10th Regional 3R and Circular Economy Forum in Asia and the Pacific
WEBINAR V 201217

Background and Scope of 2nd State of 3R

17th December 2020

Shinichi Sakai
Kyoto University

Background and Scope of 2nd State of 3R

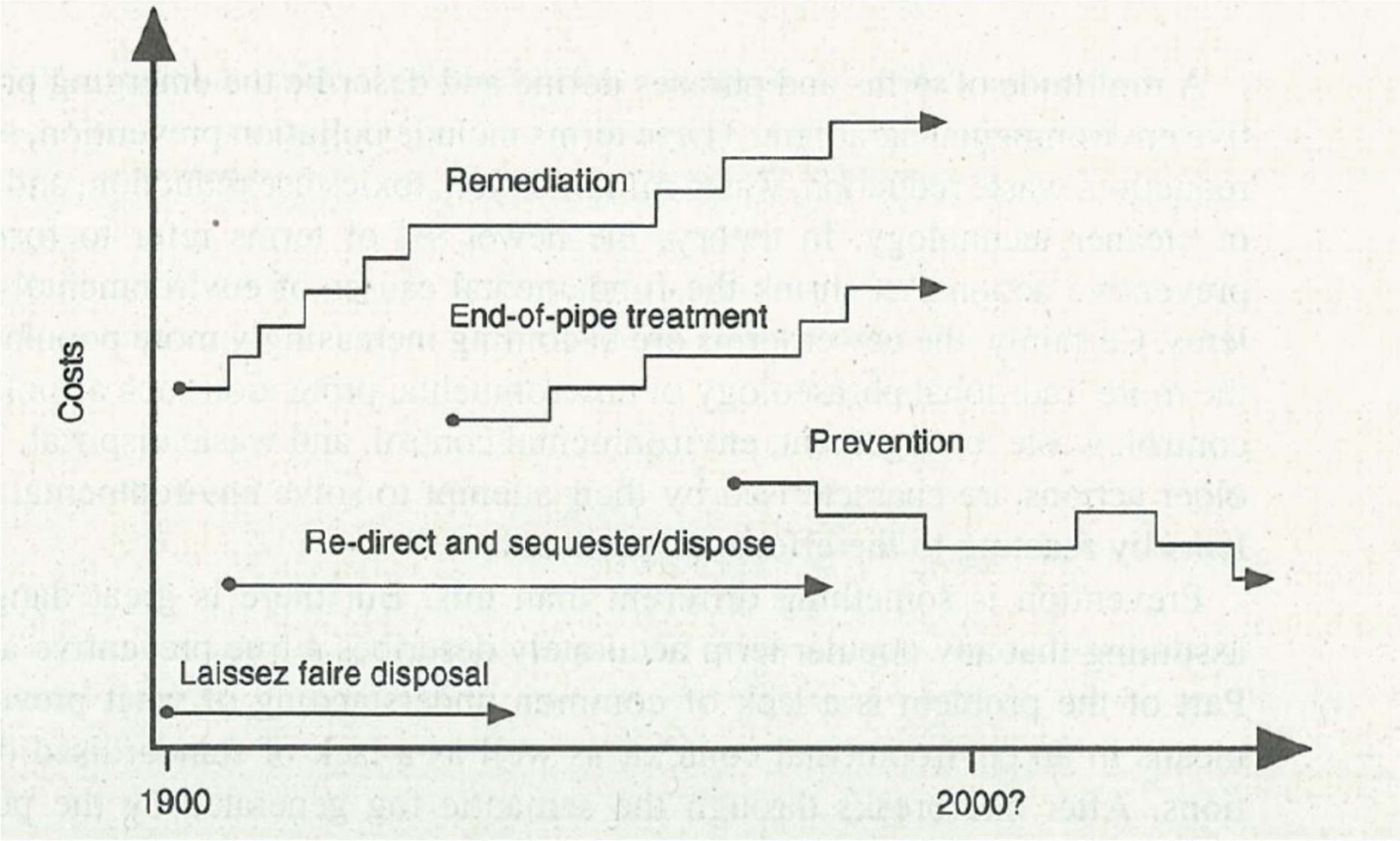
Today's topics:

1. **Short history of waste management: One-way disposal to 3R & Circular Economy**
2. **The idea of "3R Plus" as basic principles for plastic use, "Reduce, Reuse & Recycle" plus "Renewable & Recovery"**
3. **1st Status Report of the 3Rs in Asia and the Pacific 2018**

Short history of waste management and 3R (1)

1. **Before the late 20th century, European, American and Japanese countries' main waste measures had been so called "Back-Yard-Dumping" and/or "End-of-Pipe Approach".**
2. **This way was to hide waste or garbage in locations invisible from public and left them in the environment as they were.**
3. **Uncontrolled landfill and uncontrolled incineration had been taken just until half a century ago.**
4. **Consequently, illegally dumped and abandoned piles of waste were found everywhere in the world. We eventually noticed the need of huge cost for remediation of these landfill sites in 1970-1980s.**

Waste management paradigm shifts



Tim Jackson (1993) Clean production strategies, ***Lewis Publishers***

Short history of waste management and 3R (2)

1. **Infectious diseases and odor generation caused by abandoned waste.**
2. **The second phase of waste measures was (1) incineration and microbial fermentation for waste sterilization, reduction, and stabilization, and (2) adoption of control technology for generated gas and leachate at landfill sites. But they were not effective enough.**
3. **People recognized that waste incineration produced unintentional by-products like dioxins, and that so-called one-way flow End-of-Pipe treatment itself was the real problem.**

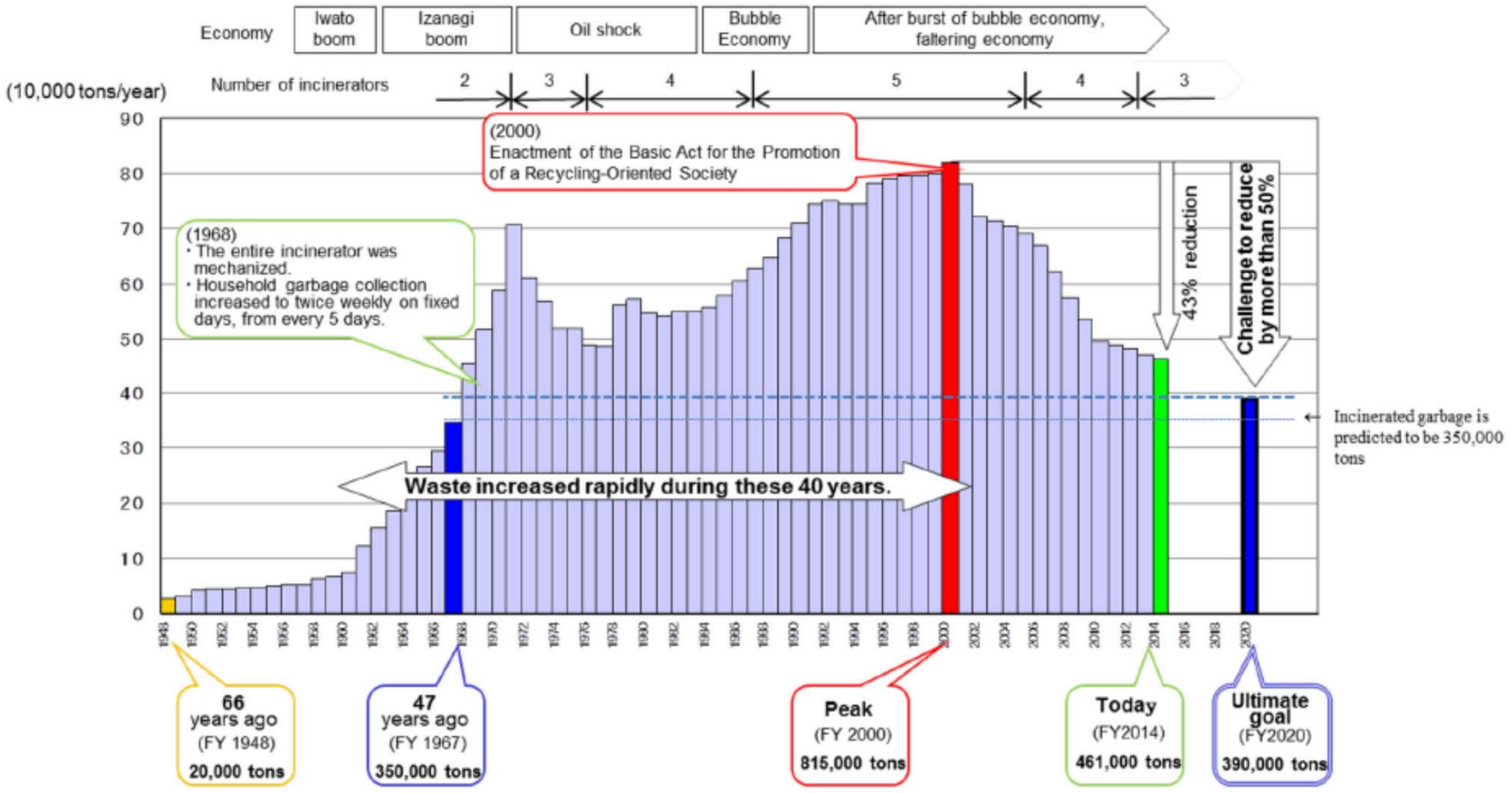
Short history of waste management and 3R (3)

