

# Global Challenges to Marine Litter and Microplastics and Expected Local Actions

January 21, 2020

Teruyoshi Hayamizu

Research Project Adviser

Center for Health and Environmental Risk Research  
National Institute for Environmental Studies (NIES), Japan

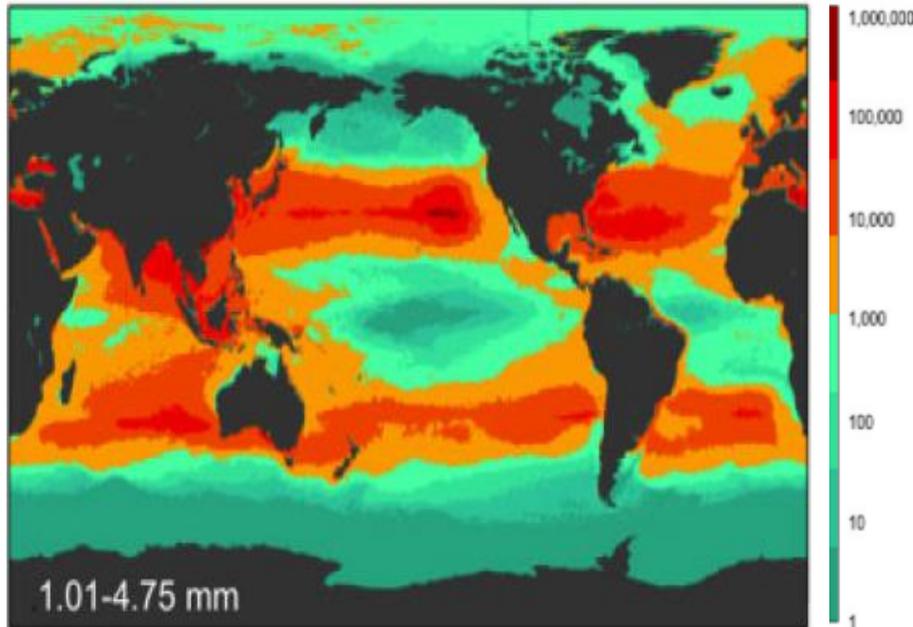
(Adviser, Ministry of the Environment (MOE), Japan)

(Materials are prepared mainly based on those from MOE Japan and partly modified or added by the presenter. Views shown here are the presenter's own ones.)

# Contents

1. Situation of marine litter and microplastics
2. Global discussion on how to tackle this issue  
(G20, UNEP, etc.)
3. Measures taken in Japan
4. Cooperation with Asian countries
5. Possible local actions
6. Challenges

## <Global Marine Plastic Pollution>



**Distribution Density of microplastics (1~4.75mm)  
(model projection)**

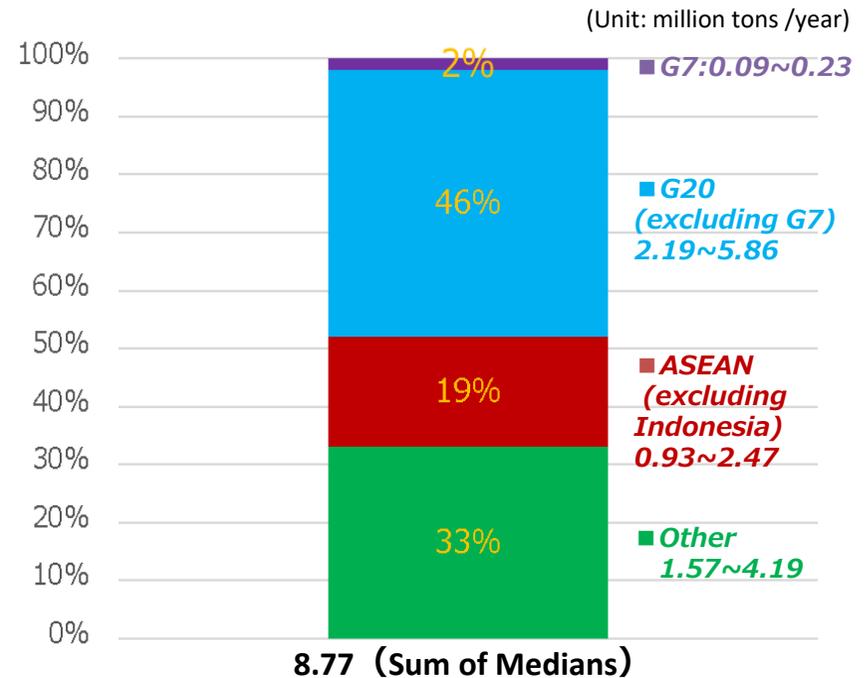
(Source) Erikson et al. : (2014), "Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea", PLoS One 9 (12), doi:10.1371/journal.pone.0111913

Color bar  
(Unit: pieces km<sup>-2</sup>)  
Yellow: 1,000-10,000  
Orange: 10,000-100,000  
Red: 100,000-1,000,000

The report of the World Economic Forum\* says that it is estimated that the amount of plastics in the oceans will exceed the amount of fish by 2050 (weight base).

(\* *The New Plastics Economy: Rethinking the future of plastics* (2016.Jan. World Economic Forum))

## <Marine Plastic Litter by Region>



(Note) The ratio is calculated by using medians of respective estimates.

