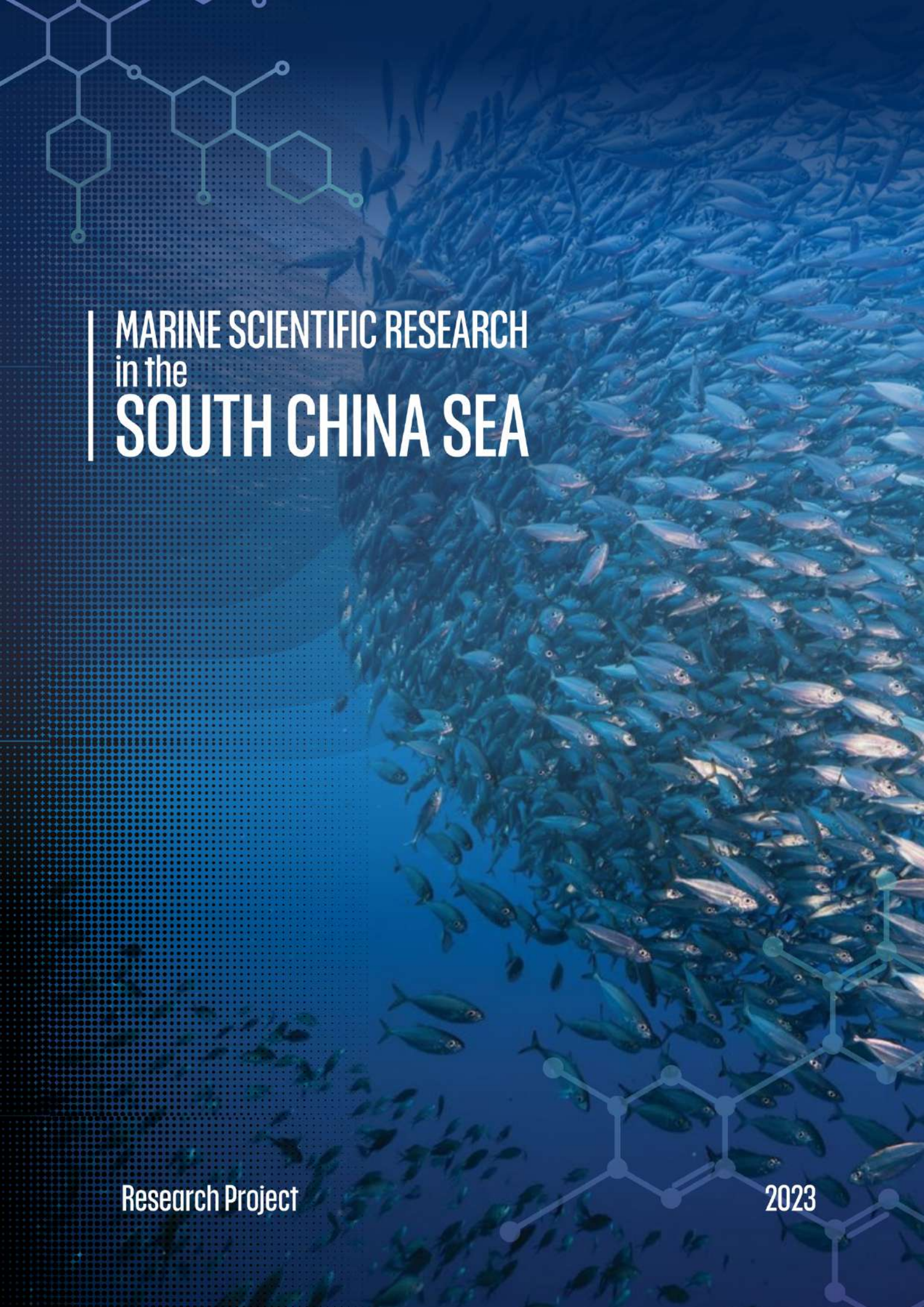

MARINE SCIENTIFIC RESEARCH in the SOUTH CHINA SEA

Research Project

2023

MARINE SCIENTIFIC RESEARCH in the SOUTH CHINA SEA

The Diplomatic Academic of Vietnam (DAV)
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Executive Summary

The research project aims to identify options for multilateral marine science research (MSR) mechanisms in South China Sea that could be piloted and discussed with ASEAN partners. The project will enable the UK to expand engagement with ASEAN as a partner of choice for expertise on maritime issues.

PROSPECTS FOR HARMONIZATION OF NATIONAL MSR REGULATIONS AMONG LITTORAL STATES OF THE SCS AS A CONFIDENCE-BUILDING MEASURE

The analysis of both the international and national legal frameworks for MSR activities of these six ASEAN Members and China is undertaken with a view to proposing and developing policy and legal options that the UK government, as a Dialogue Partner to ASEAN, can suggest for improved co-ordination of joint MSR activities, both between and among these six ASEAN States in the SCS namely, Vietnam, the Philippines, Malaysia, Indonesia, Brunei, and Singapore, as well as with the PRC/China (including Taiwan), both within and external to the Southeast Asian region, including land-locked and geographically-disadvantaged States.

II ANALYSIS OF CURRENT PRACTICES ON JOINT MSR AND LESSONS LEARNT FROM THESE PRACTICES

This 2nd part will analyse relevant multilateral cooperative practices on joint marine scientific research (MSR) to find out what lessons they can provide for the development of a joint marine scientific research mechanism in the South China Sea. Two types of practices are studied: a) cooperative practices with a geographical scope including the South China Sea and b) cooperative practices in other regional seas with disputed maritime features and overlapping maritime jurisdiction claims. For each of these types of practices, the following elements will be assessed as a matter of priority: i) areas of work focus, ii) organisational structure, iii) functioning, iv) funding, v) development, and vi) implementation of specific MSR projects.

The project suggests six lessons learnt for the development of multilateral cooperation in marine scientific research in the South China Sea, including: (i) Conceptualizing, developing and implementing a joint marine scientific research project within an existing cooperative framework; (ii) Including wider participants from the internal and external region in MSR cooperation; (iii) Providing adequate funding for MSR activities; (iv) Considering a high level of decision-making to implement cooperative MSR projects; (v) Establishing a specialised mechanism for scientific matters involving renowned scientists or experts; (vi) Resolving sensitive matters through thorough consultation to implement a field survey or research in the disputed area.

III POLICY RECOMMENDATIONS TO ENHANCE MSR IN THE SOUTH CHINA SEA

The 3rd part identifies options for multilateral MSR mechanisms in the South China Sea and identification of their theory of change to promoting MSR cooperation in the South China Sea. The project aims to promote trust building and the peaceful management and resolution of disputes in the region.

The project proposes 4 most feasible MSR models that the UK can implement as follows:

- South China Sea Marine Scientific Forum to connect marine scientists of the South China Sea littoral states and the UK;
- A MSR cooperation project between several littoral states of the South China Sea (Vietnam, Thailand, Indonesia, Malaysia, Singapore, Brunei and the Philippines) and the UK in the southern part of the South China Sea;
- A project on plastic debris in the territorial sea between South China Sea littoral states and the UK;
- A project on conserving biodiversity in the high seas of the South China Sea between the UK and the littoral states.

PROSPECTS FOR HARMONIZATION OF NATIONAL MSR REGULATIONS AMONG LITTORAL STATES OF THE SOUTH CHINA SEA AS A CONFIDENCE-BUILDING MEASURE

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1. Introduction

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This study conducts a comparative examination of the national Marine Scientific Research (hereinafter denoted as MSR) policies, legislation, and associated regulations etc. of the People's Republic of China (PRC/China) and six of the littoral Association of South East Asian Nations (ASEAN)[1] Member States of the South China Sea (hereinafter denoted as SCS), namely, Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Viet Nam.

This analysis of both the international and national legal frameworks for MSR activities of these six ASEAN Members and China is undertaken with a view to proposing and developing policy and legal options that the UK government, as a Dialogue Partner to ASEAN, can suggest for improved co-ordination of joint MSR activities, both between and among these six ASEAN States in the SCS, as well as with the PRC/China, both within and external to the Southeast Asian region, including land-locked and geographically-disadvantaged States.

Given the different national priorities, interests and capacity levels of China and the six ASEAN Member States considered here, there is a need for a preliminary, baseline policy and legal study of the national regulation of MSR activities in the SCS

[1] ASEAN was founded in 1967, with six initial members, and presently consists of 10 members, all of them pursuing several programmes of international co-operation at the regional and inter-regional levels of global governance. See: https://asean.org/asean-cooperation-projects/

by all these States in order to determine whether there are, inter alia, prospects for common understandings, interpretations and application of the accepted principles, rules and standards for both the conduct and regulation of such MSR activities within the SCS region. In doing so, this study will also examine possible means to facilitate the aim/objective of enhancing prospects for regional co-operation more generally within the SCS as a confidence-building measure, given the ongoing territorial and maritime jurisdiction disputes in this semi-enclosed sea.

The present study will therefore conduct a comparative analysis of the national MSR policies, legislation, and associated regulations etc., of China and the six ASEAN Member States whose territorial seas, Exclusive Economic Zones (EEZs) and continental shelves all extend into the SCS, as well as the high seas areas of the SCS region, wherein such scientific research activities will be undertaken by China and these six ASEAN Member States, as well as other interested States from beyond the SCS. This baseline MSR policy and law/regulation study will utilise as its overarching (international) legal framework of analysis, the relevant provisions on MSR activities of the 1982 UN Convention on the Law of the Sea (UNCLOS).[2] All six ASEAN Member States are parties to this Convention. Moreover, all non-party States with interests in MSR activities in the SCS generally accept Part XIII of the UNCLOS as regulating the conduct of such MSR activities.

This comparative study will also be conducted with a view to establishing whether there are any proposals for a harmonised set of shared understandings, interpretations and applications of MSR policies, laws and implementing regulations that can in turn form the basis of enhanced regional co-operation in promoting MSR activities, for the benefit of all States, both from within the SCS region and external to it. Such enhanced regional co-operation through a harmonised application of national MSR policies and laws can also act as a confidence-building measure in relation to other, more problematic aspects of international relations between all the littoral States of the SCS as well as among these States and those beyond the SCS region.

Finally, the findings derived from this comparative analysis of the national regulatory regimes for MSR of all the littoral SCS States, namely, China and the six ASEAN members, will be examined to see whether common features can be derived that can in turn form the basis for inclusion within an SCS-wide model MSR authorisation/ permitting/ licensing regime. The regional cooperation engendered by such a common/ uniform MSR regime can initially function as a regional confidence-building measure and then hopefully become a basic building block for the possible resolution of the SCS disputes general.

[2] 'UNCLOS 1982' <https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf> accessed 14 June 2023.


Photo: Getty Images

2. Focus on Marine Scientific Research Policies and Laws in Six ASEAN Member States and the People's Republic of China as Littoral States of the South China Sea

In this section, we will examine how the six ASEAN Member States and the PRC/China have configured their national MSR policies, laws and regulations. This assessment will target specific policy, legal and regulatory measures that are more prone to garnering bilateral, sub-regional and/or regional multilateral cooperation on MSR activities within the SCS.

Among the main areas of possible enhanced co-operation among these six ASEAN member States as well as China, as the other littoral State of the SCS, we assume that scientific research with a view to locating potential sites and/or expanding sites for offshore renewable energy, especially wind farms, could be a potential candidate. Renewable energy is generally not considered as a sensitive issue and is in line with strategies on blue and green economy as well as adaptation to climate change in many countries in the region. Therefore, it could facilitate cooperation, both among these six ASEAN Member States, between them and the rest of the ASEAN Members, as well as other States from both within and outside the Southeast Asian region, including land-locked and geographically disadvantaged (LL & GDS) States. Areas of cooperation could then be expanded to other fields, such as climate change, marine protected areas (MPAs) and/or Illegal, Unregulated or Unreported (IUU) fishing. These potential areas of co-operation can be arrived at through initial scientific research facilitated by concerted regional, sub-regional and/or bilateral efforts aimed at harmonising national MSR legal frameworks authorisation procedures and standards among and between them, prior to embarking on possible extra-regional efforts to further enhance MSR co-operation.

In this regard, Lim has observed that: 'An (important) aspect of the ASEAN States' EEZ legislation worth noting here is that while none of the States formally claims more than Article 56(1) of the (1982 UNCLOS) permits, they also do not claim less.'[3] As he explains, both the Malaysian and Thai EEZ Acts feature phrases and terms that are copied *verbatim* from Article 56(1) of UNCLOS, whereas the Indonesian and Philippine EEZ Acts follow Article 56(1) with only very slight variations in the words used. According to Lim, 'It seems therefore that so far as these four ASEAN States are concerned, Article 56(1) is the highest common denominator of the coastal State's sovereign rights and jurisdiction.'[4]

Here it is also important to pay heed to an observation made by Merdekawati as she introduces the section on MSR within the overall Indonesian chapter for the *Encyclopedia of Ocean Law and Policy in Asia-Pacific,*[5] where she iterates that:

> 'Marine scientific research (MSR) activities are regulated in Part XIII of UNCLOS, often in general terms that leave interpretation to each coastal state's policies. The general nature of the regulation correlates with the fact that UNCLOS was adopted as a package deal. Coastal states designing national legislation related to the implementation of Part XIII of UNCLOS thus becomes essential, balancing the protection of national interests with the objectives of strengthening science in the marine sector and consistency with the objectives of UNCLOS 1982.'[6]

Moreover, she asserts that: 'Beyond the need for consent from the coastal state, several basic conditions applicable to MSR include:

1. The obligation to provide notification to the coastal state, at least six months before conducting the implementation of the MSR to obtain consent (Article 248 of UNCLOS).
2. The obligation to fulfil specific procedures, both in UNCLOS and within national law of the coastal state (Article 249 of UNCLOS).
3. The obligation to ensure that the MSR activities carried out along with the existence of its infrastructure do not interfere with the existing international shipping routes (Article 261 of UNCLOS).
4. The obligation to pay compensation if the conduct of the MSR results in certain losses (Article 263 of UNCLOS).

Apart from these basic requirements, UNCLOS provides room for the coastal states to prescribe further rules related to MSR.'[7]

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[3] Raymond S. K. Lim, 'The EEZ Legislation of ASEAN' (1991) 40 International & Comparative Law Quarterly (ICLQ) 170, at 175.
[4] *Ibid.,* at 175.
[5] Arie Afriansyah, *'Indonesia', Encyclopedia of Ocean Law and Policy in Asia-Pacific* (Seokwoo Lee and Brill Nijhoff eds, 2022).
[6] Agustina Merdekawati, *Marine Scientific Research* section in 'Indonesia' country report, *Encyclopedia* (Seokwoo Lee and Brill Nijhoff eds, 2022).
[7] *Ibid.*

The following assessments of the applicable national MSR policies and laws that are available from open-source websites and where possible complemented and supplemented by academic commentary and literature will commence initially on an alphabetical basis, before being evaluated on a thematic basis to distil possible areas of harmonization and co-ordination of MSR practices.

i. Marine Scientific Research (MSR) Policy and Law of Brunei

As far as can be discerned, the Kingdom of Brunei has not published her MSR policy or any MSR-specific legislation. However, the 1972 Fisheries Act of Brunei does contain a potentially very useful legal provision, namely, Section 18, which states that: 'The Director may in writing exempt from the provisions of this Act and all regulations, either absolutely or conditionally, any person attached to a scientific institution who fishes only for the purposes of scientific research.'[8] Such an exemption, especially if provided in both hard (paper) and soft (electronic) forms, can be very useful for verification and communication purposes. For example, where a national/Brunei naval and/or coastguard vessel approaches a suspect foreign-flagged vessel within her maritime jurisdiction zones that appears to be fishing but which is in reality merely obtaining fish specimens/samples for scientific research purposes, then a quick perusal/check of the registration details of this vessel can suffice to confirm that it has been exempted from any fisheries licensing and/or regulation under the 1972 Fisheries Act, and thus need not be questioned or boarded at sea – always a potentially hazardous exercise.

ii. MSR Policy and Law of China

This section deals with the national MSR regime of the People's Republic of China (PRC/China). It is notable that China is alone among the littoral SCS States (along with six ASEAN Members) covered here that combines a truly global presence with her bilateral, sub-regional and regional role on MSR matters. China is therefore cognizant of the significant interaction between the international MSR regime and individual national MSR regimes, which governs Chinese MSR activities abroad, both in the high seas and within the national maritime jurisdiction of other States. This interaction has implications for her own national MSR regime, which governs foreign MSR activities within her own maritime jurisdiction zones. As Martin and Yue Jin note, '(a) joint regime of UNCLOS and Chinese domestic laws applies to foreign parties conducting marine scientific research (MSR) in areas under China's jurisdiction.'[9] According to them, 'Domestically, the Provisions of the People's Republic of China on Administration of Foreign-related Marine Scientific Research (No. 199 of the State Council, 18 June 1996) (henceforth, 1996 MSR Provisions) imposes several requirements regulating

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[8] FAOLEX Database, 'Fisheries Act (Chapter 61). | FAOLEX' (1972) <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC082944/> accessed 14 June 2023.

[9] Jessica Martin & Amanda Yue Jin, 'Marine Scientific Research', in section on 'China' edited by Nong Hong, *Encyclopedia of Ocean Law and Policy in Asia-Pacific* (2022) 57-59, at 57.