1. **People recognized regional and global sustainability would not be achieved only within the framework of the conventional waste treatment. So, the concept of waste prevention and recycling appeared.**
2. **Its basic policy is Waste Management Hierarchy, 3R concept: a priority order starting from Reduce, Reuse, Recycle, Treatment, and Disposal. The upper priority order is better and desirable.**

Short history of waste management and 3R (4)

1. 3R (Reduce, Reuse, and Recycle) represents top three waste hierarchy measures. Now, this policy should be prioritized in every situation.
2. Each measure enables waste reduction, long-term use of waste treatment plants, and leads to overall social resources and energy conservation.
3. However, we must know that there's no meaning if recycling wouldn't ultimately contribute to reduction in resource and energy use.

Changes in the amount of waste in Kyoto City



T. Yamada, M. Asari, T. Miura, T. Niijima, J. Yano, S. Sakai (2017) Journal of Material Cycles and Waste Management, 19 (4), pp.1351-1360

Change in Kyoto City's waste volume from the latter part of 20th century to 21st century

1. **Change in the waste volume in Kyoto City in the latter part of 20th century reflects the history of general short history.**
2. **Annual waste generation was about 20,000 tons just after World War Ⅱ around 1950. Then, it sharply increased to 820,000 tons during 1960 and 2000.**
3. **The period coincided with the period of rapid economic growth in Japan. At that time, people naturally considered there was a strong positive correlation between economic growth and waste generation.**
4. **A full-fledged challenge started for establishing a sound material- cycle society in the 21st century. The waste generation decreased to 420,000 tons in 2016; a half reduction from the peak time.**

Concerns from marine plastic pollution

Beach litter along the coastline

Tobishima, Sakata, Yamagata

Tsushima, Nagasaki

*Samples of drifted wastes

Fishing gear

Plastic container

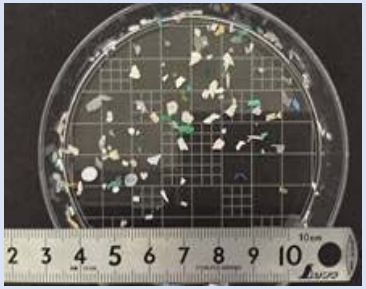
Detergent container

Negative impacts

- Concerns regarding marine life
- Obstruction for ship sailing
- Impacts on tourism and fishery
- Impacts on the residential environment along the coast