(Source) Jambeck et al. : Plastic waste inputs from land into the ocean, Science (2015)

- ◆ Estimation by a researcher based on population density, economic status, and etc.
- ◆ There is no agreed international statistics on Marine Plastic Litter.

# Estimated Adverse Effects of Marine Plastic Pollution

## Estimated damage

- Effects on marine environment including wildlife and ecosystems
- Effects on fishery, sailing and tourism
- Effects on living environment around beach

## Microplastics: a matter of concern

(Small-sized plastic litter, less than 5mm)

- Primary microplastics; banned in some countries for the use of rinse-off products
- Secondary microplastics; major microplastics found in the ocean

Plastic pieces  
(Secondary Microplastics)



Photos by Kyushu University

Microbeads  
(Primary microplastics)



Concern about the effects on marine wildlife and ecosystems



Plastic bags found in the stomach of whales



Photos by MOE of Thailand

# Overview of Marine Litter Issues in Japan

## Situation of Japan:

- Many Islands, long coastal lines surrounded by ocean, strong ocean current and monsoon winds
- Coastal environment and economy are currently affected by marine debris / litters

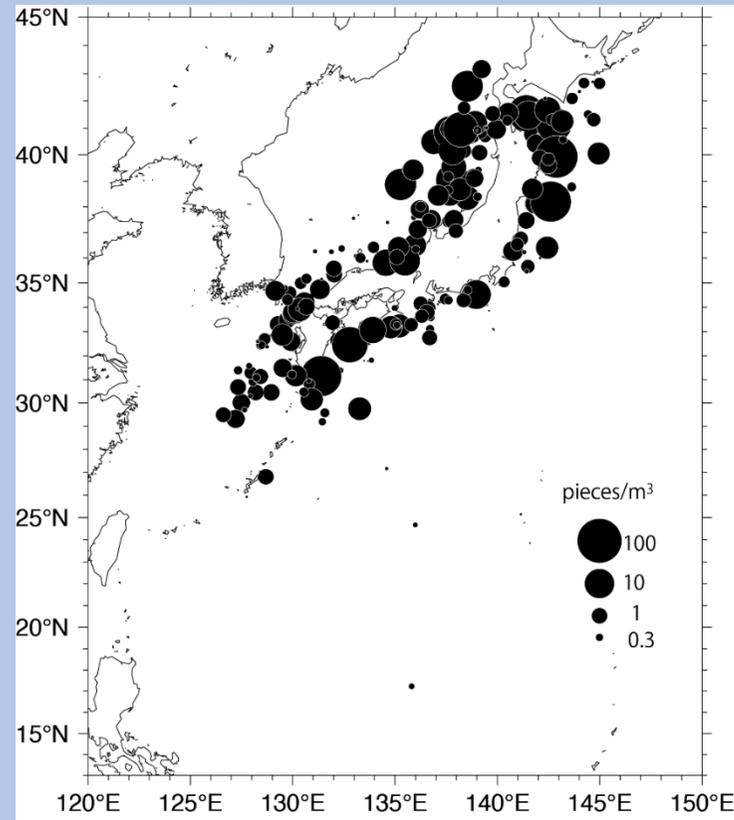
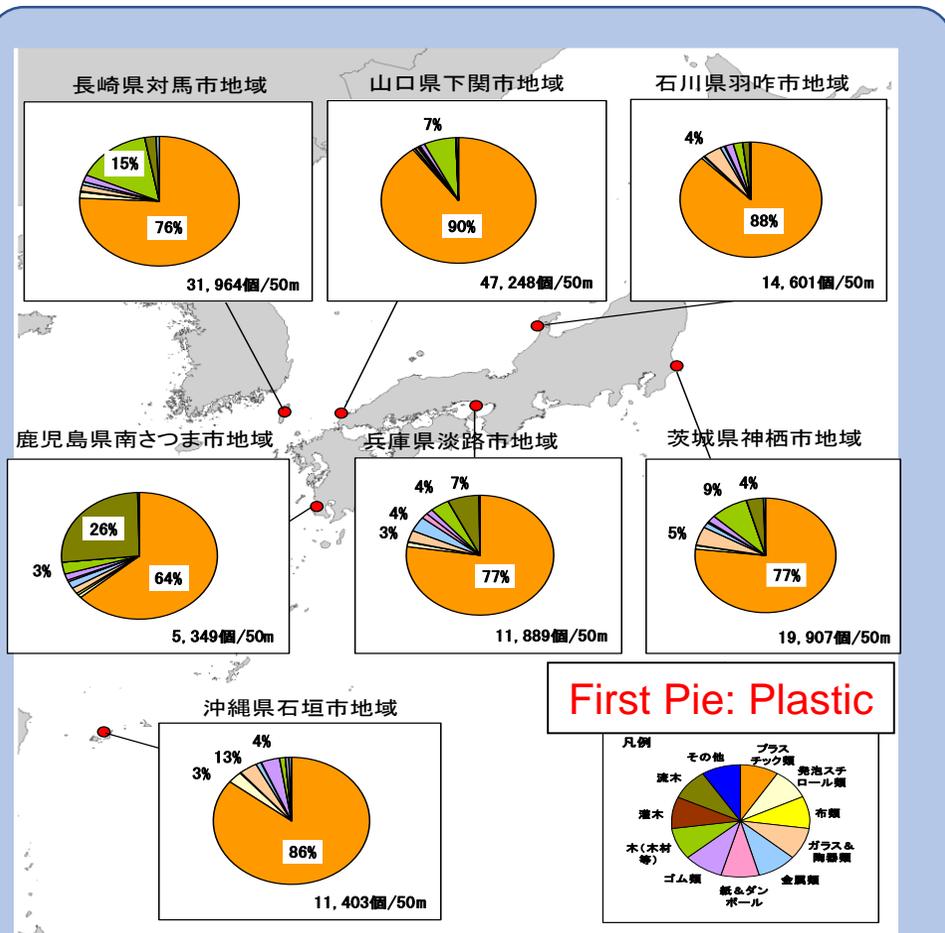
Nagasaki Pref.  
(Tsushima-city)