MSR conducted by foreign parties.'[10] However, 'when the 1996 MSR Provisions conflict with an international treaty that China concluded or acceded to, e.g., UNCLOS, the international treaty shall prevail unless an applicable reservation is relevant (Article 14).' Nevertheless, Martin and Yue Jin caution that: 'this seemingly straightforward stipulation belies the complicated relationship between the two (national and international) laws.'[11]

Under these 1996 MSR Provisions, in order to conduct MSR in China's *territorial sea,* a foreign party must collaborate with a Chinese party and obtain approval (Article 4).[12] Furthermore, under Article 10, all original data and samples acquired through such MSR research conducted in the territorial sea belongs to China, although the foreign research collaborator may use them free of charge according to any previously-adopted agreement on joint research. Article 10 also provides that neither the Chinese nor the foreign parties concerned shall publish or transfer the original data and samples without the approval of "the state administrative department of marine affairs and other competent departments under the State Council" of China. According to Martin & Yue Jin, 'The conditions set by the 1996 MSR Provisions conform with international law as Article 245 of UNCLOS grants coastal states "the exclusive right to regulate, authorize and conduct" MSR in their *territorial sea*.'[13] Moreover, they note that 'the 1996 MSR Provisions are equipped with a liability mechanism in Article 13 whereby a violation of the 1996 MSR Provisions can lead to a cessation of the research; confiscation of implements, data, and samples; a fine not exceeding 50,000 yuan and, in cases giving rise to heavy losses or serious consequences, criminal liability.'[14]

Martin & Yue Jin also note that 'The compulsory dispute resolution mechanisms in UNCLOS are not applicable to defined disputes concerning the regulation of MSR in the EEZ or on the continental shelf (UNCLOS, Article 297(2)(a)).'[15] Thus, according to them, 'a coastal state is allowed the full right to explain its obligations and exercise its right accordingly.'[16] However, it is important to point out that Article 297(2) does not exclude *all* MSR-related disputes from compulsory dispute settlement provisions under Section 2 of UNCLOS, but merely those that pertain to a right or discretion of the coastal State under Article 246 or its right to suspend or cease MSR activities within its EEZ or continental shelf. Moreover, the purported dis-application of recourse to Section 2 under Article 297(2)(a) is limited to MSR activities on the EEZ or continental shelf and does not appear to cover coastal State regulation of MSR within its territorial sea under Article 245 of UNCLOS, albeit its regulatory powers are exclusive in this regard.

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[10] *Ibid.*
[11] *Ibid.*
[12] *Ibid.,* at 57-58.
[13] *Ibid.,* at 58 (emphasis added)
[14] *Ibid.,* at 57.
[15] *Ibid.*
[16] *Ibid.*

On the other hand, a foreign party is permitted to conduct research independently within the boundaries of China's *Exclusive Economic Zone (EEZ)* and on China's *continental shelf* (Article 4), although approval by relevant authorities is still required (Article 4 of 1996 MSR Provisions). As Martin & Yue Jin observe, 'As a party of UNCLOS, China is asked to grant their consent for MSR "in normal circumstances" and to establish mechanisms preventing unreasonable delay or denial (UNCLOS, Article 246(3)).'[17] Under the 1996 MSR Provisions, a more lenient requirement also applies to the original data and samples acquired from research conducted in China's EEZ. When research is jointly conducted by Chinese and foreign parties, the original data and samples acquired shall be shared between the parties and used free of charge (Article 10). When research is independently conducted by a foreign party, the foreign party shall provide copies of the collected materials and separable samples for free as acquired by the (Chinese) state administrative department of marine affairs (Article 10). Martin and Yue Jin note that 'this requirement is consistent with Article 249(1)(c) of UNCLOS, which asks researchers to provide access for the coastal states, at their request, to all data which may be copied and samples that may be divided without detriment to their scientific value.'[18] Nevertheless, the 1996 MSR Provisions still prohibit the transfer or publication of the original data and samples without the approval of relevant Chinese authorities (Article 10). Since Article 244 (2) of UNCLOS provides that States shall "actively promote the flow of scientific data and information" resulting from MSR, Martin and Yue Jin are 'unclear whether this general (international) obligation might pre-empt the 1996 MSR Provisions.'[19]

Significantly for our purposes here of exploring possibilities for MSR co-operation between littoral SCS States, Martin and Yue Jin chart China's extensive practice in this regard within the East China Sea and further afield. They observe that: 'While sometimes a catalyst for tensions in conflict areas such as the East and South China Seas, joint MSR activities have proven to be a valuable tool in developing cooperative bilateral relationships between nations. Since opening-up in 1979, China has established and renewed MSR cooperatives with various nations, including the United States, Canada, Russia, South Korea, Japan, Iceland, France, and Germany.'[20] Among the most prominent of these cooperative agreements were the Sino-American Protocol on Cooperation in the Field of Marine and Fishery Science and Technology (1979, 2004); Sino-American Joint Research on the Mouth of the Yangtze River and the East China Sea Continental Shelf (1980–1983); the Sino-Japanese Joint Investigation of the Red Tide since 1991; and Sino-German (2002, 2004, 2009, 2011, 2018) and Sino-French (1999, 2001, 2005, 2012) Joint Research on Geophysics and Geology of the South China Sea. However, as Martin and Yue Jin note, 'Similar agreements have not been made between China and its southern neighbors in the South China Sea, partly

[17] *Ibid.*
[18] *Ibid.*
[19] *Ibid.*
[20] *Ibid.,* at 58-59.

due to tensions and suspicions in the region.'[21] Thus, Martin & Yue Jin's summary of the common provisions found within such joint MSR agreements should be highted here for possible application in joint MSR initiatives within the SCS as well. Specifically, they observe that: 'The stipulations of these agreements typically entail exchanges of related data and information, joint sustainable development initiatives, and an acknowledgment of conducting research in the spirit of scientific discovery, mutual economic progress, and environmental protection.'[22]

Aside from these individual MSR programmes (above), according to Martin & Yue Jin, China has also undertaken institutional initiatives, 'establishing joint MSR centers around the world, such as the China-Korea Joint Ocean Research Center (CKJORC) established in 1995 in Qingdao, China.'[23] Moreover, in recent years, they note that: 'Beijing has paid considerable attention to MSR partnerships in the Arctic region, evidenced by the joint inauguration in October 2018 of the China-Iceland Arctic Science Observatory (CIAO) in Northern Iceland and the upcoming China-Russia Arctic Research Center (CRARC) agreed upon in April 2019. Joint MSR initiatives have provided opportunities for China, among other countries, to establish a presence in far-reaching parts of the world, such as the Arctic and Antarctic.'[24]

To sum up, the People's Republic of China (PRC) arguably has the most well-developed and comprehensive international co-operation over MSR activities, as well as national-level MSR policies and regulation. All of this is conducive to bilateral, sub-regional, regional and even extra-regional co-operation on MSR activities with other littoral States of the South China Sea (SCS) and States from beyond the SCS, like the UK. This then raises the question as to whether the Chinese (State) practice in co-operative MSR activities *beyond* the SCS can become a template for co-operative MSR activities *within* the SCS with other littoral SC States. However, the current territorial (sovereignty) and maritime jurisdiction (sovereign rights) disputes between and amongst most of the littoral States on the SCS remain as major stumbling blocks to such co-operation.

Moreover, a response by Professor (Gavin) Yen-Chiang CHANG of Dalian Maritime University (China) to the Questionnaire by the Diplomatic Academic of Vietnam (DAV)/ UK Foreign, Commonwealth & Development Office (FCDO) summarises that while the co-operative intentions of *all* parties in the SCS on bilateral, sub-regional and regional MSR activities is much in evidence, this is currently only in the form of inter-governmental Declarations, rather than legally-binding international instruments. In this regard, he cites, for example, the Xiamen Declaration adopted at the 4th Asia-Pacific Economic Co-operation (APEC) ocean ministers' meeting held in August 2014, which emphasizes 'the establishment of a more comprehensive,

[21] *Ibid.*
[22] *Ibid.* at 59.
[23] *Ibid.*
[24] *Ibid.*

sustainable, inclusive and mutually beneficial partnership in the field of 'marine science and technology and innovation'.

Professor Chang then proposes that such MSR co-operation can fruitfully be initiated within clearly un-disputed areas of the SCS. While not directly related to Professor Chang's response, his colleague, Professor Zou Keyuan's response to the same query was to emphasise areas beyond the (12-nm) territorial sea limits of littoral SCS States as the areas that are most conducive to such co-operative MSR activities.

iii. MSR Policy and Law of Indonesia

This section will explore the practice and regulation of MSR in Indonesia. According to Lim, an initial 'problem with the Indonesian legislation is that the preamble appears to refer to Indonesian sovereignty over marine scientific research and the marine environment in the EEZ. However, in the actual provision (Article 4(1)) dealing with the sovereign rights and jurisdiction claimed by Indonesia, it goes no further than to say that Indonesia shall have jurisdiction over these two matters.' As Lim goes on to note, 'This ambiguity could obviously be due to sloppy drafting or poor translation. Moreover, it does not make sense to claim sovereignty over activities. Sovereignty, as Arbitrator Huber in the *Island of Palmas* case defines it, is the right to exercise in a portion of the globe to the exclusion of any other State the functions of a State. In other words, sovereignty is claimed over a space and not over the activities within that particular space. The better view, therefore, is that the Indonesian EEZ Act claims only sovereign rights over these two matters in the EEZ.'[25]

Indonesia consistently interprets MSR activities in UNCLOS as a non-commercial activity: 'MSR activities regulated in Part XII of UNCLOS are intended solely for scientific purposes and not for commercial purposes, as implied in Article 241 (of UNCLOS) whereby MSR activities cannot be the basis for state claims to parts of the sea or its resources. MSR activities are intended solely for scientific purposes. '[26] Thus, while 'UNCLOS encourages MSR activities by guaranteeing the rights of every country and promoting the publication and dissemination of results (Article 244 of UNCLOS). … the researcher must first obtain consent from the coastal state if the activity is carried out within the coastal state's jurisdiction. MSR conducted in other maritime zones, such as the Area, are also subject to special provisions (Part XI of UNCLOS).'[27]

According to Merdekawati, 'under Indonesia's national legal regime, different terminologies are used to imply that research activities are not entirely commercially oriented. For example, in the context of MSR on the Indonesian continental shelf, which incidentally is intended for exploitation activities, particular terminology is used, namely, "scientific investigation activities". The use of this terminology in the context

[25] Citing 2 R.I.A. A. 829, see: Lim, *ICLQ* (1991) at 175. ibid.
[26] Agustina Merdekawati (n.6)
[27] *Ibid.*

of MSR on the continental shelf can be found in Law 1/1973.'[28] As she goes on to note, 'The treatment of MSR as a non-commercial activity in Indonesia can also be seen after the promulgation of Law No. 11 of 2020 on Job Creation (hereinafter, Law 11/2020). Indonesia has since implemented a business licensing system for all commercial activities. Consistent with the treatment of MSR as a non-commercial activity, the business licensing system in Indonesia does not include marine research activities. Meanwhile, other research activities included in the business licensing regime are considered commercial activities, including oil and gas surveys. Although the licensing system in Indonesia still covers the research sector, the licensing is for the institutions that provide research services regularly and not licensing for the research activities themselves.'[29]

Moreover, 'Indonesia does not regulate MSR under one specific law. Instead, the MSR legal regime is spread across multiple interconnected laws. At other times, the terms used in Indonesian law are more restricted than the generality of UNCLOS.

> For example, the term "Penelitian dan Pengembangan Perikanan" (fisheries research and development) used in Law 31/2004 as amended by Law 45/2009 and Law 11/2020, limits the scope of research regulated therein to fisheries only. This restricted concept affects the scope of its products, such as how the permits issued by the Indonesian Ministry of Marine Affairs and Fisheries (MMAF) will only be based on fisheries-related interests.'[30]

Initially, Article 1c) of Law 5/1983 on the Indonesian EEZ provides for general regulation of Scientific Research ('Penelitian ilmiah') within the Indonesian EEZ.

Then, Law No. 11 of 2019 on the National System of Research and Technology (Research Law), as amended by the Law 11/2020, covers Research ("Penelitian") within the Indonesian territorial sea, internal waters, and archipelagic waters (applying to all territories of the Republic of Indonesia) which are generally governed by Law 43/2008.

This is supplemented by following implementing legislation:

1. Government Regulation No. 20 of 2005 on Transfer of Intellectual Property Technology and Research and Development Results from Universities and R&D Bodies; and
2. Government Regulation No. 41 of 2006 on Research and Development Activity Permits for Foreign Universities, Foreign Research Bodies, Foreign Companies, and Foreign Individuals. These will remain in force until the new implementing regulations have been issued.[31]

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[28] *Ibid.*
[29] *Ibid.,* at 327-328.
[30] *Ibid.,* at 328.
[31] *Ibid.,* at 329.

Furthermore, Law 31/2004 as amended by Law 45/2009 and Law 11/2020 on Fisheries Research and Development ("Penelitian dan Pengembangan Perikanan") applies to 'Territories of Fisheries Management in the Republic of Indonesia (WPPNRI) which consists of Indonesia's internal waters, archipelagic waters, territorial sea and EEZ as defined by Article 55. This law is implemented by:

1. Government Regulation No. 30 of 2008 on the Conduct of Fisheries Research and Development (hereinafter, Government Regulation 30/2008);
2. Minister of Maritime Affairs and Fisheries Regulation No.Per.10/Men/2010 of 2010 on the Procedures and Requirements of Permits for Fisheries Research and Development (MMAF Reg No. 10/2010);
3. Minister of Maritime Affairs and Fisheries Regulation No.Per.11/Men/2010 of 2010 on the Procedures and Requirements of permits for the processing and analysing fisheries data conducted abroad; and
4. Minister of Maritime Affairs and Fisheries Regulation Per.20/MEN/2010 of 2010 on the Procedures of Providing Consultation towards the Conduct of Fisheries Research and Development for Foreign Researcher and Development activities.[32]

Also, Law No. 27 of 2007 on the Management of Coasts and Small Islands, as amended by Law No. 1 of 2014 and Law 11/2020 covers 'Research' in Coastal areas and small islands (Article 42) and is implemented by:

1. Government Regulation No. 62 of 2010 on the Utilisation of the Outer-Most Islands as amended by Government Regulation No. 21 of 2021;
2. Minister of Maritime Affairs and Fisheries Regulation No. 8/Permen-Kp/2019 of 2019 on the Management of Permits of Utilisation of Small Islands and Surrounding Waters for Foreign Investments and Recommendations of Utilisation of Islands Smaller Than 100 km2, as amended by Minister of Maritime Affairs and Fisheries Regulation No.53 of 2020;
3. Foreign Investments and Recommendations of Utilisation of Islands Smaller Than 100 km2, as amended by Minister of Maritime Affairs and Fisheries Regulation No.53 of 2020; and
4. Minister of Maritime Affairs and Fisheries (MMAF) Regulation No. 28/PermenKp/2021 of 2021 on the Procedure of Permits of Waters and Permits of Water Management in the Coastal Areas and Small Islands.[33]

Finally, there is Law 32/2014 as amended by the Law 11/2020 which covers 'Sea Research', although there is no detailed scope of what constitutes 'sea research'. However, we can assume that it covers activity that can be carried out in Indonesia's internal waters, archipelagic waters, territorial sea, EEZ, and continental shelf. Where this Law concerns such activities by Indonesian citizens or legal entities, this also includes on the high seas or in the (deep sea-bed) Area.[34]

[32] *Ibid.,* at 329-330.
[33] *Ibid.,* at 331.
[34] *Ibid.*

Merdekawati then highlights several key aspects of Indonesian MSR regulation, as follows:

'*1. Differing Jurisdictional scope.*

Indonesia's MSR regulation follows a different jurisdictional scope pattern as compared to the appropriate UNCLOS provisions. While Part XIII of UNCLOS regulates MSR for *all* UNCLOS regimes, some Indonesian laws apply to all regimes, and some only apply to particular regimes. For example, Law 5/1983 only regulates MSR in the Indonesian EEZ. The scope sometimes includes the high seas and the deep seabed, but only in so far as applying to Indonesian nationals or legal entities.

2. Obligation to obtain an MSR permit only applies to foreign entities.

Indonesia interprets the term "consent" in UNCLOS as requiring the express permission of Indonesia to conduct any type of MSR in Indonesia. As is the case in many other states, Indonesia has different procedures applicable to foreigners and Indonesian nationals who wish to conduct MSR in Indonesia. For example, to conduct MSR in the territorial waters, EEZ, or on the continental shelf, foreigners are required to fulfil the following conditions:

a. obtain recommendation from the Ministry of Maritime Affairs & Fisheries (MMAF);
b. obtain a permit from the Ministry of Research and Technology, and
c. partner with a domestic fisheries research body and involve Indonesian researchers.

Indonesian nationals are not required to fulfil these requirements to conduct MSR in Indonesia. Nonetheless, Indonesian nationals are still clearly required to obtain a permit from the government if they seek to conduct MSR outside of Indonesia's jurisdiction.

3. No explicit separation between MSR in the (maritime) jurisdiction areas and within the national territory (including the territorial sea).

These two regimes are regulated under two separate legal regimes in UNCLOS. However, Indonesia does not seem to make any distinction between them in terms of the application procedure. There is no distinction between permits for MSR conducted in waters under (coastal) state sovereignty and in waters under a coastal state's sovereign rights. In the case of Indonesia, however, this does not seem to pose any problem. The permits to conduct scientific research in Indonesia, especially for foreign entities, are uniform.

4. Tendency to regulate only the general provisions.

All procedures depend on ministry policies (whether the MMAF or other ministries). There are guidelines in the regulations, but they are quite general. This leaves considerable discretion on the part of the officials in charge. For example, in

Government Regulation 30/2008, the minister should consider, among other things, international obligations related to fisheries, technical worthiness standards according to the current state of science and technology, and that the benefits of science and technology should be synchronised with the strategic planning of fisheries development.

These considerations are very broad, are spread out in many regulations, and are without clear indicators. This opens the door to very subjective and inconsistent use of discretion. As a result, practice shows that many (researchers) are disadvantaged by this. However, Indonesia's regulations still generally follow the basic introductory provisions of UNCLOS, such as the obligation to submit the result of the research to the government and the requirement of involving Indonesian nationals.

5. Accommodate technology transfer and the ownership of Intellectual Property.

The MSR regulations in Indonesia have accommodated technology transfer and the ownership of intellectual property. Indonesian regulations oblige foreign MSR researchers or research bodies to implement technology transfers. This transfer may be done either commercially or non-commercially. The transfer of intellectual property and research and development outputs by universities and other bodies are done via licensing, cooperation, services of science and technology, and/or publication.