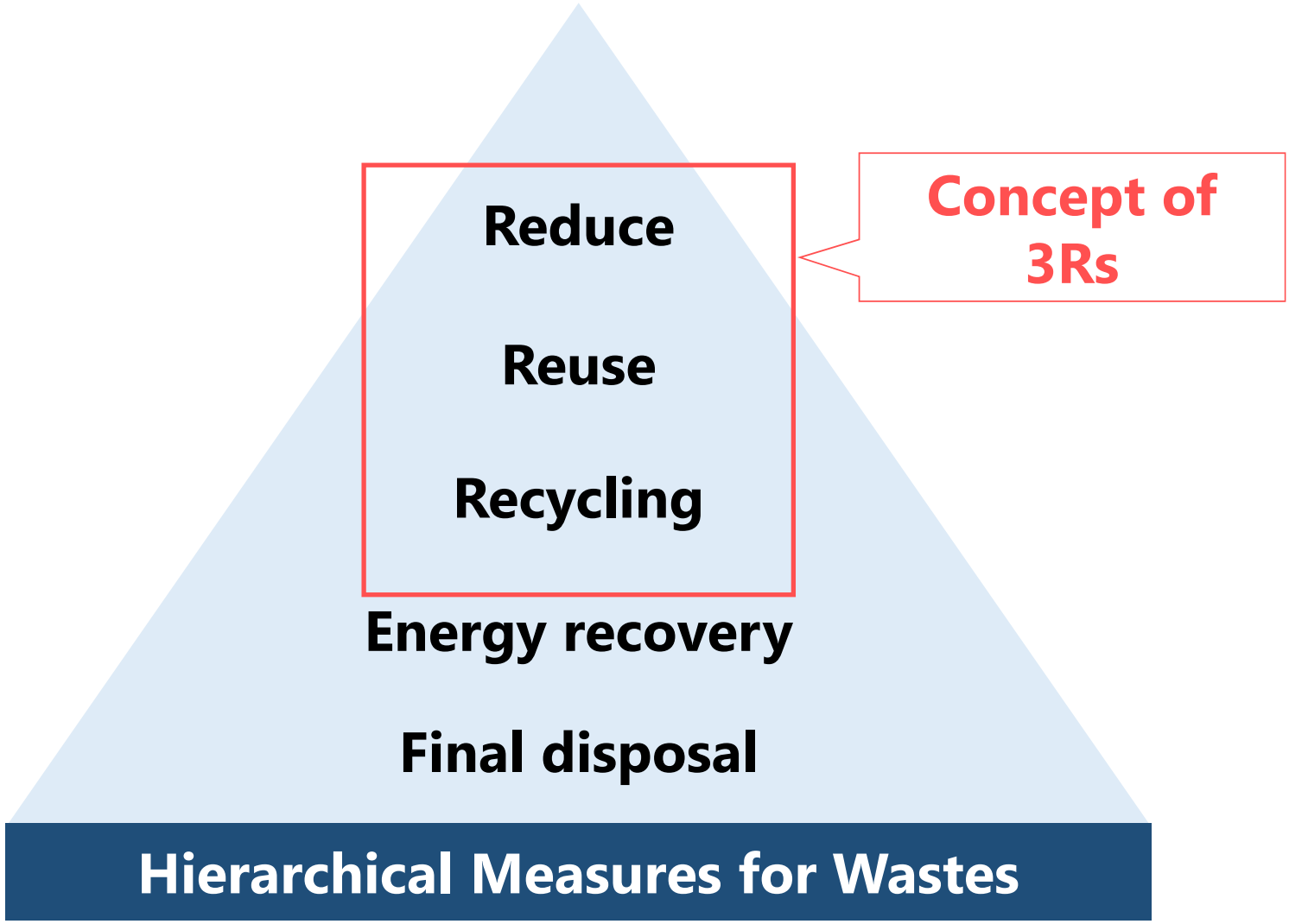
Turtle & Plastic, Source: UN World Oceans Day

A whale has died after swallowing more than 80 plastic bags Source: Ministry of Natural Resources and Environment, Thailand



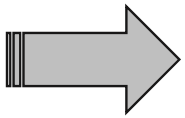
Small plastic fragments Source: Isobe lab, Kyusyu university

3R Concept as Countermeasures for Waste Issues



Principles Expansion of Resource Use based on 3R Concept

1. Find the best way for the top priority of waste prevention/ avoidance to reduce waste flow amount in society to a fixed certain level.
2. Utilize and recycle renewable resources as a basic principle. Consider accumulation of exhaustible resources before recycling.
3. Waste unavoidably generated should be treated by energy recovery and managed as natural capital at final sinks as much as possible.