Yamagata Pref.  
(Tobishima)



# Some Results of Research conducted by MOE Japan

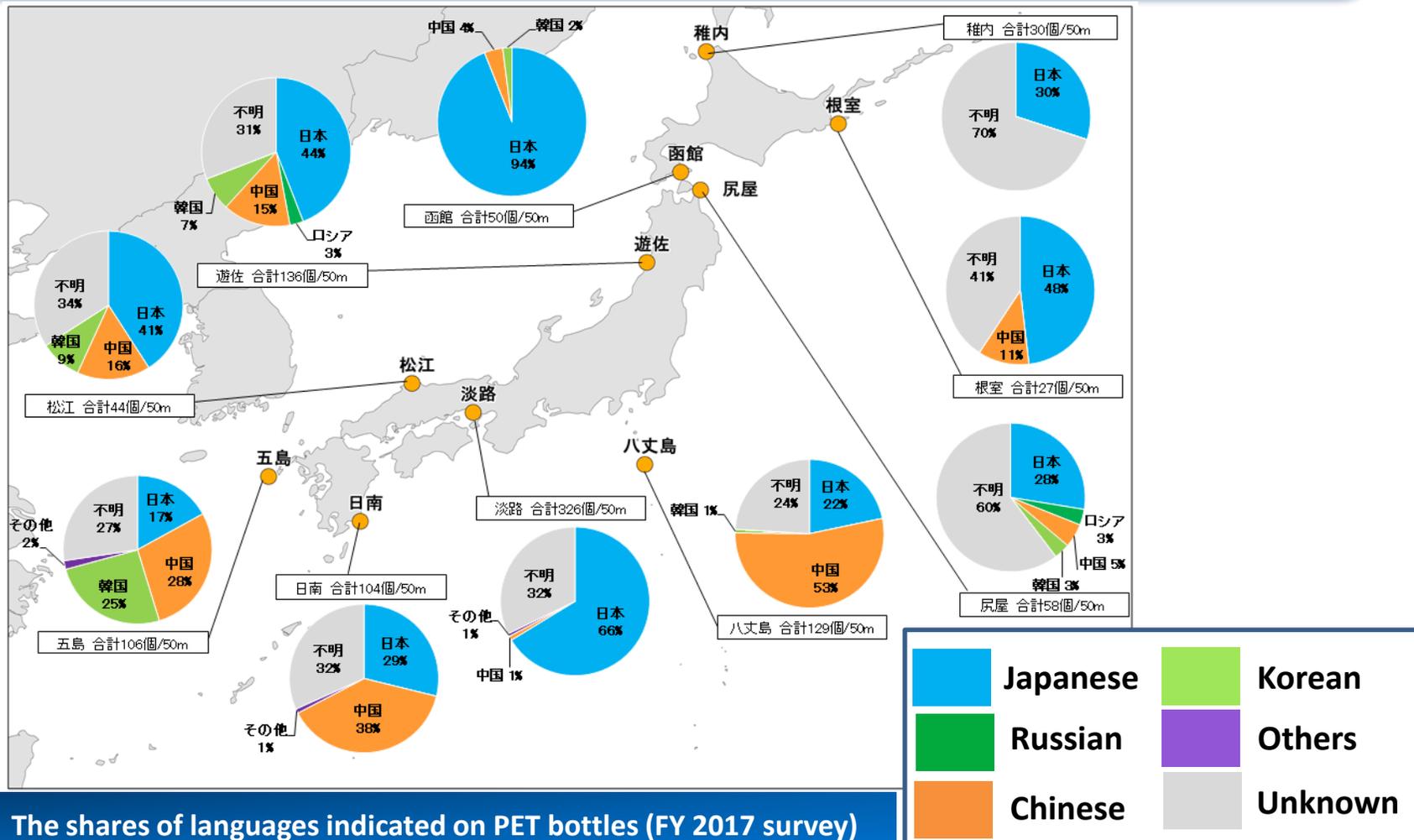


**Distribution map of microplastic density (Sum of FY 2014-2017)**

**Microplastic are found anywhere but density varies by areas.**

# Monitoring survey on washed-ashore litter (language indications on PET bottles) (FY 2017)

- MOE classified, according to the language indication, washed-ashore PET bottles recovered at 10 locations across Japan where the monitoring survey was conducted in FY 2017.
- The share of PET bottles with foreign language indications was higher than 50% at Hachijojima, Goto and Nichinan, excluding bottles for which the nationality of the language indications remained unknown, while it was smaller than 10% in Hakodate and Awaji.