Additionally, the regulations prescribe that the intellectual property of research outputs will belong to Indonesia if Indonesia fully funds it. Otherwise, if foreign bodies partially fund the research, then the intellectual property will be jointly owned, with details arranged via agreements. It must be noted that, due to the compulsory partnership with Indonesian research bodies, there cannot be researches fully funded by foreign bodies.

6. Accommodate Material Transfer Agreement.

The MSR regulations in Indonesia have regulated Material Transfer Agreements (MTAs) between foreign MSR researchers and the Indonesian government to support the delivery of research data and samples abroad. The regulations contain minimum requirements of what an MTA should accommodate. This includes the identities of the sender and receiver, the object and purpose of sample delivery agreements, the specifications, amount, origin, type of processing and analysis of a sample, the method of transfer, the procedure of residue, the rights and obligations of the sender and receiver, the time length of the agreement, the analysis output, funding, and dispute settlement.

7. Only cover conventional MSR practices.

MSR regulations in Indonesia are entirely focused on conventional MSR. However, recent developments have witnessed more modern MSRs, such as military surveys, bioprospecting, remote sensing, bio-logging, and many others. The current

Indonesian regulations have yet to include these modern developments. The modern practices of MSR include, *inter alia,* unmanned underwater vehicles (UUV). Although such "modern" MSR practices are also rarely regulated by other countries, a regulatory regime that covers such practices is necessary. They may pose new and unprecedented challenges to the existing regulatory mechanisms and thus may require a different approach to respond.'[35]

Merdekawati concludes by observing that this 'analysis of the Indonesian legislation related to MSR demonstrates that Indonesia has issued regulations to further implement Part XIII of UNCLOS. However, these regulations are spread across numerous laws and tend to use different terminologies to refer to the same activity. There are further discrepancies regarding the depth of provisions between regulations. Some laws are very general, while some other regulations are very detailed on the technical rules applicable. MSR activities done by Indonesian legal entities on the high sea or the Area are yet to be explicitly regulated. This vacuum of independent regulations governing MSR activities in the high sea and the Area by an Indonesian legal entity may exclude them from participating at all. It would be best if the MSR regulations could be compiled in one comprehensive regulatory instrument.'[36]

iv. Marine Scientific Research Policy and Law of Malaysia

The general legal provision for marine scientific research (MSR) in Malaysian waters is currently provided by Part V of the 1984 Exclusive Economic Zone (EEZ) Act of Malaysia. This Part (V) of the 1984 Act includes provisions under the following headings: Government consent required for conduct of marine scientific research (Section 16) Right to withhold consent (Section 17) Duty to provide information (Section 18) Duty to comply with certain conditions (Section 19) and Suspension or cessation of marine scientific research activities (Section 20).

Specifically, Section 16 of the Malaysian EEZ Act, 1984 entitled: 'Government consent required for conduct of marine scientific research', in Sub-section (1) provides that: 'No marine scientific research may be conducted in the exclusive economic zone or on the continental shelf without the express consent of and subject to conditions imposed by the Government.' Sub-section (2) of Section 16 provides that: 'Subject to Section 17, the Government shall give its consent where the marine scientific research would be carried out by any State or competent international organization for peaceful purposes and to increase scientific knowledge of the marine environment.' Section 17 of the Malaysian EEZ Act then provides that Malaysia has the right to withhold consent in situations that mirror the provisions in Article 246(5) of the UNCLOS (see above).

The lack of detailed regulation on what constitutes MSR for the purposes of requiring the consent (or otherwise) of Malaysian authorities means that there is

[35] *Ibid.,* 322-324.
[36] *Ibid.,* at 335.

continuing uncertainty for *all* States in relation to such activities when these are conducted by foreign-flagged vessels within the Malaysian EEZ or on its continental shelf. George noted in 2008 that there was 'no law that proffers a definition of MSR and there is no comprehensive legislation on Research that includes clear provisions on MSR in Malaysia governing national/regional scientists, international scientists or international scientific organizations within Malaysia in all of her maritime zones.'[37] More recently, it has also been argued that 'there is a need for a comprehensive legislation which can be referred to by the relevant Malaysian authorities and to facilitate request for MSR from other States and international organizations.'[38]

v. MSR Policy and Law of the Philippines

When introducing MSR policy and law in the Philippines, Espenilla and Peralta first highlight 'a peak of marine biodiversity'[39] found in the Philippines, according to a study published in 2005. Indeed, within the Indo-Malay-Philippine archipelago, it was discovered that there was a higher concentration of species per unit area in the Philippines, making it the epicentre of biodiversity and evolution'[40]. However, as Espenilla and Peralta then note, 'the Philippine marine environment is under threat due to a host of factors brought about by both human activity and climate change. Among these, overfishing and illegal, unreported, and unregulated (IUU) fishing have been identified as some of the primary threats. As a tropical country, the Philippines is also particularly vulnerable to the effects of climate change. The existence of these threats requires that special attention be given to marine conservation efforts in the Philippines.'[41] According to them, the Philippine Government's National Security Adviser Hermogenes Esperon in the past has credited MSR as 'the first step for the sustainable development of [our] marine resources which will benefit both Filipinos and the rest of mankind'[42].

Nevertheless, Espenilla and Peralta note that: 'the Philippines has not been able to fully harness MSR as a tool for conservation due to the regulatory uncertainty in the Philippines' implementation and monitoring of MSR. This uncertainty has further exacerbated the existing threats to the Philippine marine environment (e.g., the abundant marine resources found in the Philippines makes it especially susceptible to unauthorized exploration). Even authorized MSR projects are not consistently monitored to ensure compliance with existing domestic laws and regulations.'[43]

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[37] Mary George, 'Regulating Marine Scientific Research: A Correlation Between the Law of the Sea, Science and National Sovereignty' (2008) 27 Malaysian Journal of Science 137.
[38] R. Ghazali and W. S. A. Wan Dahalan, 'Malaysian Laws on Marine Scientific Research:International Law of the Sea' (2019) 1 Journal of Science Research (JoSR) 82.
[39] Kent E. Carpenter and Victor G. Springer, 'The Center of the Center of Marine Shore Fish Biodiversity: The Philippine Islands', *Environmental Biology of Fishes* (2005) 72: 476 - 480.
[40] Jacqueline Joyce F. Espenilla and Clarisse Anne G. Peralta (n 6).
[41] *Ibid.,* at 426.
[42] *Ibid.*
[43] *Ibid.*

Moreover, they are concerned that: 'Intelligence and surveillance activities conducted under the guise of MSR is also a potential threat.'[44]

When it comes to the legal framework for MSR in the Philippines, Espenilla and Peralta aver that this is primarily governed by UNCLOS, pointing to the fact that the conduct of MSR is automatically incorporated in the law of the land pursuant to Section 2 of Article II of the 1987 Constitution. They then summarise the UNCLOS regime for MSR as entailing that:

> 'All states have the right to conduct marine scientific research and should in fact promote and facilitate the development of MSR. With respect to its territorial sea, coastal states are given the exclusive right to regulate, authorize and conduct MSR. To this end, MSR may be conducted once the express consent of the coastal state is obtained. In the EEZ and on the continental shelf, coastal states are given the right to regulate, authorize and conduct MSR. The consent of the coastal state must also be obtained before the conduct of MSR in the EEZ or on the continental shelf. The coastal state may refuse the conduct of MSR in the EEZ or on the continental shelf if, among others, the project has a direct significance to the exploration and exploitation of living or non-living natural resources, involves drilling into the continental shelf, involves the use of explosives, or involves the introduction of harmful substances into the marine environment. Furthermore, any state or international organization intending to conduct MSR in the EEZ or on the continental shelf of a coastal state shall provide the latter with a full description of the project at least six months before the expected MSR project start date. Despite consenting to the MSR, the coastal state retains the right to order the suspension or cessation of the project in accordance with Article 253 of UNCLOS. Taken together, these rules embody the consent regime for MSR.'[45]

Espenilla and Peralta then note that: 'The conduct of MSR is also referred to in the domestic law of the Philippines, although the term MSR is not expressly used. Republic Act No. 8550 ("Philippine Fisheries Code of 1998", 25 February 1998), the primary piece of legislation regarding fisheries and aquatic resources, allows research and survey activities in Philippine waters under strict regulations and for purely research, scientific, technological and educational purposes that would also benefit Filipino citizens.'[46]

They then observe that institutionally, 'MSR in the Philippines is regulated and monitored by several government agencies and research institutions such as the Department of Foreign Affairs (DFA), Department of Environment and Natural Resources (DENR), National Mapping and Resource Information Authority (NAMRIA), National Security Council (NSC), and the Marine Science the Institute of the University of the Philippines (UP-MSI).'[47] However, 'The overlap in the roles and responsibilities

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[44] *Ibid.*
[45] *Ibid.,* at 426-427.
[46] *Ibid.,*
[47] *Ibid.,*

of these institutions has been identified as one of the causes of the regulatory uncertainty surrounding the conduct of MSR in the country. Each agency involved has its own set of rules for the regulation and processing of MSR consent applications.'[48] Moreover, 'These rules often overlap or contradict one another. In contrast, some agencies do not have any guidelines at all.'[49]

Significantly, for our purposes here of ascertaining possibilities for international co-operation on national legal regimes governing MSR activities conducted by foreign entities in the national maritime jurisdictions of SCS States, Espenilla and Peralta highlight that fact that for the Philippines, 'Among the government agencies enumerated, the Department of Foreign Affairs (DFA) is one of the most involved, particularly at the consent application stage.' Moreover, 'Within the DFA, the Maritime and Ocean Affairs Office (MOAO) is particularly responsible for the handling of issues concerning MSR.'[50]

They then outline the Philippine government's consent procedure for proposed MSR activities conducted by foreign entities as follows:

> 'The consent process begins with the submission of a *note verbale* to the Philippine embassy, including information regarding the MSR project. The DFA (Department of Foreign Affairs) then forwards the request to institutions such as the Philippine Navy, UP-MSI, and NAMRIA for comment. Before granting its consent, the DFA may impose further conditions in the MSR permit.'[51]

Espenilla and Peralta justify the imposition of conditions within such MSR permits by reference to the fact that it is sanctioned by Article 246 of UNCLOS which provides that the coastal state may establish conditions through laws and regulations for the exercise of its discretion to grant or withhold consent. They cite, as an example, an MSR permit issued for China, wherein the Department of Foreign Affairs (DFA) required the research team to include a Filipino scientist on board and to share the information gathered. They then refer to a statement by the Foreign Affairs Assistant Secretary of the Philippines, to the effect that the violation of any condition set forth in an MSR permit can be a ground to deny consent in future MSR applications.

In response to the DAV/FCDO Questionnaire, Julius Cesar Trajano has elaborated on the application of 1995 DFA's guidelines for MSR applications by foreign/non-Filipino entities, as follows:

The application must be made 6 months prior to actual commencement of research activities, with at least one Filipino scientist being present, and the results of the research to be shared with the Philippine government. As explained by the Maritime

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[48] *Ibid.,* at 427.
[49] *Ibid.,*
[50] *Ibid.,* at 427. citing DFA Department Order No. 14-2017 (11 December 2017).
[51] *Ibid.*

and Ocean Affairs Office of the DFA, there are seven steps in the evaluation process of MSR foreign/non-Filipino research applications:

1. The DFA receives the Diplomatic Note containing MSR application by a non-Philippine entity;
2. The DFA sends invitations (with a copy of the Diplomatic Note) to MSR-Technical Working Group (TWG)'s member-agencies for a meeting;
3. DFA hosts the MSR-TWG meeting to discuss and review the MSR application;
4. Members of the MSR-TWG complete the Review and Evaluation Form for the MSR application based on the discussions at the (above convened) MSR-TWG meeting;
5. The Department (of Foreign Affairs) then transmits the recommendation of the MSR-TWG to the Office of the President (of the Philippines) through the National Security Adviser;
6. The Office of the President will then approve or deny the MSR request;
7. The DFA then conveys the decision of the President to the applicant through a Diplomatic Note.

Any approved MSR applications are subject to the following conditions for the conduct of Marine Scientific Research (MSR) in Philippines:

- Observance of Philippine laws and regulations;
- Collaboration / Partnership with reputable Philippine Research Institution
- Necessary permits from local government units;
- Fully completed MSR form (standard UN form) 6 months prior to the start of the research;
- Participation of Filipino Scientist(s);
- Sharing of all data / specimen gathered during the research;
- Necessary permits for export of biological and rock/mineral samples from The Philippines.

In terms of numbers of foreign MSR applications, according to Espenilla and Peralta, 'In 2018, the Philippines government announced that five countries submitted applications for the conduct of MSR. The U.S. submitted 13 applications, all of which were granted; Japan and Korean had nine and four, respectively, all of which were granted. China submitted 18 applications where only two were granted while Germany had two applications both of which were rejected.'[52] In that same year (2018), however, they note that the (then) 'President Duterte ordered the cessation of all marine studies and exploration by foreign scientists in Benham Rise to give priority to research conducted by Filipino scientists.'[53] This was followed in October 2019, by a Philippine

[52] *Ibid.*
[53] *Ibid.,* at 428. Benham Rise is now officially known as Philippine Rise, is an extinct volcanic rise located in the Philippine Sea, approximately 250 kilometers (160 mi) east of the northern coastline of Luzon island in the Philippines archipelago.

government announcement that the moratorium on foreign MSR would be lifted and that there are ongoing plans to establish a national research academic fleet as part of the government's effort to make MSR in the country more robust.[54]

vi. MSR Policy and Law of Singapore

According to Beckman and Davenport, although Singapore does not have any natural offshore oil and gas resources of her own and consequently has no direct legislation on offshore exploration and exploitation of hydrocarbons, Singaporean companies are nevertheless involved in offshore oil and gas exploitation in the region, as well as being major manufacturers of oil and gas installations and structures, including installations for use in Arctic waters.[55] Moreover, with respect to the mineral resources of the (deep sea-bed) Area, mining is governed by the Deep Seabed Mining Act, 2015.[56] On this basis, Singapore has sponsored a Singapore-registered corporation, Ocean Mineral Resources, to enter into a contract with the International Seabed Authority (ISA) dated 21 January 2015 to explore common heritage of humankind resources (namely polymetallic nodules) in the seabed beyond national jurisdiction under Part XI of UNCLOS.[57]

Given Singapore's interest in sponsoring and undertaking MSR in areas beyond her tiny maritime jurisdiction zone, Beckman & Davenport note that: 'the National Research Foundation (NRF) of Singapore has established a Marine Science Research and Development (R&D) Programme (MSRDP) that will integrate R&D in tropical marine science and promote active engagement of industry in the drive towards environmental and marine sustainability. It seeks to advance marine science research in Singapore by leveraging Singapore's location in a region with rich marine biodiversity, to develop nationally relevant R&D and to build capabilities that would address the strategic needs of Singapore in the future.'[58] This programme will leverage Singapore's only offshore marine research facility, the St. John's Island National Marine Laboratory (SJINML), whenever possible. SJINML has been Singapore's key facility for inter-disciplinary marine research for 15 years and was designated by NRF to become a National Research Infrastructure in March 2016. The research themes that have been identified are: (1) marine ecosystems and biodiversity; (2) environment impact and monitoring; and (3) coastal ecological engineering. SJINML was established under the auspices of the Tropical Marine Science Institute (TMSI) of the National University of Singapore, which in itself is a research institute established to play a role on integrated marine science.[59]

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[54] *Ibid.*
[55] Robert Beckman and Tara Davenport (eds), 'Singapore'', *Encyclopedia of Ocean Law and Policy in Asia -Pacific* (2022).
[56] Act 6 of 2015, Singapore Statutes [2020 Revised Edition].
[57] Beckman & Davenport (2022) *ibid.,* at 471.
[58] *Ibid.,* at 472.
[59] *Ibid.*

vii. MSR Policy and Law of Viet Nam

With a long coastline of more than 3,260 km and more than 3,000 islands, rocks, and reefs (including the Hoang Sa (Paracel) Islands and Truong Sa (Spratly) Islands) facing the South China Sea (SCS) known domestically within Vietnam as the East Sea) Viet Nam has an important location both geopolitically and geo-economically.[60] As Trinh notes, 'of particular importance in this context is the Law of the Sea of Viet Nam (21 June 2012) which was developed based on the provisions of UNCLOS and by reference to international state practice. The broad Law of the Sea of Viet Nam includes, among others, principles of management and use of the sea; the scope and regime of internal waters, territorial sea, contiguous zone, EEZ, and continental shelf; the regime of islands; archipelagos; activities in the Vietnamese sea areas; search and rescue; protection of marine resources and environment; *marine scientific research*; development of maritime economy; sea patrols and control; and principles of international maritime co-operation.'[61]

By adopting its Law of the Sea, Trinh observes that: 'Viet Nam harmonized its sea-related laws with the provisions of UNCLOS.' Moreover, 'Viet Nam's policy to settle maritime disputes through peaceful means on the basis of the international law – including UNCLOS – is a clear statement that Viet Nam is a responsible member of the international community, respects and complies with international law – including UNCLOS – and reflects its resolve to strive for regional and global peace, stability, cooperation and development.'[62]

Furthermore, as Nguyen Thi Lan Huong notes, 'a series of domestic laws relating to ocean governance provide an integrated and comprehensive approach across a number of sea-related matters, including hydrocarbons, fishery resources, protection of natural resources, safety of navigation and scientific research.'[63] Specifically, 'the Law on Natural Resources and Environment of Sea and Islands covers different sea-related areas such as, *inter alia*, "strategy for exploitation and sustainable use of natural resources and environment of sea and island" (Chapter II); "fundamental investigation, scientific research on natural resources and environment" (Chapter III).'[64] According to Nguyen, 'The integrated approach is reflected in various domestic legislations and guiding documents covering specific sea-related activities, inter alia, in terms of maritime scientific research, these include Law of the Sea of Viet Nam (21 June 2012); Law on Natural Resources and Environment of Sea and Islands (25 June 2015); and Decree no.41/2016/ND-CP (15 May 2016) on elaborating the authorization of foreign organizations and individuals to conduct scientific research in Viet Nam's waters.'[65]

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[60] Trinh Hai Yen and Nguyen Toan Thang (eds), 'Viet Nam', *Encyclopedia of Ocean Law and Policy in Asia-Pacific* (2022).
[61] Trinh Hai Yen, at 537, emphasis added
[62] *Ibid.,* at 537.
[63] *Ibid.,* at 533.
[64] *Ibid.,* at 534.
[65] *Ibid.*

Specifically on marine scientific research (MSR), Viet Nam has enacted legislation to regulate marine scientific research activities under its jurisdiction. In 1991, the Council of Ministers issued Decree no.242/HDBT (5 August 1991) Regulations on foreign entities and equipment entering the maritime zones of the Socialist Republic of Viet Nam for scientific research activities. This 1991 Decree has contributed to facilitating MSR activities in Viet Nam but according to Nguyen Toan Thang has 'became outdated and its provisions are no longer relevant to reality.'[66] As mentioned above, to meet Viet Nam's practical needs, numerous relevant legal instruments have been issued, including the Law of the Sea of Viet Nam (2012), Law on Natural Resources and Environment of Sea and Islands (2015), and Government Decree no.41/2016/ND-CP (15 May 2016) defining the details for the issuance, amendment, re-issuance, extension, suspension and revocation of permits that enable foreign organizations and individuals to conduct scientific research in the maritime zones of Viet Nam. Finally, Decree no.41/2016/ND-CP (2016) replaced Decree no.242/HDBT (1991).