3R plus Renewable & Recovery

3R Plus Principle and Plastic Material

1. **"3R Plus" Principle is important specifically for plastic material, whose sustainable use is now being discussed.**
2. **In addition to 3R (Reduce, Reuse, and Recycle), perspective of renewability, heat recovery, and recovery of marine plastics are important to avoid greenhouse gas emissions, preservation and effective use of fossil resources, and to prevent marine micro-plastic pollution.**

Non-Renewable and Renewable Resources

Type of Resource	Note	Specific example
Non-renewable resources	Resources that cannot be replenished on the human timescale.	**Fossil fuels**: Never returns to the original hydrocarbon forms on the human timescale. **Mineral resources**: Exhaustible because soon-to-be unavailable with current technology and economic level.
Renewable resources	Resources that can be considered as no depletion depending on their usage amounts	**Sunlight**: Energy emitted from the sun to the earth will last for over billions of years.
	Resources with actually no depletion considering usage amount and renewable amount.	**Biomass**: Plants produced through photosynthesis process using solar energy; i.e., non-depletable on the human time scale.

Herman Daly's Three Principles for Natural Resources Use

1. For renewable resources (soil, water, forest, fish), the rate of their uses must not be greater than the rate of regeneration.
2. For a nonrenewable resources (fossil fuel, high-grade mineral ore, etc.), the rate of their uses must not be greater than the rate at which alternative renewable resources can be exploited.
3. For a pollutant, the rate of its emission must not be greater than the rate at which the pollutant can be absorbed or rendered harmless by the environment.

Daly, H.E. (1990) Toward some operation principles of sustainable development, Ecological Economics, 2, 1-6

Plastic Resource Circulation Strategy

Basic Principal : “3R+Renewable”

Issued in June 2019 by Japan Government

Reduce	➢Reduce the amount of the one way plastic by mandatory charging of one way plastic bags ➢Development and utilization of alternatives for petroleum resource derived plastics
Reuse Recycle	➢Easy and efficient plastic collection and recycle system ➢Promote innovative recycling technologies
Recycled and Biomass Plastics	➢Promote technical innovations and support to build infrastructures ➢Stimulate demands for recycled plastics and biomass plastics by government green procurement

Milestones

<Reduce>

① Reduce 25% of the accumulated volume of one way plastics by 2030

<Reuse / Recycle>

② Reuse / recyclable designs by 2025

③ 60% of packages / containers to be recycled or reused by 2030

④ 100% utilization of used plastics by 2035

<Recycled Plastics / Biomass Plastics>

⑤ Utilization volume of recycled plastics to be doubled by 2030

⑥ Introduce 2 million tons of biomass plastics by 2030

Action against marine plastic waste

Both international and domestic action have been taken around the 2019 G20 in Japan

The plastic strategy

- Formulate a strategy which includes the goals for 3R of plastic waste, based on the 4th Fundamental Plan for Establishing a Sound Material-Cycle Society

International communication & action

- Basel Convention on the "Control of Unclean Plastic Waste"
- Collaboration with developing countries to reduce marine plastic waste globally
- Support action including plastic waste prevention in developing countries

