JEJU PLUS
INTERNATIONAL ENVIROMENT
FORUM 2023

KSTSF 국가생존기술연구회
Korea Society for Technology Sustainable Future
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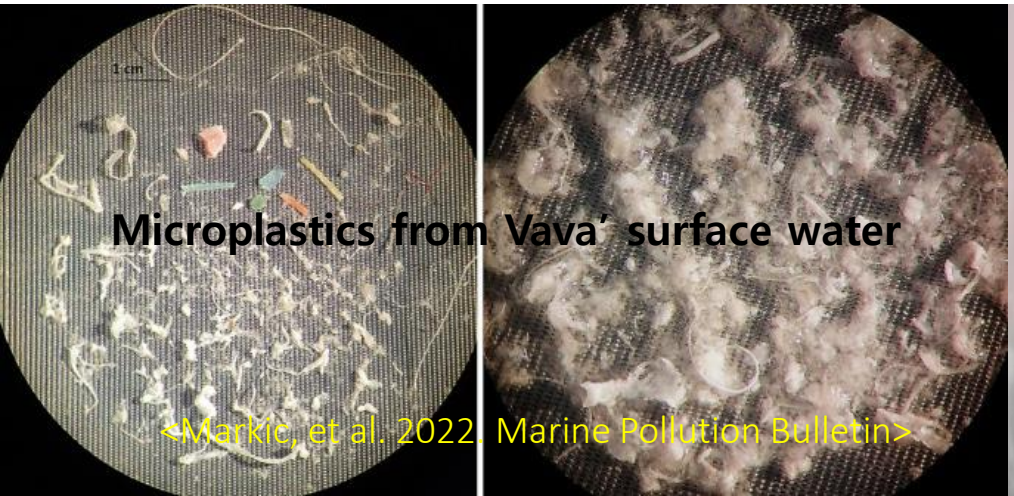
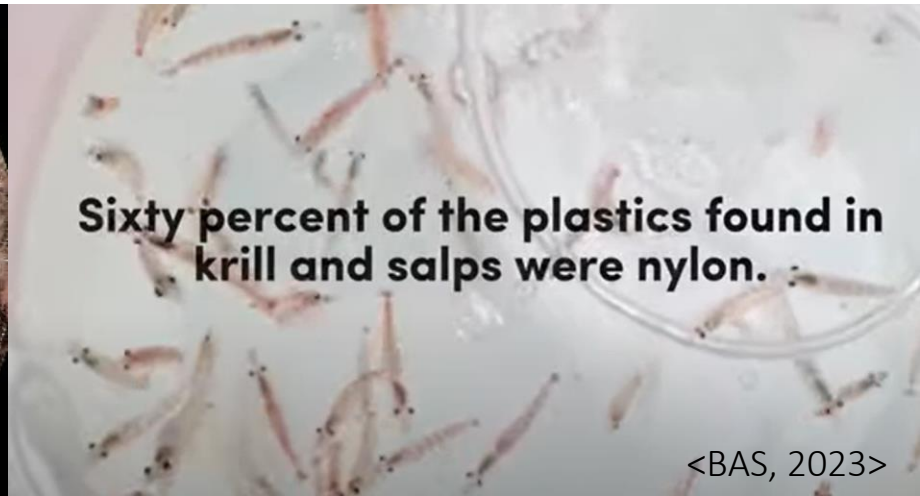
Marine Microplastic and Global Cooperation