The shares of languages indicated on PET bottles (FY 2017 survey)

# Microplastics

- Small-sized plastic litter, less than 5mm
  - Two (or three) types
    - Primary microplastics: rinse-off products, chemical pellets (synthetic textiles, abraded tyres, etc.)
    - Secondary microplastics: broken plastics from larger plastics; major microplastics found in the ocean
  - Found in wildlife, e.g. fish, marine mammals, birds
  - Hazardous chemicals originally contained (e.g. brominated flame retardants) or adsorbed in the environment (e.g. PCBs) are identified.
  - Adverse effects on wildlife and human health are suspected. Further study is required.
  - Monitoring data are lacking and international harmonization of monitoring methodologies is pursued.
  - Inventories (i.e. source and pathway to the ocean) need to be developed.

## SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

### **14.1 Prevention of marine pollution including marine debris and nutrient pollution**

**By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution.**

14.2 Restoration of marine and coastal ecosystems

14.3 Minimization of impacts of ocean acidification

14.4 Restoration of fish stocks

14.5 Conservation of coastal and marine areas

14.6 Prohibition of overly protective policies for fisheries

14.7 Sustainable use of marine resources in SIDS and LDCs

14.a Increase of scientific knowledge, development of research capacities, and transfer of technology

14.b Provision of access of small-scale fishers to marine resources and markets

14.c Enhancement of conservation and sustainable use of oceans and marine resources through implementing framework of UNCLOS



# International Movements on Marine Litter and Microplastics

- EU: Plastic Strategy was developed in January 2018
- Current G7 Summit Meetings dealt with marine plastics. At the G20 Osaka summit held in June 2019, G20 leaders shared “Osaka Blue Ocean Vision” and endorsed “G20 Implementation Framework for Actions on Marine Plastic Litter”.
- International Fora such as the COP of Basel Convention, IMO, FAO, WHO, GESAMP (Group of Experts on the Scientific Aspects of Marine Environmental Protection), etc. have been tackling marine litter and microplastics from their own viewpoints.
- Regional Seas Conventions and Programmes are also taking actions to tackle this issue.
- UNEP: Based on the resolution at the Third UN Environment Assembly (UNEA3) held in December 2017, “Ad-hoc Open-ended Expert Group on Marine Litter and Microplastics” was organized. They met twice and made recommendations to UNEA4 held in March 2019 on possible future options. UNEA4 adopted a new resolution.

# Outcomes of the G20 Osaka Summit (June 2019)

## Osaka Blue Ocean Vision

- G20 leaders shared the Osaka Blue Ocean Vision as a common global vision
- They also called on other members of the international community to also share this vision for protecting the world's oceans



"We aim to reduce additional pollution by marine plastic litter to zero by 2050 through a comprehensive life-cycle approach that includes reducing the discharge of mismanaged plastic litter by improved waste management and innovative solutions while recognizing the important role of plastics for society."

## G20 Implementation Framework

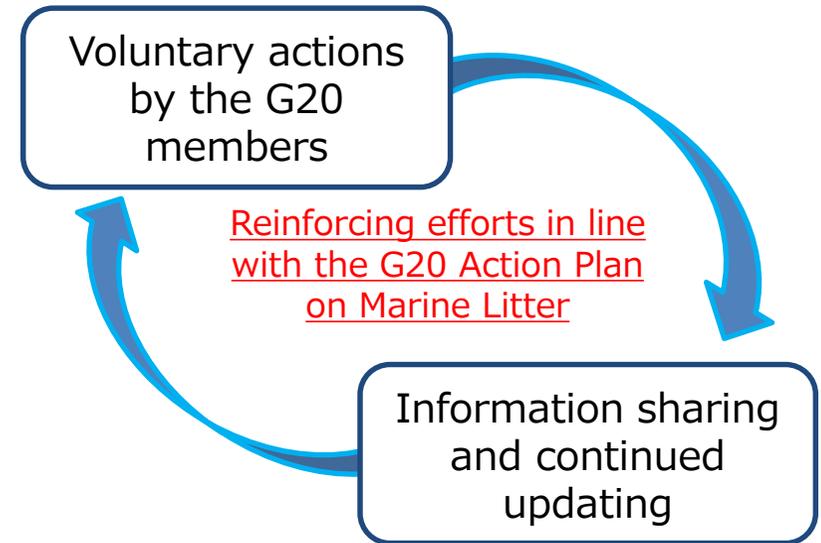
- Adopted on G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth
- Also endorsed by G20 Osaka Summit

"We also endorse the G20 Implementation Framework for Actions on Marine Plastic Litter. "

# G20 Implementation Framework for Actions on Marine Plastic Litter

## Facilitating the Effective Implementation

- Promoting a life-cycle approach including sound waste management, marine litter cleaned up, promotion and deployment of innovative solutions, and international cooperation in order to support each countries in strengthening their capacity.
- Sharing and updating information on relevant policies, plans and measures. Utilizing opportunities of G20 Resource Efficiency Dialogue for the first info sharing.