The following conditions apply when conducting marine scientific research within Vietnamese maritime jurisdiction:

1. Research is conducted exclusively for peaceful purposes. Research is conducted with appropriate methods and facilities under Vietnamese law and relevant international law;
2. Research does not impede other lawful activities at sea. Research ensures that Vietnamese scientists have the right to participate in scientific research activities, and the state is to be provided with the research materials and original specimens, as well as the option to apply and use the results obtained from such scientific research;
3. Research can aim to improve human knowledge, or to explore and exploit natural resources. Vietnamese law is not limited to non-commercial goals;
4. When conducting scientific research in Vietnamese maritime zones, foreign organizations and individuals may disclose and transfer information and research findings to a third party. However, for scientific research activities in internal waters and territorial sea, this publication can only be made after obtaining a written approval from the Minister of Natural Resources and Environment. For research activities in the EEZ and on the continental shelf, any publication of research findings in direct connection with exploration and exploitation of natural resources must first be approved in writing by the Minister of Natural Resources and Environment (Article 21 of the Law on Natural Resources and Environment of Sea and Islands (2015));
5. Based on the research objectives and contents, the competent governmental authorities of Viet Nam shall issue decisions to permit foreign organizations and individuals to conduct scientific research in Vietnamese maritime zones;

[66] *Ibid.,* at 567.

6. The duration of a research project does not exceed two years and may be extended once for no more than one year. In some cases, permit requests are refused, namely if the research is deemed:
   a. not for peaceful purposes;
   b. prejudicial to the sovereignty, sovereignty rights, jurisdiction, national
   c. defense, security, or maritime interests of Viet Nam;
   d. harmful to the sea order and safety;
   e. seriously affecting existing activities of basic investigation, scientific research, exploration, exploitation and use of marine resources in Viet Nam;
   f. using explosives, toxic chemicals, or other means and equipment capable of causing damage to humans and natural resources, or polluting the marine environment;
   g. constructing artificial islands, installations and structures at sea; or
   h. involving drilling on the seabed. In some cases, requests are denied when providing inaccurate information about the objectives and contents of scientific research activities, a lack of cooperation with Vietnamese authorities, or having previously been licensed to conduct scientific research in Vietnamese maritime zones but failed to fully fulfil their obligations under the provisions of Vietnamese law and UNCLOS (Article 3.4 of Decree no.41/2016/ND-CP (2016)).

In brief, Vietnamese law on marine scientific research is consistent with the provisions of UNCLOS and provide comprehensive and specific regulations on licensing and management of scientific research activities in Viet Nam's maritime zones. However, Vietnamese law does not have any regulations to clarify the concept of marine scientific research. [67]

Thus, in 1995 Viet Nam and the Philippines signed an Agreement to Conduct Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea (JOMSRE-SCS) (December 1995). Four JOMSRE-SCS expeditions were carried out, including one in 1996, 2000, 2005 and 2007. What is more, Viet Nam Oil and Gas Corporation, China National Offshore Oil Corporation and Philippine National Oil Company signed a Tripartite Agreement for Joint Marine Seismic Undertaking in the Agreement Area (14 March 2005).[68]

[67] *Ibid.,* at 568-569.
[68] *Ibid.,* at 570-571.

3. Thematic Analysis of MSR Policies and Law of the Six ASEAN Members and China

Generally speaking, the importance of MSR to individual SCS littoral States is well illustrated in their marine policies and laws - for example, by the fact that the conduct of MSR is actually incorporated in the 1987 Constitution of the Philippines, pursuant to Section 2 of Article II. However, a preliminary examination of the MSR policies & laws of these six ASEAN Member States and China reveals a number of differences, discrepancies and gaps in national MSR priorities, policies and laws, thereby highlighting the continuing need for coordination and possibilities for harmonisation of MSR regulatory practice. For example, in view of the lack of a definition of MSR in the UNCLOS, it may be noted that, as was the case for Vietnam, Malaysian law also offers no definition for MSR and lacks detailed regulation on what constitutes MSR for the purposes of requiring the consent of Malaysian authorities. This raises continuing uncertainty for the conduct of such activities within the Malaysian EEZ or on its continental shelf. Similarly, the conduct of MSR is referred to in the domestic law of the Philippines, but the term MSR is not expressly used.

Indonesia on the other hand, defines 'scientific surveys' under Art 1C of the EEZ Law (Law No. 5 of 1983) as *all* activity related to *all* aspects of research in the surface, water column, and seabed and subsoil of the Indonesian EEZ, according to Aristyo, in response to the DAV/UK-FCDO Questionnaire. It is perhaps unsurprising that the Indonesian archipelago, with its many thousands of islands, is concerned to ensure that MSR conducted within the vast area of Indonesian maritime jurisdiction zones is

a strictly non-commercial activity. This is reflected in several Indonesian laws regulating, *inter alia*, MSR activities, the implications of which will be examined further on in this study (below). The People's Republic of China - another SCS littoral State, albeit not an ASEAN Member - is also clearly concerned about the conduct of MSR by foreign-flagged vessels within Chinese maritime jurisdiction zones. Chinese national legal provisions on this issue centre on the Administration of Foreign-related Marine Scientific Research (No. 199 of the State Council, 18 June 1996) which imposes several requirements on MSR conducted by foreign parties.

In contrast, Singapore looks to approach MSR as the type of activity the Singaporean government will support/undertake in the maritime jurisdictional zones of other littoral States in the SCS region rather than as a regulatory MSR State. Thus, the National Research Foundation (NRF) of Singapore has established a Marine Science Research and Development Programme (MSRDP) that will integrate R&D in tropical marine science and promote active engagement of industry by leveraging Singapore's location in a region with rich marine biodiversity.

Vietnam is another of the littoral SCS States that is intent on prioritising marine science and technology for her future economic development. This is pursued in Vietnam through a comprehensive national Law of the Sea of Vietnam (21 June 2012). Furthermore, several MSR-related activities are regulated by the Vietnamese Law on Natural Resources and Environment of Sea (25 June 2015) such as 'fundamental investigation, scientific research on natural resources and environment' (Chapter III) as well as 'monitoring and supervision, information and database system on natural resources and environment of seas and islands" (Chapter VII). Further Vietnamese MSR regulation in the form of Decree no.41/2016/ND-CP (15 May 2016) elaborates on the authorization of foreign organisations and individuals to conduct scientific research in Vietnam's waters. It does so by defining the details for the issuance, amendment, re-issuance, extension, suspension and revocation of permits that enable foreign organisations and individuals to conduct scientific research in the maritime zones of Vietnam.

So, how far do these national MSR policies and laws conform to, or differ from, the UNCLOS regime for MSR? To begin with, Lim emphasises that Article 56(l)(b)(ii) of the 1982 UNCLOS which confers jurisdiction to the coastal State in marine scientific research, must be read with Article 240(1) of UNCLOS which states that this must be 'exclusively for peaceful purposes'[69]. However, not all the ASEAN Members have made this connexion explicit. For example, Lim notes that: 'Section 16(2) of the 1984 Malaysian Exclusive Economic Zone (EEZ) Act specifically acknowledges this limitation of MSR in Article 240(1).'[70] On the other hand, 'both the Indonesian (Article 7 of its 1983 EEZ Act) and Philippine (section 3(c) Philippine Presidential Decree 1979) legislation does not confine jurisdiction to marine scientific research for peaceful purposes but

[69] Lim (1991) *ibid.,* at 178.
[70] *Ibid.,* at 178.

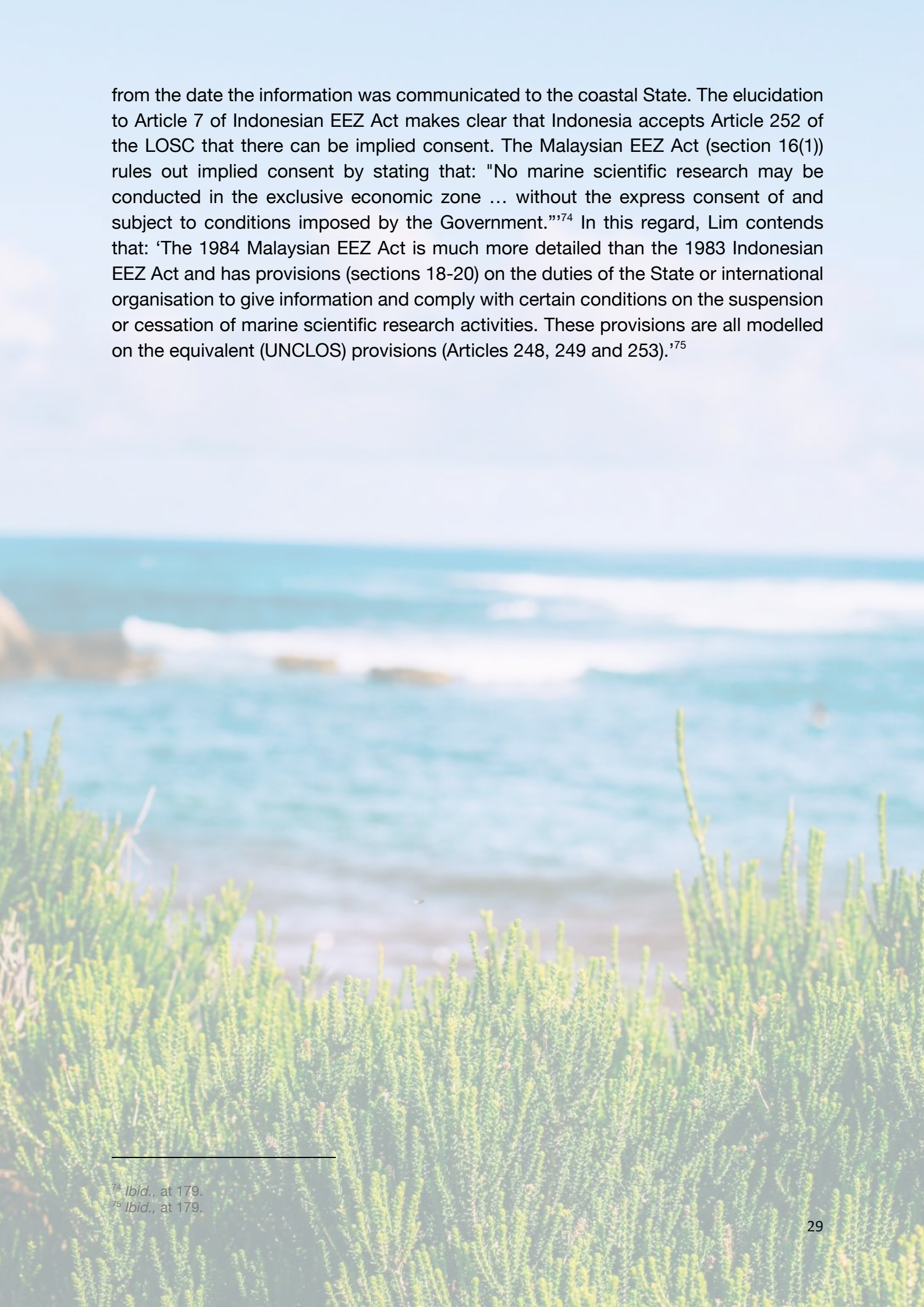
claims a wider right to control respectively 'any scientific research' and 'any research', and this is not limited to 'peaceful purposes'.'[71] Lim also highlights that section 2(b)(ii) of the Thai EEZ Act simply incorporates verbatim Article 56(l)(b)(ii): 'In the exclusive economic zone, the coastal State has: … (b) jurisdiction as provided for in the relevant provisions of this Convention with regard to … (ii) Marine scientific research.'[72]

These ASEAN Member States' claims of broader and deeper jurisdiction over activities within their EEZs are especially problematic when it comes to the general issue of coastal State consent (whether implied or otherwise) for MSR activities conducted by foreign entities. As Lim notes, 'a potentially contentious issue here is that of when a State or international organisation can conduct marine scientific research in a coastal State's EEZ. The (UNCLOS) EEZ regime seeks to resolve this issue by making it obligatory on the coastal State to grant consent in "normal circumstances", which are defined as marine scientific research conducted "in accordance with this Convention exclusively for peaceful purposes and in order to increase scientific knowledge of the marine environment for the benefit of all mankind" (Article 246(3) of the LOSC). The coastal State, however, has a discretion to withhold consent when it concerns the EEZ resources of that State (Article 246(5) and (8)). The Indonesian EEZ Act (Article 7) insists on prior consent by Indonesia before any State can engage in marine scientific research in its EEZ without incorporating the obligation to grant consent in "normal circumstances" or, for that matter, any indication at all as to when it would grant consent to other States to conduct marine scientific research in its EEZ. The Malaysian EEZ Act (section 16(2)) also makes no reference to "normal circumstances" but nonetheless accepts an obligation similar to Article 246(3) in stating that the "Government *shall* give consent where the marine scientific research would be carried out by any State or competent international organisation for peaceful purposes and to increase scientific knowledge of the marine environment" (emphasis added). The Malaysian EEZ Act (section 17) then goes on to incorporate Article 246(5) and (8) of the LOSC, allowing it to withhold consent when it concerns its EEZ resources. It is not clear what remedies are available if the Malaysian government refuses to give consent when the marine scientific research does not involve its EEZ resources. It would probably lie in the public law remedy of mandamus, though questions of standing and whether section 16(2) of the Malaysian EEZ Act is directory or mandatory would arise.'[73]

Lim goes on to observe that: 'There is another aspect to the issue of consent. Under Article 252 of the LOSC, a State which has communicated to the coastal State the information required under Article 248 for the conduct of marine scientific research may assume that the coastal State has impliedly consented to the marine scientific research if the coastal State does not reply within four months of the receipt of this information, and may proceed to conduct the marine scientific research six months

[71] *Ibid.*
[72] *Ibid.*
[73] *Ibid.,* at 178-179.

from the date the information was communicated to the coastal State. The elucidation to Article 7 of Indonesian EEZ Act makes clear that Indonesia accepts Article 252 of the LOSC that there can be implied consent. The Malaysian EEZ Act (section 16(1)) rules out implied consent by stating that: "No marine scientific research may be conducted in the exclusive economic zone … without the express consent of and subject to conditions imposed by the Government."'[74] In this regard, Lim contends that: 'The 1984 Malaysian EEZ Act is much more detailed than the 1983 Indonesian EEZ Act and has provisions (sections 18-20) on the duties of the State or international organisation to give information and comply with certain conditions on the suspension or cessation of marine scientific research activities. These provisions are all modelled on the equivalent (UNCLOS) provisions (Articles 248, 249 and 253).'[75]



[74] *Ibid.*, at 179.
[75] *Ibid.*, at 179.

4. Possible Common Understandings of 'Best Practice' and/or Harmonization Steps for National MSR Policies and Laws Among Six ASEAN Member States

Several possible common understandings of 'best practice' and/or harmonization steps that can be distilled from the six ASEAN national MSR policies & laws examined here (above) are summarised as follows:

1. A potentially very useful legal provision (taken from Section 18, 1972 Fisheries Act of Brunei) states that: 'The Director may in writing exempt from the provisions of this Act and all regulations, either absolutely or conditionally, any person attached to a scientific institution who fishes only for the purposes of scientific research.' Such an exemption, especially if provided in both hard (paper) and soft (electronic) forms, can be very useful for verification and communication purposes if the vessel conducting MSR is challenged by coastal State authorities and/or maritime enforcement vessels;

2. The Indonesian requirement for receiving an MSR permit, wherein to conduct MSR in the territorial waters, EEZ, or on the continental shelf, foreigners are required to, *inter alia*, partner with a domestic fisheries research body and involve Indonesian researchers;

3. As applications for MSR activities to be conducted within the maritime jurisdiction of any coastal State by foreign entities and/or transnational/ international organizations will almost inevitably result in a decision-making process involving a number of government bodies, it would be efficacious for each ASEAN Member State concerned to publish a flowchart of this decision-

making process, detailing each of the stages in this process and the different government entities involved at each stage of it.

4. Given the variety of interpretations of the MSR consent regime under UNCLOS and the different conditions attached to permission by the national authorities of the SCS littoral States for MSR activities conducted within their maritime jurisdiction zones, one way to ensure that compatibility with UNCLOS is maintained is to consider the application of the provision with the 1996 MSR Provisions of China that state in Article 14 that if these (national-level) 1996 MSR Provisions conflict with an international treaty that China has concluded or acceded to (for e.g., UNCLOS) then the international treaty shall prevail unless an applicable reservation is relevant, also noting here that UNCLOS does not allow for general reservations under Article 309;

5. A sample of generic provisions for inclusion within any bilateral, sub-regional, regional, and even extra-regional SCS cooperation on MSR activities can be drawn from the many MSR initiatives, agreements and programmes that China has undertaken with her East China Sea neighbours and international partners from further afield. These common provisions relate to, inter alia, exchanges of related data and information, joint sustainable development initiatives, and an acknowledgment of conducting research in the spirit of scientific discovery, mutual economic progress, and environmental protection, all of which can be usefully included within any ASEAN or China-ASEAN template for joint or otherwise co-operative MSR initiatives, designed to reduce tensions within the South China Sea;

6. Finally, in order to circumvent possible concerns over approved MSR activities within disputed areas of the SCS being regarded as evidence of implied acceptance of competing claims by littoral SCS States over these disputed areas, standard non-prejudice clauses can be introduced within co-operative/joint MSR agreements to ensure that no implied acceptance of the validity of such claims over these disputed areas within the SCS.

