative platform to share knowledge and expertise (science for society) ; work for solutions to improve livelihoods and enhance resilience to unwanted environmental change/variability, hazards, and disasters ; and support transformation toward sustainability. Members of the SIMSEA SSC have actively promoted SIMSEA and its sustainability goals through presentations and discussions in conferences and meetings, and will continue to do so at national and international meetings.

3 Main messages for policy and practice

SIMSEA as a regional research collaboration — SIMSEA was initiated by scientists representing North and South who are members of the ICSU Regional Committee for Asia and the Pacific. National funding agencies and ministries provided some initial support in the development of the SIMSEA concept but the bulk of financial support for the development of SIMSEA came from funds provided by ICSU. It is doubtful if national research funding agencies can facilitate transnational cooperation without the prior development of a framework for a regional research program that spans several countries. National funding agencies can then fund that portion of work involving particular countries. SIMSEA national committees can individually host meetings to synthesize research results from individual countries and generate a regional outlook based on the framework that was developed at the beginning of the program. This is the value of adopting the SIMSEA approach when developing a regional research program.

Governments in ASEAN should view the approach adopted by SIMSEA as a model for the development of coordinated collaborative research in the region that can contribute to joint program implementation and joint policy support when a regional outlook is vital for coherent policy development. The recent severe air pollution episodes in some ASEAN countries are related to both human activities and climate variations due to the El Niño-Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD), which originate in the tropical Pacific and tropical Indian Ocean, respectively (Ashok *et al.* 2003). This is a good example of the need for collaborative

research and planning between several countries to contribute to better implementation of mitigation measures including prediction activities at the regional level to combat air pollution.

Most governments do not support research of a regional nature. In the example of SIMSEA, a bilateral collaborative program is being developed but this will enable only two countries to engage and the effect will be limited, unless similar multilateral projects are developed between the North and the South in the SIMSEA region. In addition to funding restricted to two countries per project, we need to pursue funding to support development of borderless regional research. However, the idea of a regional research program such as SIMSEA could only be possible through something like the fund made available through ICSU as a seed budget. The Regional Offices of ICSU can play a key role in serving the collective interests of governments in the region and international bodies including philanthropic foundations.

SIMSEA as a North–South cooperation — SIMSEA is being developed in line with the design principles of Future Earth, which emphasize both inclusiveness and transdisciplinary research. Inclusiveness requires involvement of relevant stakeholders in designing a project (co-design), carrying out the study (co-production), monitoring of progress, and equitable sharing of benefits.

From its inception, SIMSEA has involved scientists from the North and South. Although only eight countries participated in the pre-scoping workshop and six in the scoping or research prioritization workshop, the 2016 SIMSEA Regional Workshop is being organized to involve as many countries in the region as possible. Likewise, the level of inclusiveness will be improved in terms of fields of expertise, distribution of age groups, gender and involvement of stakeholders from the community, business sector, government organizations, and NGOs.

North–South borderless collaboration today is a far cry from what it was three decades ago. The history of collaboration in biodiversity and natural products research shows that a united voice from the South initiated a change in the relationship between the well-funded institutions of the North and the institutions of the South that had access to bioresources. Today, North–South collaboration on bioresources is guided by the Convention on Biological Biodiversity and the Nagoya Protocol on Access and Benefit Sharing.

The Coral Triangle Initiative is an example of a well-funded transnational collaboration that was developed by institutional entrepreneurs in collaboration with initial involvement at the highest level of governments. In terms of the design principles of Future Earth, how inclusive is this program ? What is the involvement of communities in the program ? To what extent was this co-designed and at what level ? For medical research, the Council on Health Research for Development has developed the COHRED Fairness Index that provides a recognized global benchmark of good practices in health research collaborations involving LMICs (Musolino *et al.*, 2015 ; http ://www.cohred.org). The aim is to ensure research collaboration where there is equitable distribution of outputs and benefits to all partners. In these regards, further study and adoption of good practices in warranted.

An ongoing concern is when scientists in the North propose a project (especially those related to natural resources and oceans) and include a token list of scientists from the South as a means of gaining access to samples or to research areas for their own ends. SIMSEA aims to address this issue and ensure adherence to international ethical guidelines and the laws promulgated by participating countries for a really sustainable world with people having wellness and well-being. Following the example of COHRED and the CBD, perhaps a code of ethics can be drawn to guide North–South collaborations toward fair and mutually beneficial partnerships.

Related Resources

Foale, Simon, Debi Adhuri, Porfirio Aliño, Edward H. Allison, Neil Andrew, Philippa Cohen, Louisa Evans, Michael Fabinyi, Pedro Fidelman, Christopher Gregory, Natasha Stacey, John Tanzer, Nireka Weeratunge. 2013. Food security and the Coral Triangle Initiative. *Marine Policy* 38 :174-183.

Ashok, Karumuri, 1zhaoyong Guan, and Toshio Yamagata. 2003. A Look at the relationship between the ENSO and the Indian Ocean Dipole. *Journal of the Meteorological Society of Japan* 81 :41-56.

Musolino, Najia, Janis Lazdins, Jacintha Toohey, and Carel IJsselmuiden. 2015. COHRED Fairness Index for international collaborative partnerships. *The Lancet* 385 :1293-1294.