2023. 09. 08

Hong Kum Lee

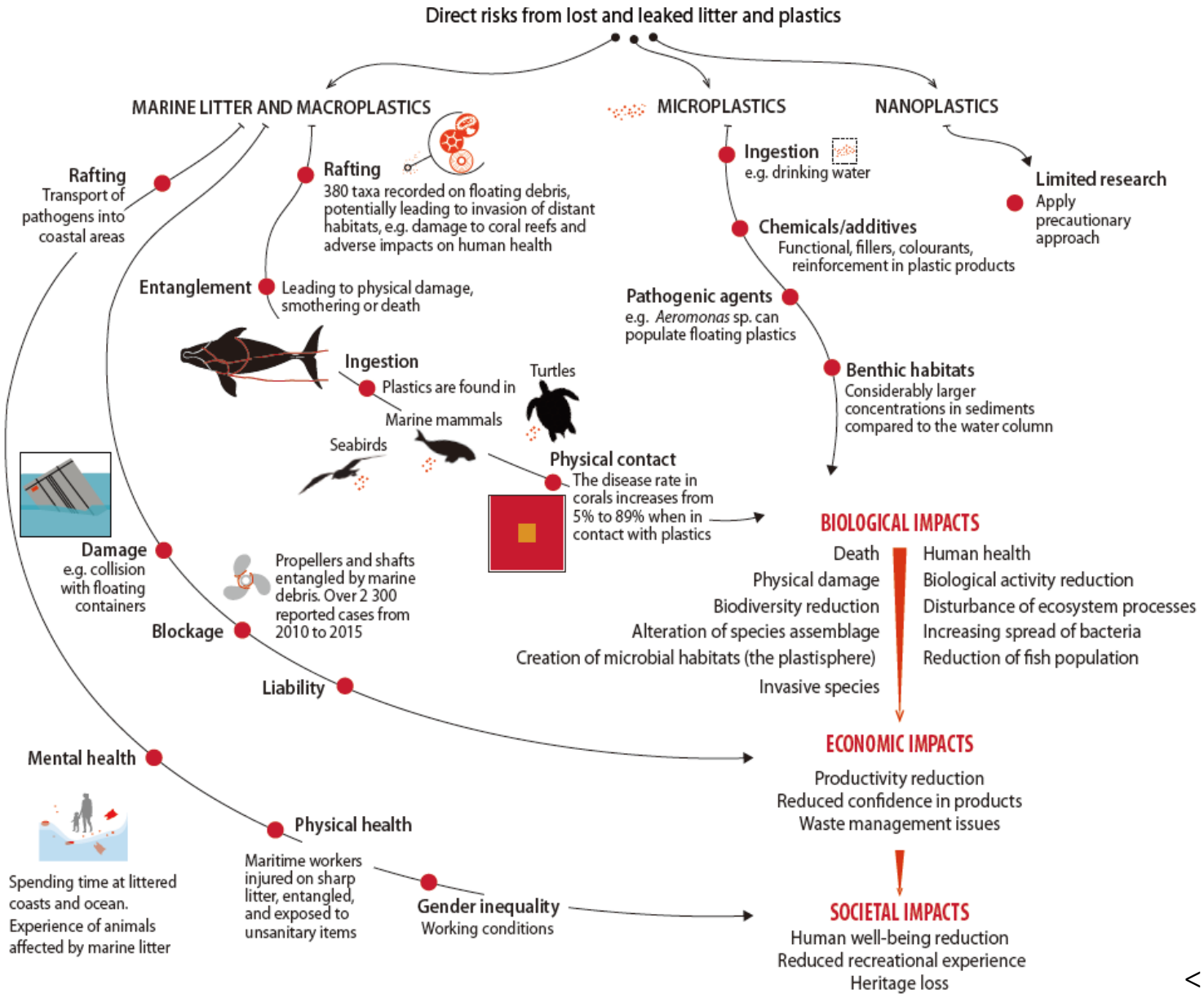


<Markic, et al. 2022. Marine Pollution Bulletin>



<BAS, 2023>

Direct risks and impacts of marine litter and plastics

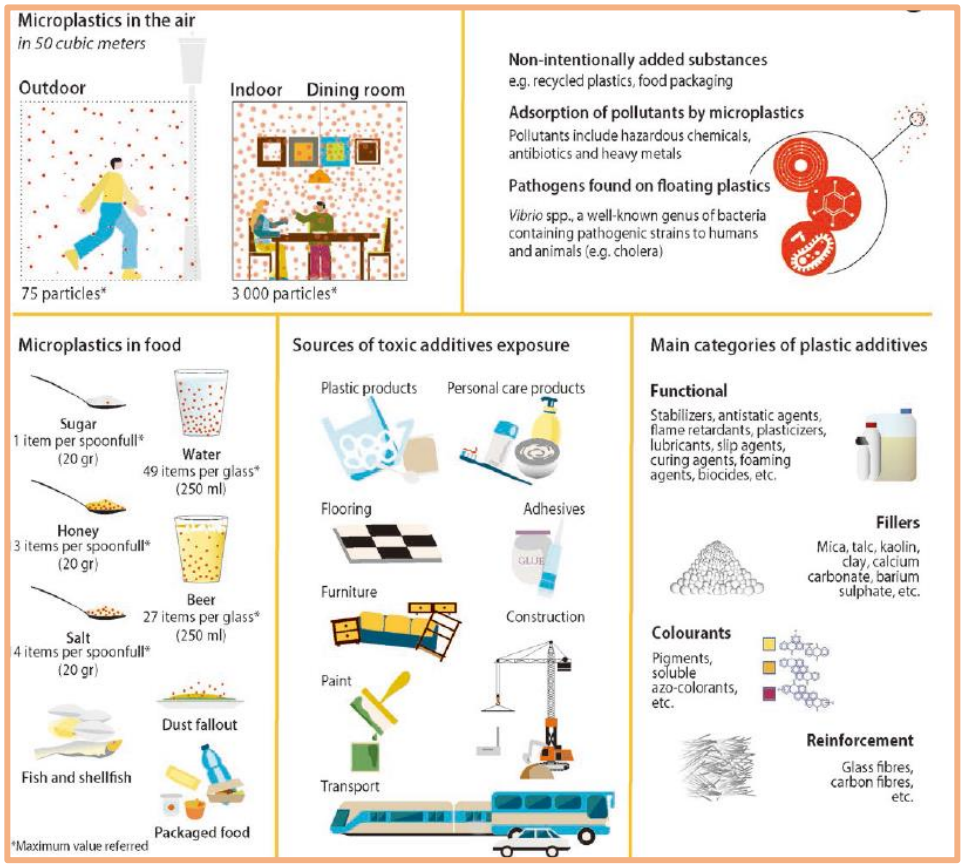


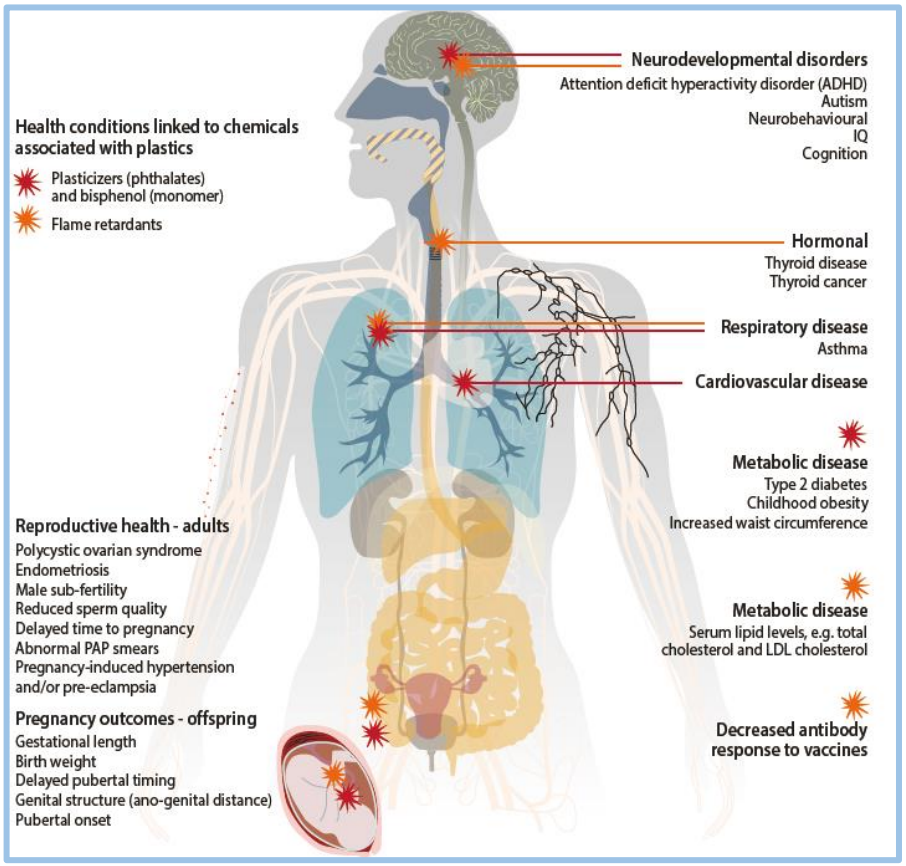
<UNEP, 2021>

Human health impacts of marine plastic waste

Human exposure to microplastic and nanoplastic particles

- **Inhalation per year** ~121 000 particles / 26~130 airborne microplastics per day
- **Ingestion per year** ~52 000 particles
- **Microplastics in an adult per year** ~163 000 particles