II ANALYSIS OF CURRENT PRACTICES ON JOINT MSR AND LESSONS LEARNT FROM THESE PRACTICES

This Part of the Report analyses relevant multilateral cooperative practices on joint marine scientific research (MSR) to find out what lessons they can provide for the development of a joint marine scientific research mechanism in the South China Sea (SCS). Two types of practices are studied: a) cooperative practices with a geographical scope including the South China Sea and b) cooperative practices in other regional seas with disputed maritime features and overlapping maritime jurisdiction claims.

1. Multilateral cooperative on joint marine scientific research with a geographical scope that includes the South China Sea

1.1. Intergovernmental Oceanographic Sub-Commission of the Western Pacific

The Intergovernmental Oceanographic Commission (IOC) was established by the General Conference of United Nations Economic, Social and Cultural Organization (UNESCO) at its 11th session, November – December 1960[76] to promote international cooperation and to coordinate programmes in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processes of its Member States.[77] Currently, IOC has 150 Member States.[78]

The IOC Sub-Commission for the Western Pacific (WESTPAC) was then established by IOC in 1989 to promote international cooperation and to coordinate programmes in marine research, ocean observations and services, as well as capacity

[76] 'Records of the General Conference, 11th Session, Paris, 1960: Resolutions - UNESCO Digital Library' <https://unesdoc.unesco.org/ark:/48223/pf0000114583> accessed 14 June 2023.
[77] 'Statutes of the Intergovernmental Oceanographic Commission, IOC' (2000) <https://unesdoc.unesco.org/ark:/48223/pf0000124367.locale=fr> accessed 14 June 2023.
[78] 'WESTPAC Terms of Reference' (*IOC – WESTPAC*) <https://www.ioc.unesco.org/en> accessed 14 June 2023.

building in the Western Pacific and adjacent seas, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of governance, sustainable development and protection of the marine environment. WESTPAC currently has of 22 Member States mainly located in East Asia, Southeast Asia, South Pacific and the eastern Indian Ocean, with its membership open to all interested Member States of IOC/UNESCO willing to participate actively in the work of the Sub-Commission. The United Kingdom is a Members State of WESTPAC.[79]

WESTPAC is committed to developing, coordinating and implementing marine scientific research, observations and services on four themes: understanding ocean processes and climate in the Indo-Pacific; ensuring marine biodiversity and seafood safety; safeguarding the health of ocean ecosystems; and enhancing knowledge of emerging ocean science issues.

IOC WESTPAC is the most institutionalised cooperation mechanisms in MSR in the region so it has less financial issues than other initiatives. However, regional and national politics can heavily influence its activities.

1.2. Southeast Asian Fisheries Development Centre

The Southeast Asian Fisheries Development Centre (SEAFDEC) is a regional organization established by the Agreement establishing the Southeast Asian Fisheries Development Centre in 1967 to promote cooperation in fisheries development in Southeast Asia.[80] Pursuant to the Agreement, the Centre's functions include training fisheries technicians of the Southeast Asian countries; studying fisheries techniques suitable to Southeast Asia; developing fishing grounds and to conduct investigation of fisheries resources and research in fisheries oceanography in Southeast Asia; collecting and analysing information related to the fisheries in Southeast Asia;

[79] 'Welcome to WESTPAC' (*WESTPAC*) <http://iocwestpac.org/aboutus/4.html> accessed 14 June 2023.

[80] 'Agreement Establishing the Southeast Asian Fisheries Development Center', *(January 30th 1968).* The Agreement has been amended in 1994.

providing the Members with the results of studies and researches by the Centre and other information.[81] SEAFDEC comprises 11 Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao People's Democratic Republic (PDR), Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.[82] Its secretariat is located in Thailand.

SEAFDEC promotes and facilitates concerted actions among Member Countries to ensure sustainability of fisheries and aquaculture in Southeast Asia through five areas of activities:

> i. Research and development in fisheries, aquaculture, post-harvest, processing, marketing of fish and fishery products, socio-economics, and the ecosystem to provide reliable scientific data and information;
>
> ii. Formulation and provision of policy guidelines based on the available scientific data and information, local knowledge, regional consultations and prevailing international measures;
>
> iii. Technology transfer and capacity building to enhance the capacity of Member Countries in the application of technologies, and implementation of fisheries policies and management tools for the sustainable utilization of fishery resources and aquaculture; and
>
> iv. Monitoring and evaluation of the implementation of the regional fisheries policies and management frameworks adopted under the ASEAN-SEAFDEC collaborative mechanism, and the emerging international fisheries-related issues including their impacts on fisheries, food security and socio-economics of the region.[83]

SEAFDEC could be a good model for the UK intervention in Southeast Asia as it is a cooperation agreement between Japan and Southeast Asian countries. Its weakness is that countries are very reluctant to share data acquired in their national waters with others.

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[81] 'Agreement Establishing the Southeast Asian Fisheries Development Center', SEAFDEC Special Council Meeting 28th December 1967, Bangkok, Thailand, Art.2.
[82] 'About SEAFDEC' (*SEAFDEC*) <http://www.seafdec.org/about/> accessed 14 June 2023.
[83] 'SEAFDEC Strategies' (*SEAFDEC*) <http://www.seafdec.org/strategies/> accessed 14 June 2023.

1.3 ASEAN Cooperation in Marine Scientific Research

The inspiration for ASEAN cooperation in science and technology was mentioned in the very founding instrument of ASEAN. The ASEAN Declaration, 1967 stipulates one of the aim and purpose of ASEAN is to "provide assistance to each other in the form of training and research facilities in the educational, professional, technical and administrative spheres".[84] Recognizing that science and technology are necessary and indispensable tools towards achieving ASEAN's mission, an Ad hoc Committee on Science and Technology was established and met for the first time on 27 – 29 April 1970. The said meeting agreed that ASEAN cooperation in science and technology should be guided by the objectives of initiating and intensifying regional cooperation in scientific and technological activities; generating and promoting development of scientific and technological expertise and manpower in the ASEAN region; facilitating and accelerating the transfer of scientific developments and technologies among ASEAN countries and from the more advanced industrialised countries to the ASEAN region; providing support and assistance in the application of the results of research and development, and in the more effective use of natural resources in the ASEAN region; and providing support towards the implementation of present and future ASEAN programmes.[85]

The first ASEAN Plan of Action on Science and Technology (APAST) was adopted in 1985 and then updated in 1989. The objective of APAST was to strengthen and enhance the capability of ASEAN in science and technology so that it can promote economic development and help achieve a high quality of life for the peoples of ASEAN.[86] Strategic plan and actions to achieve this objective include intensifying cooperation in science and technology; widening involvement and increasing participation and cooperation among the scientists and researchers of member countries; maintaining a high level of scientific and technological expertise and, in the process, develop an intelligent workforce in a rapidly changing and highly competitive world; promoting technology transfer and the commercialization of research results; ensuring human resources development for promoting scientific, technological, and economic development; and providing an overall awareness in ASEAN on the strategic role that science and technology plays in economic development.[87]

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[84] 'The ASEAN Declaration / Bangkok Declaration' (*ASEAN Main Portal*, 8 August 1967) <https://asean.org/legaldocumentparent/the-asean-declaration-bangkok-declaration-bangkok-8-august-1967/> accessed 14 June 2023.

[85] 'ASEAN Plan of Action on Science, Technology and Innovation (APASTI) 2016-2025' (6 November 2015) <https://asean.org/book/asean-plan-of-action-on-science-technology-and-innovation-apasti-2016-2025/> accessed 14 June 2023.

[86] 'Chairman's Press Statement of the 4th Informal ASEAN Ministerial Meeting on Science and Technology (IAMMST) Kuantan, Malaysia' (*ASEAN Main Portal*, 30 January 1989) <https://asean.org/chairmans-press-statement-of-the-4th-informal-asean-ministerial-meeting-on-science-and-technology-iammst-kuantan-malaysia/> accessed 14 June 2023.

[87] ibid.

ASEAN cooperation in MSR has been a sustained and important effort between ASEAN Member States. However, many of its projects depend on external funding to be implemented.

1.4. The Workshops on Managing Potential Conflicts in the South China Sea

The Workshops on Managing Potential Conflicts in the South China Sea are a series of workshops organised by Indonesia since 1990 with the participation of all the 5 claimants in the South China Sea and other ASEAN Countries (namely China, Taiwan, Philippines, Brunei, Malaysia, Indonesia, Singapore, Myanmar, Thailand, Laos, Cambodia, and Vietnam). The process was initiated in 1989 by Dr Hasjim Djalal, former Indonesian diplomat and the late Professor Ian Townsend-Gault from the University of British Columbia, Canada. The initial funding for the organisation of the workshops was provided by the Canadian Agency for International Development.[88] The purpose of the workshops is to develop confidence-building measures in the South China Sea and to promote cooperation activities between the littoral States. The participants to the meetings include government and military officials, academics, opinion-makers and scientists from the region. The Workshop is considered to have an informal nature and constitutes a "track-two" initiative. Participants attend the workshops in their personal capacity and their statements do not represent government perspectives and should not be used to justify claims or policies.[89] Besides, all the Statements of the workshop have been adopted in pursuant to the rule of consensus. So far, 33 South China Sea Workshops have been organised and initiatives of regional cooperation developed in various subjects including marine scientific research, marine environmental protection, and maritime safety.[90]

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[88] Yann-Huei Song, 'Managing the Potential Conflicts in South China Sea: Taiwan's Perspectives' East Asian Institute Paper N.14, *World Scientific Publishing and Singapore University Press (1999)*.

[89] Sulan Chen, 'Informal Cooperation: The Workshops on Managing Potential Conflicts in the South China Sea', Instrumental and Induced Cooperation: Environmental Politics in the South China Sea, *University of Maryland*, (2005), 218.

[90] Opening Speech Dr. Yayan G.H. Mulyana Head of Foreign Policy Agency Strategy Ministry of Foreign Affairs of the Republic of Indonesia at the 31st Workshop on Managing Conflicts in the South China Sea, 24 August 2022, *Ministry of Foreign Affairs of Indonesia* <https://kemlu.go.id/portal/en/read/3937/pidato/opening-speech-dr-yayan-gh-mulyana-head-of-foreign-policy-agency-strategy-ministry-of-foreign-affairs-of-the-republic-of-indonesia-at-the-31st-workshop-on-managing-conflicts-in-the-south-china-sea-24-august-2022>. See also Ian Towsend-Gault, 'The Contribution of the South China Sea Workshop: The Importance of a Functional Approach', in Sam Bateman & Ralf Emmers (eds), *Security and International Politics in the South China Sea: Towards a Co-operative Management Regime,* (Taylor and Francis, 2009).

Under the Workshops, an expedition for biodiversity studies in the Anambas and Natunas islands of Indonesia (Anambas expedition) was carried out in 2002. During this expedition, a total of 60 sites were explored, 3000 specimens collected among which some were unknown previously.[91] A project on "The Study of Tides and Sea Level Change and Its Impacts on Coastal Environment in the South China Sea" is also being implemented since 2005.[92]

The Workshops on Managing Potential Conflicts in the South China Sea' uniqueness lies in the fact that it is the only mechanism where there are both China and Taiwan present. However, the whole process depends on Indonesia who seems to lose interest in this endeavour.

1.5. The Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea

The Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea (JOMSRE-SCS) started as a bilateral initiative between the Philippines and Vietnam. It was agreed between late President Lê Đức Anh of Viet Nam and late President Fidel Ramos of the Philippines in 1994. Its objective was to enhance friendship between two countries through cooperation in marine scientific research and improve the knowledge of the process of the marine environment and resources in the South China Sea.[93] Under JOMSRE-SCS, four expeditions were carried out in different locations from 1997 to 2007 using research vessels both Philippines and Vietnam alternatively, with a focus in the Spratlys area. Much data has been collected and analysed, contributing to further understanding the South China Sea and its biodiversity. According to the results of the expeditions, while the status of the coral reef in the Spratlys was evaluated from "good" to "very good", the situation of its reef fish was quite alarming. It was estimated that the densities of reef fish in this area have decreased about one third from the first expedition in 1997 to the fourth expedition in 2007 because of over-fishing.[94] In 2008, Viet Nam and Philippines decided to end the

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[91] See N.Nivasothi, '*Progress Report for EX ANAMBAS 2002', an initiative of the Workshop on Managing Potential Conflicts in the South China Sea*, 13th Workshop on Management of Potential Conflicts in the South China Sea, (Medan, Indonesia, 17-18 September, 2003).

[92] 'The 30th Workshop on Managing Potential Conflict in the South China Sea (2021) at 11', Ministry of Foreign Affairs of Indonesia <https://kemlu.go.id/download/L3NpdGVzL3B1c2F0L0RvY3VtZW50cy9LYWppYW4lMjBCUFBLL1AzSyUyME9JLU1VTFRJTEFURVJBTC9UaGUlMjAzMHRoJTIwV29ya3Nob3AlMjBvbiUyME1hbmFnaW5nJTIwUG90ZW50aWFsJTIwQ29uZmxpY3RzJTIwaW4lMjB0aGUlMjBTb3V0aCUyMENoaW5hJTIwU2VhLnBkZg==>. See also Statement of the 15th Workshop on Managing Potential Conflicts in the South China Sea, Banten, Indonesia, 24 – 26 November 2005.

[93] 'The Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea (JOMSRE-SCS)' [in Vietnamese: Dự án Khảo sát nghiên cứu khoa học biển phối hợp Việt Nam – Philippin trên Biển Đông (JOMSRE-SCS)], 1996-2007(15 October 2012), Vietnam Institute of Oceanography <http://www.vnio.org.vn/Trangch%E1%BB%A7/H%E1%BB%A3pt%C3%A1cQu%E1%BB%91ct%E1%BA%BF/tabid/60/ctl/Details/mid/389/ItemID/575/language/vi-VN/Default.aspx>,

[94] For details see Nguyen Khoa Son *et al.*, 'Proceedings of the Conference Summarizing Results of the Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea JOMSRE-SCS V-IV, 26 – 29/03/2008' [in Vietnamese: *Kỷ yếu Hội nghị tổng kết các chuyến khảo sát nghiên cứu khoa học biển phối hợp Việt Nam-Philippin trên Biển Đông (JOMSRE-SCS I-IV), 26-29/03/2008, Hạ Long, Việt Nam*] (Hanoi: Science and Technologies Publisher, 2009).

1st phase of the program but committed to resume its 2nd phase in the future. Despite being a bilateral endeavour, scientists from other countries, in particular ASEAN Member States, were invited to take part in the expeditions as well. China also expressed interest to join the initiative. At the end of the 1st phase, Philippines and Viet Nam seemed to agree that future expeditions will be expanded to ASEAN Member States, China as well as international organisations.[95]

At the 9th Philippines-Viet Nam Joint Permanent Working Group on Maritime and Ocean Concerns on 17 November 2021, both countries agreed to resume the bilateral joint maritime scientific research expedition which has been stopped since 2007.[96] This move has been welcomed by supporters for science diplomacy in the region as it will help boosting cooperation in marine scientific research in the region as well as improving the understanding the natural characteristics of the South China Sea.

JOMSRE was a pioneering initiative in MSR cooperation in disputed areas of its time. However, it seems to be difficult to replicate the same model in today's situation.

1.6. The Centre for Humanitarian Dialogue's Common Fisheries Resource Analysis Process

The Centre for Humanitarian Dialogue also known as Henry Dunant Centre for Humanitarian Dialogue (HD Centre) is an international private, non-profit organization established in 1999 under Swiss law to prevent and resolve armed conflicts through dialogue, mediation and discreet diplomacy.[97] HD Centre implement activities such as mediation, promoting dialogues, facilitating confidence building measures, implementing humanitarian efforts in hotspots of conflicts around the world such as Africa, Kosovo, Ukraine, Latin America, Middle East.[98] For the financing of its activities, HD Centre receives both strategic support and targeted project funding with the latter making up the majority of donor support. Its donors include both public agencies (such as from Switzerland, Norway, Sweden, Germany, the Netherlands, Canada, Denmark, the UK, Australia, Ireland, the EU and UN) and private foundations.[99]

HD Centre has implemented a number of initiatives to reduce tension and improve regional cooperation in the South China Sea such as providing ideas for dispute settlement and compliance insurance in the Code of Conduct of Parties in the South China Sea and developing a set of Common Operating Principles to reduce the

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[95] Henry S. Bensurto Jr., 'Cooperation in the South China Sea: Views on the Philippines – Vietnam Cooperation on Maritime and Ocean Concerns paper presented at *the 2nd International Workshop "South China Sea: Cooperation for Regional Security and Development", November 11–12 2010, Ho Chi Minh City, Vietnam*.

[96] 'PH, Vietnam to revive joint marine research expedition after 14 years' (18 November 2021) online: Manila Bulletin <https://mb.com.ph/2021/11/18/ph-vietnam-to-revive-joint-marine-research-expedition-after-14-years/>.

[97] *(HD Centre)* <https://hdcentre.org/about/>. See also 'The HD Charter – Mediation for Peace and Articles of Association and Regulations of the Foundation entitled Henry Dunant Centre for Humanitarian Dialogue', (June 2013) at the same website for more information.

[98] 'Our Approach', *(HD Centre)* < https://hdcentre.org/our-approach/>.

[99] 'Our Donors', *(HD Centre)* <https://hdcentre.org/our-donors/>.

risk of escalations during maritime encounters.[100] Recently, HD Centre implemented a project of cooperative marine scientific research in the South China Sea which is the Common Fisheries Resource Analysis Process.