## Collaboration among G20 members and outreach activities

- Promotion of international cooperation
- Promotion of innovative solutions
- Sharing scientific information and knowledge
- Multi-stakeholder involvement and awareness raising



# G20 Report on Actions against MPL

## G20 Report on Actions against Marine Plastic Litter

First Information Sharing based on the G20 Implementation Framework  
(Compiled as a result of the follow-up meeting in Oct. 2019)



1. Introduction
2. Policy framework for MPL
3. Measures and Achievements
  - 3.1. Prevention and reduction of plastic waste generation
  - 3.2. Environmentally sound waste management and cleanup of MPL
  - 3.3. Promotion of innovative solutions
  - 3.4. Multi-stakeholder involvement and awareness raising
  - 3.5. Sharing scientific information and knowledge: R&D and Monitoring
  - 3.6. Promotion of international cooperation
4. Best practices
5. Further information

# G20 Report on Actions against Marine Plastic Litter (extracts)

## <Examples of best practices>

### **(1) [Plan] Marine strategies (Finland)**

The country has set a clear target to decrease the quantity of plastics in the marine environment by 30% by 2024, and promotes efficient waste collection in ports, significant reduction of cigarette butts on urban beaches, and removal of microplastics through waste water treatment.

### **(2) [System] Marine Debris Act (USA)**

It obliges a cooperation committee among relevant ministries and agencies to be established, and the National Oceanic and Atmospheric Administration to develop a plan, and also promotes fact finding, impact assessment, prevention of outflow and collection of waste, and international cooperation.

### **(3) [3 R] Ban on single-use plastics (Indonesia)**

The use of single-use plastics including plastic shopping bags, straws and Styrofoam has been banned since the beginning of 2019 (Bali).

# G20 Report on Actions against Marine Plastic Litter (extracts) (cont'd)

## <Examples of best practices>

### **(4) [Collection] Styrofoam buoy collection system (South Korea)**

Collection sites have been established in local communities in order to promote the collection of Styrofoam buoys that fishermen no longer use.

### **(5) [Collaboration] Citizen science platform (France)**

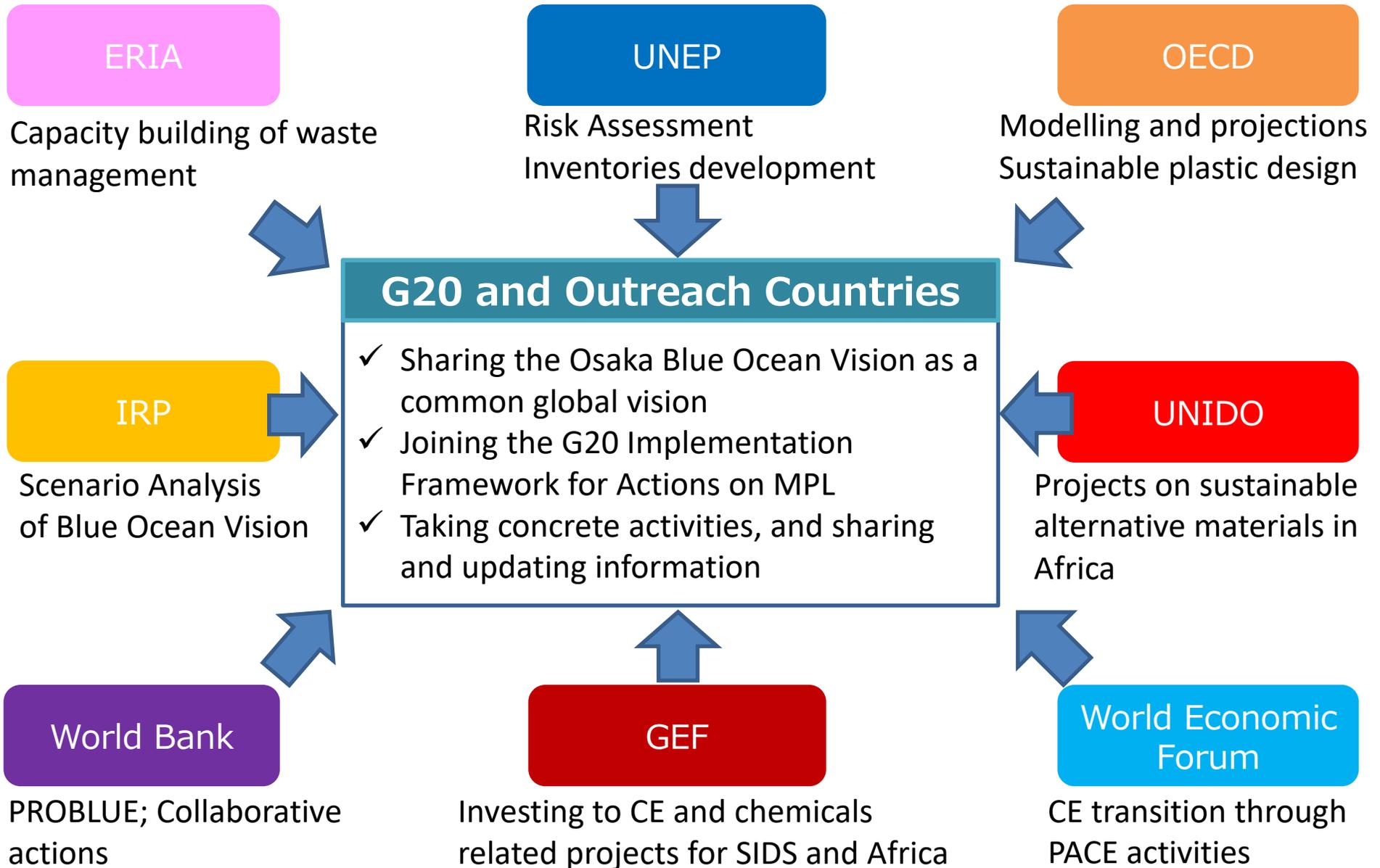
It promotes making a database of the amount and items of waste collected through clean-up actions, providing clean-up guidelines, and having activities to match citizens and NGOs.

