COBSEA – NUS Project 2021

Regional research inventory update and expansion, online data visualisation platform and recommendations to support the development of the GPML regional node

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Outline

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## Part 1: Project Activities and Deliverables

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deliverables</th>
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<tbody>
<tr>
<td><strong>A</strong> Create the foundation for a regional research network of academic and research institutions on marine litter</td>
<td>➔ Concept note for the development of a research network with a draft skeleton ToR ➔ Summary of recommendations from pilot activities (4 webinar series)</td>
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<tr>
<td><strong>B</strong> Create, populate, expand and update online database of marine litter research in the EAS region</td>
<td>➔ Concept note for the development of the database ➔ Populated database (online) ➔ Online platform with visualisation of key data and findings (including on sources, pathways and impacts of plastic pollution and marine litter)</td>
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<tr>
<td><strong>C</strong> Support development of knowledge management and networking services linked to the EAS Regional Node of the GPML.</td>
<td>➔ Concept note on development of a catalogue of experts and of capacity building resources ➔ Initial catalogues of expert individuals and institutions as well as capacity building resources</td>
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Focus of this presentation
Part 2: Regional team members

Coordinated by the National University of Singapore (NUS) with the lead of Centre for International Law (CIL), and critical support of the Tropical Marine Science Institute (TMSI) on the marine scientific data extraction.

The outcome is a joint effort of the entire regional team, made up of more than 30 members across various countries:

- **NUS-CIL, Singapore**: Youna Lyons, Cheng Ling Lim, 刘雨露 (Yulu Liu), Bùi Quang Huy (Bui Quang Huy), Dennis Tan, Dita Liliansa, 정다운 (Dawoon Jung), Sng Wen Xin, Vũ Hải Đăng (Vu Hai Dang)

- **NUS-TMSI, Singapore**: Mei Lin Neo, Jenny Fong, Lee Hsien Rong Samuel and Theresa Su

- **Universiti Sains Malaysia, Malaysia**: Japareng Lalung and his team

- **Swinburne Sarawak, Malaysia**: Changi Wong and Moritz Mueller

- **Can Tho University, Vietnam**: Vǎn Phảm Đặng Trí (Van Pham Dang Tri) and Lê Hoàng Hải Anh (Le Hoang Hai Anh)

- **University of the Philippines-Mindanao, the Philippines**: Neil Angelo S. Abreo

- **Marine Science Institute, the Philippines**: Ronan Baculi and Deo Onda

- **Chulalongkorn University, Thailand**: ชวลิต เจริญพงษ์ (Chawalit Net Charoenpong), ปิ่นมนัส บูชา (Pinamas Bucha), เพ็ญใจ สมพงษ์ชัยกุล (Penjai Sompongchaiyakul) and ราฮุล เมโรทรา (Rahul Mehrotra)

- **Indonesian Institute of Science (LIPI), Indonesia**: Sulistiowati and Muhammad Reza Cordova

- **Myanmar Ocean Project, Myanmar**: သန္တာကြီး ကာက (Thanda Ko Gyi)

- **East China Normal University, China**: 李道季 (Li Daoji) and 朱礼鑫 (Zhu Lixin) and their team
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

a - Scope and selection process for inclusion of publications in RRI 2.0

Internet search for research articles using variations of the following keywords: “marine plastics”, “marine microplastics”, names of countries/territories in ASEAN+3, and research topics and sub-topics included in the methodology (see https://mapla-riv.web.app/data/methodology-and-ontology)

✔️ Concerns plastic debris in the marine environment
✔️ About plastic/marine debris/marine litter
✔️ Refers to at least one ASEAN+3 country/territory
✔️ In English or other national languages in the region e.g. Thai, Indonesian, Vietnamese, Mandarin Chinese, Korean
✔️ Science and/or Humanities publication
✔️ Peer-reviewed articles or, if grey literature, contains primary data and rigorous analysis or report from IGOs

❌️ Does not refer to marine environment
❌️ Does not relate to plastic/marine debris/marine litter
❌️ No mention of any ASEAN+3 region/country/territory

✔️ Article is added to RRI 2.0

❌️ Article is saved if useful to overall research effort, but not added to RRI 2.0
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

b - Metadata: Information extracted from publications included in the Inventory
(see https://mapla-riv.web.app/data/methodology-and-ontology)

**Article Information**
20 different elements of general information on the publication, such as:
- Language
- Author(s)
- Research Group(s)
- Funding Information

**Research Methodology**
21 different elements of underlying research methodology, including technical information on the equipment, such as:
- Methodologies Used
- Depth of sediment sampling
- Field sampling frequency
- Species name of biota studied

**Research Scope**
16 different elements of research scope, including high-level substantive information on the research, such as:
- Aim of research
- Location of work
- Plastic sizes examined
- Coastal or offshore study

**Research Topics**
25 different research topics, such as:
- Movement of plastics in water bodies
- Fragmentation and degradation
- Microbial assemblages
- Human health/ food safety
- Laws, administrative measures
- Communication and coverage of marine plastic