Since 2018, HD Centre has convened a South China Sea Fisheries Working Group with scientists and policy-makers from China, Indonesia, Malaysia, the Philippines and Vietnam to meet regularly to discuss how to cooperatively manage the South China Sea fisheries resources. In 2019, participants decided to collectively build a scientific consensus on the status of some key fish species in the South China Sea. They would undertake a "Common Fisheries Resource Analysis" through which scientists from all five countries would develop parallel resource assessments, in a manner that did not require data sharing (which is politically infeasible due to the regional sensitivities). The Common Fisheries Resource Analysis process has been organized with the support of HD Centre, who assisted with secretariat support, sourced independent technical expertise and provided resources for collection of new data.[101]

The 1st CFRA process assessed the status of Skipjack Tuna (*Katsuwonus pelamis*) stocks around the South China Sea. These were chosen because of its economically important, highly migratory and transboundary nature. Skipjack Tuna is caught by fisherfolk around the region, and all the five participating countries had some level of data that they could contribute. The fisheries scientists collectively decided on a common methodology they would all use for their data collection and analysis. After reviewing several alternatives, they agreed on the Length-Based Spawning Potential Ratio (LBSPR) methodology to analyse their data. This methodology uses the length of fish caught to determine whether the stock is being fished sustainably. LBSPR is a particularly useful assessment tool in data-limited fisheries. The fisheries scientists from China, Indonesia, Malaysia, the Philippines and Vietnam first reviewed national data on Skipjack Tuna caught in the South China Sea that was being landed in their own ports. Each country's scientists then analysed their data using the LBSPR methodology to assess the status of locally caught Skipjack Tuna. The scientists then merged their analysis for the 1st CFRA, producing a composite picture of Skipjack Tuna health in the South China Sea. The 1st CFRA process did not require governments to share raw data, but allowed scientists to combine expertise and analysis from across the South China Sea.[102]

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[100] See 'Options Paper Implementation Mechanisms for the ASEAN-China South China Sea Code of Conduct', (HD Centre) <https://www.hdcentre.org/wp-content/uploads/2021/12/Options-Paper-Implementation-Mechanisms-for-SCS-Code-of-Conduct-1.pdf>, 'South and Southeast Asia', *(HD Centre)* <https://hdcentre.org/area-work/south-and-southeast-asia/>, and 'Northeast Asia', ' HD Centre' <https://hdcentre.org/area-work/northeast-asia/>.

[101] 'Policy Brief: The 1st Common Fisheries Resource Analysis', *(Manila, Philippines*, 1 – 2 September 2022) and Jeremy Prince et al., 'The CFRA: A Joint Assessment of South China Sea Skipjack Tuna Stocks' (September 2022), 5.

[102] Ibid.

Being a private initiative, the CFRA could be very flexible and informal. However, it will be difficult for HD to sustain this initiative financial to be a long-term project.

1.7. MicroSeap Consortium

In order to achieve a standardization of marine plastic pollution assessment, marine scientists in the region have formed a collaboration platform- MICROSEAP Consortium - formed in 2020. It is composed of universities from Singapore, Indonesia, Malaysia, Vietnam, Thailand and the Philippines. Their scientists are researching microbes on plastic waste found in the region, investigating the threats caused by plastic pollution and searching for solutions to the plastic problem. They are also part of a collaborative research project under the "Understanding the Impact of Plastic Pollution on Marine Ecosystems in south-east Asia (South-East Asia Plastics (SEAP) programme)" which began in October 2020. This three-year collaboration is funded and fully supported by Natural Environment Research Council (NERC), Singapore's National Research Foundation (NRF) and UK government funding supported by the Department for Business, Energy and Industrial Strategy (BEIS). This growing informal scientific research cooperation contributes to filling in the broad gap in the area of evidence-based policy making. This highlights the role of non-state stakeholders such as scientists in advancing regional cooperation and enhancing current cooperative frameworks and arrangements in Southeast Asia.[103]

Similar to the CFRA, MicroSeap Consortium is an ad hoc and non-governmental initiative so it has the benefit of being flexible and efficient. Once the project ends, there will be no guarantee of any follow-up activity.

1.8. Diplomatic Academy of Viet Nam's Ocean Dialogue 9 on "Marine Scientific Research: Confidence Building and Environmental Sustainability"

The Ocean Dialogues is a series of workshop organised in Vietnam jointly by the Diplomatic Academy of Viet Nam and Konrad-Adenauer-Stiftung Vietnam as well as other partners including the British High Commission to Viet Nam to raise the importance of the ocean by building up the knowledge and looking at it from different angles. With the first Ocean Dialogue taking place in 2017; until today, 11 Ocean

[103] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, (5-6/2023)

Dialogues have been organised relating to topics such as ocean governance, the South China Sea, fisheries cooperation, and plastic waste management.[104]

The 9th Ocean Dialogue took place on 5 October 2022, in Nha Trang, Vietnam. Its topic was "Marine Scientific Research: Confidence Building and Environmental Sustainability" with the purpose to explore possibilities to enhance MSR in the South China Sea, including the applicability of legal framework under UNCLOS as well as regional and international practices.[105] The themes of discussion of the workshop include legal framework for marine scientific research under UNCLOS, international practices in marine scientific research, regional practices in marine scientific research, and marine scientific research in disputed areas: challenges and policy recommendations.[106]

The event was a great success with the participation of more than 300 participants which are government officials, academia, representatives from the diplomatic corps, industries and scientists. Presenting at different panels of the Ocean Dialogue were 17 scholars who are either marine scientists or experts in law and policy on MSR from US, the UK, Germany, China, India, Singapore, the Philippines and Indonesia. Many concrete and useful suggestions on how to improve cooperation in MSR in the South China Sea were provided, such as establishing a regional coordinating unit on MSR cooperation in the South China Sea, creating an ASEAN working group on MSR in the South China Sea, establishing a shared database of scientific research implemented relating to South China Sea, networking of SCS research institutions, building partnerships between ASEAN with other regional cooperation mechanisms for MSR.[107]

The 9th Ocean Dialogue provides a very good example of an *ad hoc* cooperative activity on MSR relating to the South China Sea where scientists and experts not only from the region but also from around the world discussed on how to improve MSR in the South China Sea and provided suggestions for policymakers to take action. However, again, it is not a long-term and well-organised cooperation initiative.

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[104] '40th Anniversary of UNCLOS: Promoting Maritime Cooperation in Southeast Asia' (19 June 2022) <https://www.kas.de/en/web/vietnam/veranstaltungen/detail/-/content/8th-ocean-dialogue> accessed 15 June 2023.

[105] Administrative Note of the 9th Ocean Dialogue on 'Marine Scientific Research: Confidence Building and Environmental Sustainability, Nha Trang, Vietnam (5 October 2022).

[106] Agenda of the 9th Ocean Dialogue on 'Marine Scientific Research: Confidence Building and Environmental Sustainability', Nha Trang, Vietnam (5 October 2022).

[107] Vu Thi Thu Phuong, '9th Ocean Dialogue: Marine Scientific Research' (2022) <https://www.kas.de/en/web/vietnam/veranstaltungsberichte/detail/-/content/9th-ocean-dialogue-marine-scientific-research> accessed 15 June 2023.

2. Other Examples of Multilateral Cooperative Initiatives on Joint Marine Scientific Research with a Geographical Scope including Disputed Areas in the World

2.1. North Pacific Marine Science Organisation

The North Pacific Marine Science Organization or PICES was established in 1992 under the Convention for a North Pacific Marine Science Organisation, 1990.[108] The purpose of PICES is to promote and coordinate marine scientific research to advance scientific knowledge of the Artic and North Pacific region and its living resources and to promote the collection and exchange of information and data related to marine scientific research in this area.[109] The Members of PICES include Canada, the United States, Japan, China, Russia and South Korea.[110]

PICES has adopted a multidisciplinary approach in the implementation of its activities.[111] This could be observed through the establishment of scientific committees in different areas by the organization:

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[108] 'About Us', *(PICES - North Pacific Marine Science Organization)* <https://meetings.pices.int/about> accessed 15 June 2023.

[109] 'Convention For a North Pacific Marine Science Organization' (*PICES*, 12 December 1990) <https://meetings.pices.int/about/convention> accessed 15 June 2023.

[110] ibid.

[111] 'About Us' (n 170).

- Biological oceanography: climate change effects on marine ecosystems, carbon and climate, marine birds and mammals, ocean negative carbon emissions, ecology of seamounts, monitoring planktons using imaging system.[112]

- Fishery Science: climate change effects on marine ecosystems, small pelagic fish, integrated ecosystems assessment, impacts of warming on growth rates and fisheries yields.[113]

- Human Dimensions: marine ecosystem services and human networks to power sustainability.[114]

- Marine Environmental Quality: indicators of marine plastic pollution, ecology of harmful algal blooms, and marine non-indigenous species.[115]

- Physical Oceanography and Climate: climate change effects on marine ecosystems, carbon and climate, mesoscale and submesoscale processes, climate and ecosystem predictability, ocean negative carbon emissions, and sub-mesoscale processes and marine ecosystems.[116]

2.2. International Council for the Exploration of the Sea

The International Council for the Exploration of the Sea (ICES) is one of the oldest international organisations which was established in 1902.[117] Its purpose is to advance and share scientific understanding of marine ecosystems and the services they provide and to use this knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals. ICES has established a network of 6000 scientists from over 700 marine institutes in its 20 Member Countries. ICES' geographical scope includes North Atlantic, Arctic, Mediterranean Sea, Black Sea, and North Pacific Ocean.[118]

Based on the existing ICES' steering groups, it could be deducted that the current ICES' areas of focus are:

- *Aquaculture:* evaluating the social and economic consequences of aquaculture operations; types, transmission and prevalence of diseases affecting cultured species and actions that can be taken to address them; environmental impacts of aquaculture, approaches to monitor and mitigate them and methods of aquaculture risk assessment; carrying capacity and relative efficiencies of alternate aquaculture

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[112] 'Major Sectoral Bodies - Biological Oceanography Committee' (n 140).
[113] 'Fishery Science Committee', *(PICES)* <https://meetings.pices.int/members/committees/fis> accessed 15 June 2023.
[114] 'Human Dimensions Committee' (*PICES*) <https://meetings.pices.int/members/committees/hd> accessed 15 June 2023.
[115] 'Marine Environmental Quality', (*PICES*) <https://meetings.pices.int/members/committees/meq>.
[116] 'Physical Oceanography and Climate Change', *(PICES)* <https://meetings.pices.int/members/committees/poc>.
[117] KA Bekiashev and VV Serebriakov (ads), *International Marine Organizations: Essays on Structure and Activities* (Nijhoff 1981), 465.
[118] Namely Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Latvia, Lithuania, The Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, United Kingdom, and United States of America. See Who we are, online: ICES <https://www.ices.dk/about-ICES/who-we-are/Pages/Who-we-are.aspx>.

systems; genetics of cultured species; and projecting the future development of aquaculture and its implications for the food system and food security.[119]

- *Data Science and Technology:* increasing the representation, profile and application of new technologies and data science in ICES; ensuring ICES community evaluates and, where relevant, adopts new methods, systems and devices; assessing implications of new and emerging technologies; supporting continued improvements in monitoring through application of innovative technologies and optimization of sampling designs; and supporting and advancing effective data governance, data management, analytics and quality assurance methods.[120]

- *Ecosystem Processes and Dynamics:* oceanographic characteristics of marine systems and their influences on population, food web and ecosystem dynamics; origins and transformations of matter in biogeochemical and production cycles; measuring, understanding, reporting and forecasting the dynamics of populations, food webs and ecosystems; life histories, diversity and ecology of microbes, phytoplakton, zooplankton, benthic invertebrates, cephalopods, crustaceans, fish, and other top predators; ecosystem services; ecosystem resilience.[121]

- *Fisheries Resources:* single-species and multi-species stock assessment, including data-limited methods; management strategy evaluations, addressing uncertainty, and improving the transparency, robustness, efficiency and repeatability of stock assessment; operationalisation of ecosystem-based fishery management and maximum sustainable yield concepts and their application in mixed, multispecies and emerging fisheries; and fisheries spatial dynamics, mixed fishery interactions and responses to management measures.[122]

- *Human Activities, Pressures and Impacts:* describing and projecting trends in human pressures and impacts on marine ecosystems, including analysis of historical change; understanding and quantifying multiple impacts of human activity on populations and ecosystems, and proposing options for mitigation; prevalence and effects of contaminants, invasive species, shipping, noise, renewable energy, fishing, climate, acidification and habitat loss; estimating the vulnerability of marine ecosystems to pressures and impacts, including risk assessment and identification of limits and thresholds; developing indicators of pressure and impact and testing their role in management systems; and assessing human impacts on ecosystem goods and services and developing approaches to mitigate undesirable impacts.[123]

- *Integrated Ecosystem Assessments:* development of integrated ecosystem assessments for the Arctic, Baltic, Barents, Celtic, North, Greenland, Northern Bering-Chukchi, northwest Atlantic and Norwegian seas, the Azores, Bay of Biscay, and Iberian Coast; comparative analyses of marine ecosystems; ecosystem modelling; methods and application of ecosystem-based management and risk assessment; linking ecological, economic and social models and analyses to

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[119] 'Aquaculture Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/ASG.aspx> accessed 15 June 2023.

[120] 'Data Science and Technology Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/DSTSG.aspx> accessed 15 June 2023.

[121] 'Ecosystem Processes and Dynamics Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/EPDSG.aspx> accessed 15 June 2023.

[122] 'Fisheries Resources Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/FRSG.aspx> accessed 15 June 2023.

[123] 'Human Activities, Pressures and Impacts Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/HAPISG.aspx> accessed 15 June 2023.

understand interactions and trade-offs between management objectives; defining data needs to support integrated ecosystem assessment; and development of integrated advice to support ecosystem-based management.[124]

- *Ecosystem Observation:* evaluating and optimising survey design to meet the needs of member countries and support advisory requests; design, planning and coordination of egg and larval, acoustic and trawl surveys; identifying and evaluating new technologies for observation and monitoring; advising on the design, deployment and efficiency of sampling methods and gears and the use of resulting data for assessment and advice; aging and estimating life history parameters of sampled fauna; and developing monitoring to meet emerging data, science and advisory needs, with a focus on integrated ecosystem assessment and ecosystem-based management.[125]

2.3. International Commission for the Scientific Exploration of the Mediterranean

The Mediterranean Science Commission or International Commission for the Scientific Exploration of the Mediterranean (Commission Internationale pour l'Exploration Scientifique de la Méditerranée in French - CIESM) was officially established on 17 November 1919, though the proposal to establish such a Commission was dated back since the 9th International Congress of Geography in Geneva, 1908.[126] The mission of CIESM is to promote international research in the Mediterranean and the Black Seas. It intervenes in the planning of research and exchange of scientific information in the field of oceanology, studies and prevention of pollution, and underwater explorations.[127] The Commission has now 23 Member States.[128]

The areas of focus of the CIESM are expressed via the Commission's Committees and Programmes. Each Committee corresponds to a scientific priority of the Commission and each Programme, a parameter of changes or trends across the whole Mediterranean basin that the Commission.[129] Currently, CIESM has six Committees:

- *Marine Geosciences:* geodynamics; active tectonics; morphology and structure of active/passive margins; submarine landslides; tsunami hazards; sediments and

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[124] 'Integrated Ecosystem Assessments Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/IEASG.aspx> accessed 15 June 2023.

[125] 'Ecosystem Observation Steering Group' (*ICES*) <https://www.ices.dk/community/groups/Pages/EOSG.aspx> accessed 15 June 2023.

[126] 'History' (*CIESM*) <https://www.ciesm.org/about/history/index.htm>.

[127] KA Bekiashev and VV Serebriakov, *International Marine Organizations: Essays on Structure and Activities* (Springer Science & Business Media 2012) 595.

[128] Namely Albania, Algeria, Croatia, Cyprus, Egypt, France, Germany, Greece, Israrel, Italy, Lebanon, Malta, Maroc, Monaco, Portugal, Romania, Russian Federation, Slovenia, Spain, Switzerland, Syria, Tunisia, and Turkiye, see National Representatives to the Board. 'The Six Committees' (*CIESM - The Mediterranean Science Commission*) <https://www.ciesm.org/people/board/index.htm> accessed 15 June 2023.

[129] 'Governance' (*CIESM - the Mediterranean Science Commission*) <https://www.ciesm.org/about/gover/index.htm> accessed 15 June 2023.

sedimentary processes; evaporites; volcanic and hydrothermal activity; mud volcanism and cold seeps; geoarchaeology; multibeam sea-bottom cartography;

- *Physics and Climate of the Ocean:* water masses structure and dynamics; thermohaline circulation; air-sea interactions; climatic variability; mesoscale phenomena; hydrodynamic processes; small scale mixing and turbulence; sea level; waves; operational oceanography;

- *Marine Biogeochemistry:* chemical fluxes; trace metal speciation; sediment geochemistry; bioaccumulation and effects of contaminants; water chemistry;

- *Marine Microbiology and Biotechnology:* ecology and biodiversity of marine prokaryotes (Archaea and Bacteria); viruses and hetero - and autotrophic protists (i.e., phytoplankton); microbial food web interactions; and microbial pathogens;

- *Living Resources and Marine Ecosystems:* biodiversity changes; exotic species; fauna and flora of the water column and sea bottom; life histories adaptations; food webs; dynamics of species of commercial interest; aquaculture; and

- *Coastal Systems and Marine Policies:* coastal processes; coastal erosion; land-sea interfaces (estuaries, lagoons, deltas); scientific aspects of ICZM; climate change impacts; coastal vulnerability; river fluxes to the coastal zone, natural and anthropogenic changes.[130]

CIESM also have five Programmes:

- *Hydrochanges:* continuous, long-term measurements of temperature and salinity of Mediterranean deep waters in key areas in the current context of global warming;

- *Jellywatch:* monitoring jellyfish blooms along Mediterranean coasts and in the open sea;

- *Sharks and Rays:* monitoring the geographic distribution and movements of sharks and rays in the Mediterranean and Black Sea Basins; identification of main migration corridors, starting with a pilot species;

- *Migratory Seabirds:* monitoring the geographic distribution and movements of seabirds in the Mediterranean and Black Sea Basins; identification of migration corridors and the interconnected breeding, foraging and wintering areas; and

- *Exotic Species:* the regular update of the CIESM Atlas Series on Exotic Species in the Mediterranean.[131]

[130] 'The Six Committees' (n 224).

