

### 3. VISIBLE SCIENTIFIC RESEARCH INSTITUTIONS AND EFFORTS

This section attempts to collate the names of national development agencies and research centres that appear in several research projects on marine plastics and the protection of the marine environment in Southeast Asia.

#### 3.1 Centre for Environment, Fisheries and Aquaculture Science (CEFAS)

**Summary of role and work:** CEFAS is the UK government's centre for applied marine and freshwater science and research.

**Summary of work:** Marine litter, including marine plastics, is a research focus of CEFAS with an emphasis on waste management, reducing sea-based sources of litter and developing a more sustainable life cycle for plastics. CEFAS is in charge of the delivery of the UK-funded Commonwealth Litter Programme (CLiP).

**Keywords/research fields:** Centre for Environment, Fisheries and Aquaculture Science; CEFAS; Commonwealth Litter Programme; CLiP

##### 3.1.1 Background and aim

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) is the UK government's centre for applied marine and freshwater science and research. It also carries out research for other governments and entities.

One of CEFAS' research focus is marine litter (including marine plastics), with an emphasis on waste management, reducing sea-based sources of litter, and developing a more sustainable life cycle for plastic.

##### 3.1.2 Activities and projects

CEFAS is responsible for the delivery of the UK-funded Commonwealth Litter Programme (CLiP) which encompasses:

- Land-based sources of litter;
- Sea-based sources of litter;
- Removal of litter from the marine environment;
- Science and education; and
- Outreach.

This programme started in the South Pacific in November 2018 with Vanuatu and the Solomon Islands. In May 2019, it began work in Belize and in September 2019, in South Africa. It is expected to later work in Commonwealth countries in Asia and other parts of the world. Available:

<https://www.cefas.co.uk/news/south-pacific-region-commonwealth-litter-programme-conference-to-discuss-marine-litter-research-monitoring-and-solutions-to-reduce-plastic-pollution/>.

### 3.2 Commonwealth Scientific and Industrial Research Organisation (CSIRO)

**Summary of role:** CSIRO is an independent Australian federal government agency responsible for scientific research with marine debris as a focus area.

**Summary of recommendations and work status:** CSIRO has carried out many projects relating to plastic and waste management.

**Keywords/research fields:** Commonwealth Scientific and Industrial Research Organisation; CSIRO; projects; global plastic losses; ALDFG; commercial fishing lines; marine pollution; modelling and monitoring marine litter movement; transport and accumulation; microplastics

#### 3.2.1 Background and aim

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is an independent Australian federal government agency responsible for scientific research. Marine debris is a focus area of the CSIRO and, within this, research on marine plastics, plastic waste management and outreach activities. Whilst much of this research is focused on Australia, CSIRO collaborates with partner organisations around the world, including Vietnam. Researchers of CSIRO also carry out marine plastic research in several ASEAN member states. Available: <https://research.csiro.au/marinedebris/>.

#### 3.2.2 Activities and projects

CSIRO has been implementing since 2017 a project on quantifying flows of plastic and other debris from land-based sources to the ocean, based on field sampling and mathematical modelling to document the distribution of plastic in the ocean, on the coast and in the nearshore environment (Global Plastic Losses). On this project, CSIRO is collaborating with the following partner organisations from ASEAN+3: China, Indonesia, RO Korea and Vietnam.

In September 2019, Kelsey Richardson published a study analysing 40 years of data to show that a quarter of the world's commercial fishing lines are lost or abandoned every year. Publications from 32 countries and territories were reviewed, including from the RO Korea and Indonesia. Available: <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12407>.

In 2017, CSIRO undertook a marine pollution survey, working with countries across the globe to help them assess and reduce the amount of litter entering the oceans. These were expected to include ASEAN member states. No results could be found online. The lead researcher is Denise Hardesty.

With support from UNEP, CSIRO has also carried out a review of the state of knowledge and modelling approaches to identify sources, sinks, distribution and movement of marine litter, including microplastics in order to identify key areas where new data will be the most informative. Workshops were organised and a report was published at 'Hardesty et al. (2016), Modelling and Monitoring Marine Litter Movement, Transport and Accumulation.' Available:

<https://research.csiro.au/marinedebris/projects/modelling-monitoring-marine-litter-movement-transport-accumulation/>.

