14.7 Comparison of ecological and environmental impacts

Research on the ecological and environmental impacts from marine plastics in the region as a whole can be divided into the following focus areas:

- Direct ingestion and accumulation that limit food intake and sometimes survival or result in the release of toxic plastic-associated contaminants leachates (e.g. DDT or PCB);
- Direct physical impact on marine biota, such as entanglement and laceration, sometimes leading to the death of marine organisms;
- Uptake and accumulation through the respiratory/branchial system and subsequent blockage;
- Uptake and transfer through the food chain; and
- Changes in microbial assemblages.

Another category of research occurs in a laboratory setting, with experimental studies of physiochemical impacts of polymers (i.e. size, shape, type, concentration, etc.) on living organisms.

Table 1.2.14.12 below shows how different countries tend to focus on different types of impacts, with none of the countries having published in all six research areas. Two research areas are particularly understudied:

- Changes in microbial assemblages; and
- Trophic transfer (through the food chain).

Two other areas are the subject of very few studies:

- Branchial uptake of plastic; and
- Plastic entanglement of marine life.

Table 1.2.14.12. Ecological and environmental impacts researched in the ASEAN+3.
Legend: Red = 0 articles; Yellow = 1-9 articles; Light-green = 10-20 articles; Green = >20 articles.

	BRN	KHM	IDN	MYS	MMR	PHL	SGP	THA	VNM	CHN	ROK	JPN	Total
Ingestion of plastic in the wild	0	0	10	9	0	8	0	4	0	26	5	8	70
Branchial uptake of plastic in the wild	0	0	1	1	0	0	0	0	0	2	0	0	4
Entanglement of plastics in the wild	0	0	0	0	0	2	4	0	0	0	1	0	7
Changes in microbial assemblages	0	0	0	0	0	0	1	0	0	0	0	0	1
Experimental studies of physicochemical impacts	0	0	1	0	0	0	1	0	0	12	6	0	20
Trophic transfer of plastic	0	0	0	0	0	0	1	0	0	1	0	0	2

Further study of the large body of publications on ingestion of plastic by marine organisms shows a clear preference for commercially exploited species such as fish and bivalves, and a rare interest in the impact on endangered migratory species despite the important coverage of these species in social media (Table 1.2.14.13). This may be partly explained by the fact that most of such studies require dissecting or washing the guts out of the animals, which is costlier and more time-consuming for larger mammals. However, further research may remedy this imbalance.

Table 1.2.14.13. Biota examined for plastic ingestion.
Legend (for total): Yellow = 1-9 articles; Light-green = 10-20 articles; Green = >20 articles.

	IDN	MYS	PHL	THA	CHN	ROK	JPN	Total
Bony Fish	6	4	2	1	14	0	1	28
Bivalves	3	1	2	2	8	1	0	17
Birds	0	0	0	0	1	1	4	6
Echinoderms	1	1	0	0	2	0	0	4
Zooplankton	0	1	0	0	2	1	0	4
Crabs, Shrimps, and Amphipods	0	0	0	0	2	0	1	3
Cetaceans	0	0	1	0	2	0	0	3
Gastropods	1	0	0	1	0	0	0	2
Sharks and Rays	1	0	0	1	0	0	0	2
Turtles	0	1	1	0	0	0	0	2
Corals	0	0	0	0	1	0	0	1
Polychaetes	0	0	0	0	0	1	0	1
Barnacles	0	0	0	1	0	0	0	1