**Research Findings**
25 different elements of the research findings, such as:
- Key Findings
- Source of Plastics
- Shape and type of plastic polymers found
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

b - Metadata: Information extracted from publications included in the Inventory
(see https://mapla-riv.web.app/data/methodology-and-ontology)
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

c - A snapshot of RRI 2.0

Table containing **82 columns and 702 rows**, of organised data
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

**d - Updating of RRI 2.0**

- Updating of the RRI 2.0 is necessary for the information to remain relevant and current
- Expertise in data organisation, a familiarity with the metadata & utilizing the RRI 2.0 and technical understanding of relevant fields of research on marine plastics are necessary
- The publication may also be in non-english language and require fluency in ASEAN +3 languages and access to local databases
- Publications are commonly behind paywall and require subscriptions, such as through academic institutions, to access
Part 4: Online Data & Visualisation Platform

a - Approach chosen for the development

- Key concern was to create content that could easily be imported to other platforms
- The overall architecture of the RRI 2.0 and of the visualisation platform are like that of Lego© blocks - the parts can exist on their own and are also able to connect with other similar pieces
- Information on publications are extracted and stored on the RRI 2.0, which is set up within a Google Sheet (therefore easily exportable on any other repository)
- Data within the Google Sheet are analysed to create charts and diagrams
- Online data analytics and visualisation platform is designed and developed, separately, on Google Firebase
- Data, charts and diagrams from Google Sheet are communicated to Google Firebase and displayed on the online platform
Part 4: Online Data Visualisation Platform

b - The online platform – beta version (https://mapla-riv.web.app/data)
Part 4: Online Data Visualisation Platform

b - The online platform - beta version (https://mapla-riv.web.app/data)

Map

This interactive map provides a visual representation of the geographic extent of RRI 2.0 as well as an extract of data analysis. When clicking on a country/territory, the following information is provided in relation to that country/territory:

First, the total number of publications in RRI 2.0; Second, the number of publications on sub-topics is included:
Science-only, Humanities-only, Both (i.e. Science and Humanities), Laboratory-based, Desktop-based, Field sampling, Microplastic, Macroplastic, Fishing gear, Legal/Regulatory, Social/Cultural, Economic/Management, Policy Study.

The RRI 2.0 can be accessed here.
Part 3: The Regional Research Inventory 2.0 (RRI 2.0)

c - Examples of information available

RESEARCH PROFILE

SR1. Profile of marine plastics found

SR2. Dive into Microplastics

SR3. Biota

SR4. Compartment sampled
Part 4: Online Data & Visualisation Platform

\[d - Using the online platform: some examples\]

\[\text{Research topics covered over time}\]

\[\text{Research topics in different water bodies}\]

⚠ Note that this perspective is based on publicly-available online research published between 2001 and June 2021, that the research team has found, successfully accessed and documented. Studies that did not lead to accessible online publications could not be included.
Part 4: Online Data & Visualisation Platform

e- Factsheets (https://mapla-riv.web.app/factsheets)

- Two factsheets are available on the (beta) data visualisation online platform
- They are based on data from the inventory
- They were prepared to demonstrate the way in which data included in the inventory can be used for different applications, especially policy-making purposes
- Our vision is that many more factsheets will be added to answer specific questions in the context of the region or parts of the region. We have several in the work and hope that others from the region will join.

Examples include:

- Single-use plastic and consumer plastics
- Contaminants associated to marine plastics and the micro-plastisphere
- Social and cultural factors in pollution from marine plastics
- Economic costs, risks and hotspots
- Fisheries and aquaculture
- Marine plastics and biota
- Regional features: tropical climate condition, extreme events and hazards

- Marine plastic debris surveys and monitoring, sizes and types
- Research topics
- Evolution of the research focus
- Understanding sources and pathways
- Understanding impacts
- Responses and interventions
- Limitations and opportunities for policy-making

- What are microplastics?
- Profile of the research effort
- Sampling methods and challenges
- Findings on abundance and distribution
- Societal concerns and response
- Unanswered research questions
Part 5: Platform maintenance and integration with GPML

a- Maintaining the online platform for data visualisation and analytics

Examples of maintenance tasks:

1. Edits to textual content on the platform, as required
2. Review of the platform to ensure any changes to the RRI 2.0 are reflected in the data analytics
3. Update all softwares involved and their compatibility as needed
4. Ensure the components written by code are functional
5. Ensure security/cyber-security
Part 5: Platform maintenance and integration with GPML

b- Means of integration with GPML or other online platforms on marine litter

Several avenues can be explored, including:

1. Importing of inventory dataset onto GPML-hosted website
   a. The issue of updating of the inventory to be handled

2. Importing of visualisation and analytics onto the GPML-hosted website that would pull data from inventory
   a. Inventory will still be hosted and maintained by regional team and academia

3. Link to data hosted on current beta-temporary online platform
We are looking forward to this regional research network and joint-effort on the research inventory and data extraction to develop further

If you have any feedback, please share them here - [https://tinyurl.com/cobsea-nus](https://tinyurl.com/cobsea-nus)

Please contact us for any clarification or further discussion at younalyons@nus.edu.sg