### 3.3 East China Normal University (ECNU)

**Summary of role and work:** East China Normal University (ECNU), China, has a plastic marine debris research center and has visible publications in marine plastic research.

**Keywords/research fields:** East China Normal University (ECNU); plastic marine debris research center; hotspot monitoring; marine plastic waste forum

#### 3.3.1 Background and aim

East China Normal University (ECNU) is a public research university in Shanghai, China. It has been involved in marine plastics research for a number of years. It has a Plastic Marine Debris Research Centre.

#### 3.3.2 Activities and projects

ECNU hotspot monitoring methodologies have gained particular visibility through the technical consultations they provide under funding by the UNEP, as well as presentation of their work to COBSEA. Available: <http://web.unep.org/environmentassembly/technical-consultation-hotspot-monitoring-methodologies>.

From 4–5 November 2019, ECNU co-hosted the 'Combating Marine Plastic Waste-2019 Shanghai Forum' with UNESCO/IOC Regional Training and Research Center on Plastic Marine Debris and Microplastics (RTRC-PMDMP) on Chongming Island. The Forum adopted the 2019 Declaration of Combating Marine Plastic Waste Shanghai Forum. Available: [http://english.ecnu.edu.cn/e1/1e/c1703a254238/page.htm?fbclid=IwAR0wrhLcJh\\_k6oRikyJARztiLR7AfDvBU\\_Tc\\_xCAetmusEgt2I2PBkiT9fl](http://english.ecnu.edu.cn/e1/1e/c1703a254238/page.htm?fbclid=IwAR0wrhLcJh_k6oRikyJARztiLR7AfDvBU_Tc_xCAetmusEgt2I2PBkiT9fl).

### 3.4 The International Environmental Technology Centre (IETC)

*Summary of role and work:* The International Environmental Technology Centre (IETC) is a think-tank to promote the collection and dissemination of knowledge on Environmentally Sound Technologies with a focus on waste management.

*Keywords/research fields:* International Environmental Technology Centre; IETC; think-tank; waste management

#### 3.4.1 Background and aim

The International Environmental Technology Centre (IETC) is based in Osaka, Japan. It is a think-tank and partners with UNEP to promote the collection and dissemination of knowledge on environmentally sound technologies with a focus on waste management.

The IETC-UNEP partnership organises events and produces publications with other partners worldwide.

#### 3.4.2 Activities and projects

##### Notable global publications and activities

- 2<sup>nd</sup> Global Waste Management Outlook, to be released in 2020 and prepared jointly with the International Solid Waste Association (ISWA). IETC-UNEP and ISWA had also published the previous Global Waste Management Outlook. Available: <https://www.unenvironment.org/ietc/news/story/unep-ietc-has-signed-overarching-agreement-iswa>.
- In collaboration with the Ministry of the Environment Japan, Ministry of Foreign Affairs Japan, Osaka City and the Global Environment Centre Foundation, IETC-UNEP convened the 'Global Dialogue with the Private Sector: Technology Solutions for Holistic Waste Management' to showcase technological solutions for waste management in Osaka, Japan on 21–23 May 2019. Available: <https://www.unenvironment.org/ietc/events/summit/technology-solutions-holistic-waste-management-global-dialogue-private-sector>.
- IETC-UNEP organised the UNEP Symposium on Plastic Waste Problems on 22 May 2019 (as a side event to the abovementioned Global Dialogue) to share information of the current status of plastic waste issues and expertise on good practices to manage plastic waste in an environmentally sound way. The Symposium produced a message to the G20 Osaka Summit (28–29 May 2019). Available: <https://www.unenvironment.org/ietc/resources/other/message-unep-symposium-plastic-waste-problems-g20-osaka-summit-g20-ministerial>.