<UNEP, 2021>

Economic costs of plastic pollution

• Production • Consumption • Waste Management • Responses

► Prevention cost
- Municipal clean-up

► Remediation cost
- River clean-up
- Beach clean-up

► Damage cost
- Marine ecosystem services
- Recycling
- Agriculture
- Fisheries
- Marine tourism
- Marine transport

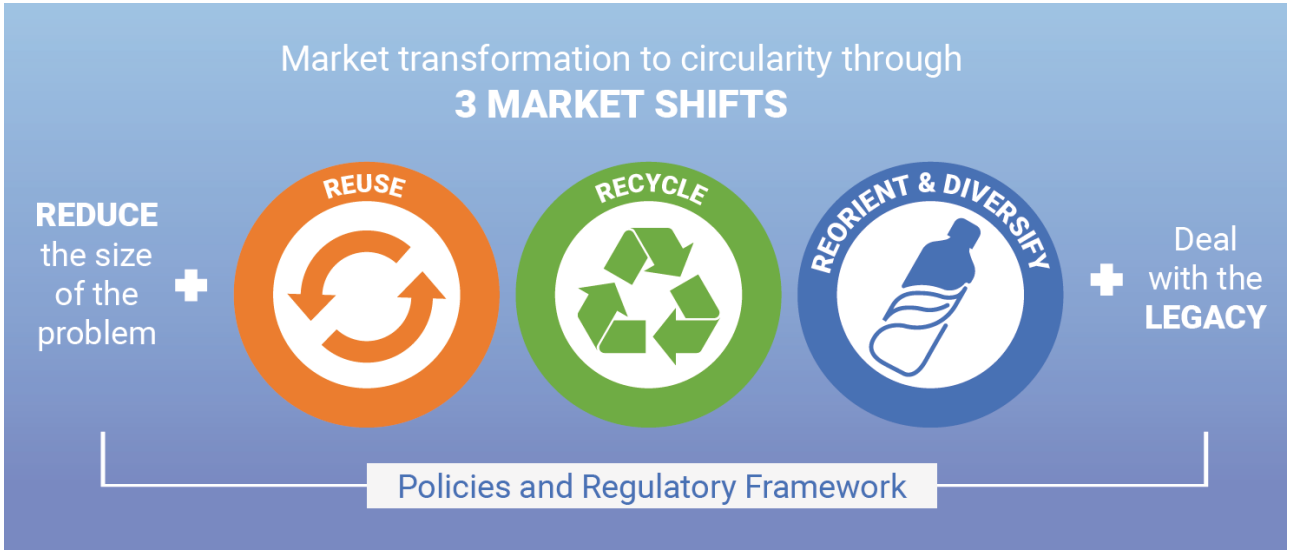
Responces

► Global goals
- Climate action
- Biodiversity protection
- Pollution prevention

► Assessment
- Monitoring
- Review of effectiveness

UN environment programme 50 1972-2022 | GRID ARENDAL A UNEP Partner | BASEL CONVENTION