### **(6) [Treatment] Strengthening resource recycling system (Japan)**

Its domestic resource circulation system is to be strengthened by the establishment of recycling facilities and the support of technology development (12.8 billion yen budget in FY2020).

The full report can be found through the following HPs  
[https://www.env.go.jp/en/water/marine\\_litter/2019g20fu.html](https://www.env.go.jp/en/water/marine_litter/2019g20fu.html)  
<https://g20mpl.org/>

# Contributions to the G20 Implementation Framework on MPL from international organizations



1. Meeting schedule: From March 11 to March 15, 2019
2. Venue: Nairobi, Kenya
3. Participating countries and organizations: **Representatives of 173 countries and related international organizations attended**
4. Deliverables:
  - Ministerial Declaration 'Environmental Issues and Innovative Solutions for Sustainable Consumption and Production'  
(Based on a proposal by Japan and other countries)
  - **Resolution on 'Marine Plastic Litter and Microplastics'**
  - Resolution on 'Innovative Pathways to Achieve Sustainable Consumption and Production.' A total of 23 resolutions were adopted.

## **Resolution on 'Marine Plastic Litter and Microplastics'** (Overview)

- 1) Request for immediate **strengthening of scientific and technological knowledge** with regard to marine litter including marine plastic litter and microplastics. (Scientific Advisory Committee was established in October 2019.)
- 2) Decision to **strengthen coordination and cooperation through a multi-stakeholder platform** within UNEP, to take immediate action towards the long-term elimination of litter and microplastic discharges into the oceans through a life-cycle approach.
- 3) Decision to **extend until UNEA-5 the mandate of the Ad Hoc Open-Ended Expert Group** on Marine Litter and Microplastics. (The 3rd meeting was held in Nov. 2019.)

# Impression about the discussion at Ad-hoc Open-Ended Expert Group on Marine Litter and Microplastics

- Many participants agreed on the following points
  - Measures should include the whole life-cycle of plastics including their production, use and disposal.
  - However, scientific knowledge is lacking. Analysis is needed on which plastics are produced, used and disposed and how they reach the ocean. (Science-based approach)
  - Monitoring data are also lacking. Harmonization of methodologies is required.
  - Proper waste management is important, especially in developing countries. However, it should be noted that marine plastic litter will not disappear even strict regulations are enforced.
  - Activities by existing organizations are important. However, they may not be enough to solve this problem.
- Different views were shown on the future international framework
  - NGOs and some countries including SIDS (Small Island Developing States) favored a legally-binding framework (i.e. convention) as an immediate action.
  - Some countries indicated that a legally-binding framework would be premature because of the lack of scientific knowledge and the difficulties in identifying proper target of measures. They preferred a flexible approach.
  - Different views were shown on whether a new coordination body is needed or not.

# Japan's Strategy for Marine Plastic litter

National Action Plan for Marine Plastic Litter

Basic Policy based on the Act on Promoting the Treatment of Marine Debris

Resource Circulation Strategy for Plastics

## Life-cycle Approach

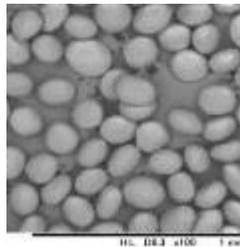
Intensified Collection and appropriate treatment of waste plastics



3 R  
Reduce  
Reuse  
Recycle



Innovation



National Movements



Accumulation of scientific knowledge



Realize the "Osaka Blue Ocean Vision"

# Measures Regarding Marine Debris and Resource Circulation for Plastics

## 【International Vision · Framework】

- ① **Osaka Blue Ocean Vision (G20 Osaka Summit)**  
Aim to reduce additional pollution by marine plastic litter to zero by 2050
- ② **G20 Implementation Framework for Actions on Marine Plastic Litter (Ministerial Meeting)**  
 A new effective framework where each country (including developing/emerging countries) implements voluntary actions and continuously share them

## 【Japan's Domestic Plan · Strategy】

- ① **Resource Circulation Strategy for Plastics (May 2019)** : Strategy to comprehensively promote resource circulation for plastics by setting a top level, ambitious "Milestone" as the course of action.
- ② **National Action Plan for Marine Plastic Litter (May 2019)** : Effective measures to realize a world without additional pollution by plastic litter.
- ③ **Basic Policy on the Promotion of Measures Against Articles that Drift Ashore (May 2019)** : Treatment of articles that drift ashore and control of waste generation to preserve coastal landscape and environment