[131] 'Programs' (*CIESM - Research Programs in Mediterranean Sea*) <https://ciesm.org/marine/programs/index.htm> accessed 15 June 2023.

3. Lessons Learnt and Proposals for the Development of Multilateral Cooperation in Marine Scientific Research in the South China Sea

Based on the examination of relevant existing practices in marine scientific research in the region and around the world, the following lessons could be suggested for the development of multilateral cooperation in marine scientific research in the South China Sea:

- There are various ways to develop multilateral cooperation in marine scientific research for the South China Sea. The simplest way is to conceptualize, develop and implement a joint marine scientific research project within an existing cooperative framework. The most robust but arguably also most sophisticated way is to establish a specialized international organization in charge of developing cooperation in marine scientific research in the region. If the former is chosen, there exist various venues which could host a joint marine scientific research project, such as ASEAN, SEAFDEC, and IOC WESTPAC. If the latter way is chosen, a regional organisation in charge of promoting cooperation in marine scientific research could be established either for the South China Sea specifically,[132] any sub-region within the South China Sea (such as the Gulf of Thailand and the Gulf of Tonkin), or a wide marine region including the South China Sea (such as East Asian Seas or North-Western Pacific).

[132] David M Ong, 'The South China Sea Environment: The Need for Formalised Institutional Interaction between Science, Policy and Law', *Routledge Handbook of the South China Sea* (Routledge 2021).

- In terms of participating countries in the cooperative mechanism for marine scientific research in the South China Sea, they do not have to be coastal countries of the South China Sea. They could be external countries and/or international organisations. As long as these countries/entities have the capacity to contribute to the cooperation, such as via financial resources and/or technical expertise, they should be welcome to participate in the cooperation. However, all direct littoral States of the SCS, namely, Brunei, Indonesia, Malaysia, Philippines, and Viet Nam, all five of these States being ASEAN Members, as well as the People's Republic of China (PRC) should be invited to become members of this SCS regional organization for MSR co-operation. This will enable confidence-building MSR activities to be undertaken between and among these littoral States to the maritime features and overlapping maritime jurisdiction zones generated by these features in the SCS.

- Furthermore, Singapore, Thailand and Cambodia, being three other ASEAN Members that also border the SCS, despite being EEZ/continental shelf-locked and therefore geographically-disadvantaged States (under Article 70 of UNCLOS) may also be interested in participating in joint or regional, sub-regional or bilateral co-operative MSR activities. This is especially the case with Singapore as she is actively investing in the development of her MSR capacity to enable the participation of Singapore-based scientists and scientific research organizations to participate in regional, sub-regional and bilateral MSR activities within the SCS.

- Adequate funding is very important for effective cooperation in marine scientific research. Among the mechanisms examined above, organisations that have successfully sustained cooperation in marine scientific research all have good sources of funding. This funding could come from the participating member countries in the form of contributions to the budget. It could also come from third-party sources such as donations or sponsoring.

- The decision on the implementation of joint or cooperative marine scientific research projects by two (or more) littoral SCS States should be made at the highest level of decision-making of a regional mechanism. These are, for example, the Conference of the Contracting Parties or the Meeting of the Contracting Parties, which have representation from all participating countries. Ideally, the decision should be adopted by consensus but a voting mechanism could be put in place in case consensus is difficult to reach.

- It is important to establish a specialised mechanism in charge of scientific matters such as the Scientific Board or Expert Working Group. Participants in the mechanism should be renowned scientists or experts. The specialised

mechanism can develop and submit proposals for joint marine scientific research to the decision-making mechanism. After the approval of the proposal, the specialised mechanism could also lead to the implementation of the project.

- For field surveys and research, among all the mechanisms studied, it is only under JOMSRE that multi-national field surveys and research were undertaken in disputed areas within the SCS. This reflects the fact that undertaking marine surveys in disputed areas is not an easy task and cannot be taken for granted. Such initiatives, therefore, require a high level of agreement between claimant States to these disputed areas to be successful. Thus, perhaps before the implementation of a field survey or research in the disputed area, a thorough consultation between relevant claimant States should be undertaken in order to resolve all sensitive matters beforehand. Where such resolutions are not possible, then other approaches should be explored, such as temporary agreements or agreements to ‘disagree’.

4. Inputs from Interviews of Experts relating to Cooperation in Marine Scientific Research in the South China Sea

This section provides a summary of the most useful inputs from the interviews of experts on how to promote cooperation in marine scientific research in the South China Sea:

- The necessary element for multilateral cooperation in MSR in the South China Sea would be resources (financial, manpower, etc); political will; entities/individuals to lead/support who have the trust of all the parties;[133] good network across the governments of the littoral states and non-governmental bodies that work in related fields;[134] and high-technology research vessels.[135]

- The obstacles to multilateral cooperation in MSR in the South China Sea include the fact that good intentions may be misread as having a hidden agenda, making it difficult to move; the lack of transparency among the parties;[136] high levels of security clearance to discuss anything related to international cooperation in the South China Sea;[137] stakeholders not thinking the way forward anew as this might jeopardise its legal position with respect to maritime delimitation and other

[133] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[134] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[135] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[136] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[137] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023

conflicts;[138] lack of MSR ships;[139] lack of sharing of MSR data and information from coastal states for regional assessment;[140] lack of cooperation with external countries with important MRS capabilities (such as United States, European Union, Japan, South Korea, and Australia);[141] nation-specific restrictions on the export of genetic material for species identification or connectivity analysis, rules requiring local government unit approvals and fees at all study sites, unreasonable restrictions on scientific publication, and lacking leadership.[142]

- For the location for multilateral cooperation in MSR, a smaller area might be easier to start with, such as the maritime area surrounded by Taiwan, China, Vietnam, Malaysia, and the Philippines;[143] coastal water of state that owns the research vessel;[144] middle of the South China Sea outside of exclusive economic zones of countries bordering the marine region with participations of China, Vietnam, the Philippines, Malaysia; Southern South China Sea with participations of Indonesia, Malaysia, Singapore, Philippines and Vietnam;[145] and non-disputed area.[146]

- Areas of MSR most suitable for multilateral cooperation in the South China Sea include fishery resources, plastic and microplastic pollution, point-source pollution from land-based, pipe or ship-based sources, the impact of climate change on the marine ecosystem, marine biodiversity, protection and conservation of the marine natural resources and environment;[147] ocean acidification; science and management of marine protected areas and marine protected areas network; assessment and modelling impacts of land-based pollution;[148] environmental impact analyses of multi-national projects such as cable-laying, potential hazard analysis from hydrocarbon extraction activites, and interactions between ocean and atmosphere.[149]

- To overcome the South China Sea disputes to improve multilateral cooperation in marine scientific research in the South China Sea, coastal States should focus on relationship building, shaping behaviours and what is seen as the “norm”; accelerating COC negotiations;[150] and encouraging cooperation at the grassroot level[151]

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[138] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[139] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[140] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[141] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[142] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[143] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
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[146] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[147] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[148] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[149] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[150] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[151] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023

- There should be both cooperation among scientists as well as among the government formally. Because MSR requires permission from the governments involved, it would be more effective if the government or authorities were also involved in the negotiations from the early stages. Also, cooperation among scientists without support and authorization from the formal government authorities will also pose challenges in the field later when the research is being conducted.[152] While collaboration among scientists is key, some may refrain from doing so because they feel they do not have their government's approval to do so; others freely collaborate but their findings or recommendations never make it to their respective governments. Cooperation should be both top-down and bottom-up;[153]

- Regional MSR institutions should be neutral on the utilization and management of data for the regional benefit or to all participating/cooperating countries.[154] All data generated from these studies should be made freely and widely available to the public, via permanent international scientific repositories. Additionally, scientists should be able to become involved with the foreknowledge that there will be no restriction on properly-shared publication in the peer-reviewed literature, and that proper data documentation and timely release will be required.

[152] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[153] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023
[154] Survey conducted by the Diplomatic Academy of Vietnam for the MSR project, 5-6/2023

III POLICY RECOMMENDATIONS TO ENHANCE MSR IN THE SOUTH CHINA SEA

1. Areas of cooperation

Marine Science encompasses many fields, such as physiography, marine chemistry, physical oceanography, marine geology, marine biology, anthropogenic effects, and climate change. Each of these fields has many specialized areas, and the human understanding of the ocean is incomplete in most fields. Meanwhile, overexploitation of marine resources, pollution of the oceans, and climate change pose challenges for countries in managing their seas and oceans. As in the South China Sea, these threats are also present and they are exacerbated by the fact that maritime management cooperation is not highly effective as a result of disputes.

Cooperation in marine scientific research in this context primarily aims to improve countries' understanding of seas and oceans, thereby enabling them to better respond to challenges. Moreover, cooperation in marine scientific research in the South China Sea involves an obligation on the part of littoral states who share a marine environment with a close interdependence within a semi-enclosed sea. By promoting MSR cooperation in the South China Sea, the project aims to promote trust building and the peaceful management and resolution of disputes in the region.

Some cooperation models in the field of marine scientific research in the South China Sea also initially focused on some aspects of marine science such as oceanography (JOMRSE SCS between the Philippines and Vietnam), and fisheries conservation (SEAFDEC). The field of cooperation and the forms of cooperation are, however, quite limited. The JOMRSE-SCS is a bilateral model, and cooperation within the SEAFDEC framework is limited to certain areas in the southern part of the South China Sea.

As part of marine research, there are areas where it is possible to collaborate within the seawater column, as well as areas related to the seabed and subsoil of the seabed. Given the interconnected issues of sovereign rights, jurisdiction, intelligence, and security of the seabed, areas of cooperation at the sea column will be easier to implement in the context of disputes in the South China Sea.

Scientists interviewed for this study have indicated that most major fields in marine science have urgent implications for the South China Sea. Inheriting the successful models that have been implemented, it is possible to focus in the short term on Marine biology, Anthropogenic Effects, and Climate Change, with special attention paid to research on plastic debris, conservation of marine diversity, and impact assessment of sea level rise as pilot areas.

2. Methods of cooperation

Current models of cooperation illustrate that cooperation can take a variety of forms, from theoretical research to field research. Theoretical research models based upon the exchange of research results, seminars, and workshops to facilitate the exchange of viewpoints, the formation of cooperation networks, and the coordination of legal and policy frameworks are examples of forms that have been implemented because of their affordability, low sensitivity, and feasibility. The identification of cooperation areas can be a sensitive issue at the field level since it requires large investments while hedging against the possibility of sovereignty claims and maritime claims. Based on successful practices and the need to promote marine scientific research in the South China Sea, it appears that cooperation in marine scientific research can be accomplished in the following ways:

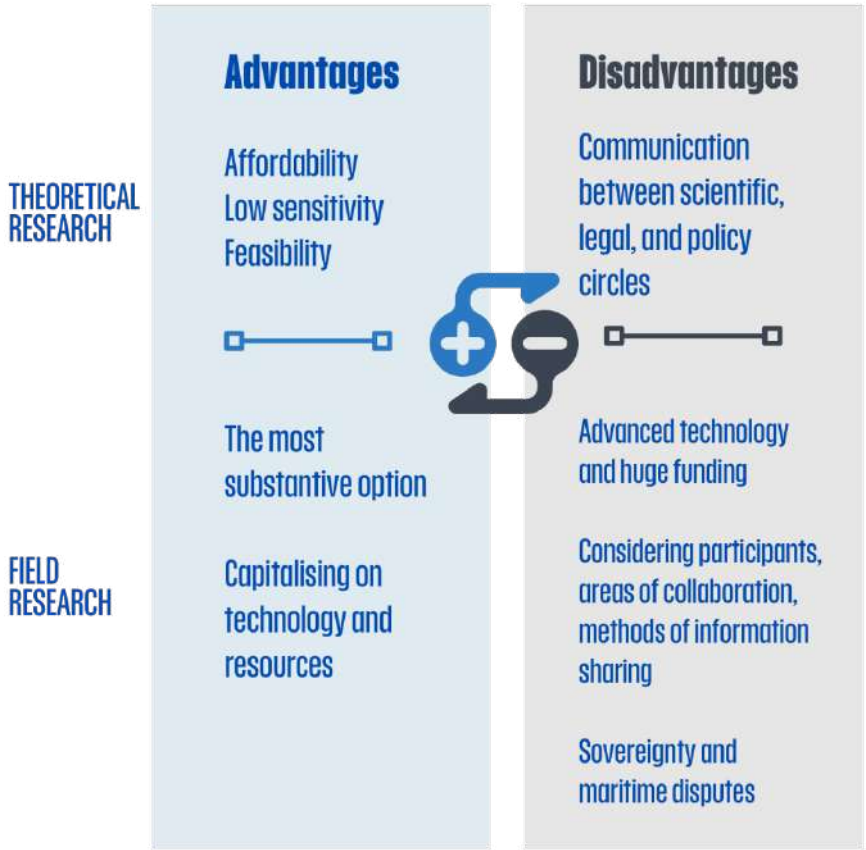
On a theoretical level, there is still a need to improve the level of communication between scientific, legal, and policy circles. The exchange of information between scientists can assist in identifying common challenges and recommend areas for future research and resources. The opinions of scientists will be necessary for the development of policies and the harmonization of the legal framework to facilitate cooperation in marine scientific research at a deeper level on the ground. In addition to scientists, discussions and exchanges of legal experts can help compare and contrast domestic legal frameworks of countries in the region with UNCLOS provisions, thus making recommendations to harmonize the domestic legal framework and proceed to sign agreements on cooperation in marine scientific research.

The results of the exchanges and recommendations of scientists and legal experts can be conveyed to policymakers. Consequently, exchanges between policymakers will help coordinate policies among countries, while working towards initiatives to formalize and institutionalise models of cooperation in marine scientific research in the region to improve effective dispute management and governance sustainably.

Exchanges at the theoretical level cannot be realised without cooperation on the ground. Collaboration in marine scientific research on the ground is the most substantive level of cooperation to assist in the collection of missing data regarding the South China Sea. Field research requires the use of appropriate technology and a large amount of funding. Consequently, field cooperation will provide countries in the region with the opportunity to capitalise on technology and combine their resources.

However, to ensure successful cooperation on the ground, factors concerning the participants, the area of collaboration, and the method of sharing research results must be considered. Due to the existence of sovereignty and maritime disputes in the South China Sea, cooperation in marine scientific research may encounter obstacles because the parties are concerned that cooperation might be interpreted as an acknowledgment of the claims of others.

As a result, while this is a significant substantive aspect, practical cooperation in MSR has been applied only to the two limited practices of JOMRSE-SCS and SEAFDEC. As part of the JOMRSE-SCS bilateral cooperation model, Vietnam, and the Philippines have selected the near-shore sea zone between their two countries as the research area. Thus far, SEAFDEC's on-the-ground cooperation models have involved countries along the South China Sea littoral such as Brunei, Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. Also, there is participation from a country outside the region, Japan. Specifically, the Gulf of Thailand and the southern South China Sea are areas of field cooperation.



3. Zones of cooperation

According to the legal framework outlined in part 1 of the report, marine scientific research within the exclusive economic zone and continental shelf requires the consent of coastal states. Therefore, it is popular that cooperation in marine scientific research will be carried out in the overlapping exclusive economic zones and continental shelves. It will also be carried out in the exclusive economic zones and continental shelves of countries participating in cooperation on the basis of reciprocity. A model of cooperation between JOMRSE-SCS and SEAFDEC is in place for this purpose.

There is, however, a reality in the South China Sea in which not only are there claims to exclusive economic zones and continental shelves defined by UNCLOS from the mainlands of coastal states, but also China's nine-dash line claims. The nine-dash line was first published on a map by China in 2009 along with a verbal note sent to the UN Commission on the Outer Limits of the Continental Shelf (CLCS). The claim did not provide specific coordinates for the nine-dash line and used vague concepts to claim sovereignty over adjacent waters as well as sovereign rights and jurisdiction over relevant waters.[155] In fact, China has utilized the nine-dash line to claim sovereign rights and jurisdiction similar to the exclusive economic zone and continental shelf, such as announcing nine oil and gas blocks on Vietnam's continental shelf, imposing a fishing ban in the South China Sea from 12 degrees northward, obstructing Filipino fishermen from fishing in Scarborough and harassing oil and gas exploration and exploitation activities on the continental shelves of Vietnam, the Philippines and Malaysia.