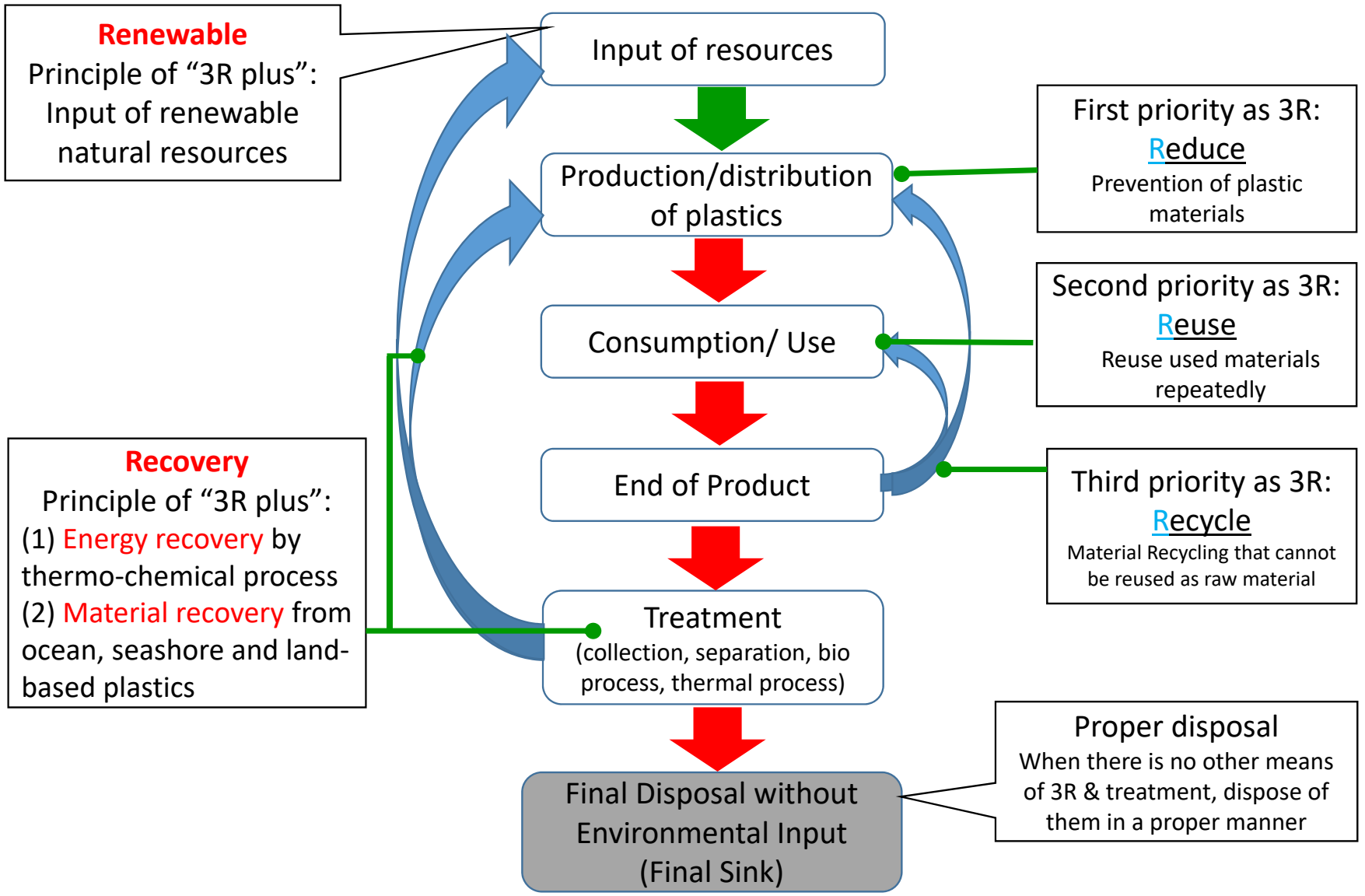
Basic policy on measures against marine litter

- Revise to accelerate the actions on monitoring, collection and treatment, prevention and international cooperation, based on the 2018 amendment of Marine Litter Act

Foster stakeholders action

- Raise awareness and encourage private sectors and municipalities to act
- Accelerate collection and treatment of marine litter and prevention measures through river basin areas

“3R plus” concept with renewable and recovery principles



The Overall Objective of 1st State of the 3Rs in Asia and the Pacific

- To assist the member countries in Asia and the Pacific for improved decision making towards effective implementation of **3Rs** and **circular economy** approaches at local and national level by improving data, information, and indicators availability in all waste sectors

- To contribute towards the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs)

About 1st State of the 3Rs in Asia and the Pacific

- Three objectives:

1) To develop synthesis and assessment report,
2) To compile data-relevant to monitor progress of the Hanoi 3R Declaration,
3) To contribute to the Regional 3R Forum in Asia and the Pacific

- Outcomes:

Developed a synthesis and status report to assess current status of 3R policy implementation in the region.

This project has developed 11 country reports and a regional report (Bangladesh, Cambodia, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, Thailand, Viet Nam, Pacific Island Countries) to inform the synthesis report.

About the 1st report

- By utilizing comparable measures for waste prevention, recycling, biomass utilization, marine plastics prevention, and e-waste management, in line with SDG 12, the report presents an assessment of progress made on waste and resource efficiency throughout Asia and the Pacific
- It defines 9 concrete recommendations towards further promotion of the 3Rs and Circular Economy in the region.

- In addition, to addressing emerging waste issues such as marine plastic pollution as well as E-waste as viewed through the lens of various policy responses,

About the 1st report

The report offers a cross-country examination and comparison of different waste categories and criteria illustrated through data visualization.