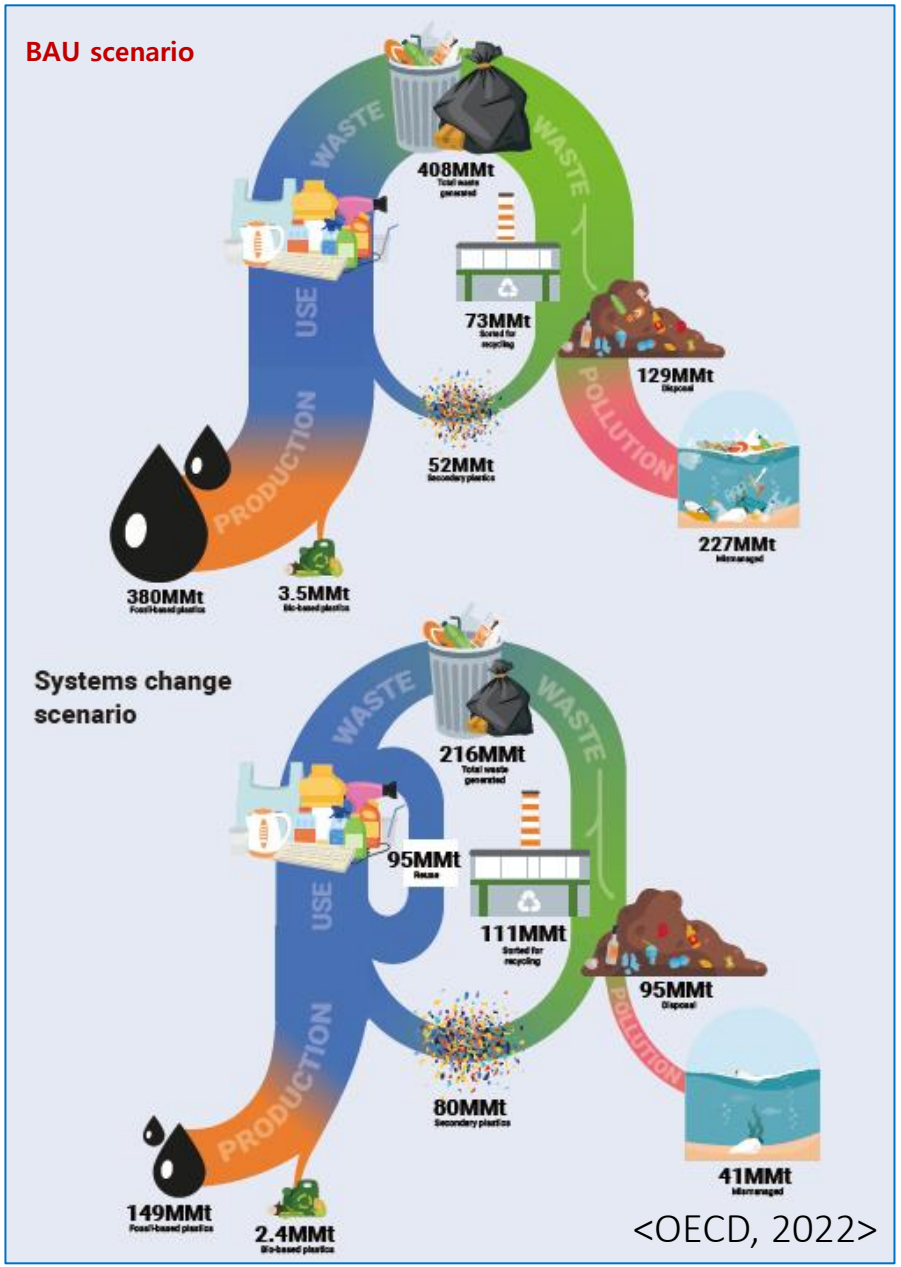
The systems change towards a new circular plastics economy



- ► Transformed plastic economy
  - • Creating Jobs, income and innovation:
    - 700,000 additional jobs
    - USD 1.3 trillion (10.3%) savings in direct public and private costs 2021~2040
  - • Reducing damage to human health and the environment
    - reducing exposure through 80% reduction of plastic pollution
    - 0.5 Gt CO2-q GHG emissions prevented annually
    - USD 3.3 trillion of environmental an social cost 2021~2040
  - • Reducing liabilities, risks and ligation
- ► Saving USD 4.5 trillion,
  20.3% reduction in direct, environment and social costs

<UNEP, 2023>

Modelled plastic flows of short-lived plastic in 2040



<OECD, 2022>

- the world produces 430 MMt of plastics each year
- over two-thirds are short-lived products which soon become waste
- 139 MMt in 2021 after one single use
- Plastic production is set to triple by 2060
- 19% of global GHG emissions

- increasing the flows of materials that are reused or recycled into the economy to 27% of the total
- the outflow of mismanaged plastic waste ending in the environment decreases by over 80%