In July 2016, the Arbitral Tribunal established under Annex VII of UNCLOS rejected the nine-dash line claim and affirmed that as between the Philippines and

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[155] Note Verbal of China to the Commission on the Limits of the Continental Shelf, CML/17/2009, https://www.un.org/depts/los/clcs_new/submissions_files/mysvnm33_09/chn_2009re_mys_vnm_e.pdf

China, the Convention defines the scope of maritime entitlements in the South China Sea, which may not extend beyond the limits imposed therein. China's claims to historic rights, or other sovereign rights or jurisdiction, concerning the maritime areas of the South China Sea encompassed by the relevant part of the 'nine-dash line' are contrary to the Convention and without lawful effect to the extent that they exceed the geographic and substantive limits of China's maritime entitlements under the Convention. The Tribunal also concludes that the Convention superseded any historic rights or other sovereign rights or jurisdiction in excess of the limits imposed therein.[156]

After the South China Sea arbitration award in 2016, China continued to claim exclusive economic zones and continental shelves for 04 island groups in the South China Sea including Pratas, Paracels, Scarborough, and Spratlys.[157] However, the South China Sea Arbitration Award already concluded that "none of the high-tide features in the Spratly Islands are capable of sustaining human habitation or economic life of their own within the meaning of those terms in Article 121(3) of the Convention. All of the high-tide features in the Spratly Islands are therefore legally rocks for purposes of Article 121(3) and do not generate entitlements to an exclusive economic zone or continental shelf".[158] The Tribunal also viewed Scarborough Shoal as a "rock" for purposes of Article 121(3).[159] At the same time, the Tribunal affirmed that any application of straight baselines to the Spratly Islands in this fashion would be contrary to the Convention.[160]

Thus, given the binding effect of the 2016 South China Sea Arbitration Award with China, the claims for the nine-dash line and exclusive economic zone and continental shelf for the Spratly and Scarborough features have no legal validity. An analogy approach can be applied to the three other groups of features in the South China Sea since they have similar natural characteristics to the Spratlys. As a consequence, a high sea exists at the center of the South China Sea. Therefore, 02 areas can promote cooperation in marine scientific research with different legal statuses: (i) Exclusive economic zones and continental shelves of coastal states and (ii) High sea and Area in the middle of the South China Sea. It should be noted that the existence of the area is also dependent on CLCS's recommendations for the extended continental shelf submissions of Vietnam, Malaysia, and possibly the Philippines in the future. As a result, countries bordering the South China Sea can cooperate in marine scientific research in fields not related to the seabed in the high seas, regardless of the principle of consensus (applied in the exclusive economic zone and continental shelf), and

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[156] South China Sea Aribitration Award (17/07/2016), Abtration esblished under Annex VII of the 1982 United Nations Convention on the Law of the Sea, https://pcacases.com/web/sendAttach/2086, para.277 and 278

[157] Note Verbal of China to the Commission on the Limits of the Continental Shelf, CML/14/2019, https://www.un.org/depts/los/clcs_new/submissions_files/mys85_2019/CML_14_2019_E.pdf

[158] South China Sea Arbitration Award (17/07/2016), Arbitration established under Annex VII of the 1982 United Nations Convention on the Law of the Sea, https://pcacases.com/web/sendAttach/2086, para. 646.

[159] South China Sea Arbitration Award (17/07/2016), Arbitration established under Annex VII of the 1982 United Nations Convention on the Law of the Sea, https://pcacases.com/web/sendAttach/2086, para.554

[160] South China Sea Arbitration Award (17/07/2016), Arbitration established under Annex VII of the 1982 United Nations Convention on the Law of the Sea, https://pcacases.com/web/sendAttach/2086, para.574

cooperate on a principle of reciprocity (as determined by consensus) in their exclusive economic zones and continental shelf. Cooperation in the high seas should avoid the 12-nautical-mile territorial sea surrounding features subject to sovereignty disputes in the Spratly Islands, the Paracel Islands, and the Scarborough Islands. In case the parties to the sovereignty dispute reach a consensus, marine scientific research within the territorial sea of the Paracel, Spratly, and Scarborough features will be a breakthrough, contributing to building trust between the parties in the dispute and managing the dispute in the South China Sea.

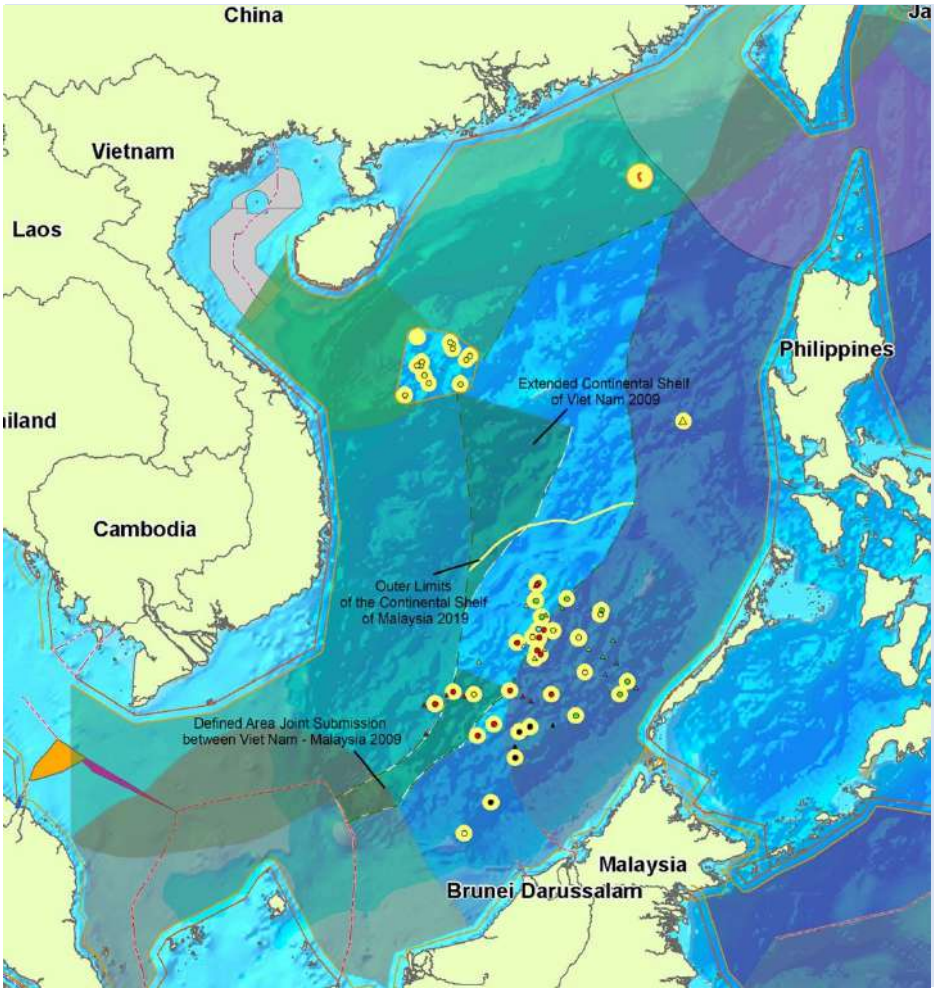


Figure 1

Maritime zones generated in accordance with UNCLOS in the South China Sea

However, this conclusion was made on the basis of China's adherence to the conclusions of the South China Sea Arbitration Award. In fact, owing to China's non-compliance, the continuation of its maritime claims without legal basis from the nine-dash line, the exclusive economic zone, and the continental shelf of the Spratly and Scarborough features will pose many obstacles to cooperation in marine scientific research. Firstly, if China participates in cooperative marine scientific research in the exclusive economic zones of coastal states, it may claim that such cooperation represents recognition of the sovereignty of China and its jurisdiction in those areas. China can exploit the findings to conduct unilateral actions that harass the legitimate activities of coastal states. The practice of tripartite cooperation on JMSU seismic

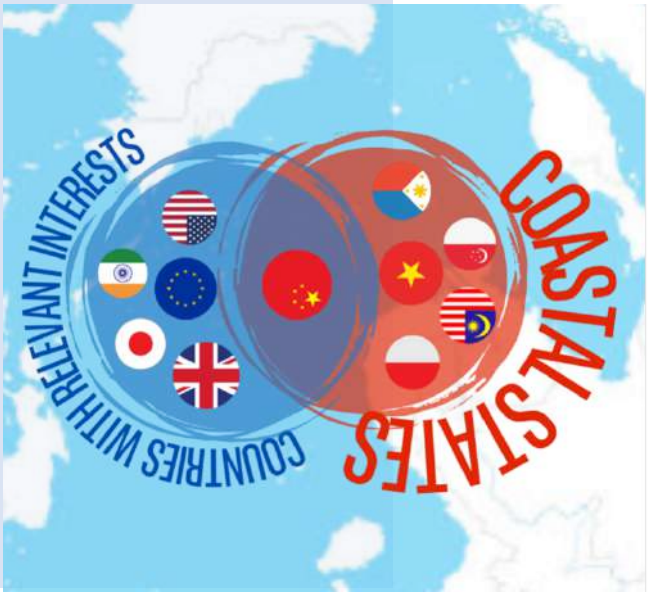
survey research between the Philippines, China, and Vietnam is believed to have led to the harassment of Philippine oil and gas activities at Reed Bank later, and China has also pressed for joint exploration with the Philippines in this area even though there are no overlaps maritime zones.

This problem may be overcome by including a "without prejudice" clause in models of cooperation in marine scientific research outside the high seas and area. Furthermore, it is necessary to ensure that there will be a transparent mechanism for sharing data and research results as well as to avoid misusing them for the purpose of conducting unilateral activities or escalating disputes in the South China Sea.

4. Parties to cooperation

Participants in marine scientific research cooperation are primarily countries bordering the South China Sea. However, the successful cooperation model adopted by SEAFDEC also includes the participation of a country outside its region, Japan. Participation of countries outside the region and international organisations is in accordance with paragraph d of UNCLOS Article 123, which states that states may, as appropriate, invite other interested states or international organisations to cooperate with them to fulfill the provisions of Article 123 regarding cooperation between enclosed or semi-enclosed seas. Additionally, participation by international organisations and countries outside the region may facilitate the transfer of technology and resources for marine scientific research.

In this sense, China can participate in marine scientific research cooperation in the South China Sea with dual roles, as a coastal state, cooperating in research according to the principle of reciprocity in both the exclusive econodmic zone and continental shelf established in accordance with UNCLOS and as a country with relevant interests in the region.



In an effort to build trust and avoid concerns about using maritime scientific research projects to impose unilateral claims inconsistent with international law, China's participation would be appreciated, but its status may need to be clarified based on the options mentioned above.

Depending on the zones and fields of cooperation, the littoral states of the South China Sea may follow a bilateral, mini-multilateral, or multilateral model with the participation of any country bordering the South China Sea. In addition, countries may decide to invite countries outside the region, such as Japan, Australia, the United Kingdom, the EU, India, and the United States, based on their level of interest and strengths in marine scientific research. It is important to note that these countries are not parties to the dispute, yet they possess advanced marine scientific research technology and an interest in conducting MSR in the South China Sea. It would be ideal if these countries could cooperate with the South China Sea littoral states on marine scientific research, providing necessary technology, resources, and technical assistance. Among these countries, the UK may play a leading role in promoting cooperation in MSR considering its strength in MSR and its desire to play a greater role in the region. This is also a constructive way to build trust and better manage disputes in the South China Sea.

It is worth noting, however, that in reality, the South China Sea disputes have resulted in strategic competition between several major powers. Particularly recently, the involvement of countries outside the region in South China Sea cooperation has been interpreted as a means of containing China. Therefore, ideally, and to ensure transparency, South China Sea littoral states should promote a model of MSR cooperation with both China and countries outside the region, in which China's status should be clearly defined.

5. Models of cooperation

Models of cooperation can be flexible, ad-hoc, case-by-case, or institutionalised as permanent organisations and mechanisms.

In the early stages of the cooperation process, the form of flexible mechanisms, ad-hoc and case-by-case, will be suitable for establishing trust, verifying the effectiveness of the field and model of cooperation. The bilateral cooperation model between the Philippines and Vietnam for the JOMRSE-SCS project has been implemented in this manner and has been proven to be an effective method of cooperation through its flexibility and compactness.

Through institutionalisation, cooperation will become more efficient and effective, especially in the form of mini-multilateral and multilateral cooperation. A critical issue raised during the cooperation process was the coordination between the parties involved and the storage and sharing of data. From this perspective, institutionalisation will enhance the efficiency of the cooperation process by providing a permanent mechanism to handle this matter. Institutionalisation, however, is also associated with several disadvantages, including the need for administrative oversight and the fact that it is cumbersome. Thus, many expert opinions shared during the interview process advocate the use of existing institutions. SEAFDEC has achieved some encouraging results in the area of collaborative marine scientific research. Therefore, the South China Sea littoral states may consider utilising existing mechanisms within ASEAN and

SEAFDEC. The drawback with ASEAN's mechanisms is that it requires 10 members to participate, while there are members who do not have much interest in the sea or have main interests not in the South China Sea.

Therefore, a more flexible approach would be to take advantage of existing mechanisms, but without becoming too dependent or rigid, and to develop new models of minilateral cooperation depending on the needs for cooperation in the South China Sea. In the early stages, these models may not need to be institutionalised, or institutionalised in a flexible and flexible form such as a rotational lead mechanism according to the location and field of MSR.

	FLEXIBLE, AD-HOC, CASE-BY-CASE	INSTITUTIONALISED
STAGE	The early stages	The later stage
ADVANTAGE	establishing trust verifying the effectiveness flexibility and compactness	Efficiency Effectiveness
DISADVANTAGE	Low-key	Administrative oversight Cumbersome
EXAMPLES	JOMRSE-SCS	mini-multilateral and multilateral cooperation ASEAN and SEAFDEC

6. Action proposals

In light of the analysis of the 05 factors mentioned above, and applying the theory of change, the research project proposes 4 most feasible MSR models that the UK can implement as follows:

SOUTH CHINA SEA MARINE SCIENTIFIC FORUM TO CONNECT MARINE SCIENTISTS OF THE SOUTH CHINA SEA LITTORAL STATES AND THE UK

The exchange of research data and ideas is part of this data-based cooperation. Discussions among scientists identify challenges facing the South China Sea littoral states, suggest promising models for promoting research between the UK and littoral states, and share research data from existing models. For coordination and policy-making on MSR in the South China Sea, legal experts and policymakers may participate in discussions. It is the most feasible method to establish trust and launch future field cooperation models. Research results will be presented within the framework of this forum as the first discussion. This event may be organized by DAV with participation from scientists from states bordering the South China Sea. A portion of the current project funding will be used to organise and invite scientists from the region. The FCDO could send representatives and invite more British scientists. This discussion will examine the proposal for the project and select MSR research areas and models that the UK can promote in the South China Sea in the near future.

A MSR COOPERATION PROJECT BETWEEN SEVERAL LITTORAL STATES OF THE SOUTH CHINA SEA (VIETNAM, THAILAND, INDONESIA, MALAYSIA, SINGAPORE, BRUNEI AND THE PHILIPPINES) AND THE UK IN THE SOUTHERN PART OF THE SOUTH CHINA SEA.

This is a model that has been successfully implemented with Japan's leading role within SEAFDEC, focusing on fishing conservation in 7 littoral states of the South China Sea. A similar UK-led model could be implemented alongside or independently of the Japan-led model, focusing on upcoming areas such as climate change. Considering Southeast Asian countries, especially Vietnam, the Philippines, Thailand, and Indonesia, as the most vulnerable to climate change, the project is highly needed. Research on climate change impacts, thus finding ways to adapt and make the transition green, developing renewable energy to minimize its impacts in the future, and achieving the net zero goals will be practical topics that countries will prioritise. As a leader in this field since COP26 in Glasgow, the UK has an opportunity to expand its influence and share its strength with the region through this project. Another major strength of the project is that it can be conducted in an area not affected by maritime disputes or sovereignty issues in the South China Sea. As for the next steps, a workshop could be held to explore the possibility of cooperation between the UK, Japan, SEAFDEC, and four Southeast Asia countries with the host nation of Vietnam (the DAV). If the UK wishes to initiate a UK-led research project, DAV can establish links with relevant research institutions in the UK, Indonesia, Philippines, and Thailand to jointly develop a research proposal. The primary purpose of this research is to include two components, including desk-based research that focuses on policy and legal recommendations as well as field-based research that provides evidence and cross-checks policy recommendations.

A PROJECT ON PLASTIC DEBRIS IN THE TERRITORIAL SEA BETWEEN SOUTH CHINA SEA LITTORAL STATES AND THE UK.

Projects target coastal areas due to their dense population and maritime traffic, which cause plastic pollution to be higher than offshore areas. Moreover, conducting research to develop a more efficient plastic debris management mechanism also prevents plastic waste from washing into the sea. Projects can be carried out on a rotation basis along the high pollution coastal areas of the participating states. Since plastic waste disposal and management are not resource-related and serve the public good, and the territorial sea of littoral states does not involve sovereignty conflicts, cooperation is less sensitive. The project is therefore highly feasible, providing a means for connecting and building trust before expanding to other areas of MSR in the South China Sea. This project will provide specific recommendations to policy-makers regarding how to adjust current policies and regulations at the national and local levels to ensure that plastic debris is prevented, reduced, and eliminated. This may include the adoption of new laws and policy documents relating to the use and disposal of plastics. In addition to recommending policy changes, the project will analyse community and local environmental conditions in order to propose sustainable alternatives to plastic. Towards achieving these objectives, a network of research institutions in the region and the UK will be established (for prospected institutions, please refer to *Appendix 1*).

A PROJECT ON CONSERVING BIODIVERSITY IN THE HIGH SEAS OF THE SOUTH CHINA SEA BETWEEN THE UK AND THE LITTORAL STATES

It can be a pioneering model to follow the BBNJ Agreement and be implemented step by step for specific marine species. Although China may invoke Article 18 of the BBNJ Agreement to claim that this is a disputed area, applying UNCLOS and the South China Sea Arbitration Award, there is no doubt that a high sea exists in the middle area of the South China Sea. The promotion of cooperation in the high sea, thereby, will help raise awareness of the importance of biodiversity conservation in the South China Sea and contribute to the development of a rules-based international order. The UK is one of the leading and most influential countries involved in negotiating and concluding the BBNJ Agreement. As the BBNJ Agreement enters into force, efforts to promote its implementation will align with the UK priorities and strengths. It is also an area of interest to the region since it promotes biodiversity conservation in the South China Sea, one of the world's most diverse marine ecosystems. There are two levels at which this project can be implemented. At the informal level at research institutes, or at the formal level, such as an ASEAN initiative with a dialogue country, the UK. A combined approach at both levels can be considered in order to take advantage of the wisdom of scholars and, at the same time, to develop a roadmap for launching initiatives in ASEAN. Therefore, research institutes in the region and the UK can jointly research and develop cooperation initiatives under the BBNJ Agreement for the South China Sea. The UK and a number of South China Sea littoral states can then co-sponsor and initiate initiatives within ASEAN mechanisms such as the ARF or EAMF (for prospected institutions, please refer to *Appendix 1*). No matter what level of implementation is utilised, the project can be divided into three components: fieldwork to find scientific solutions to the conservation of marine biodiversity, capacity building and awareness raising about marine biodiversity for coastal communities, and policy recommendations.

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