<b>Reduce/ Convert to Substitute Materials</b>	<b>Convert to Substitute Materials</b>	<ul style="list-style-type: none"> <li>● <b>Aid for converting to substitute materials</b> : Financial aid to carry out conversions to substitute materials such as paper, cellulose, biomass plastic, (3.5 billion yen for FY 2019)</li> <li>● Clean Ocean Material Alliance</li> <li>● Formulation of the Bioplastic introduction Roadmap.</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Green Purchasing</b> : Abolish the use of single-use plastics at meetings, cafeterias, etc</li> </ul>	<b>Reduce</b>	<ul style="list-style-type: none"> <li>● Initiatives within industrial circles :               <ul style="list-style-type: none"> <li>- Abolish the distribution of plastic straws (food industry, etc.).</li> <li>- Abolish the use of plastic bags (convenience stores).</li> <li>- Convert to paper or biodegradable containers (convenience stores).</li> </ul> </li> </ul>
	<b>Establish Domestic Resource Circulation System</b>	<ul style="list-style-type: none"> <li>● <b>Aid for constructing recycling facilities</b> : Financial aid for the construction of recycling facilities to address the ban on exports to countries by countries such as China (compensation of 6 billion yen for FY 2018; 3.33 billion yen for FY 2019).</li> </ul>	<ul style="list-style-type: none"> <li>● Initiatives of Industrial Circles: Declaration to Make all Beverage Containers Recyclable (100% effective use of plastic bottles by 2030).               <ul style="list-style-type: none"> <li>- Strategy for Resources Circulation by the Japan Plastics Industry Federation.</li> <li>- Declaration for the Resource Circulation by the Plastic Packaging Recycling Council.</li> </ul> </li> </ul>	<b>International Resource Circulation</b>	<ul style="list-style-type: none"> <li>● <b>Amendment to the Basel Convention</b> : Amendment to the Basel Convention calling for contaminated plastic waste unfit for recycling to be subject to the regulations of the Basel Convention (Joint proposal of Japan and Norway. Proposal will be put into effect on January 2021)</li> </ul>
<b>Recycle/ Resource Circulation</b>					

# Measures Regarding Marine Debris and Resource Circulation for Plastics (2)

<p><b>Measures Against Marine Plastic Litter</b></p>	<p><b>Measures Against Marine Plastic Litter in Japan</b></p> <ul style="list-style-type: none"> <li>● <b>Aid for the processing of waste articles that drift ashore</b> : Provide financial aid to municipalities for collecting and processing of articles that drift ashore (3.1 billion yen in FY 2018 (Supplementary); 400 million yen for FY 2019).</li> <li>● <b>Measures Against Floating Litters, etc.</b> : In a joint effort with relevant ministries/agencies, promote processing with corporation of fishermen</li> </ul>	<p><b>International cooperation</b></p> <ul style="list-style-type: none"> <li>● <b>International cooperation on waste management and recycling</b>: Support package of technologies and systems (included within 900 million yen for FY 2019 (Ministry of the Environment))</li> <li>● <b>ASEAN +3 Marine Plastics Debris Cooperative Action Initiative</b>: Measures against marine plastic with 3R, etc.</li> <li>● UN Environment Assembly (UNEA-4): Newly establish a multi-stakeholder platform for enhancement of activities.</li> <li>● Asian Development Bank (ADB): 5 billion dollars (550 billion yen), including joint financing for measures against marine plastic litter.</li> </ul>	
<p><b>National Movements / Awareness Raising</b></p>	<p><b>Plastics Smart</b></p> <ul style="list-style-type: none"> <li>● <b>Plastics Smart</b> : Utilizing social media platforms etc., disseminate both domestically and globally the ways to "form positive relationships with plastics" conducted by various actors.</li> <li>● <b>Plastics Smart Forum</b>: Promote dialogue and interactions among various actors.</li> </ul>	<p><b>Marine Plastic Public Private Innovation Partnership</b></p> <ul style="list-style-type: none"> <li>● <b>Marine Plastic Public Private Innovation Partnership</b> : Establish a cooperation system of Japanese companies etc., who engage in innovative initiatives to developing substitute materials etc..</li> </ul>	<p><b>UMIGOMI Zero Week</b></p> <ul style="list-style-type: none"> <li>● <b>UMIGOMI Zero Week</b>: A joint effort with Nippon Foundation to conduct simultaneous nationwide cleaning activities (1,300 places nationwide, mobilize hundreds of thousands participants).</li> <li>● <b>UMIGOMI Zero Award</b>: Praise outstanding initiatives, and disseminate both domestically and globally</li> </ul>

# Targets set in Japan's Resource Circulation Strategy for Plastics

## <Reduce>

(1) Cumulative reduction of 25% of single-use plastics by 2030

## <Reuse/Recycle>

(2) Reusable/recyclable design by 2025

(3) Reuse/recycle 60% of containers and packaging by 2030

(4) 100% effective use of used plastics by 2035

## <Recycling and Bio-Plastics>

(5) Double the use of recycled amount by 2030

(6) Introduce 2 million tons of bio-plastics by 2030

# Cooperation with Asian Countries

- Cooperation under Tripartite (China-Korea-Japan) Environmental Ministers' Meeting (TEMM) and North Northwest Pacific Action Plan (NOWPAP): Workshops among scientists, sharing information, etc.
- Bilateral cooperation
- ASEAN+3 (APT) Marine Plastic Debris Cooperative Action Initiative