Research and development

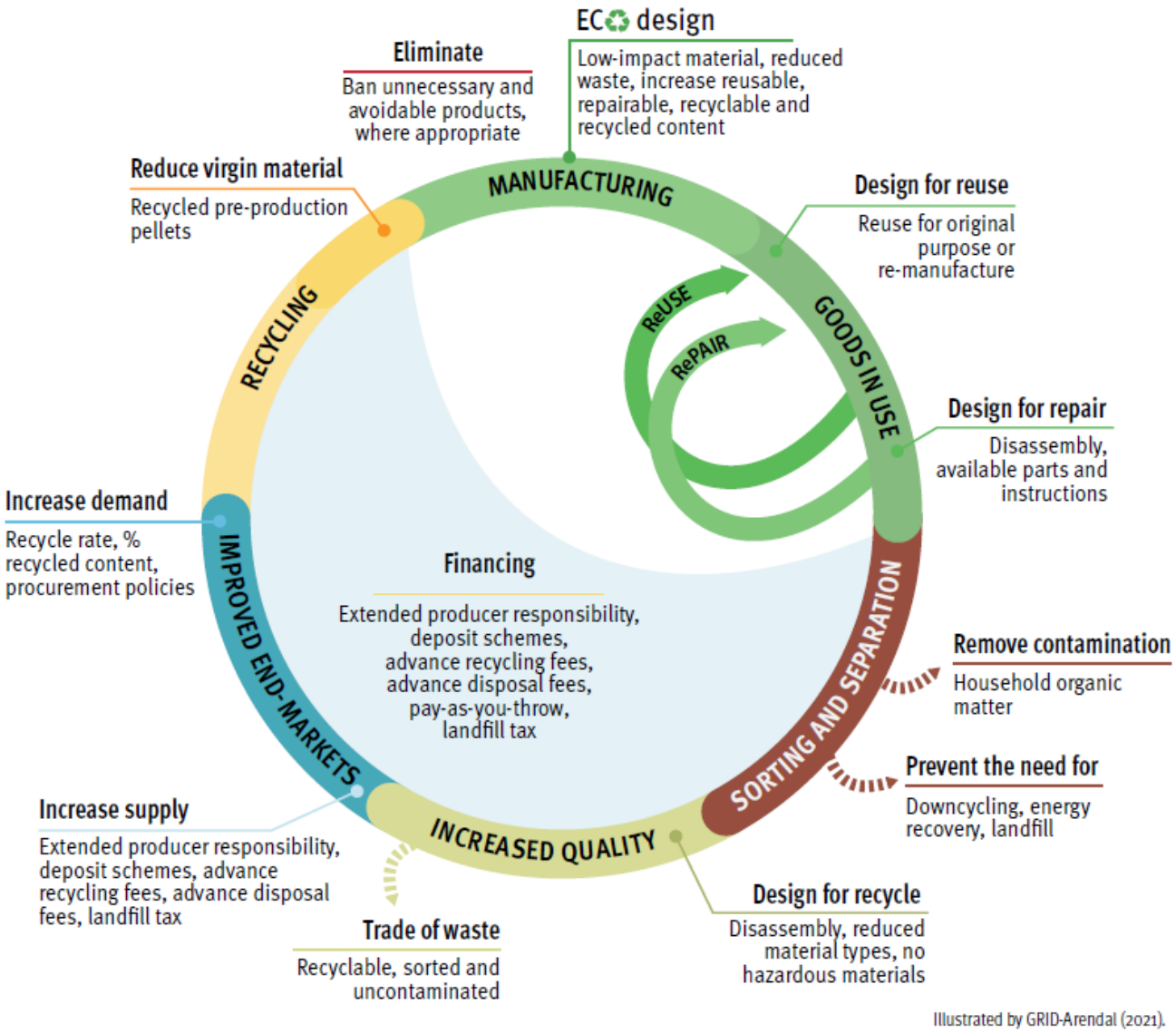
Key topics by UNEP 2016

- The properties of plastics
- Sources and pathways of marine litter
- Distribution and fate: factors controlling degradation, biodegradable products
- Monitoring: development and use of harmonized monitoring techniques, automated technologies, modelling for movement & deposition
- Impacts on biota and risks for food webs and human consumption
- Social impacts and behavioural drivers & consumer perceptions
- Economic impacts, new governance, decision-making
- Risk assessment
- Reducing the use
- Recycling

Future research priorities

- The full life cycle for key plastic products
- Informatics and harmonized monitoring frameworks
- Indicators to monitor the plastic reduction
- Green chemistry innovation to develop alternative polymers and to minimize the use of additives
- Ecodesign principles and cost road maps
- Waste and recycling technologies
- Standards for plastic certification
- Policy research, Assessment of social issues
- Literacy and educational programmes
- Behavioural economics

National policies towards circularity



Global responses and initiatives

- UNGA(UN General Assembly)
  - Lost or discarded large-scale pelagic driftnets, Waste management (1989)
  - Recycling, reuse, reduction, economic incentives (2008)
  - Negative effects on Oceans & marine biodiversity by plastics (2015)
- UNEA(UN Environment Assembly)
  - UNEP input to the GPML (2017)
  - Circularity, Science & technological knowledge, Data & information (2019)
  - Osaka Blue Ocean Vision : marine plastic liter to zero by 2050 (2019)
- Pollution prevention and protection