### Regional publications and activities

IETC has published a number of studies relating to waste management (including plastics) relating to regional countries including:

- Asia Waste Management Outlook (2017). Available: [http://wedocs.unep.org/bitstream/handle/20.500.11822/27289/Asia\\_WMO.pdf?sequence=1&isAllowed=y](http://wedocs.unep.org/bitstream/handle/20.500.11822/27289/Asia_WMO.pdf?sequence=1&isAllowed=y).
- Waste Management in ASEAN Countries: Summary Report (2017). Available: [https://wedocs.unep.org/bitstream/handle/20.500.11822/21134/waste\\_mgt\\_asean\\_summary.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/21134/waste_mgt_asean_summary.pdf?sequence=1&isAllowed=y).
- Regional Study on Mercury Waste Management in the ASEAN Countries (2017). Available [https://wedocs.unep.org/bitstream/handle/20.500.11822/21135/reg\\_study\\_mercury\\_waste\\_mgt\\_asean.pdf?sequence=1&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/21135/reg_study_mercury_waste_mgt_asean.pdf?sequence=1&isAllowed=y).
- Mapping of Waste Management Initiatives (2016). Available: <https://www.unenvironment.org/ietc/resources/report/mapping-waste-management-initiatives-global-and-regional-level-and-major-national>.
- Managing Post-Disaster Debris: the Japan Experience (2015). Available: [https://wedocs.unep.org/bitstream/handle/20.500.11822/8136/-Managing%20post-disaster%20debris\\_%20%20the%20Japan%20experience-20121122.pdf?sequence=3&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/8136/-Managing%20post-disaster%20debris_%20%20the%20Japan%20experience-20121122.pdf?sequence=3&isAllowed=y).

More publications are available at: <https://www.unenvironment.org/ietc/resources>.

The IETC also participated in the formulation of waste management strategies and action plans in Cambodia and Myanmar in 2018. Available: [http://wedocs.unep.org/bitstream/handle/20.500.11822/27516/IETC\\_2018AR.pdf?sequence=1&isAllowed=y](http://wedocs.unep.org/bitstream/handle/20.500.11822/27516/IETC_2018AR.pdf?sequence=1&isAllowed=y).

### 3.5 GRID-Arendal

**Summary of role and work:** *GRID-Arendal is a Norwegian governmental foundation established in 1989 to support environmentally sustainable development, with a research focus on marine debris (including marine plastics).*

**Keywords/research fields:** *GRID-Adrenal; marine debris; marine plastics; maps; graphics; controlling transboundary trade in plastic waste; addressing marine plastics; stock-taking report*

### 3.5.1 Background and aim

GRID-Arendal is a Norwegian governmental foundation established in 1989 that works closely with UNEP and other partners. It aims to support environmentally sustainable development and for a number of years, marine debris (including marine plastics) has been one of their research foci. Available: <http://www.grida.no/search?query=marine+litter>.

None of its published research focuses on Southeast Asia, although the global studies include Southeast Asia. GRID-Arendal has built a particular reputation for its maps and graphics. Available: [https://wedocs.unep.org/bitstream/handle/20.500.11822/9798/-Marine\\_litter\\_Vital\\_graphics-2016MarineLitterVG.pdf.pdf?sequence=3&isAllowed=y](https://wedocs.unep.org/bitstream/handle/20.500.11822/9798/-Marine_litter_Vital_graphics-2016MarineLitterVG.pdf.pdf?sequence=3&isAllowed=y).

### 3.5.2 Activities and projects

The most recent studies that have been published in the context of global programmes that GRID-Arendal participates in are:

- Controlling Transboundary Trade in Plastic Waste, 2019, graphic maps. Available: <http://www.grida.no/resources/13333>.
- 'Addressing Marine Plastics - A Systemic Approach', the 2018 Stock-taking report. Available: <http://gefmarineplastics.org/files/2018%20Stock%20taking%20report%20on%20marine%20plastics%20-%20final%20version.pdf>.