The report will be regularly updated with an aim to guide future policy discussions and monitoring on how 3R policies, strategies and actions aligned with SDG 12.

9 recommendations from 1st State of the 3Rs in Asia and the Pacific

1. The Regional 3R Forum's contributions to the participation countries for facilitating 3R policy dialogues and consolidating 3R policies and strategies **need to be sustained**.

2. Continued **focus on resource productivity and waste reduction measures** are highly recommended.

3. New and emerging waste streams (E-waste, marine litter and coastal plastic waste, micro plastics and food waste and loss issues) need to be addressed in the region

9 recommendations from 1st State of the 3Rs in Asia and the Pacific

4. Closing gaps between **institutional and investment needs (improved waste management)and opportunities (circular economy, sharing, ICT-use, re-use, product-service system, long-term goal of decarbonizatonand decoupling)** are strongly suggested.

5. Stakeholder engagement and **consensus-building-based policy making** need to be emphasized.

6.Special attention is required to address **specific challenges faced by small island countries and remote rural areas** in the region

9 recommendations from 1st State of the 3Rs in Asia and the Pacific

7. 3Rs need to **be highlighted as a part of the global sustainability agenda**(SDGs, SDG12, de-carbonization, planetary boundaries).

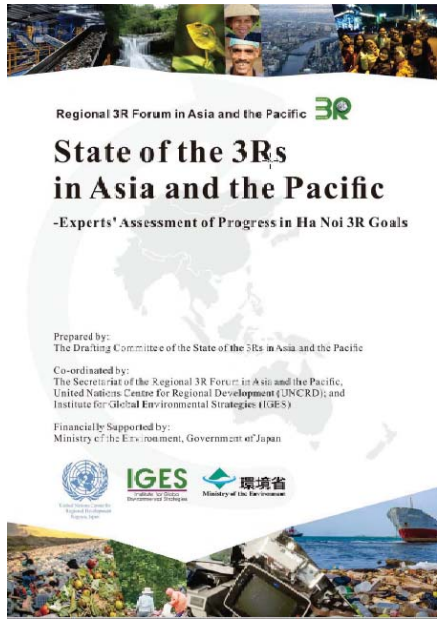
8. The Regional 3R Forum in Asia and the Pacific should be continued to **lead global policy debate on resource efficiency, circular economy, waste management and the 3Rs.**

9. Capacities for data management and evidence-based policy making need to be enhanced for continued progress on the 3Rs

Acknowledgement

- 12 country chapters were developed by country experts
- Drafting committee contributed by 34 experts on 3R policy and waste management in the region.
- Coordinated by UNCRD and IGES
- IGES has been a leading editor of the report
- Sponsored by Ministry of the Environment of Japan

Launch of the 1st State of the 3Rs



The 1st State of the 3Rs was officially launched during the 8th Forum, which was held in Indore, Madhya Pradesh, India from 9 to 12 April, 2018.

9 indicators in the 1st 3R State from the Hanoi 3R 33 goals

Goal 1: Reduction in the quantity of municipal solid waste generated

Goal 3: Recycling rate of recyclables (e.g., plastic, paper, metal, etc.)

Goal 9: Inventory of hazardous waste

Goal 11: Agricultural biomass waste management

Goal 12: Marine plastics

Goal 13: E-waste management

Goal 15: Extended producer responsibility (EPR)

Goal 17: Resource efficiency and resource productivity

Goal 18: Co-benefits for local air, water, oceans, and soil pollution and global climate change

Discussions on the Hanoi 3R Declaration's 33 goals

1. **Following three points should be discussed in addition to the 1st Status :**
   - **I. COVID-19 related issues & infectious waste management**
   - **II. Carbon neutralization challenges**
   - **III. Plastic resources management**
2. **the 2nd 3R&CE Status Report should target the following other nine important goals to be achieved.**
   1. Goal 2 & 10: These two aim to reduce food waste and food losses in food supply chain. The goals relate to SDG12 and the aims of proper reduction and recycling of food waste will have a great impact on human health and green house gas emission reduction.