  Basel Convention, Stockholm Convention, UN Convention on the Law of the Sea, MARPOL Annex V, London Convention, London Protocol, Global Program of Action, Regional Seas Action Plans, SACIM
- Biodiversity & species

  Convention on Biological Diversity, Convention on Migratory Species, UN Fish Stocks Agreements, FAO Code of Conduct for Responsible Fisheries

The Global Partnership on Marine Litter (GPML)

- Launched at UN Conference on Sustainable Development(Rio+20) in 2012
- Platform for cooperation and coordination/ development of Digital Platform
- private sector, civil society, NGOs, regional bodies
- Objectives:
  - reducing the leakage of plastics into the ocean through improved design
  - the application of the 3Rs principle (reduce, reuse, recycle)
  - encouraging closed-loop systems
  - maximization of resource efficiency
  - minimization of waste generation

Intergovernmental Negotiating Committee (INC) on Plastic pollution

- **develop an International Legally Binding Instrument(ILBI) on plastic pollution**
- UNEA established Ad Hoc Expert Group(AHEG) on marine litter and microplastic in 2017, Nairobi, Kenya
- Ministerial Conference on Marine Litter an Plastic Pollution in 2021
- Open-ended Working Group(OEWg): 29 May – 1 June 2022, Dakar, Senegal
- INC-1: 29 November – 2 December 2022, Punta del Este, Uruguay
- INC-2: 29 May – 2 June 2023: convened at the UNESCO to continue discussions on the rules of procedure (RoP), mandating open-ended consultations to solve outstanding issues.
- INC-3: 13 – 17 November 2023, Nairobi

A selection of data coordination, collection, repository and portal initiatives

Their geographical range, activities and application areas

		GEOGRAPHICAL RANGE	ACTIVITIES	APPLICATION AREA	INCLUDES CITIZEN SCIENCE
MARINE LITTER ACTION COORDINATION					
GPML	*Global Partnership on Marine Litter*	*Worldwide*			yes
GEOSS	*Global Earth Observation System of Systems' Platform*	*Worldwide*			-
-	*Living Atlas of the World*	*Worldwide*			yes
ODIS	*IOC Ocean data and information system*	*Worldwide*			-
ODP	*Ocean Data Platform*	*Worldwide*			yes
MDMAP	*NOAA Marine Debris Monitoring and Assessment Project*	*US west coast, Worldwide*			yes
MSFD	*Marine Strategy Framework Directive - EMODnet*	*European waters*			-
EMODnet	*European Marine Observation and Data Network*	*European waters*			-
SeaDataNet	*Pan-European infrastructure for ocean & marine data management*	*European waters*			-
DATA COLLECTION FRAMEWORKS					
TIDE	*Trash Information and Data for Education and Solution*	*Worldwide*			yes
-	*LITTERBASE*	*Worldwide*			yes
GGGI	*Global Ghost Gear initiative - database and app*	*Worldwide*			yes
-	*Resource Watch*	*Worldwide*			yes
MEDITS	*International bottom trawl survey in the Mediterranean*	*Mediterranean*			-
LARGE-SCALE DATA REPOSITORY/PORTAL INITIATIVES					
COASST	*Coastal Observation and Seabird Survey Team - Marine Debris*	*US*			yes
-	*Deep-sea Debris Database - JAMSTEC**	*Pacific & Indian Oceans*			-
AMDI	*Australian Marine Debris initiative database*	*Pacific, Oceania*			yes
DOME	*DOME (Marine Environment) data portal - an ICES data portal*	*European waters*[1]			-
DATRAS	*The Database of Trawl Surveys - an ICES data portal*	*European waters*[1]			-
-	*Marine LitterWatch*	*European waters*			yes

ACTIVITIES[2]

- Data acqusition
- Collection/compilation
- Analysis
- Coordination

APPLICATION AREA[2]

- Beach
- Water column
- Biological - ingested plastic
- Shoreline
- Sea floor
- Inland water bodies

* Japan Agency for Marine-Earth Science and Technology

[1] Baltic Sea, Skagerrak, Kattegat, North Sea, English Channel, Celtic Sea, Irish Sea, Bay of Biscay and the eastern Atlantic from the Shetlands to Gibraltar

[2] Including but not limited to

<UNEP, 2021>

Networks and Initiatives

futurearth
Research. Innovation. Sustainability.