Regional Knowledge Center



Decrease leakage



©国連広報センター

# Regional knowledge center for marine plastic litter

## Overview

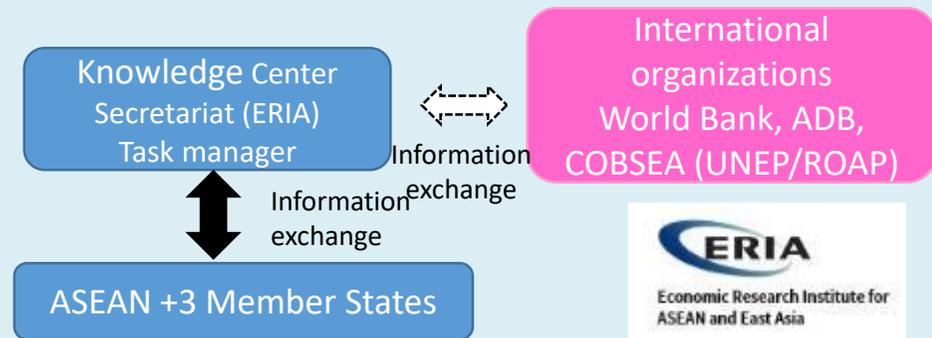
The Regional Knowledge Center (RKC) is a **information clearinghouse** regarding marine plastic in APT countries.

<Purpose>

1. Networking and raising awareness
2. Promoting innovative actions in each county
3. Facilitating national and regional cooperation

## Implementation Framework

Secretariat: To be established at **ERIA**  
 Task manager: To be hired in charge of information collection, communication and coordination among stakeholders



## Major Activities

### Development of RKC Foundation

Identify **focal ministries and agencies** in member states

Establish **network of relevant organizations**

### Collection and Analysis of information

Review and share **good practices and relevant policies**

- Policies and initiatives
- Material flows and monitoring methodologies
- Best practices and innovative solutions



### Knowledge Sharing

Develop **website**



**Decrease leakage**

### Raising Awareness and Capacity Building



# Overall Goals and Project Outline of JAIF\* projects

Objectives and Outline of JAIF Projects			Further activities
Objectives	Phase 1 Period : 2019.3 – 2019.9	Phase 2 Period : 2019. – 2021.12	
<b>1. Assist Formulation of National Action Plans</b>	<b>Develop Template of National Action Plan (NAP)</b> (1) Reviewing existing marine debris measures in ASEAN Member States (2) Collection and analysis of good practices (ex. Existing NAP of Indonesia ) (3) Development template of NAP => input to item 5 WS	<b>Apply Template of NAP in Target Countries</b> (1) Assistance for formulation of NAPs (2) Sharing lessons through workshops (3) Development monitoring methods for NAP implementation	Formulation of NAPs by dissemination of outcomes of Phase2 project
<b>2. Develop Supporting Tools for Integrated Land to Sea Policy Approach</b>	<b>Case Study Research on Generation Amount and Sources of Land Originated Marine Debris (MD)</b> (1) Reviewing existing study reports and information (2) Investigation of actual condition for indicators (3) Implementation of joint research	<b>Develop Estimation Tools on Generation Amount and Sources, and MD Measures</b> (1) Experts Review and Developing Estimation Tools (2) Trial run in target river basin (3) Recommendation for MD reduction measures	Develop Integrated Land to Sea Policy Approach System
<b>3. Support Capacity Building for Solid Waste Management Activities</b>	<b>Develop Capacity Building Program</b> (1) Reviewing solid waste management(SWM) activities (3R etc.) and identify basic needs in ASEAN Member States (AMS) (2) Preparation of draft capacity building program	<b>Pilot Study on Capacity Building Program for Enhancement SWM Activities</b> (1) Implementation of the capacity building program (2) Preparation of application guidelines in AMS	Dissemination of Phase2 outcomes and enhancement of 3R Activities
<b>4. Develop Marine Debris Monitoring</b>	<b>Review Monitoring Method inside/outside of ASEAN</b> (1) Collection of monitoring methods (2) Review of monitoring system in ASEAN region (3) Grasp challenges and countermeasures for development and application of monitoring system	<b>Development and Trial of Marine Debris Monitoring Plan</b> (1) Reviewing the monitoring method by the platform (2) Review by Development and trial of monitoring plans	Establishment and Implementation of sustainable monitoring system

\*JAIF: Japan-ASEAN Integration Fund

# Possible local actions to reduce marine plastic litter

- Government
  - Set ambitious target and effective framework to promote 3Rs (Reduce, Reuse, Recycle)
  - Support and promote 3R activities and collection of plastic litter
  - Improve waste management (including international cooperation)
- Industry
  - Innovation for biodegradable plastics and alternatives
  - Innovation to facilitate recycling
  - More contribution based on “Extended Producers Responsibility” (EPR)
- Academia
  - Accumulation of scientific knowledge including the identification of source and pathway (i.e. inventory), monitoring, research on adverse effects on wildlife and human health
- Citizens
  - Change of life-style including the actions for 3Rs (+ Recognize, Refuse, ...)

# Challenges

- How and to what extent should the measures be promoted when scientific knowledge is lacking? Should we promote regulatory measures or voluntary/incentive measures?  
(Science-based approach vs. Precautionary approach)
- How could we measure the effect of individual effort at local level on the global problem?
- Incineration (thermal recovery) is often criticized in the international discussion. However, it could appropriately be used when necessary. How should we deal with it?
- We should consider the whole life-cycle of plastics. How should we combine the upstream measures (in production and use of plastics) with the downstream measures (in pollution prevention and waste management)?
- Is a new legally-binding instrument (i.e. convention/treaty) necessary?

**Thank you for your attention!**