Discussions on the Hanoi 3R Declaration's 33 goals (continued)

2. The 2nd 3R&CE Status Report should target the following other nine important goals to be achieved (Continued)

2. Goal 16 & 32: These two aim to improve health-care waste management and eliminate illegal engagement of children in the informal waste sector. The goals also relate to how to cope with the situation during the COVID-19 pandemic.
3. Goal 25 & 26: These two aims to eliminate illegal open dumping as a plastic measure and follow international laws, especially the Basel Convention.
4. Goal 4 & 31: These two aims to build sustainable cities and to promote "3R+ Return" concept in the Pacific region.
5. Goal 24: It is desirable that, at the earliest possible date, to improve the system of subsidies that favour unsustainable use of resources.

Other 9 important goals to be achieved in the Hanoi 3R 33 goals (1)

Goal 2: Full-scale utilization of the organic component of municipal waste, including food waste, as a valuable resource, thereby achieving multiple benefits such as the reduction of waste flows to final disposal sites, reduction of GHG emission, improvement in resource efficiency, energy recovery, and employment creation.

Goal 4: Build sustainable cities /green cities by encouraging “zero waste” through sound policies, strategies, institutional mechanisms, and multi-stakeholder partnerships (giving specific importance to private sector involvement) with a primary goal of waste minimization

Goal 10: Reduce losses in the overall food supply chain (production, post harvesting and storage, processing and packaging, distribution), leading to reduction of waste while increasing the quantity and improving the quality of products reaching consumers.

Goal 16: Promote the 3R concept in health-care waste management.

Goal 24: Phase out harmful subsidies that favour unsustainable use of resources (raw materials and water) and energy, and channel the freed funds in support of implementing the 3Rs and efforts to improve resource/energy efficiency.

Other 9 important goals to be achieved in the Hanoi 3R 33 goals (2)

Goal 25: Protect public health and ecosystems, including freshwater and marine resources by eliminating illegal activities of open dumping, including dumping in the oceans, and controlling open burning in both urban and rural areas.

Goal 26: Facilitate the international circulation of re-usable and recyclable resources as well as remanufactured products as mutually agreed by countries and in accordance with international and national laws, especially the Basel Convention, which contributes to the reduction of negative environmental impacts and the effective management of resources.

Goal 31: Promote 3R + “Return” concept which stands for Reduce, Reuse, Recycle and “Return” where recycling is difficult due to the absence of available recycling industriesand limited scale of markets in SIDS, especially in the Pacific Region.

Goal 32: Complete elimination of illegal engagement of children in the informal waste sector and gradually improve the working conditions and livelihood security, including mandatory provision of health insurance, for all workers.

Table of Content (TOC) of the 2nd State of the 3R&CE will be introduced by Mr. Mohanty

WEBINAR V:

17 DECEMBER 2020
(THURSDAY)

Scope and Coverage of The 2nd State of the 3R in Asia and the Pacific

Conclusions

- Human invented plastics almost a century ago. Now we have to consider how to control the use of plastics. We should address this issue on the basis of "3R Plus", that is, "Reduce, Reuse & Recycle" plus "Renewable & Recovery."
- Just like the 1st 3R Status Report, the 2nd 3R&CE Status Report should also focus on the nine goals and indicators. In short, these goals should be set as important basic milestones for realization of 3R & CE in Asia-Pacific region. Moreover, the 2nd 3R&CE Status Report should target the other nine important goals to be achieved.

3R International Scientific Conference

3RINCs2021 ONLINE

The 7th 3R International Scientific Conferece on Material Cycles and Waste Management

IMPORTANT DATES

Deadline for abstracts: 1 February 2021
Deadline for early registration: 5 March 2021
Conference: 11, 15-19th March 2021

WEBSITE: https://www.3rincs.org/ Facebook: https://www.facebook.com/3rincs

ORGANIZER: **Japan Society of Material Cycles and Waste Management (JSMCWM)**
CO-ORGANIZERS: Korean Society of Waste Management (KSWM)
Society for Solid Waste, Chinese Society for Environmental Sciences (SSW-CSES)
SUPPORTERS: UNEP (United Nations Environment Programme), UNCRD (United Nations Centre for Regional Development), JICA (Japan International Cooperation Agency), ISWA (International Solid Waste Association), IGES (Institute for Global Environmental Strategies), MOEJ (Ministry of the Environment, Government of Japan)

Japan Society of Material Cycles and Waste Management
JSMCWM