OCEAN KNOWLEDGE ACTION NETWORK

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

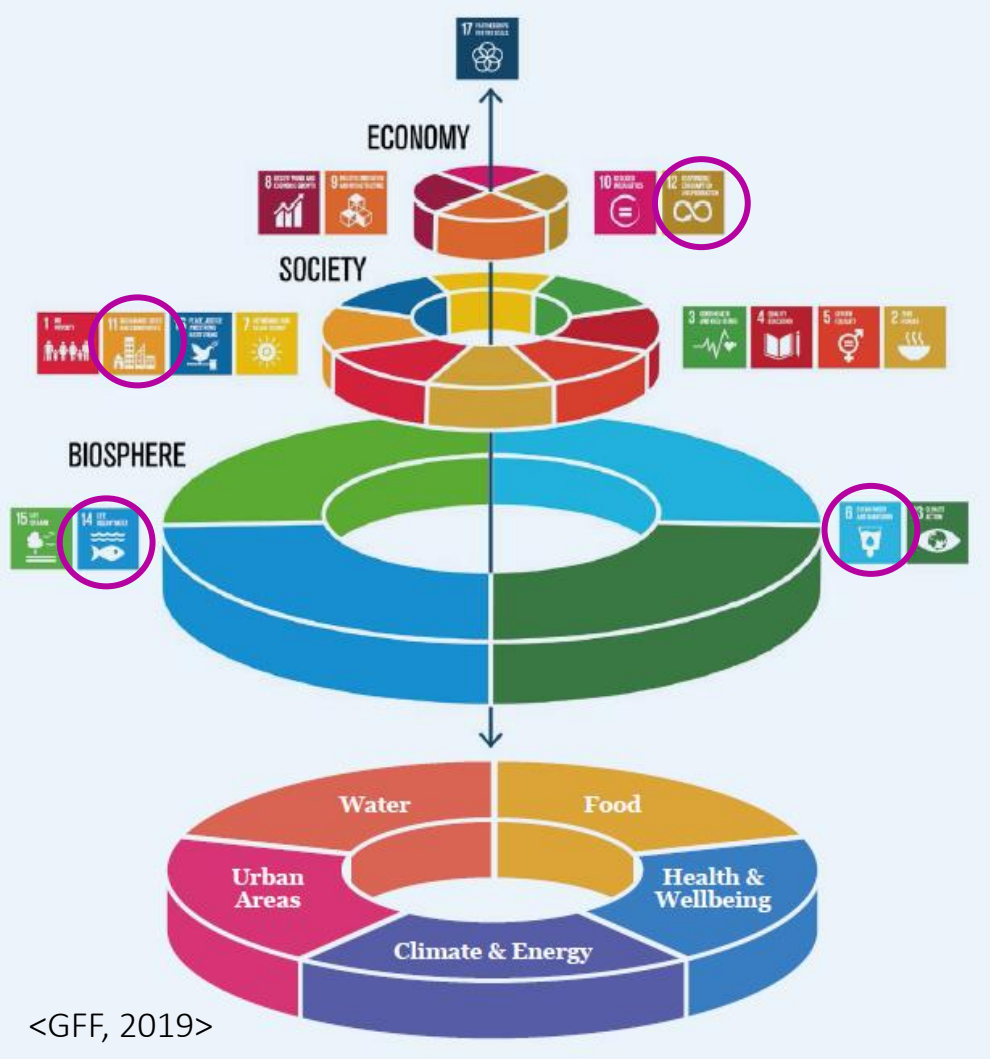
ALLIANCE TO END PLASTIC WASTE

MOONSHOT
RESEARCH & DEVELOPMENT PROGRAM

enzycle

bottle
changing the way we recycle™
U.S. DEPARTMENT OF ENERGY

Sustainability, Circular Economy, and S&T



<GFF, 2019>

Five Missions integrating 17 SDGs

Food
Waters
Health & Wellbeing
Urban Areas
Climate & Energy

Sustainable Future Environment depending on resilience of

SDG 6 Water
SDG 13 Climate Change
SDG 14 Life under Water
SDG 15 Life on Land

Marine Microplastic

- SDGs 6 (Clean Water and Sanitation)
- 11 (Sustainable Cities and Communities)
- 12 (Responsible Consumption and Production)
- 14 (Life Below Water)

Thanks!

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water energy resources food security population disaster