## 3.6 Our Seas of East Asia Network (OSEAN)

**Summary of role and work:** *Our Seas of East Asia Network (OSEAN) is a RO Korean non-profit organisation active in research, education promotion, policy development and international co-operation to protect the marine environment with a focus on marine debris.*

**Keywords/research fields:** *Our Seas of East Asia Network; OSEAN; marine debris; research; education promotion; policy development; international cooperation; coastal cleanup*

### 3.6.1 Background and aim

Our Seas of East Asia Network (OSEAN) is a Korean non-profit organisation that registered with the RO Korea's Ministry of Oceans and Fisheries in 2009 for research, education promotion, policy development and international cooperation to protect the marine environment with a focus on marine debris issues.

### 3.6.2 Activities and projects

OSEAN produces and distributes research results and education promotional materials relating to marine debris. Available: <http://osean.net/gallery/gallery.php>.

In 2019, OSEAN, in co-operation with the RO Korea Coast Guard, conducted a questionnaire survey on 470 ships to understand the amount of waste generated by these vessels. They found that approximately 90 kg of solid waste is generated in a round trip. Available: <http://osean.net/bdlist/activity.php?ptype=view&idx=6814&page=1&code=activity>.

OSEAN also participates in organising national and international seminars, conferences and training workshops relating to marine debris as well as coastal clean-ups. Its recent activities include:

- The Asia Pacific Marine Garbage Expert Training Workshop, which was organised in Busan, RO Korea in October 2019 to train trainees with the skills needed to be marine litter specialists. A total of 14 trainees (from Cambodia, Taiwan, Indonesia, Lao PDR, Malaysia, Peru, the Philippines, Russia, Timor-Leste, Singapore, and RO Korea) participated in the Workshop. Available: <http://osean.net/bdlist/activity.php?ptype=view&idx=6695&page=1&code=activity>
- A coastal clean-up in Busan, RO Korea in September 2019 with support from companies such as Nike, Taekwang, Changsin INC. A total of 70 people participated in the event. Available: <http://osean.net/bdlist/activity.php?ptype=view&idx=6692&page=2&code=activity>.

## 3.7 Plastics in Society Hub

***Summary of role and work:** Plastics in Society Hub is a UK-led society that aims to establish a multi-national, multi-disciplinary and multi-stakeholder research and innovation hub to solve the global challenge of plastics in society.*

***Keywords/research fields:** Plastics in Society Hub; research; innovation*

### 3.7.1 Background and aim

The Plastics in Society Hub is led by Brunel University London in the UK, and is joined by several international partners and leading experts in fields surrounding plastic pollution. It provides a unique platform for research, knowledge transfer and innovation. The Hub aims to establish a multi-national, multi-disciplinary and multi-stakeholder research and innovation hub to solve the global challenge of plastics in society. There are partners from the Southeast Asia region, including Indonesia, Malaysia and Thailand (see Table 1.6.3.1 below). Available: <http://www.plasticsinsociety.global/>.

Table 1.6.3.1. Southeast Asian Partners of the Plastics in Society Hub.

Country	Partners
Indonesia	Institute Technology Bandung (ITB) - Indonesia Network Hub; University of Indonesia; University National Indonesia; Sempuloh Nopember Institute of Teknologi; Hasanuddin University; Padjadjaran University; Uduyana University; Canara Plastics Manufacturer & Traders; Surabaya City Government; Coordinating Ministry of Maritime Affairs, Indonesia; Intera Lestari Polimer; Indonesian Waste Platform
Malaysia	University of Malaysia; Sabah Parks, Malaysia
Thailand	Prince of Songkhla University, Phuket; SEEK Phuket

### **3.7.2 Activities and projects**

Out of its six research themes, the following one is of particular relevance to this review:

- Sources and fate of plastic pollution, including the development of locally-relevant protocols to monitor litter (in the waste stream, on land, in freshwater, on shorelines and at sea) by category (including size, use, and where feasible, source).

Other focus areas relevant to combating pollution from marine plastics are on re-designing the plastic system, designing and testing solutions, social and behavioural change in geographic areas other than Southeast Asia.

Available: <http://www.plasticsinsociety.global/work-package-themes>.